
# REPORT TO CONGRESS

## MAJOR PROGRAM ANNUAL REPORT ON NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION SATELLITES TO ACCOMPANY THE FY 2024 BUDGET REQUEST

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*Submitted pursuant to: 33 U.S.C. § 878a(c) and Public Law 117-328*

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33 U.S.C. § 878a, SPECIFICALLY 33 U.S.C. § 878a(c)(1), INCLUDED THE FOLLOWING LANGUAGE

*Annually, at the same time as the President's annual budget submission to the Congress, the Under Secretary shall transmit to the appropriate congressional committees a report that includes the information required by this section for the satellite development program for which NOAA proposes to expend funds in the subsequent fiscal year. The report under this paragraph shall be known as the Major Program Annual Report.*

*This report is current as of June 2023 and organized into the following categories:*

*I. Programs that have submitted a Baseline Report.*
*II. New programs that have not yet submitted a Baseline Report.*

THIS REPORT RESPONDS TO THE REQUEST AND SATISFIES THE REQUIREMENTS.

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# I. EXECUTIVE SUMMARY

This is the Major Program Annual Report on National Oceanic and Atmospheric Administration (NOAA) satellites to accompany the Fiscal Year (FY) 2024 President's Budget request pursuant to the requirements of the Consolidated Appropriations Act, 2023 (Public Law (P.L.) 117-328).

This report includes updates and overall information on the life cycle costs, schedule, and other technical data for NOAA's major satellite programs within NOAA's National Environmental Satellite, Data, and Information Service (NESDIS) that have submitted baseline reports to Congress.

NOAA is in the midst of implementing its next generation satellite architecture. NOAA will submit reporting requirements as soon as projects/missions determine that it has reached the appropriate stage pursuant to 33 U.S.C. § 878a.

# II. REPORT PURSUANT TO 33 U.S.C. § 878a(c)(3) FOR PROGRAMS THAT HAVE SUBMITTED A BASELINE REPORT

## A. Geostationary Operational Environmental Satellite-R Series Program

The Geostationary Operational Environmental Satellite-R (GOES-R) Series Program delivered its Baseline Report to Congress on February 8, 2013.

Effective May 27, 2018, the responsible reporting official under 33 U.S.C. § 878a(c)(2)(E) is: Pam Sullivan, System Program Director for the GOES-R Series Program.

### 1. Life Cycle Cost

FY 2024 President's Budget

The FY 2024 President's Budget request continues support for operations and acquisitions in both the Procurement, Acquisition, and Construction and Operations, Research, and Facilities accounts after the Operational Phase Transfers enacted in the Consolidated Appropriations Act, 2017 (P.L. 115-31).

Updated GOES-R Series Life Cycle Cost

On May 12, 2020, the acting Under Secretary of Commerce for Oceans and Atmosphere, in his capacity as the Milestone Decision Acquisition Authority for the GOES-R Series Program, approved a revised program life cycle cost (LCC) of $11,700.1 million, covering the period from FY 2001 through FY 2036. NOAA provided the GOES-R Series LCC update to Congress on June 19, 2020.

| | FY 2023 & Prior | FY 2024 | FY 2025 | FY 2026 | FY 2027 | FY 2028 | CTC | Total LCC |
|---|---|---|---|---|---|---|---|---|
| **GOES-R** | **10,114.6** | **309.9** | **133.9** | **129.9** | **129.9** | **129.9** | **752.0** | **11,700.1** |
| **Development** | **9,204.7** | **191.2** | **17.8** | **0.0** | **0.0** | **0.0** | **0.0** | **9,413.7** |
| Flight | 5,847.5 | 158.2 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 6,006.0 |
| Instruments | 2,061.7 | 21.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2,082.7 |
| Spacecraft | 2,042.1 | 11.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2,053.8 |
| Launch Services | 772.7 | 15.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 788.1 |
| Other | 971.1 | 110.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 1,081.4 |
| Ground | 1,869.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1,869.6 |
| Program Support | 1,487.7 | 33.0 | 17.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1,538.2 |
| **Operations, Maintenance, Sustainment** | **909.9** | **118.7** | **116.1** | **129.9** | **129.9** | **129.9** | **752.0** | **2,286.4** |
| Operations and Maintenance | 237.3 | 33.9 | 33.9 | 33.9 | 33.9 | 33.9 | 271.2 | 949.2 |
| Sustainment | 672.6 | 84.8 | 82.2 | 96.0 | 96.0 | 96.0 | 480.8 | 1,608.4 |

*1. Outyears are estimates. Spend Plan submissions will be based on current needs and requirements.*
*2. The 'FY 2023 & Prior' column accounts for the FY 2023 Enacted amounts as well as any reductions for de-obligations.*
*3. Reserves are distributed among development and sustainment line items above. As of February 2023, GOES-R Series reserves were $150.9 million / 11.0 percent of cost to go, including encumbrances and liens. The cost-to-go calculation excludes items for which no contingency is carried, such as firm fixed price contracts.*

## 2. Schedule

There have been no changes to the launch schedule from the Major Satellite Report accompanying the FY 2021 President's Budget request.

| Satellite | Launch Commitment Date Reported in Baseline Report February 8, 2013 | Launch Commitment Date as of July 1, 2021 |
|---|---|---|
| GOES-R | Second Quarter of FY 2016 | Launched November 19, 2016 |
| GOES-S | Third Quarter of FY 2017 | Launched March 1, 2018 |
| GOES-T | Third Quarter of FY 2019 | Launched March 1, 2022 |
| GOES-U | First Quarter of FY 2025 | First Quarter of FY 2025 |

## 3. Technical Data

GOES-R Satellite: The GOES-R satellite was successfully launched on November 19, 2016, at 6:42 p.m. EST. Upon reaching geostationary orbit on November 29, 2016, the satellite was renamed GOES-16. On December 18, 2017, GOES-16 replaced GOES-13 as NOAA's operational GOES East satellite, taking up its location at 75 degrees W longitude.

GOES-S Satellite: The GOES-S satellite was successfully launched on March 1, 2018, at 5:02 p.m. EST. The satellite was renamed GOES-17 when it reached geostationary orbit on March 12, 2018. On February 12, 2019, GOES-17 replaced GOES-15 as NOAA's operational GOES West satellite, taking up its location at 137 degrees W longitude. On June 25, 2021, the decision was announced to replace GOES-17 with GOES-18 as the operational GOES West after launch, due to the impacts of the Advanced Baseline Imager (ABI) thermal

anomaly. On January 4, 2023, GOES-17 was taken out of service and replaced by GOES-18 as NOAA's operational GOES West satellite. GOES-17 was moved into storage to serve as an on-orbit spare.

GOES-T Satellite: The GOES-T satellite was successfully launched on March 1, 2022, at 4:38 p.m. EST. Upon reaching geostationary orbit on March 14, 2022, the satellite was renamed GOES-18. The GOES-18 Handover Readiness Review was successfully completed on October 3, 2022. The review certified readiness to transition operational responsibility of GOES-18 from the GOES-R Series Program to the NOAA Office of Satellite and Product Operations (OSPO) operations team. GOES-18 was officially handed over to OSPO on October 6, 2022. On January 4, 2023, GOES-18 replaced GOES-17 as NOAA's operational GOES West satellite, taking up its location at 137 degrees W longitude.

GOES-U Satellite: Integration and test continues at Lockheed Martin in Littleton, Colorado. All instruments have been integrated, including the new compact coronagraph. Satellite-level environmental test is underway. GOES-U is currently scheduled to ship to the launch site in Q2 FY 2024. The Falcon 9 Heavy has been selected to launch GOES-U and the planned launch date is Q2 FY 2024.

GOES-R Series Ground System: The GOES-R Ground System contract is being recompeted due to the end of the contract. The GOES-R Series ground system consists of command and control at the NOAA Satellite Operations Facility (NSOF) in Suitland, Maryland, and primary up link to the satellite via the Wallops Island Command and Data Acquisition Station in Wallops, Virginia. Meteorological data processing and product development and distribution occurs at the NSOF and the NOAA Center for Weather and Climate Prediction, College Park, Maryland. Space weather data is sent directly to the NWS Space Weather Prediction Center and the National Centers for Environmental Information in Boulder, Colorado, for product processing and long-term data access and archive.

GOES-R Series Ground System Upgrade: The GOES-R Ground Segment Project made progress executing the IBM (Lenovo) server replacement. Servers at the NSOF were upgraded prior to the GOES-T launch. Post-launch, progress has continued with the server replacement at the Wallops Command and Data Acquisition Station, and the Consolidated Backup Facility in Fairmont, West Virginia. Despite COVID-19 induced challenges, the GOES-R Ground System has successfully supported GOES-16 and -17 operations as well as the GOES-T/-18 launch, orbit-raising, and post-launch test campaign.

## B. Polar Weather Satellites – Joint Polar Satellite System

The Consolidated Appropriations Act, 2020 (P.L. 116-93), accepted the Administration's request in the FY 2020 President's Budget to merge the two major polar subactivities – the Joint Polar Satellite System (JPSS) and Polar Follow-On (PFO) – into a new subactivity called Polar Weather Satellites (PWS). With PFO being the continuation of

the JPSS Program of Record, merging these two subactivities ensures programmatic flexibility and minimizes risk in the developmental stages of the JPSS satellites. The JPSS development portion of PWS is largely complete with the launch of JPSS-2 and focus of the system has now moved to the Operations and Sustainment phase. NOAA continues to track the components of PWS per the approved LCC for JPSS and the approved LCC for PFO separately to aid programmatic transparency and oversight.

The JPSS Program delivered its combined Determination of Readiness and Baseline Report to the Congress on November 14, 2014, which covered all the components of the PWS program.

Effective January 2022, the responsible reporting official under 33 U.S.C. § 878a(c)(2)(E) is Timothy J. Walsh, JPSS Director.

### 1. Life Cycle Cost

As baselined in September 2014, the JPSS Program LCC is $11,322.1 million, and this total supports operations for the NOAA/NASA Suomi National Polar-orbiting Partnership (Suomi NPP), development and launch of the JPSS-1 and JPSS-2 spacecrafts, development and operations of the common ground system, and operations for JPSS satellites through FY 2025. During the development of the Independent Cost Estimate (ICE) for PFO, which was concluded by the Department of Commerce (DOC) Office of Acquisition and Management in 2019, a projected underrun of approximately $134 million within the JPSS program was identified based on recent program execution performance. DOC and NOAA agreed that projected underrun would be reflected under Cost to Complete in future budget requests and would be reevaluated as conditions and circumstances warrant. Based on cost analyses conducted in FY 2022, the JPSS projected underrun has since been deemed necessary to incorporate back into the FY 2023 budget profile due to the JPSS-2 launch being delayed from March 2022 to November 2022 (see section 2 below), as well as an increase in ground station operations and maintenance costs. Any future efficiencies will be managed by the program within the PWS subactivity and LCC to address out-year issues within JPSS and PFO.

The JPSS program has been able to manage all adverse cost impacts experienced due to COVID-19 within reserves.

| | FY 2023 & Prior | FY 2024 | FY 2025 | FY 2026 | FY 2027 | FY 2028 | CTC | Total LCC |
|---|---|---|---|---|---|---|---|---|
| **JPSS/POR** | **11,070.3** | **167.4** | **84.4** | **0.0** | **0.0** | **0.0** | **0.0** | **11,322.1** |
| **Development** | **6,846.4** | **45.3** | **1.8** | **0.0** | **0.0** | **0.0** | **0.0** | **6,893.5** |
| Flight | 3,295.7 | 9.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3,304.7 |
| Instruments | 1,796.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1,796.1 |
| Spacecraft | 707.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 707.9 |
| Launch Services | 334.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 334.8 |
| Other | 456.9 | 9.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 465.9 |
| Ground | 3,061.4 | 27.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3,088.7 |
| Program Support | 489.3 | 9.0 | 1.8 | 0.0 | 0.0 | 0.0 | 0.0 | 500.1 |
| **Operations, Maintenance, Sustainment** | **4,223.9** | **122.1** | **82.6** | **0.0** | **0.0** | **0.0** | **0.0** | **4,428.6** |
| Operations and Maintenance | 3,555.1 | 74.8 | 74.8 | 0.0 | 0.0 | 0.0 | 0.0 | 3,704.7 |
| Sustainment | 668.8 | 47.3 | 7.8 | 0.0 | 0.0 | 0.0 | 0.0 | 723.9 |

*1. Outyears are estimates. Spend Plan submissions will be based on current needs and requirements.*
*2. The 'FY 2023 & Prior' column accounts for the FY 2023 Enacted amounts as well as any reductions for de-obligations.*
*3. As of February 2023, JPSS/POR reserves were $0 million / 0 percent of cost to go, including encumbrances and liens. The cost-to-go calculation excludes items for which no contingency is carried, such as firm fixed price contracts.*

## 2. Schedule

There have been no changes to the launch schedule from the Major Satellite Report accompanying the FY 2021 President's Budget request.

| Satellite | Launch Commitment Date Reported in Baseline Report November 14, 2014 | Launch Commitment Date as of February 1, 2020 |
|---|---|---|
| Suomi NPP | N/A | Launched October 28, 2011 |
| JPSS-1 | Second Quarter of FY 2017 | Launched November 18, 2017 |
| JPSS-2 | First Quarter of FY 2022 | Launched November 10, 2022 |

## 3. Technical Data

Suomi NPP Satellite: The Suomi NPP satellite was successfully launched on October 28, 2011, at 2:48 a.m. PDT. Suomi NPP is NOAA's secondary operational polar-orbiting satellite and operates in tandem with NOAA-20. Suomi NPP is currently operating beyond its design life, allowing NOAA to continue to use Suomi NPP to meet its operational data needs.

JPSS-1 Satellite: The JPSS-1 satellite was successfully launched on November 18, 2017, at 1:47 a.m. PST. Upon reaching its polar orbit, the satellite was renamed NOAA-20. The NOAA-20 spacecraft and operations were transferred from the launch team to NOAA on March 7, 2018. NOAA-20 became operational on May 30, 2018, after completing on-orbit calibration and validation. On February 12, 2019, NOAA-20 was designated as NOAA's primary afternoon polar satellite. NOAA-20 and Suomi NPP circle the Earth in tandem with the two satellites being separated in time and space by 50 minutes.

JPSS-2 Satellite: JPSS-2 was successfully launched on November 10, 2022, at 1:49 a.m. PST. While NOAA already had two operational satellites on orbit at the time of launch, NOAA made the decision to launch JPSS-2 as a risk reduction measure given Suomi NPP had exceeded its design life by five years and its viability is becoming increasingly uncertain. JPSS-2 was also the first NOAA satellite to use a Northrop Grumman spacecraft. Flying the new hardware with the added redundancy ensures operational continuity while any potential issues or concerns are resolved, minimizing the risk of a potential data gap. Once NOAA-21 becomes operational, the program will re-evaluate the JPSS constellation reliability to determine if the cadence should be adjusted. The JPSS-2 launch provided a rideshare for NASA's Low-Earth Orbit Flight Test of an Inflatable Decelerator (LOFTID). Upon reaching its designated polar orbit on November 21, the satellite was renamed NOAA-21.

On December 16, 2022, after 32 days of nominal performance, an anomaly was observed and reported in the Ka-band transmitter. The Ka-band transmitter is responsible for transmitting data from the spacecraft to the ground system using specific spectrum channels. After evaluating the problem, the engineering team recommended a switch from the malfunctioning transmitter to a fully-functioning, redundant transmitter. The switch occurred on February 2, 2023, and the satellite is operating nominally. NOAA-21 will continue the standard on-orbit operation and instrument calibration and validation procedures to confirm the data is being collected, transmitted, and processed correctly. The NOAA-21 spacecraft and operations are expected to be transferred from the launch team to NOAA in Q2 FY 2023.

JPSS Ground System: The JPSS ground system operates through a northern polar station at Svalbard, Norway; a southern polar station at McMurdo, Antarctica; an operational back up at Fairbanks Command and Data Acquisition Station; primary command and control at NSOF, Suitland, Maryland; and a Consolidated Backup in Fairmont, West Virginia. Data processing and product development and distribution occurs at the NSOF and the NOAA Center for Weather and Climate Prediction, College Park, Maryland. Long-term data access and archive is managed by the National Centers for Environmental Information in North Carolina, and Colorado.

JPSS Ground System Upgrade: Block 2.2 transitioned to operations in November 2020 and supports all on-orbit missions on a single string-per-nominal operational configuration, and Block 2.3 transitioned to operations in February 2021 and migrated the JPSS mission unique data processing to a cloud processing environment.

Through a reimbursable arrangement, the National Science Foundation, in partnership with NESDIS, transferred the communications capabilities for McMurdo Station in Antarctica from Black Island Earth Station to Ross Island

Earth Station on March 14, 2022. The new station is using new hardware and is more accessible, reducing troubleshooting times to ensure continuity.

Through a contract with Kongsberg Satellite Services AS (KSAT) that was recently re-competed and re-awarded to KSAT, the Svalbard Station continues routine operations with command and control from the NSOF is routed through Svalbard to the JPSS satellites.

## C. Polar Weather Satellites – Polar Follow-On

As stated in Section B above, the Consolidated Appropriations Act, 2020 (P.L. 116-93), accepted the FY 2020 President's Budget request to merge JPSS and PFO into the new PWS subactivity. As part of the merged PWS program, PFO extends the current JPSS program to FY 2038 to continue weather observations in the afternoon orbit beyond JPSS-2.

The PFO program delivered its Determination of Readiness and Baseline Report to the Congress on June 28, 2021.

Effective January 2022, the responsible reporting official under 33 U.S.C. § 878a(c)(2)(E) is Timothy J. Walsh, JPSS Director. The previous responsible reporting official was Gregory A. Mandt, JPSS Director.

### 1. Life Cycle Cost

On December 16, 2016, NOAA evaluated the schedule baseline for the LCC of the PFO program at $7,573 million through FY 2038, as reflected within the DOC Milestone 2/3 Decision Memorandum. As directed by this memorandum, NOAA has since updated the PFO LCC to reflect the greater clarity in the actual contracted costs for all major satellite hardware elements. This LCC includes the JPSS-3 and -4 spacecraft, instruments, launch vehicle, operations for all on-orbit assets, maintenance, sustainment, and science from FY 2016 to FY 2038. The cost re-baseline also benefited from the ICE generated by the DOC Office of Acquisition Management, which was developed using a different methodology than the program's estimate. The new LCC of the PFO program documented in the updated DOC Milestones 2/3 Decision Memorandum on June 1, 2020 (Appendix D) is $6,838 million.

| | FY 2023 & Prior | FY 2024 | FY 2025 | FY 2026 | FY 2027 | FY 2028 | CTC | Total LCC |
|---|---|---|---|---|---|---|---|---|
| **PFO** | **2,215.9** | **257.6** | **340.6** | **425.0** | **425.0** | **425.0** | **2,748.8** | **6,837.9** |
| **Development** | **2,215.9** | **257.6** | **340.6** | **342.4** | **342.4** | **342.4** | **1,922.9** | **5,764.2** |
| Flight | 2,034.6 | 136.8 | 153.3 | 148.6 | 148.6 | 148.6 | 505.5 | 3,276.0 |
| Instruments | 1,572.6 | 36.2 | 39.1 | 26.9 | 25.5 | 0.0 | 0.0 | 1,700.3 |
| Spacecraft | 326.4 | 12.6 | 22.1 | 20.1 | 20.1 | 30.7 | 110.0 | 542.0 |
| Launch Services | 0.0 | 23.3 | 43.6 | 69.4 | 69.4 | 69.4 | 138.7 | 413.8 |
| Other | 135.6 | 64.7 | 48.5 | 32.2 | 33.6 | 48.5 | 256.8 | 619.9 |
| Ground | 111.2 | 96.2 | 114.9 | 114.9 | 114.9 | 114.9 | 936.2 | 1,603.2 |
| Program Support | 70.1 | 24.6 | 72.4 | 78.9 | 78.9 | 78.9 | 481.2 | 885.0 |
| **Operations, Maintenance, Sustainment** | **0.0** | **0.0** | **0.0** | **82.6** | **82.6** | **82.6** | **825.9** | **1,073.7** |
| Operations and Maintenance | 0.0 | 0.0 | 0.0 | 74.8 | 74.8 | 74.8 | 747.9 | 972.3 |
| Sustainment | 0.0 | 0.0 | 0.0 | 7.8 | 7.8 | 7.8 | 78.0 | 101.4 |

*1. Outyears are estimates. Spend Plan submissions will be based on current needs and requirements.*
*2. The 'FY 2023 & Prior' column accounts for the FY 2023 Enacted amounts as well as any reductions for de-obligations.*
*3. Reserves are distributed among development and sustainment line items above. As of February 2023, PFO reserves were $270.2 million / 7.1 percent of cost to go, including encumbrances and liens. The cost-to-go calculation excludes items for which no contingency is carried, such as firm fixed price contracts.*

## 2. Schedule

In Q3 FY 2023, NOAA made the decision to switch the launch sequence between JPSS-3 and JPSS-4. NASA's Libera instrument, critical for monitoring the Earth's radiation, is currently manifested to fly on the JPSS-3 spacecraft. The JPSS-3 spacecraft is scheduled to complete assembly in Q2 FY 2025 and be placed into storage. However, construction of the Libera instrument is scheduled to be completed in Q1 FY 2026. At the same time that construction of the Libera instrument is completed, the JPSS-4 spacecraft, which is a copy of the JPSS-3 spacecraft, will be completing the integration of instruments and preparing for environmental testing of the satellite. By manifesting the Libera instrument on JPSS-4 and switching the launch sequence between JPSS-4 and JPSS-3, the need to remove JPSS-3 from storage to incorporate the Libera instrument is eliminated. This adjustment creates the least amount of technical, cost and schedule risk for NOAA and NASA. There have been no other changes to the schedule of launches included in the Determination of Readiness and Baseline Report.

| Satellite | Launch Commitment Date Reported in Baseline Report June 28, 2021* |
|---|---|
| PFO / JPSS-4 | First Quarter of FY 2028 |
| PFO / JPSS-3 | First Quarter of FY 2033 |

*Launch commitment dates will be re-evaluated based on annual appropriations, the performance of on-orbit
assets, and the overall constellation risk posture.

The launch sequence and launch cadence will continue to be evaluated based on operational performance of on-orbit satellites and ability to meet mission requirements.

### 3. Technical Data

JPSS-3 and JPSS-4 Satellites: The PFO program is developing PFO/JPSS-3 and PFO/JPSS-4 instruments and spacecraft buses as copies of the JPSS-2 satellite. This takes advantage of JPSS-2 development experiences to reduce overall cost and risk to PFO. NOAA has employed a "build ahead and store" strategy for PFO. The strategy calls for procuring and building instruments as a block-buy to reduce schedule, cost, and risks. The instruments will be integrated with the satellite and fully tested to be available for launch earlier than the scheduled date if required due to a launch or on-orbit failure. This approach was recommended by an independent review team, as well as the National Academies of Sciences.[1] The JPSS-3 instruments will be integrated onto the JPSS-3 spacecraft in the fall/winter of CY 2022/CY 2023. The JPSS-4 instruments are in their integration and test phases and will be delivered in CY 2023/early CY 2024.

## D. Space Weather Follow-On

The Space Weather Follow-On (SWFO) Program delivered its Baseline Report to Congress on March 27, 2022.

Effective March 18, 2018 the responsible reporting official under 33 U.S.C. § 878a(c)(2)(E) is Dr. Elsayed Talaat, System Program Director for the SWFO Program.

### 1. Life Cycle Cost

SWFO successfully completed DOC Milestone 2/3 on October 31, 2019, and the DOC Milestone Decision Memorandum was signed by the Deputy Secretary for Commerce on November 19, 2019. The SWFO Determination of Readiness Report was sent to Congress on June 15, 2020. The SWFO Baseline Report was submitted to the Congress on March 27, 2023.

SWFO-Geostationary Mission

The SWFO Program has completed the CCOR that will fly on GOES-U spacecraft in Q2 FY 2024. The CCOR has been integrated onto the GOES-U observatory, and successfully completed thermal/vacuum testing in Q1 FY 2023.

SWFO-Lagrange Point-1 Mission

As documented in the SWFO Baseline Report, the COVID-19 pandemic impacted the SWFO Program's schedule and cost. Early in the COVID-19 pandemic, evacuation orders forced work-stoppage with resulting schedule delays and labor cost of $3.9 million for the CCOR-1 manufactured by the Naval Research

[1] National Research Council 1997. Continuity of NOAA Satellites. Washington, DC: The National Academies Press. https://doi.org/10.17226/5588.

Laboratory. In addition, the NASA Interstellar Mapping and Acceleration Probe (IMAP) mission experienced similar issues resulting in an announced 4-month launch delay from October 2024 to February 2025. The SWFO Program estimates COVID-19-related costs of around $30 million for extension of contracts associated with this delay. At this time, NOAA plans to manage these impacts within the existing LCC. NOAA has documented the COVID-19-related costs as a program risk; specifically, a risk for the operations and sustainment phase.

In November 2021, the SWFO Program completed Key Decision Point (KDP)-C, culminating a series of NOAA/NASA management reviews that recommended retaining the development cost and schedule baselined at MS 2/3. The milestone decision authority found that SWFO has sufficient funding reserves, per NASA guidelines, to be ready for launch in February 2025.

| | FY 2023 & Prior | FY 2024 | FY 2025 | FY 2026 | FY 2027 | FY 2028 | CTC | Total LCC |
|---|---|---|---|---|---|---|---|---|
| **SWFO** | **496.7** | **97.2** | **41.2** | **22.3** | **21.8** | **13.6** | **0.0** | **692.8** |
| **Development** | **496.7** | **89.4** | **26.1** | **0.0** | **0.0** | **0.0** | **0.0** | **612.2** |
| Flight | 314.6 | 27.6 | 11.7 | 0.0 | 0.0 | 0.0 | 0.0 | 354.0 |
| Instruments | 118.5 | 18.0 | 8.2 | 0.0 | 0.0 | 0.0 | 0.0 | 144.8 |
| Spacecraft | 190.1 | 6.7 | 1.5 | 0.0 | 0.0 | 0.0 | 0.0 | 198.2 |
| Launch Services | 4.2 | 2.7 | 1.9 | 0.0 | 0.0 | 0.0 | 0.0 | 8.9 |
| Other | 1.8 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 2.1 |
| Ground | 141.9 | 48.2 | 12.3 | 0.0 | 0.0 | 0.0 | 0.0 | 202.3 |
| Program Support | 40.2 | 13.6 | 2.1 | 0.0 | 0.0 | 0.0 | 0.0 | 55.9 |
| **Operations, Maintenance, Sustainment** | **0.0** | **7.8** | **15.1** | **22.3** | **21.8** | **13.6** | **0.0** | **80.6** |
| Operations and Maintenance | 0.0 | 7.8 | 15.1 | 22.3 | 21.8 | 13.6 | 0.0 | 80.6 |
| Sustainment | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

*1. Outyears are estimates. Spend Plan submissions will be based on current needs and requirements. Out-year estimates do not include the impact of COVID-19 (see above discussion).*
*2. The 'FY 2023 & Prior' column accounts for the FY 2023 Enacted amounts.*
*3. Reserves are distributed among development and sustainment line items above. As of February 2023, SWFO development reserves were $49.6 million / 30.7 percent of cost-to-go through encumbrances and liens. The cost-to-go calculation excludes items for which no contingency is carried, such as NOAA withholds.*

## 2. Schedule

There have been no changes to the launch schedule from the Baseline Report delivered to Congress in March 2023.

| Satellite | Date Reported in Baseline Report March 27, 2023 |
|---|---|
| GOES-U CCOR | First Quarter of FY 2025* |
| SWFO | Second Quarter of FY 2025** |

*GOES-U Launch Commitment Date
**NASA IMAP mission Launch Readiness Date

## 3. Technical Data

SWFO-Geostationary Mission: The compact coronagraph instrument that will be flown on GOES-U has been completed, despite challenges due to COVID-19, and delivered to the GOES-R Series Program in time to meet GOES-U development schedule. The planned launch date for GOES-U is April 2024. There are no current technical issues related to this mission.

SWFO-L1 Mission: To date, all the major flight and ground segment contracts have been awarded. The SWFO Program is being developed to take advantage of a rideshare opportunity with the launch of NASA's IMAP mission. NOAA and NASA's Science Mission Directorate formalized a partnership and developed a joint program management structure to oversee the SWFO program acquisitions.

The European Space Agency (ESA) X-ray flux monitor has been de-manifested from the SWFO-L1 mission. NOAA and ESA are in discussions on the next flight opportunity.

To accommodate schedule changes due to COVID-19, NASA moved the IMAP launch readiness date from October 1, 2024, to February 1, 2025. Because SWFO-L1 is a rideshare with the IMAP mission, the SWFO-L1 launch readiness date is also delayed by 4 months. The SWFO Program estimates COVID-19-related costs of approximately $30 million for extension of contracts associated with this delay. At this time, NOAA plans to manage these impacts within the existing LCC.

## III. REPORT FOR NEW PROGRAMS THAT HAVE NOT YET SUBMITTED A BASELINE REPORT PURSUANT TO 33 U.S.C. § 878a(c)(2)

NOAA is in the midst of implementing its next generation satellite architecture. NOAA will submit reporting requirements as soon as projects/missions determine that it has reached the appropriate stage pursuant to 33 U.S.C. § 878a.

NESDIS will provide status reports with its Satellite Quarterly reviews with the Committees on Appropriations, House Science, Space and Technology Committee, and the Senate Commerce, Science and Transportation Committee.

### A. Geostationary Extended Observations (GeoXO)

NOAA has determined that the GeoXO program meets the 33 U.S.C. § 878a threshold as a Major Satellite Program.

On February 9, 2023, NOAA submitted the Determination of Readiness Report to the Congress.

A Baseline Report will be prepared when the project achieves KDP-C, which is scheduled to occur in FY 2025. The Deputy Secretary of Commerce authorized Milestone 2/3 for the GeoXO program on December 14, 2022, establishing the program's planning baseline of $19,644 million. With this authorization, the GeoXO program has entered the development and execution phases and allows for program procurements.

1. GeoXO Background: The GeoXO program comprises the next generation geostationary Earth orbit observing capabilities to support the DOC Primary Mission Essential Functions and NOAA strategic objectives associated with terrestrial weather prediction and warning, climate adaptation and mitigation, and healthy oceans and resilient coastal communities and economies. GeoXO will be implemented jointly by NOAA and NASA. GeoXO will continue and improve the GOES-R Series observations for weather forecasting and will extend observations to include ocean, coasts, and atmospheric monitoring. The projected loss of the GOES-R Series on-orbit spare necessitates the first GeoXO satellite to be launched in 2032. The GeoXO system is planned to observe through 2055.

## B. Space Weather Next (SW Next)

1. SW Next Background: The SW Next program is a loosely-coupled program, utilizing an innovative portfolio management approach which allows for individual "projects" to be developed over time to satisfy portfolio goals and requirements.

   NOAA has determined that the first project in the SW Next program, SW Next L1 continuity project, meets the 33 U.S.C. § 878a threshold as a Major Satellite Program; therefore, a Determination of Readiness Report is being prepared for delivery to Congress in FY 2024. A Baseline Report will be prepared when the project achieves KDP-C.

   This program formulation is responsive to the PROSWIFT Act (2020), which specified NOAA as providing space weather observational data continuity and enhanced space weather capability. SW Next will provide NOAA space weather observations through a comprehensive architecture and coordinated multi-mission program to ensure space weather products are available to meet user requirements. In addition to the previously mentioned L1 Continuity project, SW Next will include an L5 mission in partnership with the ESA that will provide off the Sun-Earth Line (off-SEL) observations. It may also include observations from GEO, LEO, and other orbits.

## APPENDIX A: LIST OF ACRONYMS

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|---|---|
| ABI | Advanced Baseline Imager |
| CDR | Critical Design Review |
| CME | Coronal Mass Ejections |
| DOC | Department of Commerce |
| DSCOVR | Deep Space Climate Observatory |
| ESA | European Space Agency |
| FY | Fiscal Year |
| GeoXO | Geostationary Extended Observations |
| GLM | Geostationary Lightning Mapper |
| GOES | Geostationary Operational Environmental Satellite |
| IMAP | Interstellar Mapping and Acceleration Probe |
| IR | Infrared |
| JPSS | Joint Polar Satellite System |
| KDP-C | Key Decision Point - C |
| L1 | Earth-Sun Lagrange Point 1 |
| LCC | Life Cycle Cost |
| LCD | Launch Commitment Date |
| LHP | Loop Heat Pipe |
| NASA | National Aeronautics and Space Administration |
| NOAA | National Oceanic and Atmospheric Administration |
| NRL | U.S. Naval Research Laboratory |
| OPT | Operational Phase Transfer |
| ORF | Operational Research and Facilities |
| PAC | Procurement, Acquisition, and Construction |
| PDR | Preliminary Design Review |
| PFO | Polar Follow-On |
| POR | Program of Record |
| PWS | Polar Weather Satellites |
| SOHO | Solar and Heliospheric Observatory |
| Suomi NPP | Suomi National Polar Partnership |
| SW Next | Space Weather Next |
| SWFO | Space Weather Follow-On |
| SWIS | Solar Wind Instrument Suite |
| SWO | Space Weather Observations |
| TRL | Technology Readiness Level |
| U.S.C. | United States Code |

## APPENDIX B: LEGISLATIVE MANDATE

Title 33. Navigation and Navigable Waters
Chapter 17, National Oceanic and Atmospheric Administration
Subchapter 1. General Provisions
§ 878a. Contract for development of a major program; costs; Major Program Annual Report for satellite development program

(a) For purposes of this section—

(1) the term 'Under Secretary' means Under Secretary of Commerce for Oceans and Atmosphere;
(2) the term 'appropriate congressional committees' means—
(A) the Committee on Appropriations and the Committee on Commerce, Science, and Transportation of the Senate; and
(B) the Committee on Appropriations and the Committee on Science, Space and Technology of the House of Representatives;
(3) the term 'satellite' means the satellites proposed to be acquired for the National Oceanic and Atmospheric Administration (NOAA);
(4) the term 'development' means the phase of a program following the formulation phase and beginning with the approval to proceed to implementation, as defined in NOAA Administrative Order 216-108, Department of Commerce Administrative Order 208-3, and NASA's Procedural Requirements 7120.5c, dated March 22, 2005;
(5) the term 'development cost' means the total of all costs, including construction of facilities and civil servant costs, from the period beginning with the approval to proceed to implementation through the achievement of operational readiness, without regard to funding source or management control, for the life of the program;
(6) the term 'life-cycle cost' means the total of the direct, indirect, recurring, and nonrecurring costs, including the construction of facilities and civil servant costs, and other related expenses incurred or estimated to be incurred in the design, development, verification, production, operation, maintenance, support, and retirement of a program over its planned lifespan, without regard to funding source or management control;
(7) the term 'major program' means an activity approved to proceed to implementation that has an estimated life-cycle cost of more than $250 million; and
(8) the term 'baseline' means the program as set following contract award and preliminary design review of the space and ground systems.

(b)(1) NOAA shall not enter into a contract for development of a major program, unless the Under Secretary determines that—
(A) the technical, cost, and schedule risks of the program are clearly identified and the program has developed a plan to manage those risks;

(B) the technologies required for the program have been demonstrated in a relevant laboratory or test environment;
(C) the program complies with all relevant policies, regulations, and directives of NOAA and the Department of Commerce;
(D) the program has demonstrated a high likelihood of accomplishing its intended goals; and
(E) the acquisition of satellites for use in the program represents a good value to accomplishing NOAA's mission.

(2) The Under Secretary shall transmit a report describing the basis for the determination required under paragraph (1) to the appropriate congressional committees at least 30 days before entering into a contract for development under a major program.

(3) The Under Secretary may not delegate the determination requirement under this subsection, except in cases in which the Under Secretary has a conflict of interest.

(c)(1) Annually, at the same time as the President's annual budget submission to the Congress, the Under Secretary shall transmit to the appropriate congressional committees a report that includes the information required by this section for the satellite development program for which NOAA proposes to expend funds in the subsequent fiscal year. The report under this paragraph shall be known as the Major Program Annual Report.

(2) The first Major Program Annual Report for NOAA's satellite development program shall include a Baseline Report that shall, at a minimum, include—

(A) the purposes of the program and key technical characteristics necessary to fulfill those purposes;
(B) an estimate of the life-cycle cost for the program, with a detailed breakout of the development cost, program reserves, and an estimate of the annual costs until development is completed;
(C) the schedule for development, including key program milestones;
(D) the plan for mitigating technical, cost, and schedule risks identified in accordance with subsection (b)(1)(A); and
(E) the name of the person responsible for making notifications under subsection (d), who shall be an individual whose primary responsibility is overseeing the program.

(3) For the major program for which a Baseline Report has been submitted, subsequent Major Program Annual Reports shall describe any changes to the information that had been provided in the Baseline Report, and the reasons for those changes.

(d)(1) The individual identified under subsection (c)(2)(E) shall immediately notify the Under Secretary any time that individual has reasonable cause to believe that, for the major program for which he or she is responsible, the

development cost of the program has exceeded the estimate provided in the Baseline Report of the program by 20 percent or more.

(2) Not later than 30 days after the notification required under paragraph (1), the individual identified under subsection (c)(2)(E) shall transmit to the Under Secretary a written notification explaining the reasons for the change in the cost of the program for which notification was provided under paragraph (1).

(3) Not later than 15 days after the Under Secretary receives a written notification under paragraph (2), the Under Secretary shall transmit the notification to the appropriate congressional committees.

(e) Not later than 30 days after receiving a written notification under subsection (d)(2), the Under Secretary shall determine whether the development cost of the program has exceeded the estimate provided in the Baseline Report of the program by 20 percent or more. If the determination is affirmative, the Under Secretary shall—

(1) transmit to the appropriate congressional committees, not later than 15 days after making the determination, a report that includes—

(A) a description of the increase in cost and a detailed explanation for the increase;

(B) a description of actions taken or proposed to be taken in response to the cost increase; and

(C) a description of any impacts the cost increase, or the actions described under subparagraph (B), will have on any other program within NOAA; and

(2) if the Under Secretary intends to continue with the program, promptly initiate an analysis of the program, which shall include, at a minimum—

(A) the projected cost and schedule for completing the program if current requirements of the program are not modified;

(B) the projected cost and the schedule for completing the program after instituting the actions described under paragraph (1)(B); and

(C) a description of, and the projected cost and schedule for, a broad range of alternatives to the program.

(f) NOAA shall complete an analysis initiated under paragraph (e)(2) not later than 6 months after the Under Secretary makes a determination under subsection (e). The Under Secretary shall transmit the analysis to the appropriate congressional committees not later than 30 days after its completion.

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