Congressional Research Service
Informing the legislative debate since 1914

NOAA's Geostationary Extended Observations (GeoXO) Satellite Program and Issues for Congress

July 10, 2026

Congressional Research Service
https://crsreports.congress.gov
R49026

CRS REPORT
Prepared for Members and
Committees of Congress

Congressional Research Service
Informing the legislative debate since 1914

NOAA's Geostationary Extended Observations (GeoXO) Satellite Program and Issues for Congress

R49026

July 10, 2026

Caitlin Keating-Bitonti
Specialist in Natural Resources Policy

Eva Lipiec
Specialist in Natural Resource Policy

SUMMARY

The National Oceanic and Atmospheric Administration (NOAA) typically deploys a new generation of geostationary satellites every two decades. Geostationary satellites operated by NOAA's National Environmental Satellite, Data, and Information Service (NESDIS) continuously observe the Western Hemisphere to detect and monitor weather conditions and environmental hazards. NOAA's current two-satellite operational geostationary mission, the Geostationary Operational Environmental Satellites R Series (GOES-R Series), is expected to end in the early 2030s. In 2019, NESDIS began defining requirements for its next geostationary mission, Geostationary Extended Observations (GeoXO); NOAA expects GeoXO to continue and improve upon GOES-R Series observations. A Department of Commerce Office of Inspector General investigation conducted between July 2024 and December 2025 identified that the GeoXO program had made adequate progress. In particular, the National Aeronautics and Space Administration, which serves as the acquisition agent, had awarded contracts for all GeoXO instruments (five instruments) and spacecraft (six satellites) between 2023 and 2024. In 2025, the Trump Administration determined that GeoXO had unsustainable costs and directed NOAA to cancel all existing GeoXO contracts. The Administration directed NOAA to recompete the contracts as firm-fixed-price contracts for fewer satellites (four instead of six) and for only certain instruments—an infrared and visible imaging instrument and a hyperspectral infrared sounder.

The Trump Administration argues that the GeoXO program modifications serve two primary objectives. First, eliminating two spacecraft and terminating certain instruments (i.e., an atmospheric composition instrument, an ocean color instrument, and a lightning mapping instrument) from the mission would reduce the program's cost. Second, the modifications would refocus the mission on weather, thereby excluding observations that would apply directly to climate, atmospheric composition, and the ocean. NOAA aims to launch the first GeoXO satellite in 2032, and it remains unclear whether these modifications would impact NOAA's launch timeline.

At issue for Congress are NOAA's current progress on the GeoXO mission and whether modifications to the mission would create a geostationary satellite observation data gap—either through a potential launch delay of the first GeoXO satellite or due to delays caused by the modified satellite architecture. A data gap could impact NOAA's future weather services for the United States—geostationary satellite observations support the statutory requirements of the National Weather Service to protect life and property. Furthermore, Congress appropriated funds to NOAA for five new instruments with the expectation that these instruments would advance weather, climate, coastal, and ocean observations. The elimination of three instruments could reduce the opportunity for forecasting and research advances, according to some stakeholders.

Contents

Figures

Tables

Appendixes

Contacts

Congress has directed the Secretary of Commerce to observe, forecast, and warn the public of weathers and floods (15 U.S.C. §313); improve weather forecasting and prediction (15 U.S.C. §§8501 et seq.); and support aviation (49 U.S.C. §44720), among other responsibilities. The National Oceanic and Atmospheric Administration (NOAA) fulfills these responsibilities, as delegated from the Secretary, through the development and launch of satellites, and their continuous collection of data on weather conditions and environmental hazards, among other activities.[1] Geostationary satellites are one kind of satellite operated by NOAA. These satellites are positioned 22,300 miles above the equator and orbit at the same speed as Earth's rotation, thereby allowing the satellites to provide continuous coverage over the same location on the Earth.[2] NOAA-operated geostationary satellites continuously observe the Western Hemisphere—from the west coast of Africa to New Zealand and from near the Arctic Circle to the Antarctic Circle. NOAA has deployed a new generation of geostationary satellites about every two decades since 1975.[3] NOAA's current two-satellite operational geostationary mission, the Geostationary Operational Environmental Satellites R Series (GOES-R Series), is expected to end in the early 2030s.[4] NOAA anticipates the deployment of its next mission, Geostationary Extended Observations (GeoXO) satellites, will begin in 2032.[5] NOAA expects GeoXO to continue and improve upon GOES-R Series observations through 2055.[6]

Multiple Administrations have worked to advance GeoXO. NOAA began defining requirements for GeoXO in 2019, under the first Trump Administration. Under the subsequent Biden Administration, NOAA planned for five instruments (i.e., sensors that collect Earth observation data) across three operational satellites, with an additional three backup satellites and instruments.[7] The GeoXO program was set to be NOAA's largest procurement ever at $19.6 billion.[8] In April 2025, under the second Trump Administration, an internal Office of Management and Budget (OMB) pre-decisional passback directed NOAA's National Environmental Satellite, Data, and Information Service (NESDIS) to "immediately cancel all major instruments and spacecraft contracts on the GeoXO program" because its projected budget

[1] National Oceanic and Atmospheric Administration (NOAA), National Environmental Satellite, Data, and Information Service (NESDIS), "Office of Geostationary Earth Orbit Observations," https://www.nesdis.noaa.gov/about/our-offices/office-of-geostationary-earth-orbit-observations (hereinafter NOAA, NESDIS, "Office of Geostationary Earth Orbit Observations").

[2] NOAA, NESDIS, "Office of Geostationary Earth Orbit Observations."

[3] NOAA, National Weather Service (NWS), "The National Weather Service at 150: A Brief History," https://vlab.noaa.gov/web/nws-heritage/-/the-national-weather-service-at-150-a-brief-history; and Daniel T. Lindsey et al., "GeoXO: NOAA's Future Geostationary Satellite System," *Bulletin of the American Meteorological Society*, vol. 105, no. 3 (2024), pp. E660-E679 (hereinafter Lindsey et al., "GeoXO: NOAA's Future Geostationary Satellite System").

[4] NOAA, NESDIS, "Office of Geostationary Earth Orbit Observations."

[5] NOAA, NESDIS, "GeoXO Timeline," accessed April 3, 2025, http://nesdis.noaa.gov/our-satellites/future-programs/geoxo/geoxo-timeline (hereinafter NOAA, NESDIS, "GeoXO Timeline"); and NOAA, NESDIS, "Geostationary Extended Observations (GeoXO)," accessed April 3, 2026, https://www.nesdis.noaa.gov/our-satellites/future-programs/geostationary-extended-observations-geoxo.

[6] NOAA and National Aeronautics and Space Administration (NASA), *Geostationary and Extended Orbits (GeoXO)*, fact sheet, updated July 2025, https://www.nesdis.noaa.gov/s3/2025-08/2025_GeoXO_2-sided_FS.pdf; and NOAA, NESDIS, "Office of Geostationary Earth Orbit Observations." NOAA and NASA work in collaboration. NOAA determines the parameters and requirements for the program, and NASA leads the development and launch of the satellites. Once launched, NOAA leads satellite operations.

[7] NOAA and NASA, *Geostationary and Extended Orbits (GeoXO)*, fact sheet, updated August 2021, https://www.nesdis.noaa.gov/s3/2021-08/GeoXO_FactSheet.pdf.

[8] NOAA, *Report to Congress: Geostationary Extended Observations (GeoXO): Determination of Readiness*, 2022, p. 20 (hereinafter NOAA, *Report to Congress: GeoXO Determination of Readiness*).

was "unsustainable."[9] Consequently, in the FY2026 budget request, the Trump Administration proposed to modify the GeoXO program and mission, including eliminating some instruments and restructuring it to be a "focused, core weather mission."[10] The FY2027 NOAA budget request maintains these modifications.[11]

Congress conducts oversight of NOAA satellite programs (i.e., *major programs*) given the high cost and long time frame of such programs.[12] For example, Congress has provided direction to NOAA regarding the GeoXO program in appropriations law and related reports since FY2020.[13] In 2025, some Members began expressing concerns regarding modifications to the GeoXO program.[14] This report focuses on the GeoXO program's progress thus far, including differences in the satellite mission between the Biden Administration and second Trump Administration, and selected issues for Congress associated with GeoXO's progress, such as potential program delays and data gaps. The **Appendix** includes a list of frequently used abbreviations in this report.

GeoXO Program Developments

In 2019, NOAA began to identify the requirements for GeoXO—the agency's next geostationary satellite program—including the program's instrument, spacecraft, and system needs.[15] Internal to the agency, NOAA line offices identified priorities for GeoXO related to weather, oceans, coasts, and climate mission areas. External to the agency, NOAA conducted outreach, such as workshops, surveys, listening sessions, polls, and town hall meetings, to "thousands of end users in dozens of organizations" to define the future observational needs for GeoXO.[16] NOAA selected GeoXO's instrument suite to meet existing requirements and in anticipation of emerging needs. The identified priorities resulted in the inclusion of three new instruments in the mission: a hyperspectral sounder, atmospheric composition instrument, and ocean color instrument.[17] The

[9] White House Office of Management and Budget (OMB) to the Department of Commerce (DOC), *Pre-Decisional 2026 Passback Agency Funding Highlights*, 2025, https://www.documentcloud.org/documents/25898182-noaa-passback/, p. 5 (hereinafter OMB, *Pre-Decisional 2026 Passback Agency Funding Highlights*). Also see Debra Werner, "OMB Suggests NOAA Scale Back Plans for Geostationary Satellites," *SpaceNews*, April 21, 2025, https://spacenews.com/omb-suggests-noaa-scale-back-plans-for-geostationary-satellites/. NESDIS is a subagency, or *line office*, of NOAA. For information about NOAA's organization, see CRS Report R47636, *National Oceanic and Atmospheric Administration (NOAA): Organization Overview and Issues for Congress*, by Eva Lipiec.

[10] NOAA, *Budget Estimates: Fiscal Year 2026*, Congressional Submission, p. NESDIS-27.

[11] NOAA, *Budget Estimates: Fiscal Year 2027*, Congressional Submission, p. NESDIS-36.

[12] 33 U.S.C. §878a defines a *major program* for NOAA satellites as "an activity approved to proceed to implementation that has an estimated life-cycle cost of more than $250,000,000."

[13] See "GeoXO Budget and Funding," below.

[14] For example, U.S. Congress, Senate Committee on Commerce, Science, and Transportation, *Hearings to Examine the Nominations of Neil Jacobs, of North Carolina, to be Under Secretary for Oceans and Atmosphere, and Taylor Jordan, of the District of Columbia, and Harry Kumar, of New York, Both To Be an Assistant Secretary, All of the Department of Commerce*, hearings, 119th Cong., 1st sess., July 9, 2025; and U.S. Congress, House Committee on Science, Space, and Technology (SST) Subcommittee on Environment, *From Orbit to Operations: How Weather Satellites Support the National Security Mission*, hearings, 119th Cong., 2nd sess., January 13, 2026 (hereinafter House SST Subcommittee on Environment, *From Orbit to Operations*).

[15] NOAA, NESDIS, "GeoXO Timeline."

[16] NOAA, *Report to Congress: America's Next Generation Weather and Space Weather Satellite Systems, 5-Year Profile (Fiscal Years 2025-2029)*, September 2024, p. 10 (hereinafter NOAA, *Report to Congress: Next Generation Weather*).

[17] NOAA, *Report to Congress: Next Generation Weather*, 2024, p. 10.

other two instruments in the GeoXO instrument suite were an improved imager and an improved lightning mapper, follow-ons to those in the GOES-R Series program.[18]

After identifying an instrument suite that would meet GeoXO user needs, NESDIS released a broad agency announcement "to engage the commercial sector in developing new concepts for instruments, spacecraft, business models and mission elements for NOAA's future space-based observation architecture."[19] In April 2020, NESDIS awarded contracts to several companies from the commercial and research sector to study GeoXO instrument designs and spacecraft concepts, as well as the program's potential risks and costs, among other things.[20]

GeoXO Program Under the Biden Administration

Under the Biden Administration, between 2021 and 2022, NOAA and the National Aeronautics and Space Administration (NASA) used the contracted studies described above to refine mission requirements; detail acquisition strategies, schedules, cost estimates, resource planning, and risk management; and confirm technology readiness.[21] Following the approval of the GeoXO requirements and preliminary program plan, the Department of Commerce (DOC) officially approved the GeoXO program in December 2022 (i.e., the Deputy Secretary of Commerce signed the DOC Milestone 2/3 decision memorandum), allowing GeoXO to proceed to the development and execution phase.[22] The Milestone decision memorandum cited a program budget of $19.6 billion,[23] which would have covered GeoXO operations and support from 2020 to 2055.[24] The GeoXO program, as planned for under the Biden Administration, would have been NOAA's largest procurement ever.[25]

The Biden Administration's GeoXO program planned for six total spacecraft, with a maximum of three operating simultaneously. The three operational satellites—GEO-West, GEO-Central, and GEO-East—would have been positioned over the Western Hemisphere. The GeoXO constellation would have hosted five instruments to provide continuous imagery and data of Earth's atmosphere, land, and ocean (**Figure 1**). As discussed below, the second Trump Administration has requested to eliminate some instruments that were part of the Biden Administration's GeoXO program.[26] Both Administrations' programs have included the following instruments:

[18] NOAA, *Report to Congress: Next Generation Weather*, 2024, p. 11.

[19] DOC, Office of Space Commerce, "Future NOAA Satellite Architecture," https://space.commerce.gov/business-with-noaa/future-noaa-satellite-architecture/.

[20] DOC, Office of Space Commerce, "Future NOAA Satellite Architecture"; and NOAA, NESDIS, "GeoXO Industry Collaboration," accessed April 8, 2026, https://www.nesdis.noaa.gov/our-satellites/future-programs/geoxo/geoxo-industry-collaboration.

[21] NOAA, NESDIS, "GeoXO Timeline"; and NOAA, *Report to Congress: GeoXO Determination of Readiness*, p. 6.

[22] NOAA, *Report to Congress: GeoXO Determination of Readiness*, pp. 19-20. Also see NOAA, NESDIS, "GeoXO Timeline."

[23] NOAA, *Report to Congress: GeoXO Determination of Readiness*, p. 20.

[24] DOC, OIG, Office of Audit and Evaluation, *The GeoXO Program: Cost and Schedule Baselines are Established, But NOAA Should Evaluate Plans for the Central Satellite Mission and Revise Its Approach to Performance Gains to Provide the Best Overall Value*, Final Report No. OIG-23-028-A, September 20, 2023, p. 2 (hereinafter DOC, OIG, Office of Audit and Evaluation, *The GeoXO Program: Cost and Schedule Baselines*).

[25] Debra Werner, "Full Steam Ahead for NOAA's $20 Billion GeoXO Program," *SpaceNews*, January 10, 2023, https://spacenews.com/20-billion-geoxo-program/.

[26] See "GeoXO Program Under the Second Trump Administration."

1. The GeoXO Imager (GXI) is planned to include 18 channels for viewing visible and infrared wavelengths used to collect real-time, high-resolution imagery.[27] The imager will help NOAA meet its mission needs for "[s]hort-range weather forecasting, severe weather watches and warnings, and monitoring hazardous environmental conditions such as fires, smoke, flooding, fog, snow, ice, and volcanic ash."[28]
2. The GeoXO Sounder (GXS) is planned to be a camera-like device to detect fine-scale ranges of infrared wavelengths used to collect real-time data of the troposphere (where weather occurs).[29] The device will measure the vertical distribution of atmospheric moisture, winds, and temperature.[30] According to the agency, the sounder instrument will improve NOAA's numerical weather prediction and *nowcasting* (i.e., current conditions to conditions expected up to six hours into the future, for example).[31]

The following instruments were included in the Biden Administration's GeoXO program; the second Trump Administration has eliminated them:

1. The GeoXO Atmospheric Composition (ACX) instrument would have been a hyperspectral spectrometer that measured ultraviolet to visible light.[32] The instrument would have provided hourly observations of air pollutants, including ozone, particulate matter, nitrogen dioxide, formaldehyde, glyoxal, and sulfur dioxide.[33] In addition to monitoring air quality, NOAA anticipated the instrument would have helped link air quality to weather and climate events.[34]
2. The GeoXO Lightning Mapper (LMX) instrument would have been a single-channel, near-infrared optical detector used to detect, locate, and measure lightning characteristics, such as its intensity, duration, and extent.[35] The lightning mapper would have helped NOAA meet its mission needs for storm warning and nowcasting.[36]
3. The GeoXO Ocean Color (OCX) instrument would have been a hyperspectral, ultraviolet to near-infrared passive imaging radiometer used to provide ocean color observations every two hours during the daytime over the U.S. ocean

[27] NOAA, NESDIS, "GeoXO Visible and Infrared Imaging," accessed April 3, 2026, https://www.nesdis.noaa.gov/our-satellites/future-programs/geoxo/geoxo-visible-and-infrared-imaging.

[28] NOAA, *Report to Congress: GeoXO Determination of Readiness*, p. 6.

[29] NOAA, NESDIS, "GeoXO Infrared Sounding," accessed April 3, 2026, https://www.nesdis.noaa.gov/our-satellites/future-programs/geoxo/geoxo-infrared-sounding.

[30] NOAA, NESDIS, "GeoXO Infrared Sounding."

[31] NOAA, *Report to Congress: GeoXO Determination of Readiness*, p. 6.

[32] NOAA, NESDIS, "GeoXO Atmospheric Composition Instrument (ACX)," https://web.archive.org/web/20250819081353/https://www.nesdis.noaa.gov/our-satellites/future-programs/geoxo/geoxo-atmospheric-composition-instrument-acx. Also, see NOAA, NESDIS, "NASA Selects BAE Systems to Develop Air Quality Instrument," May 1, 2024, accessed April 3, 2026, https://www.nesdis.noaa.gov/news/nasa-selects-bae-systems-develop-air-quality-instrument-noaa.

[33] Lindsey et al., "GeoXO: NOAA's Future Geostationary Satellite System."

[34] NOAA, *Report to Congress: GeoXO Determination of Readiness*, p. 6.

[35] NOAA, NESDIS, "GeoXO Lightning Mapping," https://web.archive.org/web/20260410043521/https://www.nesdis.noaa.gov/our-satellites/future-programs/geoxo/geoxo-lightning-mapping. Also, see NOAA, NESDIS, "NASA Selects Lockheed Martin to Develop Lightning Mapper for NOAA," September 17, 2024, accessed April 3, 2026, https://www.nesdis.noaa.gov/news/nasa-selects-lockheed-martin-develop-lightning-mapper-noaa.

[36] NOAA, *Report to Congress: GeoXO Determination of Readiness*, p. 6.

waters.[37] The ocean color instrument would have helped NOAA monitor "dynamic coast/ocean features, ecosystem change, water quality, and hazards," according to the agency.[38]

According to a 2022 NOAA report, the GeoXO program as approved under the Biden Administration would "sustain a foundational set of geostationary imaging and lightning detection observations used continuously by NOAA's National Weather Service (NWS)" and would "provide observations to meet mission requirements for NOAA's NWS, National Marine Fisheries Service, Oceanic and Atmospheric Research, and National Ocean Service" with sounding, ocean color, and atmospheric composition observations.[39]

Figure 1. GeoXO Constellation and Instruments As Planned Under the Biden Administration

Source: NOAA, NESDIS, "NASA Awards Contracts for NOAA GeoXO Spacecraft Phase A Study," July 26, 2022, https://www.nesdis.noaa.gov/news/nasa-awards-contracts-noaa-geoxo-spacecraft-phase-study.

Under the Biden Administration's plan, the GEO-West and GEO-East satellites would have been identical, each carrying GXI, LMX, and OCX (**Figure 1**).[40] GXI and LMX would mainly have been used for weather applications and OCX would have been used to support ocean, coasts, and climate observations (**Figure 2**).[41] GXI and LMX would have been improved versions of GOES-R Series' instruments—the Advanced Baseline Imager (ABI) and Geostationary Lightning

[37] NOAA, NESDIS, "GeoXO Ocean Color Instrument (OCX)," https://web.archive.org/web/20250202172010/https://www.nesdis.noaa.gov/our-satellites/future-programs/geoxo/geoxo-ocean-color-instrument-ocx. Also, see NOAA, NESDIS, "NASA Selects BAE Systems to Develop Ocean Color Instrument for NOAA," May 20, 2024, accessed April 3, 2026, https://www.nesdis.noaa.gov/news/nasa-selects-bae-systems-develop-ocean-color-instrument-noaa.

[38] NOAA, *Report to Congress: GeoXO Determination of Readiness*, p. 6.

[39] NOAA, *Report to Congress: GeoXO Determination of Readiness*, pp. 14-15.

[40] NOAA, *Report to Congress: GeoXO Determination of Readiness*, p. 6.

[41] NOAA, *Report to Congress: GeoXO Determination of Readiness*, p. 6; and Lindsey et al., "GeoXO: NOAA's Future Geostationary Satellite System," p. E662.

Mapper (GLM), respectively.[42] For example, GXI is planned to have more spectral bands and higher resolution than ABI.[43] NOAA identified that GXI would be the "only [instrument] that provides [high-availability product] capabilities."[44] *High-availability products* "are mission-critical products that the system must provide for mission success" (also known as a core system), according to NOAA.[45] Two backup spare satellites (one for GEO-West and one for GEO-East) would have helped to manage the risk of a potential satellite failure.

The GEO-Central satellite would have carried GXS, ACX, and a partner payload (**Figure 1**). GXS and ACX would have been new instruments to support climate and weather observations (**Figure 2**).[46] Because the GEO-Central satellite would not have carried GXI, it would have been a "non-core" system in the GeoXO mission.[47] As a non-core system instrument, GXS would have been placed on GEO-Central and would have collected weather-related data over the continental United States and the fringes of Alaska. NOAA also planned to equip GEO-Central with ACX, which would have been used to inform air quality over population centers in the continental United States.

NOAA took operational needs, logistics, and other factors into consideration when planning the number of satellites and the position of instruments over the Western Hemisphere under the Biden Administration, according to the agency. For example, to accommodate the small-car-sized GXI and GXS instruments in the GeoXO mission, NOAA planned to include the mission-critical GXI (i.e., a core system instrument), along with two smaller instruments (LMX and OCX), on GEO-West and GEO-East. Because OCX would have been an ocean-focused instrument, positioning this instrument on the fringes of the continental United States would have aligned with the GeoXO mission needs.

[42] Geostationary Operational Environmental Satellites-R Series (GOES-R), "Instruments: Geostationary Lightning Mapper (GLM)," https://www.goes-r.gov/spacesegment/glm.html; GOES-R, "Instruments: Advanced Baseline Imager (ABI)," https://www.goes-r.gov/spacesegment/abi.html.

[43] GXI would have 18 spectral bands, while ABI has 16 spectral bands. Seven ABI bands would be included in GXI but at a higher resolution. See Debra Werner, "Budget Remains Tight for Scaled-Back GeoXO Program," *SpaceNews*, January 27, 2026, https://spacenews.com/budget-remains-tight-for-scaled-back-geoxo-program/ (hereinafter Werner, "Budget Remains Tight for Scaled-Back GeoXO Program").

[44] DOC, OIG, Office of Audit and Evaluation, *The GeoXO Program: Cost and Schedule Baselines*, p. 4.

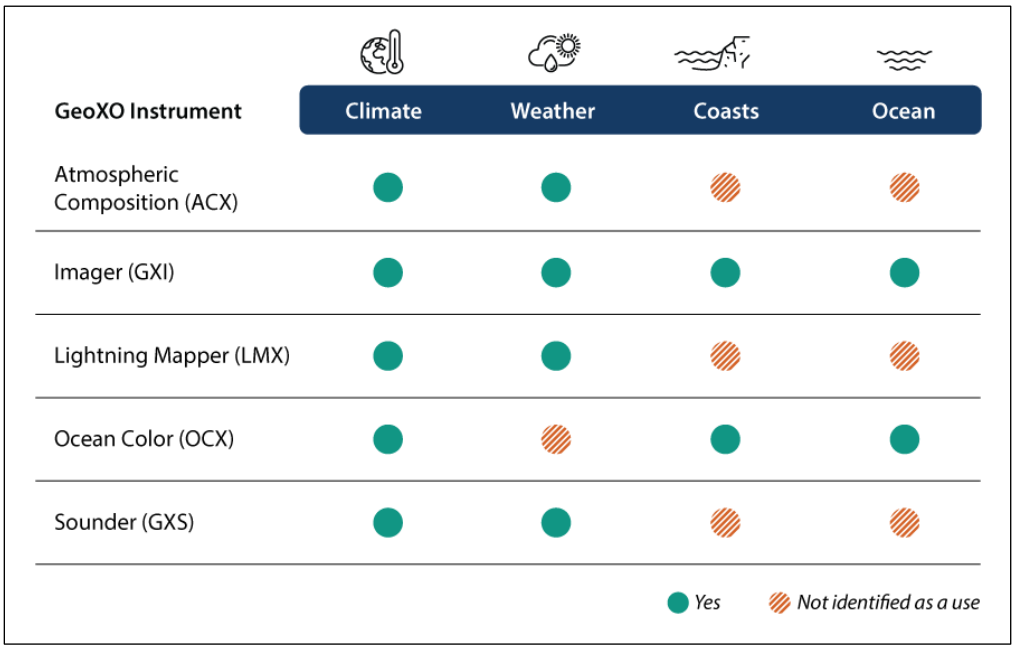
[45] DOC, OIG, Office of Audit and Evaluation, *The GeoXO Program: Cost and Schedule Baselines*, p. 4. NOAA considers *products* to include "data, information, user support, and reports that NESDIS provides to users."

[46] NOAA, *Report to Congress: GeoXO Determination of Readiness*, p. 6; and Lindsey et al., "GeoXO: NOAA's Future Geostationary Satellite System," p. E662.

[47] DOC, OIG, Office of Audit and Evaluation, *The GeoXO Program: Cost and Schedule Baselines*, p. 4.

Figure 2. Application of Planned GeoXO Instruments to Climate, Weather, Coasts, and Ocean Observations

As Planned Under the Biden Administration



Sources: CRS. Daniel T. Lindsey et al., "GeoXO: NOAA's Future Geostationary Satellite System," *Bulletin of the American Meteorological Society*, vol. 105, no. 3 (2024), pp. E660-E679; NOAA and NASA, *Geostationary and Extended Orbits (GeoXO)*, fact sheet, updated August 2021, https://www.nesdis.noaa.gov/s3/2021-08/GeoXO_FactSheet.pdf; NOAA, NESDIS, "GeoXO Infrared Sounding," accessed April 3, 2026, https://www.nesdis.noaa.gov/our-satellites/future-programs/geoxo/geoxo-infrared-sounding; NOAA, NESDIS, "GeoXO Visible and Infrared Imaging," accessed April 3, 2026, https://www.nesdis.noaa.gov/our-satellites/future-programs/geoxo/geoxo-visible-and-infrared-imaging; NOAA, NESDIS, "GeoXO Atmospheric Composition Instrument (ACX)," https://web.archive.org/web/20250819081353/https://www.nesdis.noaa.gov/our-satellites/future-programs/geoxo/geoxo-atmospheric-composition-instrument-acx; NOAA, NESDIS "GeoXO Lightning Mapping," https://web.archive.org/web/20260410043521/https://www.nesdis.noaa.gov/our-satellites/future-programs/geoxo/geoxo-lightning-mapping; and NOAA, NESDIS, "GeoXO Ocean Color Instrument (OCX)," https://web.archive.org/web/20250202172010/https://www.nesdis.noaa.gov/our-satellites/future-programs/geoxo/geoxo-ocean-color-instrument-ocx.

NASA, on behalf of NOAA, contracted several companies between March 2023 and September 2024 to develop GeoXO instruments and spacecraft (**Table 1**).[48] NASA served as the acquisition agency (i.e., awarded and oversaw contracts) for the program's instruments, spacecraft, and integration activities.[49] According to a 2026 DOC OIG report, which investigated GeoXO's progress through December 2025, the GeoXO program had "awarded contracts for the spacecraft and all instruments" included in the Biden Administration's plan.[50]

[48] NOAA, NESDIS, "GeoXO Industry Collaboration."

[49] DOC, OIG, Office of Audit and Evaluation, *Evaluation of NOAA's Progress Implementing the GeoXO Satellite Program*, Final Report No. OIG-26-009-1, March 9, 2026, p. 2 (hereinafter DOC, OIG, Office of Audit and Evaluation, *Evaluation of NOAA's Progress Implementing the GeoXO Satellite Program*).

[50] DOC, OIG, Office of Audit and Evaluation, *Evaluation of NOAA's Progress Implementing the GeoXO Satellite Program*, p. 3. The OIG report "did not evaluate the restructuring" as proposed by the Trump Administration.

Table 1. Awarded Contracts for GeoXO Instruments and Spacecraft

As Cost-Plus-Award-Fee Contracts, According to USASpending.gov, as of July 9, 2026

	Biden Administration			Second Trump Administration
GeoXO Instrument/Spacecraft	**Award ID**	**Current Award Amount** (in millions)	**Company** (City, State)	**Contract Status**
Atmospheric Composition (ACX)	80GSFC24CA026	$262.2	BAE Systems (Boulder, CO)	In Progress[a]
Imager (GXI)	80GSFC23CA044	$620.9	L3Harris (Fort Wayne, IN)	In Progress
Lightning Mapper (LMX)	80GSFC25CA013	$313.1	Lockheed Martin (Littleton, CO)	In Progress[a]
Sounder (GXS)	80GSFC23CA072	$386.8	Ball Aerospace & Technologies Corporation (Boulder, CO)	In Progress
Ocean Color (OCX)	80GSFC24CA035	$371.2	BAE Systems (Boulder, CO)	In Progress[a]
Spacecraft	80GSFC24CA001	$1,800.0	Lockheed Martin (Littleton, CO)	In Progress

Sources: CRS using USAspending.gov. The Award ID corresponds to the contract identification used on USAspending.gov.

Notes: A *cost-plus-award-fee contract* (a type of cost-reimbursement contract) provides for a fee consisting of (1) a base amount (which may be zero) fixed at inception of the contract and (2) an award amount, based on a judgmental evaluation by the government that the contractor may earn for excellence in whole or in part during the contract performance (Federal Acquisition Regulation, "Subpart 16.3—Cost-Reimbursement Contracts," https://www.acquisition.gov/far/subpart-16.3).

a. While the second Trump Administration announced that the contracts for ACX, LMX, and OCX have been discontinued, these contracts appear as "in progress" on USAspending.gov.

GeoXO Program Under the Second Trump Administration

The second Trump Administration aims to restructure the GeoXO program to have a weather-focused mission and to make it a "more streamlined, innovative, and cost-effective operation."[51] In August 2025, the DOC directed "NOAA to submit a revised Milestone 2/3 decision package in order to rebaseline a weather-focused program that prioritizes imaging and hyperspectral infrared sounding observations."[52]

The Trump Administration aims to lower the GeoXO life cycle cost by 50% and to keep annual costs below $500 million.[53] To reduce costs, the Trump Administration requested in FY2026 to change GeoXO to a four-satellite program by eliminating the "third satellite position that was to fly over the central [United States]."[54] The FY2027 budget request also includes a GeoXO four-satellite program composed of two series of two operational satellites (GEO-West and GEO-East).[55] It is unclear whether the elimination of the two GEO-Central satellites was due to their "non-core" status in the GeoXO mission, as previously discussed, or an alternative justification.[56] As of January 2026, NOAA noted that the new "reduced scope and focused mission architecture" addressed many of the risks DOC OIG had identified in a March 2026 report, with a "simplified four-satellite constellation design and elimination of higher-risk program elements."[57]

In addition to changing the GeoXO mission to a four-satellite program, the Administration proposed changes to the program's instruments. Initially, the Administration requested to eliminate ACX and OCX, and possibly LMX, from the program.[58] The FY2026 budget request noted that the agency was open to retaining the LMX if it would be within "cost guidelines."[59] The proposed four-satellite architecture with three instruments would have been configured as follows (**Figure 3**):

- The first GeoXO satellite would have "carr[ied] two GOES-R-era instruments: an Advanced Baseline Imager (ABI) and a Geostationary Lightning Mapper (GLM)." This satellite would have served in the GEO-West position and had an anticipated 2032 launch.
- The second GeoXO satellite would have carried GXI and GXS. This satellite would have served in the GEO-East position and had an anticipated 2034 launch.

[51] NOAA, *Budget Estimates: Fiscal Year 2026*, Congressional Submission, p. NESDIS-27.

[52] NOAA, NESDIS, "GeoXO Timeline."

[53] OMB, *Pre-Decisional 2026 Passback Agency Funding Highlights*, pp. 5-6.

[54] NOAA, *Budget Estimates: Fiscal Year 2026*, Congressional Submission, p. NESDIS-19.

[55] NOAA, *Budget Estimates: Fiscal Year 2027*, Congressional Submission, p. NESDIS-36.

[56] A 2023 OIG report had recommended that NESDIS "[a]ssess the cost and performance tradeoffs of the second Central satellite." The report estimated that the second Central satellite would have a life cycle cost of $866.4 million. In response to the OIG report, NOAA stated that "the second Central satellite [was] needed to meet the required maximum replacement time" of the first Central satellite (DOC, OIG, Office of Audit and Evaluation, *The GeoXO Program: Cost and Schedule Baselines*, pp. 7, 9, and 13).

[57] DOC, OIG, Office of Audit and Evaluation, *Evaluation of NOAA's Progress Implementing the GeoXO Satellite Program*, p. 22.

[58] NOAA, *Budget Estimates: Fiscal Year 2026*, Congressional Submission, pp. NESDIS-19 and NESDIS-27. The director of NOAA's Office of Geostationary Earth Orbit Observations reportedly stated that "if we get too expensive, we will remove stuff" in reference to the GeoXO program (Werner, "Budget Remains Tight for Scaled-Back GeoXO Program").

[59] NOAA, *Budget Estimates: Fiscal Year 2026*, Congressional Submission, p. NESDIS-19.

- The third GeoXO satellite would have carried GXI and, if the budget had allowed, LMX. This satellite would have served in the GEO-West position and had an anticipated 2039 launch.
- The fourth GeoXO satellite would have carried GXI and GXS. This satellite would have served in the GEO-East position and had an anticipated 2043 launch.

Figure 3. GeoXO Constellation and Instruments As Planned Under the Trump Administration in 2025

Source: NOAA, NESDIS, "GeoXO Spacecraft & Instruments," accessed April 3, 2026, https://www.nesdis.noaa.gov/our-satellites/future-programs/geoxo/geoxo-spacecraft-instruments.

Notes: Prior to FY2026 congressional direction, the second Trump Administration had planned for a four-satellite program. The two satellites planned for the GEO-West position would have carried an imager and a lightning mapper and the two satellites planned for the GEO-East position would have carried an imager and sounder.

As of January 2026, NOAA had discontinued the BAE contracts for the ACX and OCX instruments, "as per the direction of the administration."[60] The Administration stated it was assessing whether to include the lightning mapper on GeoXO or to purchase commercial space- or ground-based lightning data.[61] The agency has since discontinued Lockheed Martin's contract for LMX.[62]

[60] Testimony of Irene Parker, Deputy Assistant Administrator for Systems, NOAA, NESDIS, in House SST Subcommittee on Environment, *From Orbit to Operations*. NOAA provides a list of GeoXO "discontinued observations procurements" (see NOAA, NESDIS, "GeoXO Industry Collaboration"); CRS uses terminated and canceled as synonymous terms for discontinued contracts in this report. For more information about the federal government's ability to terminate procurement contracts, see CRS Legal Sidebar LSB11275, *The Government's Broad Power to Terminate Procurement Contracts*, by David H. Carpenter.

[61] Testimony of Irene Parker, Deputy Assistant Administrator for Systems, NOAA, NESDIS, in House SST Subcommittee on Environment, *From Orbit to Operations*.

[62] NOAA, NESDIS, "GeoXO Industry Collaboration."

In early January 2026, Congress passed FY2026 appropriations (P.L. 119-74) and an accompanying explanatory statement that addressed some of the proposed and implemented changes to the GeoXO program.[63] Specifically, Congress stated that "the revised [GeoXO] mission architecture must include imaging and sounding as the core instruments for all satellites with data quality standards that meet or exceed GOES–R requirements and to consider additional instruments if they can be accommodated under a lower life cycle cost cap."[64] Later in January, a NOAA official stated that NOAA would "ensure" congressional direction is executed "as long as the President enacts the law."[65] In April 2026, the DOC Deputy Secretary approved a new rebaseline of the GeoXO program that aligns with FY2026 congressional direction, with each of the four satellites hosting an imager and a sounder (**Figure 4**).[66] Under the revised GeoXO mission, the first GeoXO satellite is planned to launch in 2032 and would "carry the GOES-R-era Advanced Baseline Imager (ABI) and a new GeoXO Sounder instrument" (i.e., GXS).[67] NOAA plans to launch the remaining GeoXO satellites in 2034, 2039, and 2043.[68] Each of these satellites would carry GXI and GXS.[69]

NOAA's FY2027 budget request, released in April 2026, states that the GeoXO constellation will include imagers and a hyperspectral sounder,[70] and estimates total program life cycle costs of $11.9 billion.[71] The budget request also states that contracts for instrument and spacecraft elements are in the process of transitioning from cost-plus to firm-fixed-price contracts.[72] NOAA's FY2026 budget request first requested this change in contract type.[73] A *firm-fixed-price contract* would not be subject to any adjustment on the basis of the contractor's cost experience in performing the contract, meaning the maximum risk and responsibility for the costs would be placed on the contractor.[74]

[63] "Explanatory Statement Submitted by Representative Cole, Chair of the House Committee on Appropriations, Regarding H.R. 6938, Commerce, Justice, Science; Energy and Water Development; and Interior and Environment Appropriations Act, 2026," *Congressional Record*, vol. 172 (January 8, 2026). The explanatory statement stated that H.Rept. 119-272 accompanying H.R. 5342, and S.Rept. 119-44 accompanying S. 2354, "carries the same weight as language included in this joint explanatory statement and should be complied with" unless otherwise noted.

[64] S.Rept. 119-44, p. 69. See footnote 63.

[65] Testimony of Irene Parker, Deputy Assistant Administrator for Systems, NOAA, NESDIS, in House SST Subcommittee on Environment, *From Orbit to Operations*.

[66] NOAA, NESDIS, "GeoXO Timeline."

[67] NOAA, NESDIS, "GeoXO Spacecraft & Instruments."

[68] NOAA, NESDIS, "GeoXO Spacecraft & Instruments."

[69] NOAA, NESDIS, "GeoXO Spacecraft & Instruments."

[70] NOAA, *Budget Estimates: Fiscal Year 2027*, Congressional Submission, p. NESDIS-36.

[71] NOAA, *Budget Estimates: Fiscal Year 2027*, Congressional Submission, p. NESDIS-5.

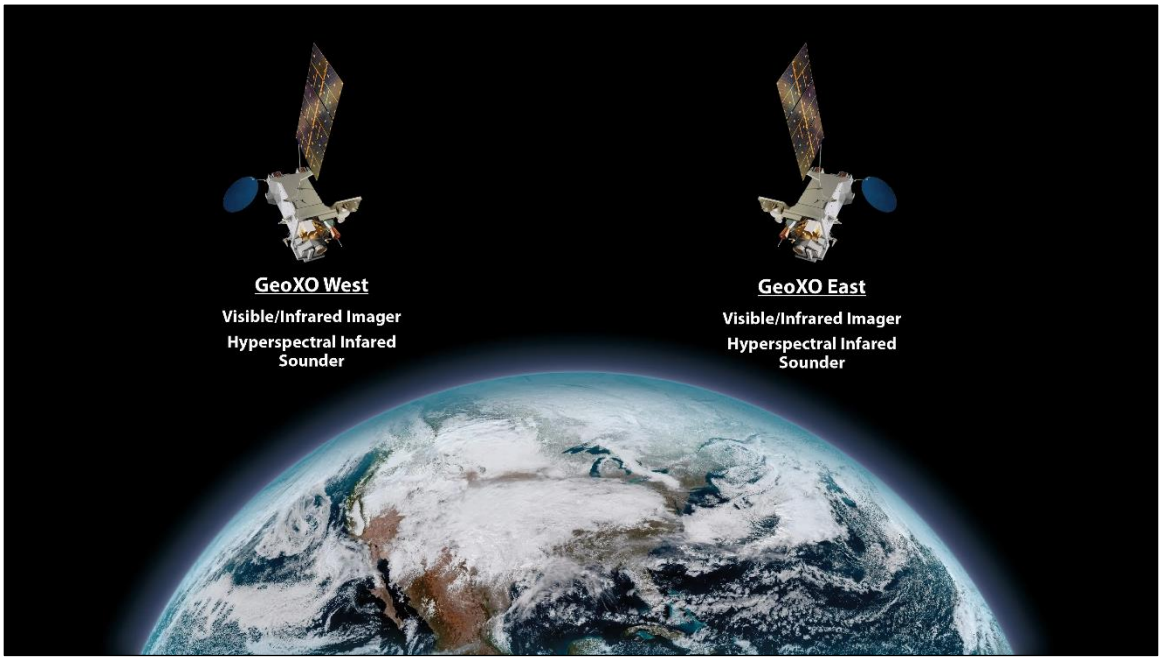
[72] NOAA, *Budget Estimates: Fiscal Year 2027*, Congressional Submission, p. NESDIS-36. The USAspending.gov entries for the imager, sounder, and spacecraft contracts do not reflect a change in the contract type to a firm-fixed-price contract as of the date of this publication.

[73] NOAA, *Budget Estimates: Fiscal Year 2026*, Congressional Submission, p. NESDIS-19.

[74] Federal Acquisition Regulation, "16.305, Cost-plus-award-fee contracts," https://www.acquisition.gov/far/16.305. For more information about federal procurement contracts, see CRS Report R48784, *Types of Federal Procurement Contracts*, by Alexandra G. Neenan and Dominick A. Fiorentino.

Figure 4. GeoXO Constellation and Instruments As Planned Under the Trump Administration in 2026

After FY2026 Congressional Direction Accompanying P.L. 119-74



Source: NOAA, NESDIS, "GeoXO Spacecraft & Instruments," accessed May 11, 2026, https://www.nesdis.noaa.gov/our-satellites/future-programs/geoxo/geoxo-spacecraft-instruments.

Notes: After FY2026 congressional direction in P.L. 119-74 and accompanying explanatory statement (and S.Rept. 119-44 as incorporated by the explanatory statement), the second Trump Administration plans for a four-satellite program with each satellite carrying imager and sounder instruments.

GeoXO Budget and Funding

Congress has appropriated funding to NOAA for geostationary satellite programs over the years, including for GeoXO. Some NOAA documents have indicated that the GeoXO program began in 2019; however, future geostationary satellites (i.e., GeoXO) were first noted in NOAA's FY2020 budget request and the Senate report associated with FY2020 appropriations. NOAA has requested a total of $2.7 billion for GeoXO between FY2020 and FY2026.[75] CRS estimates that Congress has provided approximately $1.72 billion for GeoXO since FY2020.[76] NOAA is requesting $500.0 million in FY2027 for GeoXO.[77]

Issues for Congress

The Trump Administration aims to reduce federal spending by modifying GeoXO.[78] Modifications to the GeoXO program, including the number of satellites and planned instruments,

[75] CRS estimated the total from NOAA's annual budget requests.

[76] CRS estimated the total from explanatory statements accompanying annual appropriations laws and the FY2027 NOAA budget request.

[77] NOAA, *Budget Estimates: Fiscal Year 2027*, Congressional Submission, p. NESDIS-58.

[78] The second Trump Administration aims to keep the total cost of GeoXO to less than $12 billion and to keep annual costs under $500 million (OMB, *Pre-Decisional 2026 Passback Agency Funding Highlights*).

may impact NOAA's continuous observational coverage over the Western Hemisphere, among other possible consequences. The sections below discuss some of the potential consequences of GeoXO modifications, including launch delays and data gaps associated with canceled GeoXO contracts, loss of data due to the elimination of certain instruments, and reduced operational and research gains due to the deployment of GOES-R-era instruments in place of new GeoXO instruments. Congress may weigh the potential consequences associated with modifying the GeoXO program against the benefits of reducing the program's total cost, as intended by the Trump Administration.

Cancellation of Contracts

In April 2025, NOAA stated that FY2026 funding would go toward the "termination costs related to the ocean color, atmospheric composition, and advanced lightning mapper contracts as necessary," among other things related to the GeoXO program.[79] Some Members of Congress have raised concerns about the cancellation of previously awarded GeoXO contracts, especially given that NOAA had not notified congressional authorizing committees about canceled contracts and other modifications to the GeoXO program.[80] In January 2026, Congress directed NOAA to submit a revised GeoXO mission architecture, including component costs and planned launch schedule, before terminating any GeoXO program elements.[81] The cancellation and potential recompetition of these contracts could cause delays to the planned launch timeline and/or data gaps should GOES-R Series satellites fail or reach their end of life (anticipated in the early 2030s) prior to the launch of the first GeoXO satellite (anticipated in 2032).

Other NOAA satellite contracts have been canceled in the past. For example, the National Polar-Orbiting Operational Environmental Satellite System (NPOESS), a planned program between the-then Department of Defense (DOD), NOAA, and NASA, experienced significant instrument development and triagency management challenges, among other issues, that posed potential data gaps.[82] A presidential task force disbanded the NPOESS program and restructured it into separate NOAA and DOD satellite programs to ensure weather and climate data continuity.[83] The restructuring involved the transfer or termination of some NPOESS contracts.[84] Congress could choose to establish a similar task force to determine next steps, or otherwise require the agency to

[79] NOAA, *Budget Estimates: Fiscal Year 2026*, Congressional Submission, p. NESDIS-27.

[80] Ranking Member Maria Cantwell, Senate Committee on Commerce, Science, and Transportation, "Democratic Questions for the Record," *Nominations on Wednesday, July 9, 2025, at 10:00 A.M.*, https://www.commerce.senate.gov/wp-content/uploads/media/doc/QFR%20DEMOCRATS%20Taylor%20Jordan%207.15.25.pdf (hereinafter Ranking Member Maria Cantwell, "Democratic QFRs"); Remarks from Representative Gabe Amo, Ranking Member of the House SST Environment Subcommittee, in House SST Subcommittee on Environment, *From Orbit to Operations*; and Representative Zoe Lofgren, Ranking Member of the House Committee on SST, *Opening Statement for A Review of the President's Fiscal Year 2027 Budget Request for the National Oceanic and Atmospheric Administration*, hearing, April 28, 2026.

[81] S.Rept. 119-44, p. 69. See footnote 63.

[82] U.S. Government Accountability Office (GAO), *Polar-Orbiting Environmental Satellites: Changing Requirements, Technical Issues, and Looming Data Gaps Require Focused Attention*, GAO-12-604, June 2012 (hereinafter GAO, *Polar-Orbiting Environmental Satellites*, GAO-12-604).

[83] GAO, *Polar-Orbiting Environmental Satellites*, GAO-12-604.

[84] GAO, *Polar-Orbiting Environmental Satellites*, GAO-12-604. Also, see Turner Brinton, "White House Dissolves NPOESS Partnership in Blow to Northrop," *SpaceNews*, February 2, 2010, https://spacenews.com/white-house-dissolves-npoess-partnership-blow-northrop/; and Mike Gruss, "Northrop Grumman Awarded $152 Million for Canceled NPOESS Program," *SpaceNews*, August 28, 2013, https://spacenews.com/36984northrop-grumman-awarded-152-million-for-canceled-npoess-program/.

retain or reauthorize the Biden Administration-era contracts and resultant instruments/satellite architecture moving forward, among other considerations.

Senator Maria Cantwell has questioned whether companies will sue the federal government for termination costs associated with the canceled GeoXO contracts.[85] When terminating for convenience, the government is typically liable to the contractor for costs, including reasonable profits, for the portion of the contract already performed; certain costs incurred in anticipation of performance; and costs associated with terminating the contract.[86] Some of the terminated contracts have already outlaid more than $35 million.[87] The contracted companies might forgo requesting termination costs. For example, the companies that had GeoXO contracts for the eliminated instruments (ACX, LMX, and OCX) continue to participate in other GeoXO contracts (see **Table 1**). One of the contractors, L3Harris, reportedly said it is "committed" to navigating any program changes.[88]

The FY2026 budget request stated that "NOAA will work with NASA to convert the imager, sounder, and spacecraft contracts from cost-plus to firm-fixed price."[89] On April 30, 2026, President Trump issued Executive Order 14402, "Promoting Efficiency, Accountability, and Performance in Federal Contracting," making it the "policy of [the Trump] Administration that fixed-price contracts with performance-based considerations should serve as the default and preferred method of procurement" as a means to "incentivize performance rather than cost inflation."[90] Lockheed Martin reportedly said its contracts for the GeoXO mission could be "well-suited" for a firm-fixed-price contract.[91] According to one article, some stakeholders have expressed concerns that firm-fixed-price contracts may not provide as much savings as aimed for by the Administration.[92] Others may argue that while the contractor bears the cost risks under a fixed-price contract, the government may assume the schedule or performance risk if the contractor is unable to fulfill the operational needs.[93]

NASA as an Acquisition Agent

NASA awarded contracts for GeoXO spacecraft and instruments in 2023 and 2024. In the FY2026 budget request, NOAA stated that "with appropriate acquisition authorities, the contracts may be novated from NASA to NOAA as the acquisition agent, as the Administration addresses unnecessary layers of bureaucratic oversight."[94] In January 2026, a NOAA official testified that NASA continued to be the primary acquisition agent for the GeoXO program and that NOAA had

[85] Ranking Member Maria Cantwell, "Democratic QFRs."

[86] See CRS Legal Sidebar LSB11275, *The Government's Broad Power to Terminate Procurement Contracts*, by David H. Carpenter.

[87] For example, see USAspending.gov, "Contract Summary: GEOXO OCEAN COLOR INSTRUMENT IMPLEMENTATION CONTRACT," https://www.usaspending.gov/award/CONT_AWD_80GSFC24CA035_8000_-NONE-_-NONE-.

[88] Tim Fernholz, "NOAA's Weather Sat Do-Over Starts with Less," *Payload Space*, August 29, 2025, https://payloadspace.com/noaas-weather-sat-do-over-starts-with-less/ (hereinafter Fernholz, "NOAA's Weather Sat Do-Over Starts with Less").

[89] NOAA, *Budget Estimates: Fiscal Year 2026*, Congressional Submission, p. NESDIS-27.

[90] Executive Office of the President, Executive Order 14402 of April 30, 2026, "Promoting Efficiency, Accountability, and Performance in Federal Contracting," 91 *Federal Register* 24325, May 5, 2026.

[91] Fernholz, "NOAA's Weather Sat Do-Over Starts with Less."

[92] Fernholz, "NOAA's Weather Sat Do-Over Starts with Less."

[93] See CRS Report R48784, *Types of Federal Procurement Contracts*, by Alexandra G. Neenan and Dominick A. Fiorentino.

[94] NOAA, *Budget Estimates: Fiscal Year 2026*, Congressional Submission, p. NESDIS-19.

the authority to approve the acquisition strategy.[95] NOAA's FY2027 budget request did not include a request to change acquisition agents; the Trump Administration's reason for no longer requesting a change in acquisition agents or additional authorities is unclear. Congress may consider specifying its preference for which agency should lead GeoXO acquisition activities, and therefore provide NOAA with additional authorities if necessary, or retain the agency's existing authorities. As part of its deliberations, Congress might weigh whether changes to NOAA's and NASA's workforces during the second Trump Administration may impact the agencies' ability to implement new or existing acquisition authorities.

NOAA and the Private Sector

Multiple Congresses and Administrations have supported NESDIS's partnership with the private sector, including as it relates to geostationary satellites. A 2018 NOAA study found that a hybrid architecture of government-owned satellites and commercially hosted payloads in the geostationary position would best meet the agency's needs.[96] A 2024 NOAA report found that GeoXO, as conceived by the Biden Administration, could also host a commercial partner payload on the central satellite (**Figure 1**), but did not identify the commercial partner.[97] The Trump Administration's current plan does not include a commercial partner payload (**Figure 4**); however, the FY2026 budget request proposed that NOAA would "award a contract for a commercial mission to handle all satellite, launch, commissioning, and operations" related to GeoXO.[98] NOAA's FY2027 budget request does not contain similar language, and the Trump Administration has not shared further information regarding its commercial mission plans. Given that the FY2027 budget request omits mention of a commercial partner payload or commercial mission contract, Congress may wish to continue its previous support for partnerships with the private sector and direct NOAA to include a commercial partner in the GeoXO program in certain capacities, if that aligns with current congressional priorities. In its oversight capacity, Congress could require NOAA to explain why its FY2027 budget request did not include a commercial partner, and whether that reflects a change in Administration policy compared to its FY2026 request or an alternative objective.

Data and Satellite Configuration Concerns

NOAA depends on continuous observational coverage over the United States for its weather forecasts. A gap in coverage could "impact NOAA's ability to track and issue warnings about severe weather," according to a 2026 DOC OIG report.[99] For FY2026, Congress directed "NOAA to procure a revised [GeoXO] mission architecture that retains continuity of data in geostationary orbit, while modernizing core weather-monitoring capabilities and maintaining first launch in 2032."[100] On April 27, 2026, the DOC Deputy Secretary approved a new rebaseline of the GeoXO program that aligns with FY2026 congressional direction.[101] Modifications to the types

[95] Testimony of Irene Parker, Deputy Assistant Administrator for Systems, NOAA, NESDIS, in House SST Subcommittee on Environment, *From Orbit to Operations*.

[96] NOAA, *The National Oceanic and Atmospheric Administration (NOAA) Satellite Observing System Architecture Study: Building a Plan for NOAA's 21st Century Satellite Observing System*, Draft, May 31, 2018, pp. 23-27.

[97] NOAA, *Report to Congress: Next Generation Weather*, p. 11.

[98] NOAA, *Budget Estimates: Fiscal Year 2026*, Congressional Submission, p. NESDIS-19.

[99] DOC, OIG, Office of Audit and Evaluation, *Evaluation of NOAA's Progress Implementing the GeoXO Satellite Program*.

[100] S.Rept. 119-44, p. 69. See footnote 63.

[101] NOAA, NESDIS, "GeoXO Timeline."

and configuration of the satellites at this point in the procurement cycle may lead to a potential gap in data. Congress may opt to conduct additional oversight over whether NOAA continues to adhere to congressional priorities and direction related to GeoXO, as reflected in the new rebaseline of the program.[102]

Continuity of Data

The 2026 DOC OIG report, which was based on the Biden Administration's GeoXO plan, identified the potential for at least a three-month gap in imaging observations under a scenario where the first GeoXO launch is delayed and a current GOES-R Series satellite fails.[103] A launch delay could have several consequences, including a potential gap in continuous weather coverage over the Western Hemisphere. However, OMB determined in 2025 that the "health" of the GOES-R Series satellites minimized the risk for such a data gap.[104] It remains unclear whether modifications made by the second Trump Administration have delayed NOAA and NASA's progress on the GeoXO mission.

NOAA has previously purchased commercial satellite data to complement its Earth observations.[105] Commercial weather data purchases could potentially fill gaps in the continuity of NOAA's geostationary satellite observations, and some advocacy organizations have called for the prioritization of commercial weather technologies.[106] However, the commercial sector generally launches weather or earth observation satellites in low-Earth orbit (LEO), not geostationary orbit (GEO).[107] In general, LEO satellites fly at altitudes less than 2,000 kilometers above Earth's surface and orbit around the Earth once every 90 minutes, rather than providing continuous observations over a certain portion of the Earth like GEO satellites.[108] In addition, commercial satellite data would also likely require a period of comparison with federal satellite data before commercial data would be considered a replacement for federal assets.[109] Congress may direct NOAA to determine whether and how commercial satellite providers could provide

[102] For example, see remarks from Representative Gabe Amo, Ranking Member of the House SST Environment Subcommittee, in House SST Subcommittee on Environment, *From Orbit to Operations*.

[103] DOC, OIG, *Evaluation of NOAA's Progress Implementing the GeoXO Satellite Program*, p. 5.

[104] OMB, *Pre-Decisional 2026 Passback Agency Funding Highlights*, p. 6.

[105] NOAA, NESDIS, "Search News," https://www.nesdis.noaa.gov/news-events/search-news?tag=1,1126,1186.

[106] For example, The Heritage Foundation, *Mandate for Leadership: The Conservation Promise, Project 2025*, 2023, p. 675 (hereinafter The Heritage Foundation, *Project 2025*).

[107] Union of Concerned Scientists (UCS), "UCS Satellite Database," updated May 1, 2023, https://www.ucs.org/resources/satellite-database. UCS identified over 7,500 satellites launched and operating through April 2023 (UCS stopped tracking satellites after this time). As part of its database, UCS tracked information on satellite operator/owners, their countries, users, purposes, orbits, and other characteristics. Of the 7,560 records, 690 satellites had users in the "commercial" or commercial/other user sector, with "earth observation" (or related), "earth science," "meteorological," or "space science" purposes as defined by UCS. All 690 were identified as being in low-Earth orbit (LEO). CRS did not otherwise identify a comprehensive source of satellite information.

[108] European Space Agency, "Types of Orbits," March 30, 2020, http://esa.int/Enabling_Support/Space_Transportation/Types_of_orbits. According to NOAA, meteorologists use LEO data for long-term and near-term weather forecasts (NOAA, NESDIS, "From Orbit to Outlook: How LEO Satellites Enhance Weather Forecasting," March 10, 2025, https://www.nesdis.noaa.gov/news/orbit-outlook-how-leo-satellites-enhance-weather-forecasting).

[109] For example, see letter from Dr. Steve Volz to the House Committee on SST Chairman Brian Babin and Ranking Member Zoe Lofgren and the Environment Subcommittee Chairman Scott Franklin and Ranking Member Gabe Amo for the hearing on *From Orbit to Operations: How Weather Satellites Support the National Security Mission*, January 11, 2026 (hereinafter Letter from Steve Volz (personal capacity) for the House SST Subcommittee on Environment, *From Orbit to Operations*). Dr. Steve Volz, Assistant Administrator of NESDIS, was placed on administrative leave by the acting director of NOAA on July 24, 2025. He remained on administrative leave until his retirement from NOAA in July 2026.

geostationary weather data and evaluate how data from commercial sources compare to data traditionally used.

Logistical Challenges

Under FY2026 congressional direction and the Trump Administration's revised plan, each GeoXO satellite would carry GXI and GXS instruments (**Figure 4**).[110] Some stakeholders have questioned whether the planned GeoXO spacecraft design can handle a combination of the two small-car-sized instruments.[111] Lockheed Martin, the company awarded the GeoXO spacecraft contract, is reportedly strategizing how to solve the logistical challenge of carrying two instruments of this size on one satellite.[112] Outstanding questions for Congress include whether these logistical challenges can be overcome for the single satellite, and whether the planned satellite architecture will be achieved on schedule. The Biden Administration's plan had avoided this issue by proposing to fly GXS, along with ACX and a commercial partner payload, on a third, central satellite (GEO-Central) and GXI, along with LMX and OCX, on each of GEO-East and GEO-West (**Figure 1**). The Biden Administration proposed a three-satellite operational geostationary mission that differed from the currently operational two-satellite GOES-R Series mission. [113] The GOES-R Series mission does not include a sounder and therefore did not encounter this problem during development and launch.[114]

Improved or Additional Data

NOAA anticipates that GXI would be an operational follow-on and improvement to the GOES-R Series imager (ABI).[115] GXI would produce higher-resolution data compared to ABI, thereby improving short-range weather forecasting and severe weather watches and warnings, among other environmental observation and monitoring improvements. While the Trump Administration plans to deploy GXI on the second, third, and fourth launched GeoXO satellites, the first GeoXO satellite would carry an ABI instrument equivalent to those on currently operational GOES-R Series satellites, thereby meeting the congressional directive to include imaging with "data quality standards that meet or exceed GOES-R requirements."[116] The launch of ABI in 2032 would maintain the status quo for imaging data, but would delay the collection of advanced imaging data with GXI until 2039, when the next satellite for that position over the United States is scheduled for launch.

NOAA anticipated that LMX would extend lightning observations for another two decades and fill data gaps over the ocean.[117] Lightning mappers serve to improve lightning safety, severe thunderstorm and tornado warnings, wildfire response, short-term model forecasts, precipitation

[110] S.Rept. 119-44, p. 69. See footnote 63.

[111] Fernholz, "NOAA's Weather Sat Do-Over Starts with Less."

[112] Fernholz, "NOAA's Weather Sat Do-Over Starts with Less."

[113] GOES-R, "GOES-R Series Instruments Overview," https://www.goes-r.gov/spacesegment/instruments.html.

[114] NOAA currently includes sounder instruments in its LEO missions. NOAA, NESDIS, "JPSS Satellite and Instruments," https://www.nesdis.noaa.gov/our-satellites/currently-flying/joint-polar-satellite-system/jpss-satellite-and-instruments; and NOAA, NESDIS, "Office of Low Earth Orbit Observations," https://www.nesdis.noaa.gov/about/our-offices/office-of-low-earth-orbit-observations.

[115] Lindsey et al., "GeoXO: NOAA's Future Geostationary Satellite System," pp. E663-E664.

[116] S.Rept. 119-44, p. 69. See footnote 63

[117] Jeffrey Adkins, *GeoXO Benefit Analysis*, Integrated Systems Solutions, Inc., contractor for the NOAA chief economist, August 2022, , https://repository.library.noaa.gov/view/noaa/47719, p. 41 (hereinafter Adkins, *GeoXO Benefit Analysis*); and Lindsey et al., "GeoXO: NOAA's Future Geostationary Satellite System," pp. E664-E665.

estimation, tropical cyclone diagnosis and warning, and aviation operations across the United States, according to one study.[118] The Trump Administration did not provide details on its decision to eliminate LMX from its GeoXO configuration; however, as of January 2026, NOAA had been comparing the effectiveness of space-based lightning mappers like LMX and GLM against commercial ground-based observation. In the absence of LMX or GLM, ground-based lightning observations could inform forecasts, but they have geographic limitations compared to space-based lightning mappers. For example, ground-based lightning observations are less able to inform how rapidly hurricanes intensify over the ocean before making landfall.[119]

The benefits of ACX included air quality forecasting, weather and climate forecasting, fire weather forecasting, hazards forecasting, stratospheric ozone monitoring, and air quality monitoring, according to one study.[120] The Trump Administration canceled the contract for ACX.[121] In the absence of ACX, forecasters may continue to depend on NASA's Tropospheric Emissions: Monitoring of Pollution (TEMPO) instrument for "measurements of ozone, nitrogen dioxide, formaldehyde, aerosols, and other constituents important for understanding air quality."[122] ACX was anticipated to be an operational follow-on to TEMPO.[123] NOAA has eliminated instruments from previous satellite missions, such as eliminating the sounder instrument from the GOES-R Series mission;[124] however, some note that cancelling planned upgrades to instruments is not without cost.[125]

The main benefits of OCX included monitoring and forecasting primary production for fisheries models, harmful algal blooms, and hypoxia (i.e., low or depleted oxygen in a water body), according to one study.[126] Ocean color data also provides information about turbidity (i.e., the amount of particles in the water) and ocean currents, which can inform U.S. naval operations.[127] The OCX instrument would have provided ocean color data for the Atlantic Ocean, the Pacific Ocean (including waters around Hawaii and southern Alaska), the Gulf of America, waters around Puerto Rico, and the Great Lakes.[128] Congress had directed NOAA to partner with NASA

[118] Adkins, *GeoXO Benefit Analysis*, p. 41.

[119] NOAA, NESDIS, "Can Lightning Research Improve Hurricane Intensity Forecasts? A Q&A With NOAA's Dr. Stephanie Stevenson," June 2, 2023, https://www.nesdis.noaa.gov/news/can-lightning-research-improve-hurricane-intensity-forecasts-qa-noaas-dr-stephanie-stevenson. For more information about hurricane rapid intensification, see CRS Report R48212, *Hurricane Rapid Intensification: In Brief*, by Eva Lipiec.

[120] Adkins, *GeoXO Benefit Analysis*, p. 57.

[121] NOAA, *Budget Estimates: Fiscal Year 2026*, Congressional Submission, p. NESDIS-19; and NOAA, NESDIS, "GeoXO Spacecraft & Instruments."

[122] NASA "TEMPO," https://www.earthdata.nasa.gov/data/instruments/tempo. NASA launched TEMPO in 2023 and is reportedly optimistic that it will remain operational for at least 10 years (Debra Werner, "NASA Will 'Baby' TEMPO to Extend Its Life," *SpaceNews*, December 13, 2023, https://spacenews.com/nasa-will-baby-tempo-to-extend-its-life/).

[123] Lindsey et al., "GeoXO: NOAA's Future Geostationary Satellite System," p. E668.

[124] See Jonathan Coopersmith, "Why NOAA Wants Its Sounders," *Aerospace America*, June 1, 2022, https://aerospaceamerica.aiaa.org/features/why-noaa-wants-its-sounders/.

[125] For example, in a January 2026 letter to the House SST Environment Subcommittee, Steve Volz (in his personal capacity), claimed that "cancelling planned and well vetted system upgrades will stall progress in critical areas and will lead to reductions in overall system and mission performance." Letter from Steve Volz for the House SST Subcommittee on Environment, *From Orbit to Operations*.

[126] Adkins, *GeoXO Benefit Analysis*, p. 49. *Hypoxia* refers to water conditions that have dissolved oxygen levels below 2 milligrams per liter (NOAA, "Hypoxia," https://oceanservice.noaa.gov/hazards/hypoxia/).

[127] For example, see PACE: Plankton, Aerosol, Cloud, ocean Ecosystem (PACE), "Early Adopter," https://pace.oceansciences.org/people_ea.htm?id=57.

[128] DOC, OIG, Office of Audit and Evaluation, *The GeoXO Program: Cost and Schedule Baselines*, p. 7.

on a GeoXO ocean color instrument in FY2023 and FY2024.[129] The Trump Administration canceled the contract for OCX.[130] In the absence of OCX, researchers and other stakeholders may continue to depend on dispersed existing ocean-based observations, or depend on the periodic ocean color data provided by orbiting LEO satellites (e.g., NOAA's Joint Polar Satellite System or NASA's Plankton, Aerosol, Cloud, ocean Ecosystem satellite).[131] However, some scientists contend that existing ocean color observations from LEO satellites can be limited by cloud cover and glare from the sun.[132] According to NASA, the advanced technology of OCX would have "solve[d] a series of ubiquitous problems faced in remote sensing, enabling us to see around pervasive cloud cover, adequately resolve dynamic coastal features, and provide better information about the composition of the water."[133]

The second Trump Administration eliminated ACX, OCX, and LMX from the GeoXO mission as part of its strategy to reduce the total cost and change the focus of the program (to a weather-focused mission).[134] Some news articles state that some of these instruments may have been eliminated from the GeoXO program because of their climate applications (**Figure 2**), as proposed by some stakeholder groups.[135] CRS did not identify any public NOAA sources that corroborate that the use of these instruments for climate applications is the reason for their elimination.

[129] "Explanatory Statement Submitted by Senator Leahy, Chair of the Senate Committee on Appropriations, Regarding H.R. 2617, Consolidated Appropriations Act, 2023," *Congressional Record*, vol. 168 (January 20, 2022), p. S7918; "Explanatory Statement Submitted by Senator Murray, Chair of the Senate Committee on Appropriations, Regarding H.R. 4366, Consolidated Appropriations Act, 2024," *Congressional Record*, vol. 170 (March 5, 2024), p. S1402; and S.Rept. 118-62, p. 62.

[130] NOAA, *Budget Estimates: Fiscal Year 2026*, Congressional Submission, p. NESDIS-19; and NOAA, NESDIS, "GeoXO Spacecraft & Instruments."

[131] NOAA, NESDIS, "Joint Polar Satellite System," https://www.nesdis.noaa.gov/our-satellites/currently-flying/joint-polar-satellite-system; NASA, "PACE," https://science.nasa.gov/mission/pace/; and PACE, "Information for the Media." PACE, launched in 2024, has a 3-year design life and 10 years of propellant. The next Join Polar Satellite System launch is anticipated in 2027.

[132] Lindsey et al., "GeoXO: NOAA's Future Geostationary Satellite System," p. E665.

[133] NASA, "GeoXO -OCX," December 9, 2024, https://svs.gsfc.nasa.gov/5417/.

[134] NOAA, *Budget Estimates: Fiscal Year 2026*, Congressional Submission, p. NESDIS-27.

[135] Andrew Freedman, "Trump Admin Strips Ocean and Air Pollution Monitoring from Next-Gen Weather Satellites," *CNN*, August 20, 2025, https://www.cnn.com/2025/08/20/weather/noaa-satellites-climate-trump; and Fernholz, "NOAA's Weather Sat Do-Over Starts with Less." For example, the elimination of these instruments would align with some of policy proposals that The Heritage Foundation advocates for in Project 2025, such as reducing the source of "climate alarmism" within NOAA. The Heritage Foundation, *Project 2025*, p. 676.

Appendix. Abbreviations

Abbreviations used in this report are listed below, alphabetically.

Glossary of Frequently Used Abbreviations

ABI	Advanced Baseline Imager
ACX	GeoXO Atmospheric Composition
DOC	Department of Commerce
GEO	Geostationary Orbit
GOES-R	Geostationary Operational Environmental Satellites R
GeoXO	Geostationary Extended Observations
GLM	Geostationary Lightning Mapper
GXI	GeoXO Imager
GXS	GeoXO Sounder
LEO	Low-Earth Orbit
LMX	GeoXO Lightning Mapper
NASA	National Aeronautics and Space Administration
NESDIS	National Environmental Satellite, Data, and Information Service
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
OCX	GeoXO Ocean Color
OIG	Office of Inspector General
OMB	Office of Management and Budget

Author Information

Caitlin Keating-Bitonti
Specialist in Natural Resources Policy

Eva Lipiec
Specialist in Natural Resources Policy

Disclaimer