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Department of Defense  
OFFICE OF PREPUBLICATION AND SECURITY REVIEW

## **Selected Acquisition Report (SAR)**



# **Global Positioning System III Follow-On Production (GPS IIIF)**

**FY 2024 President's Budget**

**Defense Acquisition Visibility Environment  
(DAVE)**

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## Common Acronyms and Abbreviations

\$B - Billions of Dollars  
\$K - Thousands of Dollars  
\$M - Millions of Dollars  
ACAT - Acquisition Category  
Acq O&M - Acquisition-Related Operations and Maintenance  
ADM - Acquisition Decision Memorandum  
APB - Acquisition Program Baseline  
APPN - Appropriation  
APUC - Average Procurement Unit Cost  
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  
FMS - Foreign Military Sales  
FOC - Full Operational Capability  
FRP - Full Rate Production  
FY - Fiscal Year  
FYDP - Future Years Defense Program  
ICE - Independent Cost Estimate  
Inc - Increment  
IOC - Initial Operational Capability  
JROC - Joint Requirements Oversight Council  
KPP - Key Performance Parameter  
LRIP - Low Rate Initial Production  
MDA - Milestone Decision Authority  
MDAP - Major Defense Acquisition Program  
MILCON - Military Construction  
N/A - Not Applicable  
O&M - Operations and Maintenance  
O&S - Operating and Support  
ORD - Operational Requirements Document  
OSD - Office of the Secretary of Defense  
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  
U.S. - United States  
UCR - Unit Cost Reporting  
USD(A&S) - Under Secretary of Defense (Acquisition and Sustainment)  
USD(AT&L) - Under Secretary of Defense (Acquisition, Technology and Logistics)

## Program Information

### Program Name

Global Positioning System III Follow-On Production (GPS IIIF)

### DoD Component

Air Force

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## Responsible Office

### Program Manager

**Name:** Col Jung Ha

**Date Assigned:** April 22, 2022

**Address:** 483 N. Aviation  
El Segundo, CA 90245

**Phone:** (310) 653-3211

## Mission and Description

The Global Positioning System (GPS) is a satellite-based radio navigation system that provides worldwide military and civil users satellite signals that they can process to determine accurate position, velocity, and time. GPS III Follow-On (GPS IIF) is an Acquisition Category IB program that, in concert with the GPS III program, comprises the next generation of space vehicles (SVs) that provide significant enhancements to modernize the constellation originally delivered under the Navstar GPS program. GPS IIF, will deliver GPS III satellites beyond the first ten SVs being delivered by the GPS III program. The primary GPS IIF missions are worldwide positioning, navigation, and precise time transfer. GPS provides strategic and tactical support to the following DoD missions: Joint Operations by providing capabilities for Position, Navigation and Timing (PNT); Command, Control, Communications, and Intelligence; Special Operations; Military Operations in Urban Terrain; Defense-Wide Mission Support; Air Mobility; and Space Launch Orbital Support. The GPS IIF satellites will maintain the same capabilities as the GPS III satellites, but will also deliver significant enhancements to include: Regional Military Protection (RMP) capabilities that provide the ability to deliver high-power regional M-Code signals in specific areas of intended effect, Unified S-Band (USB) interface compliance, and integration of hosted payloads (redesigned Nuclear Detonation Detection System (NDS), Laser Retro-reflector Arrays (LRAs), Search and Rescue/GPS (SAR/GPS), Energetic Charged Particles (ECP) sensor). Consistent with the GPS III programs support for military users, the GPS IIF program provides Precise Positioning Service (PPS) to military operations and force enhancement. It also provides increased anti-jam power to the earth coverage Military code signals and anti-exploitation techniques in order to prevent unauthorized use of the GPS PPS signal. In addition, the program will support the U.S. Nuclear Detonation Detection System mission for worldwide monitoring and detection of nuclear events, as well as the international Cospas-Sarsat Search and Rescue mission for detection and location of emergency beacons, both via a hosted payload. The GPS IIF program provides a Standard Positioning Service to a broad spectrum of civil users which will include the four civil signals (L1 C/A, L1C, L2C, and L5) flown on GPS III satellites. The L1C signal is compatible with the European Galileo satellite navigation system signal, E1. L1C is also compatible with those signals planned for broadcast on Japan's Quasi-Zenith Satellite System, a system meant to augment GPS services. This common civil signal will be jointly broadcast by up to 60 satellites from both GPS and Galileo constellations, further increasing the accuracy and availability of user PNT solutions. The program also benefits the civil community by hosting laser retroreflectors, used to refine the International Terrestrial Reference Frame, and particle sensors, used for space-based environmental monitoring. The GPS IIF SVs build upon the GPS III program's approach to rapidly and affordably respond to warfighter capability requirements. The GPS IIF program will also execute Space Modernization Initiative (SMI) efforts that focus on space vehicle affordability, capability and addresses future requirements and resiliency needs. The Air Force is using its research laboratories to mature mission related capabilities, technologies (advanced clocks, amplifiers, crosslinks, etc.), and inform future PNT architectures.

## Executive Summary

### GPS IIF

#### Program Highlights Since Last Report

The GPS IIF program is on track to meet cost, schedule, and performance objectives, but with increased risks to the program since the last SAR. There have been impacts to cost and schedule due to manufacturing, hardware, and delivery delays. There have also been manpower and supply chain issues due to inflation and industry impacts that have increased pressures on the cost and schedule performance. Cost Performance Index (CPI) is below .95 due to technical and staffing challenges. CPI trend has improved to .94 as of the end of December 2022, and the contractor continues to identify opportunities to improve cost performance. Schedule performance improvement initiatives continue to be implemented through schedule risk assessments and reviews.

Additionally, Congressional marks created disconnects with cyber testing with OCX 3F adding risk to program certification (passing Initial Operational Capability, Full Operational Capability, and Information Assurance Certification) and Regional Military Protection (RMP) functionality development.

#### Significant Accomplishments:

The United States Space Force (USSF) exercised its third production option valued at approximately \$744 million for the procurement of three additional GPS IIF satellites, from Lockheed Martin on October 27, 2022. This contract option is for GPS IIF Space Vehicles (SVs) 18, 19, and 20. As of today, ten GPS IIF SVs (11-20) are ordered and proceeding as planned. Of the SVs with APB milestones (11, 12, 13, 16), all are currently scheduled to deliver two years prior to their APB thresholds.

As a result of the accelerated procurement schedule, the USSF removed previously planned procurement of two SVs in the FY 2024 Budget Cycle. The FY 2024 re-phasing in procurement will create the right sized buy profile to end procurement in FY 2030 as originally planned. The GPS IIF program office will resume planned procurements of two SVs each year starting in FY 2025.

GPS IIF conducted an Independent Program Assessment (IPA) to analyze execution of the program and provide recommended actions for improvement in CY 2021. The program office has validated implementation plans for all accepted recommendations in September 2021. All IPA recommendations are completed as of end-of-month October 2022.

GPS IIF Non-Flight Satellite risk reduction testbed Enhanced Remote Interface Unit module was delivered on July 5, 2022; this is first of its kind for GPS program (common with Next-Gen Geosynchronous Earth Orbit program and more producible product).

GPS IIF program also successfully completed Hardware Acceptance Review for the GPS Non-Flight Test Bed Mission Data Unit on October 10, 2022, and L3Harris delivered it to Lockheed Martin on October 13, 2022.

Linearized L1 RMP Traveling Wave Tube Amplifier (LTWTA) was delivered on December 14, 2022. This is one of the critical path drivers; completing this milestone reduces schedule risk and proves out LTWTA manufacturing process (brought in-house on GPS IIF) for SVs 11 through 15.

NOTE: Some of the Significant Accomplishments and Issues for this program are Controlled Unclassified Information (CUI) and have been removed per paragraph (i) of title 10 United States Code 4351 which required the SAR be submitted without any designation relation to dissemination control.

<b>History of Significant Developments Since Program Initiation</b>	
History of Significant Developments Since Program Initiation	
<b>Date</b>	<b>Significant Development Description</b>
Oct - 2022	Contract modified to add Procurement SVs 18, 19, and 20.
Oct - 2021	Contract modified to add Procurement SVs 15, 16, and 17.
Aug - 2021	Enterprise Test and Evaluation Master Plan Revision C received OSD Director, Operational Test and Evaluation approval.
Oct - 2020	Contract modified to add SV 13 and 14 procurement.
Jul - 2020	GPS IIIIF Milestone C certification and updated APB approval.
Mar - 2020	GPS IIIIF CDR completed.
Nov - 2019	Successfully held the Navigation Payload Element CDR.
Mar - 2019	GPS IIIIF initiated the Critical Design Review (CDR) campaign for the baseline technical design.
Mar - 2019	The program completed the initial Integrated Baseline Review for the scope awarded in September 2018.
Sep - 2018	GPS IIIIF awarded a competitively-procured contract on September 26, 2018 to Lockheed Martin Space. The Fixed Price Incentive/Award Fee contract includes non-recurring engineering, satellite simulators, and SV 11-12.
Sep - 2018	The GPS IIIIF program obtained Milestone B certification and APB approval on September 12, 2018.
Aug - 2018	GPS IIIIF Service Cost Position (SCP) approved.
Mar - 2018	GPS IIIIF Capability Development Document (CDD) approved.



## Schedule

### GPS IIIF

Events	Milestone Baseline Objective	Current Baseline Objective/Threshold		Current Estimate/Actual	Deviation
GPS IIIF Milestone B	Sep 2018	Sep 2018	Sep 2018	Sep 2018	
GPS IIIF Critical Design Review	Mar 2020	Mar 2020	Mar 2020	Mar 2020	
GPS IIIF Milestone C	Dec 2020	Dec 2020	Jun 2021	Jul 2020	
GPS IIIF SV11 AFL	Jan 2028	Jan 2028	Jul 2028	Feb 2026	
GPS IIIF SV12 AFL	Oct 2028	Oct 2028	Apr 2029	Jun 2026	
GPS IIIF SV13 AFL	Oct 2029	Oct 2029	Apr 2030	Aug 2026	
GPS IIIF SV16 AFL	Oct 2030	Oct 2030	Apr 2031	Feb 2028	
GPS IIIF SV22 AFL	Oct 2032	Oct 2032	Apr 2033	Oct 2032	

#### Schedule Note

The following schedule events were added with approval of the July 14, 2020 APB: GPS IIIF Space Vehicles (SV)13 Available for Launch (AFL), GPS IIIF SV16 AFL, and GPS IIIF SV22 AFL.

GPS IIIF SV12 AFL Current Estimate changed from August 2026 to June 2026 to correct a clerical error in previous SAR.

GPS IIIF SV13 AFL Current Estimate changed from October 2026 to August 2026 to correct a clerical error in previous SAR.

## Performance

### GPS IIIIF

Performance Characteristics				
Milestone Baseline	Current Baseline Objective/Threshold	Demonstrated Performance	Current Estimate/Actual	Deviation
<b>(KPP) - Availability of Position Accuracy (5.2.2)</b>				
N/A	The GPS III Follow-on SVs and Control Segment shall provide Availability of Accuracy in the terrestrial service volume with UE as described in Section 5 [of the GPS IIIIF CDD]	(T=O) The GPS III Follow-on SVs and Control Segment shall provide Availability of Accuracy in the terrestrial service volume with UE as described in Section 5 [of the GPS IIIIF CDD]	TBD	The GPS III Follow-on SVs and Control Segment shall provide Availability of Accuracy in the terrestrial service volume with UE as described in Section 5 [of the GPS IIIIF CDD]
<b>(APA) - Availability of Time Transfer Accuracy (5.2.5)</b>				
N/A	The GPS III Follow-on satellites and Control Segment shall provide Availability of Dynamic and Static Time Transfer Accuracy with UE described in Section 5 [of the GPS IIIIF CDD].	(T=O) The GPS III Follow-on satellites and Control Segment shall provide Availability of Dynamic and Static Time Transfer Accuracy with UE described in Section 5 [of the GPS IIIIF CDD].	TBD	The GPS III Follow-on satellites and Control Segment shall provide Availability of Dynamic and Static Time Transfer Accuracy with UE described in Section 5 [of the GPS IIIIF CDD].
<b>(KPP) - Satellite Availability</b>				
N/A	0.984	(T=O) 0.984	TBD	0.984

**(KPP) - Backward Compatibility (5.2.1)**

N/A	All modifications made to the existing GPS Space Segment and Control Segment shall allow continued operation of existing IS-GPS-200, IS-GPS-700, IS-GPS-705, IS-GPS-800, and SS-GPS-001 compliant UE and continued operation of legacy receivers (to include Federal augmentation system receivers) IAW performance meeting the Acquisition Program Baseline, Precise Positioning Service Performance Standard and GPS Standard Positioning Service Performance Standard, and Federal augmentation system specifications for the Local Area Augmentation System, Wide Area Augmentation System, Nationwide Differential GPS, and Maritime Differential GPS	(T=O) All modifications made to the existing GPS Space Segment and Control Segment shall allow continued operation of existing IS-GPS-200, IS-GPS-700, IS-GPS-705, IS-GPS-800, and SS-GPS-001 compliant UE and continued operation of legacy receivers (to include Federal augmentation system receivers) IAW performance meeting the Acquisition Program Baseline, Precise Positioning Service Performance Standard and GPS Standard Positioning Service Performance Standard, and Federal augmentation system specifications for the Local Area Augmentation System, Wide Area Augmentation System, Nationwide Differential GPS, and Maritime Differential GPS	TBD	All modifications made to the existing GPS Space Segment and Control Segment shall allow continued operation of existing IS-GPS-200, IS-GPS-700, IS-GPS-705, IS-GPS-800, and SS-GPS-001 compliant UE and continued operation of legacy receivers (to include Federal augmentation system receivers) IAW performance meeting the Acquisition Program Baseline, Precise Positioning Service Performance Standard and GPS Standard Positioning Service Performance Standard, and Federal augmentation system specifications for the Local Area Augmentation System, Wide Area Augmentation System, Nationwide Differential GPS, and Maritime Differential GPS	
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**(KPP) - Position and Time Transfer Integrity (5.2.4)**

N/A	The GPS III Follow-on satellite shall not transmit MSI to the user with a probability greater than 0.0001 per hour	(T=O) The GPS III Follow-on satellite shall not transmit MSI to the user with a probability greater than 0.0001 per hour	TBD	The GPS III Follow-on satellite shall not transmit MSI to the user with a probability greater than 0.0001 per hour	
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**(KPP) - Regional Military Protection (5.2.3)**

N/A	Each GPS III Follow-On satellite shall provide a -140 dBW (measured at a 5-degree minimum user elevation mask angle) regional high-power M-Code signal on both L1 and L2	(T=O) Each GPS III Follow-On satellite shall provide a -140 dBW (measured at a 5-degree minimum user elevation mask angle) regional high-power M-Code signal on both L1 and L2	TBD	Each GPS III Follow-On satellite shall provide a -140 dBW (measured at a 5-degree minimum user elevation mask angle) regional high-power M-Code signal on both L1 and L2	
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**(KPP) - Sustainment Materiel Availability (5.1.4.2)**

N/A	Achievement of the Availability of Position Accuracy KPP and Time Transfer Accuracy KPP thresholds satisfies this KPP	(T=O) Achievement of the Availability of Position Accuracy KPP and Time Transfer Accuracy KPP thresholds satisfies this KPP	TBD	Achievement of the Availability of Position Accuracy KPP and Time Transfer Accuracy KPP thresholds satisfies this KPP	
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**(KPP) - Sustainment Operational Availability (5.1.4.1)**

N/A	Achievement of the Availability of Position Accuracy KPP and Time Transfer Accuracy KPP thresholds satisfies this KPP	(T=O) Achievement of the Availability of Position Accuracy KPP and Time Transfer Accuracy KPP thresholds satisfies this KPP	TBD	Achievement of the Availability of Position Accuracy KPP and Time Transfer Accuracy KPP thresholds satisfies this KPP	
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**(KPP) - System Survivability (5.1.2)**

The System Survivability KPP is satisfied by meeting the thresholds of the Availability of Position Accuracy KPP (SS and CS; Position and Time Transfer Integrity KPP (SS and CS)); System Survivability System Survivability KPP and associated CSA (SS and CS)	The System Survivability KPP is satisfied by meeting the thresholds of the Availability of Position Accuracy KPP; Position and Time Transfer Integrity KPP; Availability of Time Transfer Accuracy KPP; System Survivability System KPP and associated Cyber Survivability Attributes	(T=O)The System Survivability KPP is satisfied by meeting the thresholds of the Availability of Position Accuracy KPP; Position and Time Transfer Integrity KPP; Availability of Time Transfer Accuracy KPP; System Survivability System KPP and associated Cyber Survivability Attributes	TBD	The System Survivability KPP is satisfied by meeting the thresholds of the Availability of Position Accuracy KPP; Position and Time Transfer Integrity KPP; Availability of Time Transfer Accuracy KPP; System Survivability System KPP and associated Cyber Survivability Attributes	
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**(KPP) - User Range Error (meters)**

N/A	0.2	(T=O) 0.2	TBD	0.2	
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**Requirement Reference**

GPS IIIF CDD dated March 20, 2018 GPS III CDD dated February 7, 2011

## Acquisition Budget Estimate

### GPS IIIF

#### Total Acquisition Cost

		Milestone APB	Current Baseline		Budget Estimate PB 2024		
Category	Base Year	Objective (BY\$M)	Objective (BY\$M)	Threshold (BY\$M)	BY\$M	TY\$M	Deviation
RDT&E	2020	3,175.6	3,175.6	3,493.2	2,980.8	3,427	
Procurement	2020	6,214	6,214	6,835.4	5,829.6	7,467.5	
MILCON	2020	0	0	0	0	0	
Acq. O&M	2020	0	0	0	0	0	
<b>Total</b>		<b>9,389.6</b>	<b>9,389.6</b>		<b>8,810.4</b>	<b>10,894.5</b>	
PAUC	2020	426.800	426.800	469.480	400.472	495.205	
APUC	2020	310.700	310.700	341.770	291.480	373.375	

#### Budget Note

Decrease in FY 2011 – 2018 RDTE of \$21.9M due to removal of Distress Alert Satellite System, Coast Guard, and National Geospatial Intelligence Agency funds of \$21.91M erroneously carried in the GPS IIIF report.

Net decrease in FY 2022 - 2023 RDT&E of \$79.5M due to Congressional marks.

Net decrease in FY 2024 - 2027 RDT&E of \$0.9M due to a decrease due to higher Space Force priorities (\$6.8) and an increase due to inflation adjustments (\$5.9M).

Net decrease in FY 2028 RDT&E of \$68.5 due to a decrease in support of higher Space Force priorities (\$104.6M) and an increase due to inflation adjustment (\$1.5M) and aligning with FY 2024 President's Budget (\$34.6M).

Increase in FY 2029 - FY 2037 RDT&E of \$14.9M due to reflection of updated December 2022 Single Best Estimate.

Decrease in FY 2020 Procurement of \$7.2M due to Congressional reduction.

Decrease in FY 2022 Procurement of \$17.7 M due to a Congressional reduction.

Decrease in FY 2023 Procurement of \$40.6M due to Congressional mark.

Decrease in FY 2024 Procurement of \$545.2M due to the deferral of two Space Vehicles (-\$535.6M) and baseline transfer (-\$9.6M) in support of higher Space Force priorities.

Net decrease in FY 2025 - 2027 Procurement of \$16M due to decrease of higher Space Force priorities (\$32.7M) and increase due to inflation adjustment (\$16.7M).

Net increase in FY 2028 Procurement of \$20.2M due to decrease of higher Space Force priorities (\$12.7M) and an increase due to inflation adjustment (\$7.4M) and aligning with FY 2024 President's Budget (\$25.5M).

Net Increase in FY 2029 - FY 2036 Procurement of \$377.4M due to reflection of updated December 2022 Single Best Estimate.

***Total End Item Quantity***

Quantity Category	Current APB Quantity	Current Estimate Quantity
Development	2	2
Procurement	20	20
O&M-Acquired	--	--

**Unit Cost****GPS IIIF**

<b>Current UCR Baseline and Current Estimate (Base-Year Dollars)</b>			
<b>Category (\$M) Base Year:2020</b>	<b>Current UCR Baseline</b>	<b>Current Estimate</b>	<b>% Change</b>
<b>Program Acquisition Unit Cost</b>			
Cost	9,389.6	8,810.4	
Quantity	22	22	
Unit Cost	426.800	400.473	-6.17%
<b>Average Procurement Unit Cost</b>			
Cost	6,214.0	5,829.6	
Quantity	20	20	
Unit Cost	310.700	291.480	-6.19%
<b>Original UCR Baseline and Current Estimate (Base-Year Dollars)</b>			
<b>Category (\$M) Base Year:2018</b>	<b>Original UCR Baseline</b>	<b>Current Estimate</b>	<b>% Change</b>
<b>Program Acquisition Unit Cost</b>			
Cost	9,273.8	8,535.5	
Quantity	22	22	
Unit Cost	421.536	387.977	-7.96%
<b>Average Procurement Unit Cost</b>			
Cost	6,113.0	5,647.7	
Quantity	20	20	
Unit Cost	305.650	282.385	-7.61%

The Current Estimate's base-year costs have been converted from Base Year 2020 to Base Year 2018 using the National Defense Budget Estimates for FY 2023 (Green Book).



**Risk and Sensitivity Analysis****GPS IIIF****Risk and Sensitivity Analysis****Current Procurement Cost (December - 2022)**

1. Current estimates and funding profile are based upon the latest service cost estimate. NRE SV11-12 and simulators are FPIF/AF, SV13-32 are FPIF. No issues at this time.

**Original Baseline Estimate (September - 2018)**

1. Total Acquisition Cost - \$9,273.8 (Qty 22) PAUC - \$421.536 (Qty 22); APUC - \$305.65 (Qty 20). SCP was conducted at contract ceiling price; Non-Recurring Engineering (NRE) SV11-12 and simulators are Fixed Price Incentive Fee/Award Fee (FPIF/AF), SV13-32 are FPIF. This approach is intended to control cost in a manner consistent with the relative maturity of the requirements and technical baseline, production designs, and their associated execution risk.
2. Milestone B APB (BY 2018\$M): Total Acquisition Cost - \$9,273.8 (Qty 22) PAUC - \$421.536 (Qty 22); APUC - \$305.65 (Qty 20). SCP conducted at contract ceiling price; NRE SV11-12 and simulators are FPIF/AF, SV13-32 are FPIF. This approach is intended to control cost in a manner consistent with the relative maturity of the requirements and technical baseline, production designs, and their associated execution risk.

**Current Baseline Estimate (July - 2020)**

1. Total Acquisition Cost - \$9,389.6M (BY 2020) (Quantity 22) PAUC - \$426.800M (Quantity 22); APUC - \$310.700M (Quantity 20). SCP was conducted at contract ceiling price; Non-Recurring Engineering (NRE) SV11-12 and simulators are Fixed Price Incentive Fee/Award Fee (FPIF/AF), SV13-32 are FPIF. This approach is intended to control cost in a manner consistent with the relative maturity of the requirements and technical baseline, production designs, and their associated execution risk.

**Significant Schedule Risks****Current Estimate (December - 2022)**

1. Hardware delivery challenges are impacting program milestones and consuming Lockheed Martin held margins; the program is still on track to meet APB milestones.

**Milestone B (September - 2018)**

1. Constellation Performance: Congress, DoD, and/or Air Force currently does not fund GPS Directorate to acquire 2-3 Space Vehicles per year due to funding constraints, thus putting at risk constellation sustainment and performance.
2. Design Not Mature: GPS III Follow-On Production designs may not be sufficiently mature due to requirements changes driving expanded non-recurring engineering effort to establish the production line.
3. Space Modular Common Crypto: May not meet GPS IIIF operating environment requirements.

**Significant Technical Risks****Current Estimate (December - 2022)**

1. Launch & Checkout Capability (LCC) Giver-Receiver: Potential disconnects in delivery dates for Government Furnished items may delay LCC readiness for integrated system testing and the Mission Readiness Campaign.
2. Performance Test Risk: New payloads and capabilities may result in unforeseen anomalies during testing.
3. National Security Agency (NSA) Certification: New NSA certification requirements may expand the Information Security boundary, which could drive schedule delays for Information Assurance milestones.

**Milestone B (September - 2018)**

1. Constellation Performance: Congress, DoD, and/or Air Force currently does not fund GPS Directorate to acquire 2-3 Space Vehicles per year due to funding constraints, thus putting at risk constellation sustainment and performance.
2. Design Not Mature: GPS III Follow-On Production designs may not be sufficiently mature due to requirements changes driving expanded non-recurring engineering effort to establish the production line.
3. Space Modular Common Crypto: May not meet GPS IIIIF operating environment requirements.

**Low Rate Initial Production****GPS IIIIF**

There is no LRIP for this program.

**Contracts & Efforts**

<b>Contract Data</b>	
Contract Number	FA8807-18-C-0009
Effort Number	5
Modification Number	P00120
Award Date	09/26/2018
Definitization Date	09/26/2018
Order Number	
CAGE Code/CAGE Legal Name	04236/Lockheed Martin Corporation
Contract Title	GPS IIIF
Contract Address	12257 S Wadsworth Blvd, Littleton, CO 80125-8504
Contract Type	Fixed-Price Incentive (Firm Target)

<b>Contracts/Effort Price, Quantity, and Performance (TY \$M)</b>		
Initial Target Price	Current Target Price	
\$1,362.1	\$3,455	
Initial Ceiling Price	Current Ceiling Price	
\$1,499.7	\$3,765.5	
Contractor EAC	PM EAC	
\$3,197.1	\$3,215.4	
Initial Quantity	Current Quantity	Delivered Quantity
2	10	0
BAC	BCWP	ACWP
\$2,863.7	\$1,135.3	\$1,205.2
BCWS	Cost Variance	Schedule Variance
\$1,185.3	-\$69.9	-\$50

**Contract Note:**

Data current as of the December 2022 Integrated Program Management Report. The Current Target Price is \$3,455M and is significantly higher than the Initial Target Price due to the exercise of Space Vehicle (SV) Options 13-20. Ten SVs were exercised in total (2 RDT&E, 8 Production). SV 13-14 were exercised in October 2020. SVs 15-17 were exercised in October 2021. SVs 18-20 were exercised in October 2022.

**Factors Contributing to Cost Variance:**

Cost Variance: The unfavorable Cost Variance in the December 2021 SAR of -\$58.0M has degraded to -\$69.9M in the December 2022 SAR. The primary driver for this degradation was engineering design complexities and overruns in the GPS Non-Flight Satellite Testbed (GNST+) Electrical Power Subsystem, Special Test Equipment, Solar Substrates, and Linearized Traveling Wave Tube Amplifier (LTWTA). Additionally, inflation-driven contractor labor rate increases contributed significant cost growth.

**Factors Contributing to Schedule Variance:**

Schedule Variance: The unfavorable Schedule Variance in the December 2021 SAR of -\$40.0M has degraded to -\$50.0M in the December 2022 SAR. Ongoing manufacturing inefficiencies and rework, staffing challenges, and supply chain delivery issues with the LTWTAs, GNST+ Structure, Scalable Power Regulation Units, and the L3Harris Mission Data Unit have caused schedule delays. The contractor is aggressively pursuing multiple avenues to recover schedule and mitigate further delays.

## Deliveries and Expenditures

### GPS IIF

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	0	0	2	0.00%
Production	0	0	20	0.00%
Total Program Quantity Delivered	0	0	22	0.00%

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

Years Appropriated to date: 16

Total Years Appropriated Funding (Current Baseline): 30

Percent Years Appropriated: 53.33%

Then-Year Funding Appropriated as Percentage of Total Acquisition Estimate: 38.10%

Then-Year Funding Expended as Percentage of Total Acquisition Estimate: 15.76%

Total Acquisition Cost: \$10,894.5

## Operating and Support Costs

### GPS IIIF

#### *O&S Cost Breakdown:*

Category (BY2020\$ Million)	GPS IIIF
Unit-Level Manpower	\$0.0
Unit Operations	\$0.0
Maintenance	\$418.2
Sustaining Support	\$57.8
Continued System Improvements	\$179.8
Other	\$0.0
<b>Total</b>	<b>\$655.7</b>

Cost Estimate Source: SCP dated June 15, 2020

Total Program O&S Cost Compared with Baseline					
	Current Baseline				
Base Year: 2020	Objective (BY\$M)	Threshold (BY\$M)	Current Estimate (BY\$M)	Current Estimate (TY\$M)	Deviation
<b>Total O&amp;S</b>	\$765.0	\$841.5	\$655.7	\$1,166.0	

**Note:** The GPS III F system will consist of the Operational Support System (OSS), the GPS III F Simulators (GSS+1 and GSS+2), and the GPS III F Software Sustainment Labs.

This effort is for on-site organizational engineering and related activities necessary to support GPS III F on-orbit operations. Contractor is co-located with 2nd space Operations Squadron personnel at Schriever Air Force Base. Efforts include maintaining engineering liaison support and documenting and reporting on anomalies and resolutions. Other activities include updating command plans and updating the Orbital Operations Handbook as needed and after resolution of on-orbit problems to assure integrity of continuing SV operations. Maintain Satellite Unique Software, perform hardware and software maintenance of OSS and provision for operating the OSS. Provide continuing support to the Operational Control Segment to ensure compatibility with the GPS III F SV. Ensure continuing Space/Control Segment (SS/CS) interface compliance, via review, analysis, implementation, test and documentation of technical changes and incompatibilities, as applicable. Ensure the SS/CS interface is adequately documented by supporting the GPS Directorate for all GPS III F related documents. Ensure command procedures and data bases are up-to-date/maintained to support on-orbit operations. Perform reliability and mean mission duration analysis, SV performance trending, anomaly resolution, documentation updates, delta V planning, SV reprogramming, end-of-life testing, and disposal. Perform hardware obsolescence analysis and replacement of OSS equipment as required. This requirement also includes maintaining and operating the GPS III F satellite simulator for ground control software change validation and compatibility testing.

The scope of the GPS III F O&S estimate includes GPS III F On-Orbit Support (OOS) costs (FY 2024-FY 2049, FY 2024- FY 2034 are III F costs not included in the Next Generation Operational Control System (OCX) SCP). The following costs are included after the end of the OCX SCP Period of performance: IIR-M OOS costs (FY 2034-FY 2035 for end of life) and GPS III OOS costs (FY 2034-FY 2049).

***Operating and Support Costs - Disposal and Unitized Costs*****GPS IIIF****Annual Unitized O&S Cost Definition and Calculation Relative to Total O&S Cost:**

The annual O&S Cost was calculated based on the total BY 2020 cost of \$655.73 and divided by the expected service life of 25 years, resulting in an annual O&S Cost of \$26.2M based on this FY 2020 SCP.

Sustainment Factors	System Name: GPS IIIF	Antecedent System Name:
Quantity to Sustain	1	
Unit of Measure	System	
Unit Expected Service Life	25	

**Base Year: 2020**

Annual Unitized O&S Cost by Category Base Year \$ Unit:(\$M)	System Name: GPS IIIF	Antecedent System Name:
Unit-Level Manpower	\$0.0	
Unit Operations	\$0.0	
Maintenance	\$16.7	
Sustaining Support	\$2.3	
Continued System Improvements	\$7.2	
Other	\$0.0	
Total O&S	\$26.2	

**Disposal/Demilitarization Cost Estimate**

(BY2020\$M)	System Name: GPS IIIF	Antecedent System Name:
Total Disposal	\$0.0	

Cost Estimate Source - Disposal	
Type:	Service Cost Position
Approval Authority and Date:	06/15/2020
Note:	
None	
Disposal Cost Note:	
None	



**Additional O&S Estimate Assumptions:**

- First GPS IIIIF SV launch in FY 2026 (and be operational accepted in FY 2027) and last SV to launch in FY 2034.
- GPS IIIIF SV have an expected design life of 15 years.
- Tech Insertions are removed from this estimate as the Tech Insertions are not currently on contract to be completed,.
- GPS IIIIF Flight Software lab to transition to Sustainment in FY 2034.
- Inflation rates for all non-labor factors beyond FY 2026 based on latest CY 2020 OSD published rates.
- GPS III & IIRM cost transition in FY 2034 when the CY 2020 OCX SBE ends.
- CES 1.0 & 2.0 Unit Ops and Program Management costs are captured in the CY 2020 OCX and OCX 3F SBE.