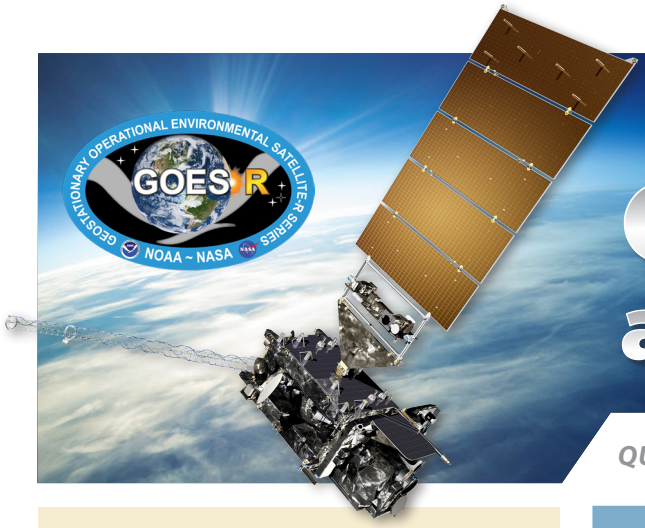


GOES-R and GeoXO

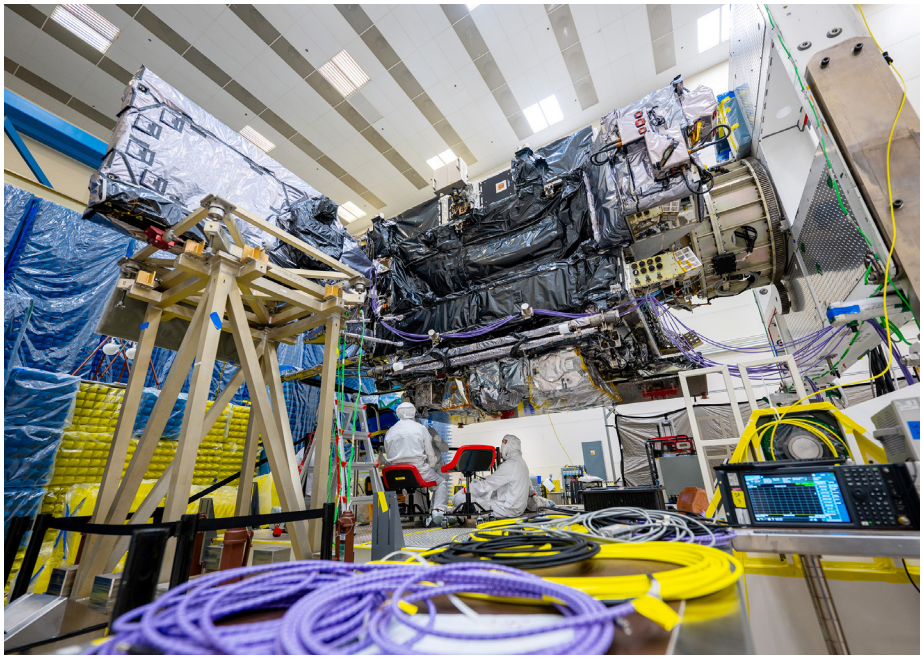
QUARTERLY NEWSLETTER ■ JULY-SEPTEMBER 2023 ■ ISSUE 43

A note from Pam Sullivan, GEO director:

The GOES-R and GeoXO programs accomplished a lot this quarter. GOES-U completed environmental testing and is preparing for its Pre-Shipment Review at the end of October. The ground, flight, and mission operations teams are busy conducting rehearsals and readiness exercises to prepare for the April 2024 launch. We awarded the second GeoXO development contract to build the Sounder and released three development RFPs this quarter – for the Lightning Mapper and Ocean Color instruments and the Spacecraft. Also, the GeoXO Imager had a successful System Requirements Review/System Definition Review and is proceeding to the preliminary design phase. And we welcomed our new deputy program director, Brian Hall. I hope folks have a chance for a little downtime this fall before we head into the GOES-U launch campaign and award the remaining GeoXO contracts early next year.

GOES-R HIGHLIGHTS

GOES-U completed electromagnetic interference (EMI)/ electromagnetic compatibility (EMC) testing in August 2023. EMI/EMC testing ensured that spacecraft functions will not be affected by various types of electromagnetic radiation during operations. This concluded a rigorous environmental testing program to confirm the satellite can withstand the harsh conditions of launch and maintain functionality while in orbit 22,236 miles above Earth. GOES-U completed pre-shipment testing in September.



Engineers prepare GOES-U for EMI/EMC testing. Photo credit: Lockheed Martin

The GOES-U Operational System Validation Test was successfully completed on Aug. 2, 2023. The test simulated mission operations with all subsystems operating a flight-like environment using flight software. The test demonstrated that the spacecraft data system can successfully process data from all of the instruments running at their maximum data rate.

DID YOU KNOW: **An annular solar eclipse happens when the moon passes directly between the sun and Earth, but does not completely cover the sun's disk. As a result, the moon appears as a dark disk on top of a larger, bright disk, creating what looks like a ring around the moon. On Oct. 14, 2023, an annular solar eclipse will cross North, Central, and South America.**

GOES-R HIGHLIGHTS (CONTINUED)

The first GOES-U mission rehearsal was conducted Aug. 28 – Sept. 1, 2023. Mission rehearsals use a satellite simulator and the ground system to train operations personnel and test the readiness of operational products and the ground system. These rehearsals help to test different parts of launch, like orbit-raising, post-launch separation events, solar array deployment, and propulsion system readiness. They simulate both normal operations and what to do if a procedure doesn't go as planned. Mission rehearsal 1 focused on launch and liquid apogee engine/hydrazine bi-propellant thruster burns.

Three GOES-18 science data products were declared fully mature following Peer Stakeholder-Product Validation Reviews in September 2023. These include Advanced Baseline Imager (ABI) Level 1b cloud and moisture imagery, Space Environment In Situ Suite (SEISS) Solar and Galactic Proton Sensor (SGPS), and Goddard Magnetometer (GMAG) data. These products are now fully validated and operational.

The GEO ground system team conducted the second GOES-U Ground Readiness Exercise (GRE) on Sept. 18-22, 2023. Ground readiness exercises are performed to ensure the ground system, work processes, and staff are ready to perform operations. GRE-2 focused on spacecraft navigation procedures using a new mission analysis tool.

GeoXO HIGHLIGHTS

On Sept. 11, 2023, NOAA and NASA announced the selection of Ball Aerospace & Technologies Corporation of Boulder, Colorado, to develop the GeoXO Sounder (GXS). The contract includes the development of one flight instrument as well as options for additional units. GXS will provide real-time information about the vertical distribution of atmospheric moisture, temperature, and winds over the Western Hemisphere. The National Weather Service (NWS) will use GXS data to improve numerical weather prediction and short-term forecasts of convection and severe weather. The National Hurricane Center will use GXS data to improve hurricane track and intensity forecasts.

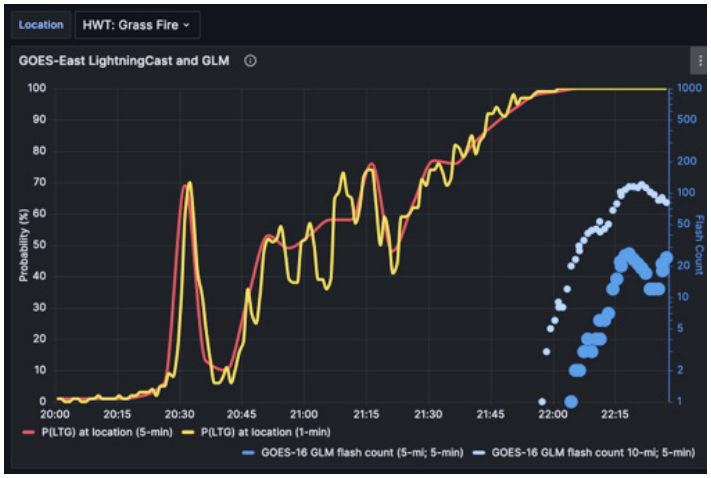
The GeoXO program is soliciting proposals to develop additional instruments and the spacecraft. On October 18, 2023, NASA released the request for proposals (RFP) to develop the GeoXO Lightning Mapper (LMX). The team is evaluating proposals and is planning to award the contract in late February 2024. On Aug. 31, NASA posted the request for proposals for the GeoXO Ocean Color (OCX) instrument implementation contract. Proposals are due on Oct. 16 and the anticipated contract award is April 2024. On Sept. 29, NASA posted the GeoXO spacecraft development RFP. Proposals are due on Nov. 30. NASA plans to award the contract in late May 2024.

The GeoXO Imager (GXI) System Requirements Review /System Definition Review was held Aug. 29-31, 2023. The Goddard Systems Review Team (GSRT) determined the GXI is well-positioned to proceed into the preliminary design phase. The GSRT congratulated the GeoXO flight project and L3Harris GXI team for the thorough and detailed information presented that exceeded expectations for these reviews.

GXI SRR/SDR participants at L3Harris in Fort Wayne, Indiana. Photo credit: L3Harris

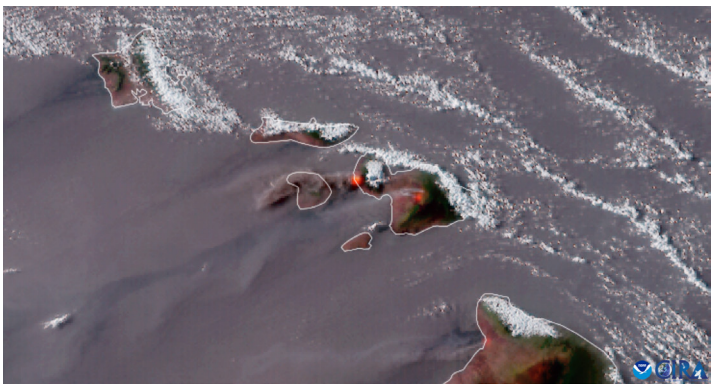
SCIENCE

NWS forecasters are testing a new experimental LightningCast dashboard. LightningCast is a machine-learning model that forecasts the probability of lightning at a location within the next hour, using GOES-R ABI data as input. The dashboard is designed to help forecasters support local events, like outdoor concerts or sporting events, with warnings of impending lightning threats. Users enter the location and time for a specific event into a Google form, and the system will generate a customized time series of lightning observations and predictions for the following hour.



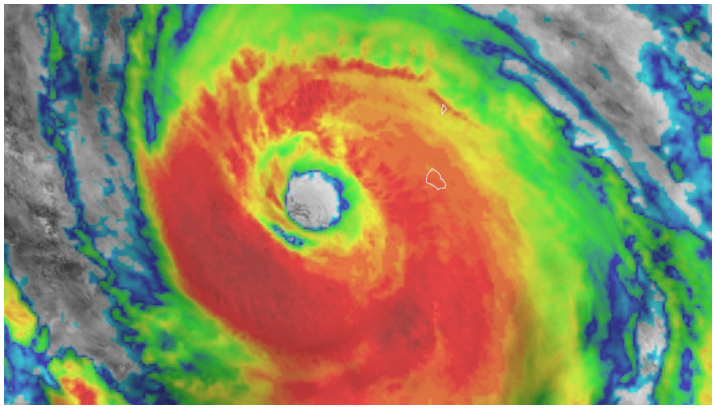
LightningCast dashboard example. Image credit: NOAA/CIMSS

Large and fast-moving wildfires ravaged the Hawaiian Island of Maui in early August 2023, prompting evacuations across the west coast. Downed power lines ignited the fires and windy conditions, drought, and overgrown non-native vegetation fueled the flames. Early on Aug. 7, NWS forecasters in Honolulu analyzed GOES-18 (GOES West) water vapor imagery and the total precipitable water product to diagnose the pre-ignition conditions. The wildfires became very active during the afternoon of Aug. 8. Forecasters used GOES-18 GeoColor imagery to monitor the smoke plumes and land vegetation changes and infrared data to characterize the hot spots as the fires intensified. At least 115 people perished in the fire that devastated the city of Lahaina. It was the deadliest U.S. wildfire in more than a century.



GOES-18 GeoColor and fire temperature imagery on Maui fires on Aug. 8. Image credit: NOAA/CIRA

GOES-18 monitored Hurricane Hilary in the eastern Pacific as it rapidly intensified into a Category 4 storm with maximum sustained winds of 145 mph on Aug. 18, 2023. That day, the National Hurricane Center (NHC) issued the first-ever tropical storm watch for Southern California. After weakening to a tropical storm, Hilary made landfall in San Quintin, Baja California, on Aug. 20 and moved into Southern California hours later, bringing torrential rainfall, flooding and mudslides. The NWS in Los Angeles said totals for Hilary broke "virtually all rainfall daily records." Hilary also brought heavy rainfall and flooding to parts of Arizona and Nevada. GOES-18 data helped forecasters monitor and track Hilary in real-time and estimate its intensity.

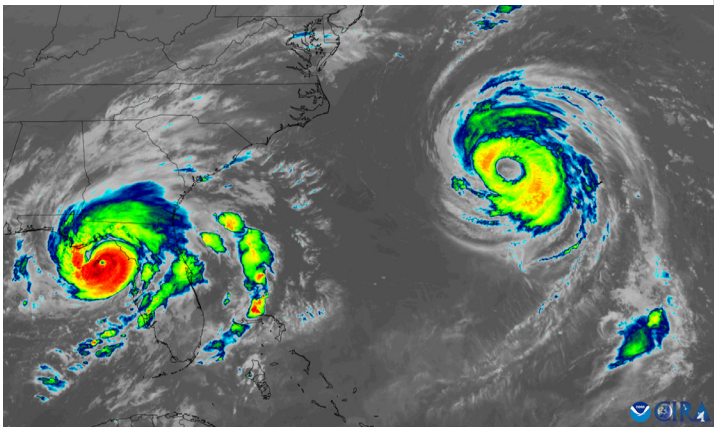


GOES-18 visible and infrared "sandwich" imager of Category 4 Hurricane Hilary on Aug. 18, 2023. Image credit: NOAA/CIRA

GeoXO supported NOAA's Atmospheric Emissions and Reactions Observed from Megacities to Marine Areas (AEROMMA) research campaign this summer. AEROMMA is a comprehensive study led by NOAA's Chemical Sciences Laboratory to investigate atmospheric emissions and chemical reactions that affect air quality and climate. Lessons learned from the campaign will aid the development of the GeoXO Atmospheric Composition (ACX) instrument. GeoXO scientists supported the field campaign and the ACX team is helping to analyze the data. AEROMMA is part of a larger air quality research campaign conducted by NOAA, NASA and 21 universities in summer 2023.

Participants at an AEROMMA stakeholder event held at NASA Armstrong on Aug. 24, 2023. Photo credit: NASA

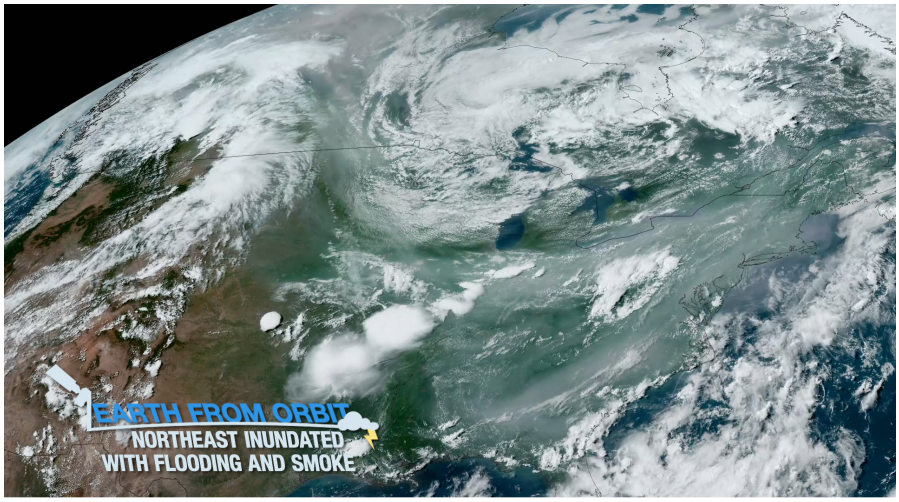
GOES-16 (GOES East) watched over an increasingly active 2023 Atlantic hurricane basin, with 13 named storms forming in August and September. Hurricane Franklin intensified into a Category 3 storm on Aug. 28, becoming the first major hurricane of the Atlantic season, and further intensified into a Category 4 storm that day. Tropical Storm Idalia formed northeast of the Yucatan Peninsula on Aug. 27. After passing just to the west of Cuba on Aug. 29, Idalia strengthened into a Category 1 hurricane. Idalia rapidly intensified over the exceptionally warm waters of the Gulf of Mexico and strengthened into a Category 4 hurricane on Aug. 30, hours before landfall in Florida. Idalia came ashore on Aug. 30 as a Category 3 hurricane, the strongest storm to hit Florida's Big Bend region in 125 years, bringing dangerous storm surge, flash flooding, and damaging winds. GOES-16 provided critical data on the storms, used by operational forecasters to monitor conditions in real time, track the storms, and estimate their intensity and wind speeds.



GOES-16 infrared imagery of Hurricanes Idalia (left) and Franklin (right) on Aug. 30, 2023. Image credit: NOAA/CIRA

EDUCATION AND OUTREACH

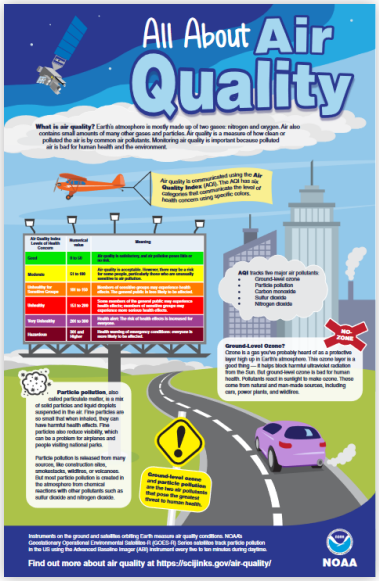
The GOES-R Program, in partnership with JPSS, NOAA Satellite and Information Service (NESDIS), NASA Goddard Space Flight Center, and the Cooperative Institute for Research in the Atmosphere (CIRA) produced 10 "Earth from Orbit" videos during this quarter. Earth from Orbit is a series of short videos that showcase a compelling weather event, environmental hazard, or interesting meteorological phenomenon, as seen by NOAA satellites. A web article with additional information accompanies each video.



Earth from Orbit: Northeast inundated with flooding and smoke. Image credit: NOAA/NASA/CIRA

The GeoXO Program published two new fact sheets. The GeoXO mission overview fact sheets highlights the observations GeoXO is planning to provide and how they will benefit society. The GeoXO Ocean Color (OCX) instrument fact sheet explains why we need ocean color observations from geostationary orbit, how it will improve upon currently available ocean color measurements, and the many benefits the OCX data will provide to support ecological forecasters, marine resource managers, fisheries, health departments, water treatment managers, and the commerce, recreation, and tourism industries.

NOAA Scijinks published a new poster about air quality. The poster explains air pollutants and how they affect human health and the environment as well as how we monitor air quality using GOES-R Series satellites.



All about air quality poster. Image credit: NOAA SciJinks

AWARDS

Randy Race was named the 2023 NESDIS Outstanding Science and Research Team Member. Race devised a method to reduce GOES-R data volumes by 30%, which lowers data transfer costs for the GOES-R ground segment, NWS, and the global enterprise of GOES data users.

The Space Weather Follow On (SWFO) Mission Operations Support Team received a 2023 NESDIS Collaboration Award. GEO team members Dan Linebarger and Perry Baltimore contributed to the successful execution of SWFO's Mission Operations Review, which demonstrated the high level of cooperation and collaboration between the SWFO Program, the Office of Satellite and Product Operations, and the GOES-R Program to prepare for SWFO's schedule-constrained launch and long-term operations.

MEET THE TEAM

In this issue, meet Lili Alvarado, GEO ground system assistant project manager (APM). As the ground system APM, she leads NOAA contract acquisition efforts and provides technical oversight of ground system sustainment and evolution activities, such as migrating system elements to the cloud. Lili joined the GEO team in April 2023 from the NESDIS Office of Common Services, where she was working on the NESDIS Common Cloud Framework and the Radio Frequency Interference Monitoring System projects.

Prior to joining NOAA in 2021, Lili worked with the Department of Defense and the intelligence community as an acquisition career professional with over 20 years of experience in aircraft and space systems engineering, electronics depot operations, software development, and technical contract management and oversight.

In her studies and interest for national strategy, Lili is conscious of how our nation continues to prioritize addressing climate change both at home, and as one of the core elements of national security and foreign policy. "I'm ecstatic to become part of the team that enables foundational core technologies, such as cloud computing and data handling, enabling critical work on climate moving forward," she said. "I'm also very fortunate to work with the team that's paving the way for the wide distribution of needed GEO observations to be used by our scientific community to tackle the climate crisis. Day in and day out I get to work with smart and motivated peers to move our technologies towards innovation edges that will result in real-world positive impacts, on the world's climate needs. And that's an awesome responsibility."

Lili earned a Bachelor of Science in electrical engineering and obtained Navy qualifications as a surface warfare and nuclear operator officer. She also has a master's in national defense strategy and logistics management sciences. As for her passions outside of work, her love for food is such that it led her to pursue a culinary certificate from the Art Institute of Atlanta in 2005. "In my free time, I spend time in my kitchen or at a foodie event with family and friends, learning and cooking up some delicious foods, incorporating my Puerto Rican ethnic roots," said Lili.

UPCOMING EVENTS

GeoXO Imager Integrated Baseline Review

Oct. 24-26, 2023

GOES-U Pre-Shipment Review

Oct. 31 – Nov. 1, 2023

2023 American Geophysical Union Fall Meeting

Dec. 11-15, 2023

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