



GOES-R and GeoXO



QUARTERLY NEWSLETTER ■ OCTOBER-DECEMBER 2024 ■ ISSUE 47

A note from Pam Sullivan, GEO director:

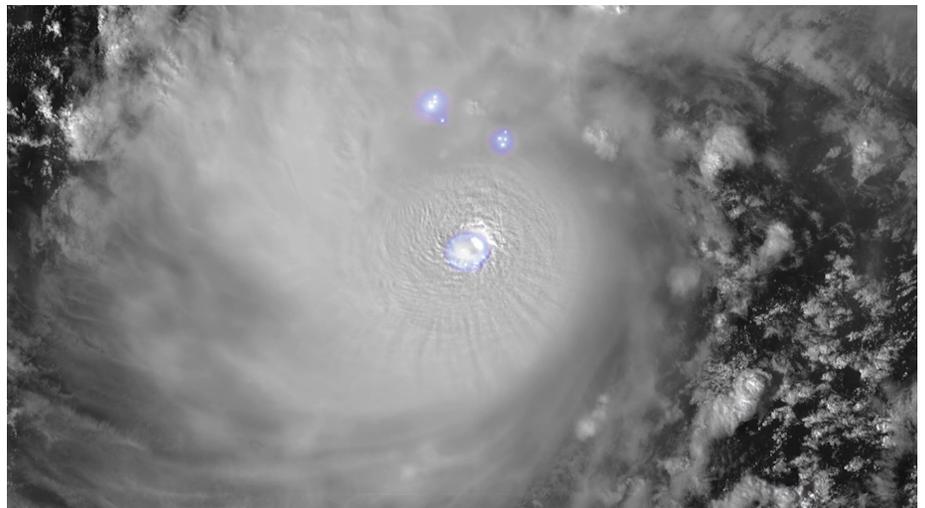


As GOES-19 prepares to enter operational service, I want to acknowledge the tremendous amount of hard work and dedication our team has put into GOES-R

since 1999. From the very start of the program, the GOES-R team has been recognized as setting the standard for satellite and ground system development as well as inter-agency collaboration. The GOES-R system will continue to serve our nation providing observations of severe weather and environmental conditions into the 2030s, while the focus of our team now turns to GeoXO development. We completed the Mission Definition Review in December, are working on evolving the ground system for GeoXO, and are preparing to enter the preliminary design phase. Congressional support of GeoXO has us on track for planned launches. It is an exciting time as we make NOAA's next-generation geostationary satellite system a reality, bringing new and improved capabilities to meet our users' needs and address emerging environmental challenges.

GOES-R HIGHLIGHTS

NOAA released initial imagery from three GOES-19 satellite instruments during the fourth quarter of 2024. GOES-19 is currently undergoing post-launch testing, which includes validation and calibration of its instruments, systems and data to prepare it for operations. Imagery and data from GOES-19 during the post-launch testing phase should be considered preliminary and non-operational. [On Oct. 17, 2024, NOAA shared initial imagery from the GOES-19 Geostationary Lightning Mapper \(GLM\).](#) The GOES-19 GLM detected and monitored lightning activity in two extremely hazardous hurricanes – Helene and Milton. Lightning activity in the outer rainbands and eyewalls of these hurricanes was associated with rapid intensification. Frequent lightning outside Milton's core was associated with intense rain bands that produced widespread flash flooding and tornadoes across Florida on Oct. 9, 2024.



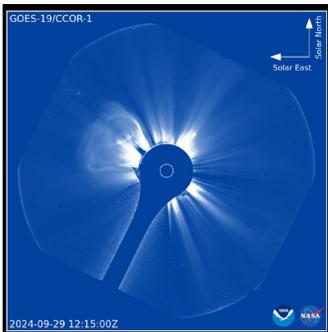
Lightning activity in Hurricane Milton, captured by GOES-19. Image credit: NOAA/NASA/CIRA

On Oct. 22, 2024, NOAA shared the first imagery from the Compact Coronagraph-1 (CCOR-1). [CCOR-1, a powerful solar telescope onboard GOES-19, began observing the sun's corona on Sept. 19, 2024.](#) The initial video showed a clearly defined coronal mass ejection (CME), a large expulsion of plasma and magnetic fields, emerging from the east limb or left side of the sun. CCOR-1 monitors the corona (the outer layer of the sun's atmosphere) to forecast CMEs and delivers uninterrupted coverage of the corona with a

DID YOU KNOW?

In October 2024, NOAA and NASA announced the sun reached the [solar maximum](#) period of Solar Cycle 25. During solar maximum, the amount of solar activity increases.

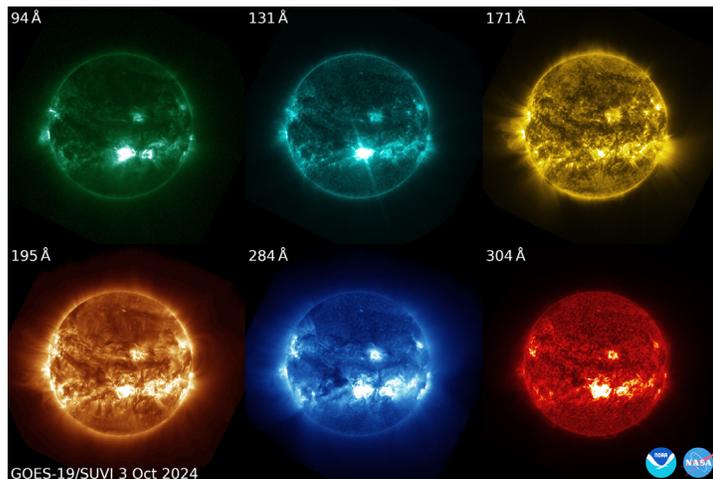
GOES-R HIGHLIGHTS (CONTINUED)



new image every 15 minutes. CCOR-1 is NOAA's first coronagraph instrument and is part of NOAA's SWFO (Space Weather Follow On) mission.

CCOR-1 onboard GOES-19 captured imagery of a coronal mass ejection emerging from the sun's left side on Sept. 29, 2024. Image credit: NOAA/NASA

On Oct. 29, 2024, NOAA shared the first imagery from the GOES-19 Solar Ultraviolet Imager (SUVI). [The GOES-19 SUVI began observing the sun on Sept. 24, 2024.](#) On Oct. 3, 2024, the instrument captured an X9 solar flare, the most powerful of the current solar cycle. SUVI monitors the sun in the extreme ultraviolet portion of the electromagnetic spectrum to watch for hazardous space weather that could affect Earth.



GOES-19 imagery of the Oct. 3, 2024, solar flare shown in six extreme ultraviolet channels. The clearest depiction of the flare is in the 131 Å channel (top center). Image credit: NOAA/NASA

On Oct. 24, 2024, GEO team members gathered at NASA's Goddard Space Flight Center to celebrate the GOES-R Series satellite program and the achievement of building and launching all four satellites in the series. GOES-R began in 1999, and the team launched the final satellite in June. During the "commencement" event, GEO director Pam Sullivan recognized the team's many accomplishments throughout the program.



GEO program members gathered at the GOES-R commencement event. Photo credit: NASA

On Nov. 13, 2024, NESDIS published its fiscal year 2024 accomplishments report, which prominently features GEO achievements. ["NESDIS Reflects on FY 2024"](#) highlighted the GOES-U launch and release of the first data and imagery from each of its instruments. The report also featured accomplishments from GeoXO, including the awards of the remaining development contracts and the completion of the GeoXO Sounder System Requirements and System Definition Reviews.

GeoXO HIGHLIGHTS

The GeoXO program completed its Mission Definition Review in December 2024. The review determined the overall mission design is reasonable, feasible, complete and responsive to the mission requirements, as well as consistent with system requirements and available resources. The Standing Review Board noted several program strengths, including having adapted to lower-than-baseline funding profiles, the experienced team, BAE System's portfolio approach for the Atmospheric Composition (ACX), Ocean Color (OCX) and GeoXO Sounder (GXO) instruments, Advanced Baseline Imager (ABI) and GLM instrument heritage, and use of the Cloud for data delivery.

The GeoXO flight team completed System Requirements

Reviews/System Definition Reviews for the OCX, ACX and spacecraft in November 2024. The instruments and spacecraft are now positioned to proceed into the preliminary design phase.

The GEO Ground Project Management Office hosted an industry day on Nov. 7, 2024. The in-person event was held at the NASA Goddard Visitor Center and welcomed 55 participants from 18 vendors. [Participants received an overview of the GEO Program, current GEO ground system operations and plans for evolving the ground system to support future NOAA-NASA satellite programs.](#) The event was part of the market research phase of the acquisition effort for the future GEO Ground Multi-Mission Sustainment

GOES-R HIGHLIGHTS (CONTINUED)

& Evolution (GMSE) contract. Through open briefings and one-on-one sessions, GEO sought insight from industry partners on advancing the current ground system to support GeoXO and space weather mission requirements while reducing the overall sustainment burden.



GEO ground system engineering and test lead Katie Spotz (foreground) and communications specialist/science writer Emma Friedman provide support for the GEO ground system industry day on Oct. 7, 2024. Photo credit: NOAA

The GEO ground system project released the [GMSE acquisition market research RFI](#) on Dec. 5, 2024. The purpose of the RFI is to plan for the evolution of the current GEO ground system to expand multi-mission support to the NOAA's GeoXO and space weather missions while sustaining the existing GOES system. The RFI also seeks to minimize the overall lifecycle costs of sustainment, operations and maintenance by identifying opportunities to streamline, simplify, and optimize the ground system using emerging technologies while ensuring extensibility, reliability and continued IT security policy compliance.

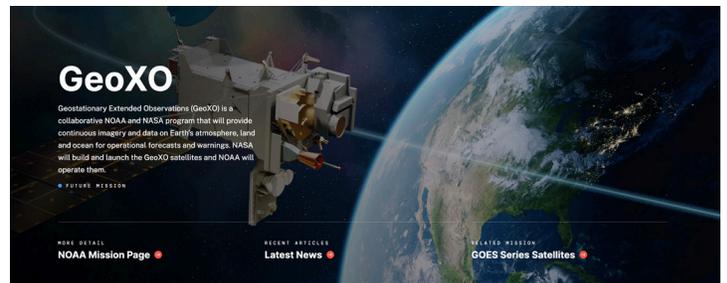
On Dec. 16, 2024, experts provided a briefing to Congressional staff on future NOAA air quality monitoring capabilities. Personnel from the GEO Program (Pam Sullivan, Andy Heidinger), NESDIS STAR (Shobha Kondragunta), NOAA OAR (Greg Frost), and the Maryland Department of the Environment (Joel Dreesen) presented one of four GeoXO Learning Series briefings for Senate Commerce and the Congressional Environmental Justice Caucus staff. The briefing, "GeoXO: Air," focused on the

ACX instrument and the capabilities it will bring to improve observations of air quality and therefore human health.



GeoXO briefers, NOAA legislative affairs, and communications staff at the Dirksen Senate Office Building. From left: Andy Heidinger, Greg Frost, Pam Sullivan, Topher Holmes (back row), Joel Dreesen, and Jessica Dueck. Photo credit: NOAA

NASA published a new webpage for the GeoXO mission. The [NASA Science GeoXO webpage](#) provides GeoXO with a presence within the NASA digital space, offering an overview of the mission and the NOAA/NASA partnership and directing users to the [NESDIS GeoXO webpage](#) for detailed information.



New NASA GeoXO webpage banner image. Image credit: NASA/NOAA

A new video highlights a day in the life of GeoXO. The year is 2036, and a [new generation of geostationary weather satellites called GeoXO](#) is orbiting Earth and constantly watching the Western Hemisphere. This new generation includes three satellites: [GEO East](#), [GEO Center](#) and [GEO West](#). The constellation measures, monitors and watches multiple events across the United States at the same time. Using data from current satellites, we can imagine what this new generation will see. The GeoXO instruments will provide near real-time information to forecasters, decision-makers, and first responders. From severe weather and [hurricane](#) warnings to [air quality](#), [wildfires](#), and [marine hazards](#), GeoXO will contribute to the protection of life and property within the United States. All in a day's work.

SCIENCE

The GOES-19 CCOR-1 and SUVI instruments captured extended images of the sun's atmosphere on Oct. 22-25, 2024. [NOAA operated SUVI in a special mode called "extended coronal imaging \(ECI\)."](#) Typically, SUVI captures the sun's activity in six types of extreme ultraviolet light,

each showing different temperatures on the sun. During ECI, SUVI captured images slightly off-center from the sun, using two wavelengths (171 Å and 195 Å). By doing this, scientists can create three-panel mosaic images that reveal more of the sun's outer atmosphere, known as the middle corona.

This extended view helps connect the details in SUVI images with the new CCOR-1 images. Once operational, the Space Weather Prediction Center (SWPC) will use data from both CCOR-1 and SUVI to issue early warnings and improve the accuracy of forecasts, protecting vital infrastructure from space weather threats.



GOES-19 CCOR-1 and SUVI composite image of the sun on Oct. 24, 2024, while the SUVI instrument operated in ECI mode. Image Credit: NOAA

GEO participated in episode 10 of the Planet NOAA Podcast episode “Hail, yeah!” GOES-R program scientist and GeoXO deputy program scientist Dan Lindsey was part of a roundtable discussion about severe weather for the latest episode of the [Planet NOAA Podcast](#), released on Nov. 12, 2024. The episode focused on the science and observational tech that shapes our understanding of severe weather. Lindsey explained how important satellites are for hurricane forecasting. Because hurricanes form over the open ocean that lack ground-based radar and other surface observations are limited, we wouldn't know exactly where and when storms are forming and which direction they're heading without geostationary satellites. Lindsey also highlighted cutting-edge artificial intelligence/machine learning applications that use GOES-R data, like LightningCast, and provided an overview of the exciting new and improved capabilities that will be available from the future GeoXO satellites.

In November 2024, a rapidly intensifying extratropical cyclone developed in the Northeast Pacific. [The low-pressure system underwent a remarkable period of strengthening and exceeded hurricane-force winds.](#) On Nov. 19, GOES-18 (GOES West) imagery helped forecasters determine the storm was rapidly intensifying. GOES-18 also identified sea spray, which is a threat to mariners. This storm system also produced an atmospheric river over Northern California, leading to days of heavy rainfall. Several GOES-18 data products helped forecasters estimate how much rainfall the storm would produce.

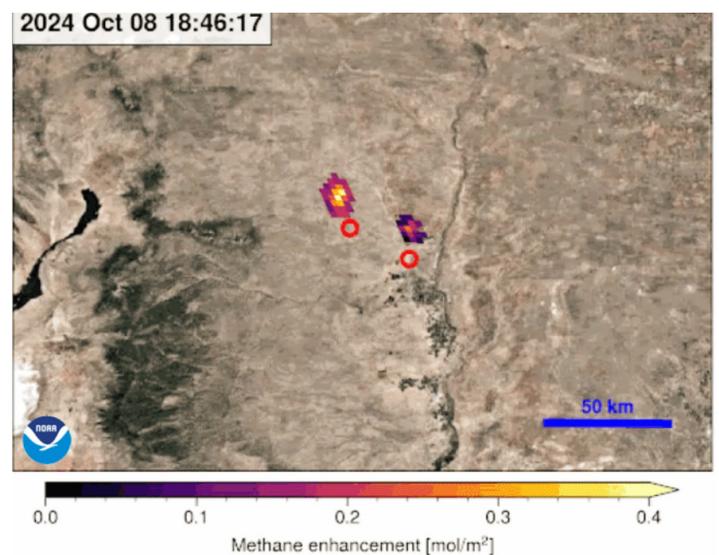
The 2024 Atlantic hurricane season officially ended on Nov. 30. [It was an above-average season with a record-breaking ramp-up following a peak-season lull.](#) The Atlantic basin saw 18 named storms with 11 intensifying into

hurricanes. Five were major hurricanes intensifying into Category 3 or higher, including the devastating hurricanes [Helene](#) and [Milton](#). GOES-16 (GOES East) constantly monitors the Atlantic basin for the development of tropical storm systems. Data from the satellite provided early warning that storms were forming, monitored and tracked the movement of the storms, and helped forecasters estimate the intensity of each storm.

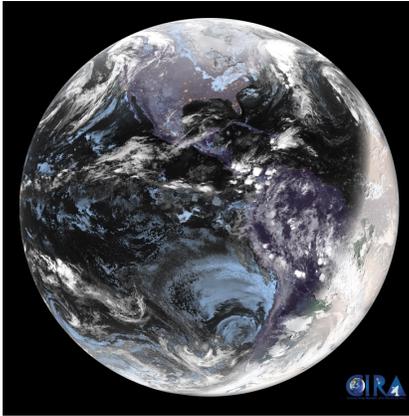


GOES-16 GeoColor imagery of Hurricane Milton approaching Florida on Oct. 9, 2024. Image credit: NOAA/CIRA

The innovative use of NOAA's geostationary satellites (GOES) has given scientists a new way to detect large methane emissions faster and more accurately. [Results of a new experiment show the ABI can pinpoint leaks or venting of methane—a potent greenhouse gas—as often as every seven seconds.](#) NOAA scientists say the experimental verification of GOES methane data will lead to faster, more complete data on the location—and amount—of methane emissions and successful mitigation efforts when there are accidental leaks.



NOAA's GOES-16 satellite captured methane released from two pipeline valves during a planned blowdown event on Oct. 8, 2024. The methane plumes are estimated to be confined to the lowest 300 to 600 meters in the atmosphere with a width of 2 to 8 kilometers by ground-based Lidar observations. Image credit: NOAA



NOAA's newest eyes in space captured the winter solstice on Dec. 21, 2024. [GOES-19 provided a beautiful view of Earth during the winter solstice.](#) Currently positioned over the Western Hemisphere at 89.5° west longitude, between NOAA's GOES East and GOES West satellites, GOES-19 captured this celestial moment from space while undergoing post-launch testing. The winter solstice marked the shortest day and longest night of the year in the Northern Hemisphere. At precisely 4:21 a.m. EST, the Northern Hemisphere reached its maximum tilt away from the sun, positioning the sun directly over the Tropic of Capricorn, 23.5° south of the equator.

On Dec. 21, 2024, GOES-19 captured this image of Earth during the winter solstice shortly after the Northern Hemisphere reached its maximum tilt away from the sun, positioning the sun directly over the Tropic of Capricorn at 23.5° south latitude. Imagery and data from GOES-19 during the post-launch testing phase should be considered preliminary and non-operational. Image credit: NOAA/NASA/CIRA

EDUCATION AND OUTREACH

On Oct. 18, 2024, GEO communications and outreach team members participated in the 2024 Maryland STEM (science, technology, engineering, mathematics) Festival Opening Ceremony at Johns Hopkins University Applied Physics Laboratory, along with LEO and SWO colleagues. The opening ceremony featured speeches by leaders in the STEM community, interactive STEM activities, and demonstrations highlighting the latest advancements and innovations. The GEO/LEO/SWO team guided students through hands-on activities, provided handouts and answered questions.



GEO communications specialist/science writer Emma Friedman helps students create a tornado in a bottle at the Maryland STEM Festival. Photo credit: NOAA

On Oct. 19, 2024, GEO outreach supported the Massachusetts Teacher STEM Fair in Foxboro, Massachusetts. The "Observing the Earth and Sun with GOES and JPSS" booth was hosted in collaboration with LEO outreach at Patriot Place Conference Center at Gillette Stadium. More than 450 educators, adults and children explored the STEM-focused activities and learned more about the science behind GOES-19. The Massachusetts Teacher STEM Fair was designed for all educators from all content areas to dive into hands-on STEM lessons, explore

state and national STEM organizations, and ignite excitement for STEM.

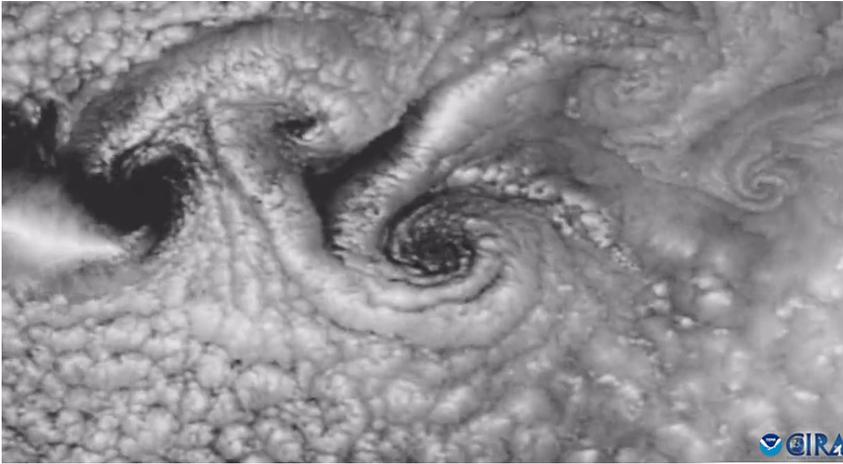


GEO senior outreach manager Erin McKinley (left) guides a student through a STEM activity at the Massachusetts Teacher STEM Fair. Photo credit: NOAA

On. Nov. 14, 2024, GEO participated in the United States Patent and Trademark Office (USPTO) Noche de Ciencias (Night of Science) event at USPTO HQ in Alexandria, Virginia. The event, in collaboration with the USPTO chapter of the Society of Hispanic Professional Engineers and Alexandria City Public Schools, introduced K-12 students and families to STEM through hands-on activities. The event drew over 700 visitors from the area. GEO provided hands-on activities demonstrating the science behind GOES-19 and connected STEM concepts to the mission objectives and instruments.

GEO outreach hosted 11 GEO virtual visit events for schools in Michigan, Minnesota, Texas, New Jersey and Florida. The team connected with 364 students in grades 5 through 10 and 26 educators during October, November and December. The virtual programs explored the STEM connections in the GOES-R and GeoXO missions and highlighted several major terrestrial and space weather events including Hurricanes Helene and Milton and the Oct. 10, 2024, solar storm.

EDUCATION AND OUTREACH (CONTINUED)



The top 10 GOES satellite images of 2024, chosen by followers of NESDIS social media accounts, were highlighted in an article, [“Your Picks for the Best NOAA Satellite Imagery from 2024.”](#) The top contenders provided captivating, and occasionally sobering, views of hurricanes, wildfires, space weather and more from around the globe. The most-liked GOES image was a visible imagery animation of von Kármán vortices over the Pacific Ocean from GOES-18 on April 30, 2024.

GOES-18 visible imagery of von Kármán vortices over the Pacific Ocean. Image credit: NOAA/CIRA

CONFERENCES AND MEETINGS

The GEO program participated in the **2024 EUMETSAT Meteorological Satellite Conference**, held Sept. 30 – Oct. 4, 2024, in Würzburg, Germany. The meeting included a dedicated GeoXO session. This annual conference brings together meteorological and scientific communities from around the world to share experience and knowledge during plenary, poster and workshop sessions. The theme of this year’s conference was [“Earth observation value chains for weather, climate and hydrosphere.”](#)

The GEO Program user engagement team continued the NOAA Satellite Applications Symposium Series with an air quality event on Oct. 8, 2024. [“The Evolving Capabilities of Monitoring Atmospheric Composition for Human Health and Air Quality Applications”](#) highlighted developing satellite capabilities to monitor the composition of the atmosphere, including air pollution that affects human health. New sensors have recently launched while others are in development to serve users in the future. This event focused on advancing engagement and readiness for the newest and next generation of these satellites.

Several GEO team members participated in the **American Geophysical Union Annual Meeting**, held Dec. 9-13, 2024, in Washington, D.C. through oral presentations, town halls, and NOAA and NASA exhibit engagements. GEO

senior outreach manager Erin McKinley engaged with Maryland Lt. Gov. Aruna Miller, explaining GOES fire detection and monitoring capabilities. On Dec. 11, a GeoXO Town Hall provided an opportunity for the AGU community to learn about GeoXO from scientists across NOAA and NASA and to offer feedback to program personnel on research and development ideas to best prepare for the future data stream.



GEO senior outreach manager Erin McKinley (right) explains GOES-R fire detection and monitoring capabilities to Maryland Lt. Governor Aruna Miller (Right) at AGU. Photo credit: NASA

AWARDS

Monica Todirita, GeoXO flight project deputy program manager, was honored as the 2024 NESDIS Employee of the Year in the category of professional/technical services for leadership. During an award ceremony on Dec. 10, 2024,

NESDIS recognized Todirita for her exceptional leadership that led to all five of the GeoXO instruments entering production.

MEET THE TEAM



In this issue, meet Amanda Demski, senior budget analyst. Amanda joined the GEO program control team in August 2024 and supports the program in planning, executing, reporting and financial management of GEO's multi-million-dollar budget, while also navigating new NOAA financial systems.

Amanda has over 22 years of financial experience, including 15 years with NOAA, in effectively managing budgets, analyzing financial data, and providing strategic recommendations that enhance fiscal responsibility and operational efficiency. She began her federal career in 2009 at the National Polar Orbiting Environmental Satellite System Program (NPOESS) and the Joint Polar Satellite System (JPSS) where she executed multi-million-dollar budgets. Amanda served as JPSS' construction work in progress activity manager where she tracked and capitalized two billion dollars once NOAA-20 became operational. She also managed the JPSS annual financial audit and ensured internal controls were in place.

Amanda has a working knowledge of both NOAA and NASA financial systems and budget processes. "I'm proud to have served as an acting NASA resource analyst for three years while also keeping all NOAA responsibilities," she said. Amanda served on a source selection board for an upcoming major development contract. While working with the Office of Common Services, she was a member of the NESDIS Enterprise Cloud team and gained knowledge in Scale Agile Framework and FinOps for Cloud budgeting and chargeback practices. "While completing these accomplishments, I'm also very proud of the working relationships I have built over the years," said Amanda.

Amanda lives in Chesapeake Beach, Maryland, with her husband and two children, Fae (6) and Phineas (4). In her free time, she enjoys baking and crafting with her kids. When she's not running her kids' extracurricular activities (jiu-jitsu

and gymnastics), she enjoys hiking and riding bikes with her children and enjoying downtime by the Chesapeake Bay.

UPCOMING EVENTS

GOES-19 Handover Readiness Review

Jan. 28, 2025

GeoXO Imager Preliminary Design Review

Jan. 28-30, 2025

GeoXO Key Decision Point-B

Feb. 19, 2025

GeoXO Summit I

March 4-6, 2025

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