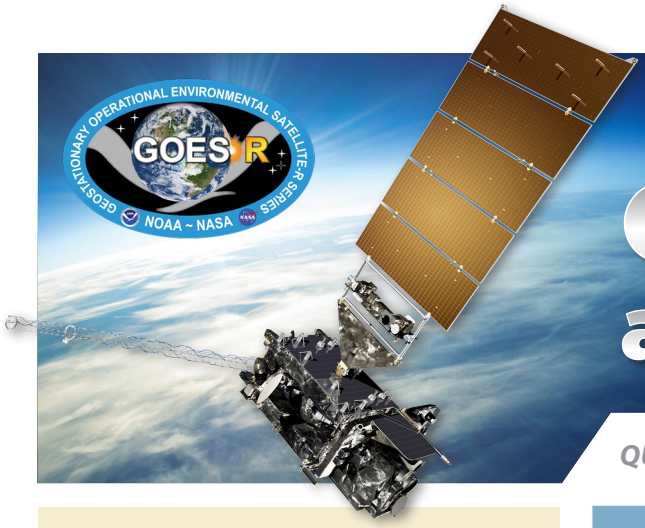


GOES-R and GeoXO

QUARTERLY NEWSLETTER ■ JANUARY–MARCH 2023 ■ ISSUE 41

A Note from Pam Sullivan, GOES-R /GeoXO System Program Director:

2023 is off to an exciting start! We are just a little over a year away from the GOES-U launch, the final launch for the GOES-R Series. GOES-U completed mechanical environments testing and will next undergo electromagnetic interference/ electromagnetic compatibility testing. We held our first GOES-R summit since 2019 and had the opportunity to collaborate in person with our colleagues from across the country. The newly operational GOES-18 satellite monitored a deluge of atmospheric rivers affecting the West Coast and an increasingly active sun. On GeoXO, we took our first step into implementation, with the award of the development contract for the Imager, the primary instrument on our next-generation satellite system.

GOES-R PROGRAM HIGHLIGHTS

GOES-U completed vibration, acoustics and shock testing. Vibration testing mimics the stresses the satellite will experience during launch to ensure the spacecraft's structure has been designed and built to successfully deliver the instruments to orbit. During acoustics testing, GOES-U endured extremely high sound pressure of 138.4 decibels from high-intensity horns to simulate the noises the satellite will experience during launch. Shock testing ensured the satellite can withstand the shocks encountered during separation from the launch vehicle and

GOES-U acoustics testing. Photo credit: Lockheed Martin

DID YOU KNOW: **There are only two times of the year when Earth's axis is tilted neither toward nor away from the sun, resulting in a nearly equal amount of daylight and darkness at all latitudes. Mar. 20, 2023, marked the vernal equinox, the beginning of astronomical spring in the Northern Hemisphere.**

GOES-R PROGRAM HIGHLIGHTS (CONTINUED)

deployment of its solar panels. GOES-U also completed antenna wing assembly, solar array, and X-band antenna deployment tests.

GOES-U end-to-end (ETE) test 3a was conducted on Mar. 9, 2023. ETE tests validate the compatibility between the flight and ground systems in a mission operations context. The operations team, located at the NOAA Satellite and Operations Facility (NSOF) in Suitland, Maryland, transmitted operational command sequences to the GOES-U spacecraft and instruments, located at the Lockheed Martin facility in Littleton, Colorado, and validated the responses. ETE 3a focused on the interface between the Compact Coronagraph (CCOR)-1 instrument and NSOF.

CCOR-2 completed vibration testing in January 2023 and thermal vacuum testing in March. Thermal vacuum testing simulates the extreme temperatures the instrument will experience during launch and residing in space. CCOR-2 will fly on the Space Weather Follow On Lagrange 1 (SWFO-L1) mission.

GOES-R and GeoXO were featured in the NESDIS 2022 Accomplishments report, published on Jan. 9, 2023. The report highlighted GOES-T's launch, post-launch testing, and transition to operations, the formal approval of the GeoXO program, and the many extreme weather events that GOES-16, 17, and 18 helped to detect and monitor in 2022.

GeoXO PROGRAM HIGHLIGHTS

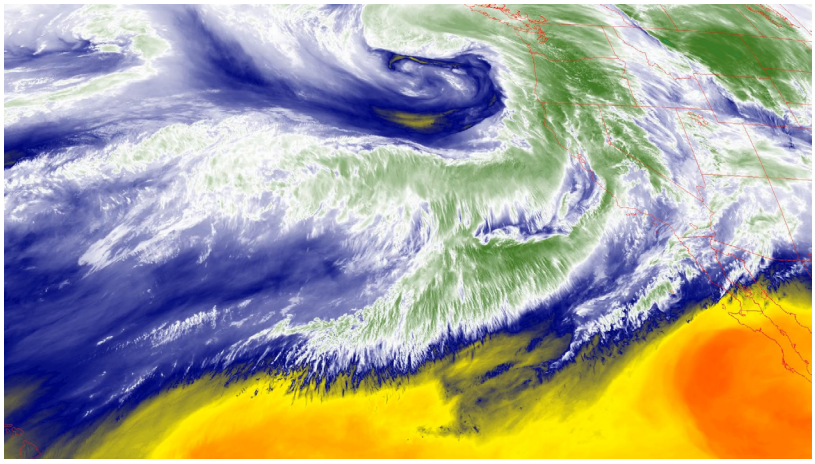
On Mar. 13, 2023, NOAA and NASA announced the selection of L3Harris Technologies Inc. of Fort Wayne, Indiana, to develop the GeoXO Imager (GXI). The contract includes the development of two flight instruments as well as options for additional units. The contract scope includes the tasks and deliverables necessary to design, analyze, develop, fabricate, integrate, test, verify, evaluate, support launch, supply and maintain the instrument ground support equipment, and support mission operations at NSOF. The GXI is GeoXO's main instrument and the first development contract awarded for the program.

On Feb. 10, 2023, NASA posted the request for proposals for the GeoXO Sounder (GXS) implementation. Industry was invited to submit a proposal for developing NOAA's GeoXO sounder instrument. Proposals were received in March and the Source Evaluation Board is reviewing them. The contract award is planned for late August 2023.

The GeoXO flight project conducted spacecraft Phase A Study mid-term reviews with Lockheed Martin and Maxar in January 2023. In March, the flight project executed a non-reimbursable Space Act Agreement with Northrop Grumman for an abbreviated GeoXO spacecraft Phase A study. These definition-phase studies will help design the GeoXO spacecraft concept, mature necessary technologies, and help define potential performance, risks, costs, and development schedule. The results of the studies will be used to set performance requirements for the spacecraft development contract.

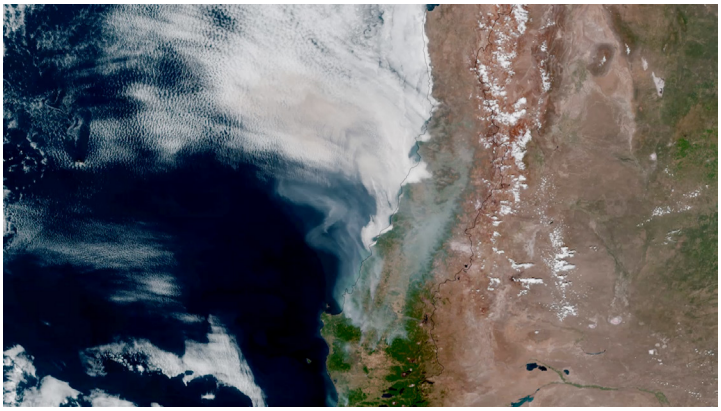
IMAGERY AND SCIENCE APPLICATIONS

From late December 2022 into January 2023, a series of nine atmospheric rivers dumped a record amount of rain and mountain snow across the western U.S. and Canada, hitting California particularly hard. More than 32 trillion gallons of water rained down across the state. The San Francisco Bay area experienced its wettest three-week period in 161 years. Atmospheric rivers are long, narrow belts of moisture that move through the atmosphere. They can deliver tremendous amounts of rain and high-elevation snow. This deluge of rain can provide relief for drought-stricken areas but also trigger flash flooding and mudslides. GOES-18 (GOES West) provided detailed information about moisture in the atmosphere and helped forecasters track the atmospheric rivers as they happened.



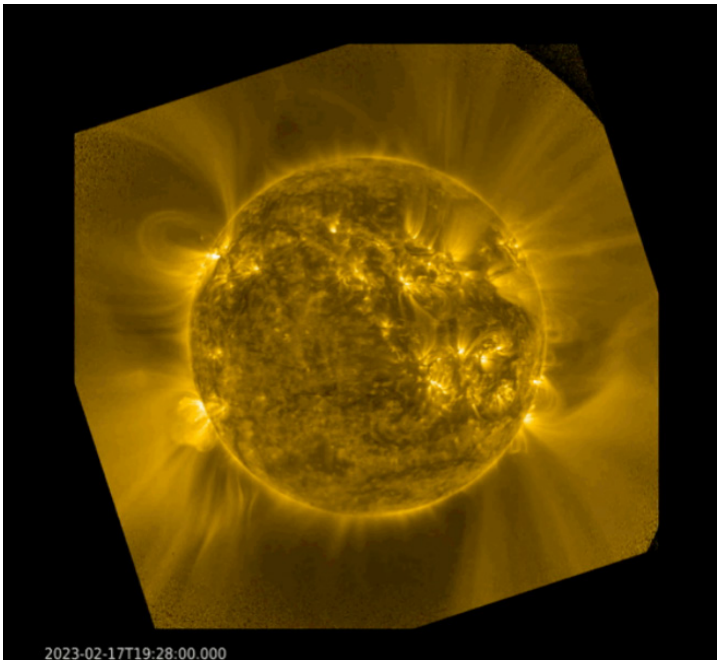
GOES-18 water vapor imagery of an atmospheric river affecting the U.S. West Coast in Jan. 2023. Image credit: NOAA

Hundreds of wildfires broke out in south-central Chile in early February 2023. The region is experiencing a "mega drought" with a decade-long period of dry weather. NOAA satellites monitored the fires as hot and dry weather persisted. As of Feb. 8, 231 fires had burned more than 741,315 acres of land, making it the second worst year for acreage burned in Chile. GOES-16 (GOES East) and GOES-18 observed the movement of smoke from the fires in near-real time, while identifying new fires. The satellites also help determine a fire's size and temperature.



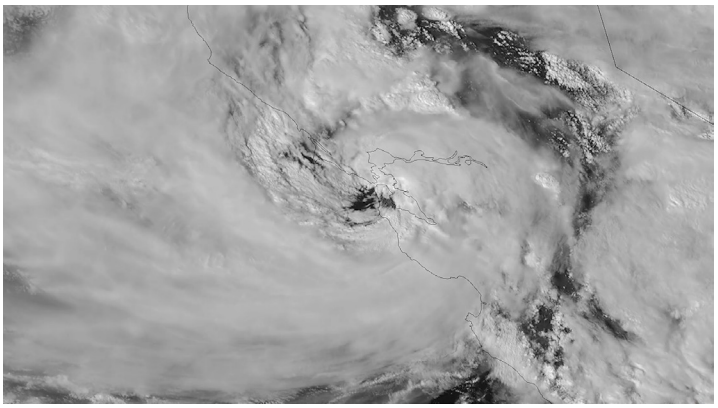
GOES-16 GeoColor imagery of smoke from fires burning in Chile. Image credit: NOAA

GOES-16's Solar Ultraviolet Imager (SUVI) captured a powerful X-class flare on Feb. 17, 2023. The flare triggered a rare type of shockwave known as a solar tsunami that rippled across the sun's visible surface and caused temporary radio blackouts on the sunlit side of Earth. X-class flares are the most intense type of solar flare.



GOES-16 SUVI image of the sun on Feb. 17, 2023, shows an X-class flare at the top left of the sun. Image credit: NOAA

After tracking a series of atmospheric rivers that have drenched California this year, GOES-18 monitored the latest storms to impact the state in March 2023. Rain and snow triggered flash flooding, caused numerous evacuations and left more than 350,000 homes and businesses without power. The atmospheric river fueled a mid-latitude cyclone that led to the formation of a hurricane-like eye when two low pressure areas converged over San Francisco. GOES-18 and GOES-16 monitored clouds and atmospheric conditions in near real-time to help forecasters track the rapidly changing weather conditions, identify when a storm was becoming severe, and predict where the storm would move next.



GOES-18 visible imagery of a mid-latitude cyclone with an eye-like feature moving ashore in the San Francisco Bay Area on Mar. 21, 2023. Image credit: NOAA

On Mar. 27, 2023, Stephanie Stevenson, Ph.D., a meteorologist at the NOAA National Weather Service (NWS) National Hurricane Center presented her ground-breaking study on the link between GOES-R Geostationary Lightning Mapper (GLM) observations and hurricane intensification. For this work, Dr. Stevenson was awarded the 2023 NOAA David S. Johnson Award for outstanding innovation in the use of satellite data for operational environmental applications.

The White House Office of Science and Technology Policy launched the Air Quality and Community Health Subcommittee of the National Science and Technology Council on Mar. 28, 2023. GeoXO team members Monika Kopacz, Greg Frost, and Shobha Kondragunta have

White House Office of Science & Technology Policy Air Quality and Community Health Subcommittee of the National Science and Technology Council members at White House on Mar. 28, 2023. Photo Credit: WHOSTP

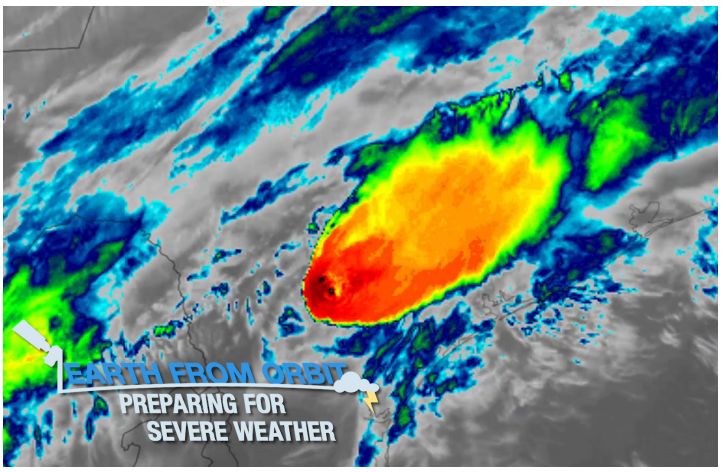
IMAGERY AND SCIENCE APPLICATIONS (CONTINUED)

leadership roles in the subcommittee. Kopacz is co-chair of the subcommittee and Kondragunta co-chairs a working group focused on air quality characterization and community engagement. The team is working to coordinate federal air pollution research activities to address environmental health disparities. Frost and Kondragunta were at the White House for the formal launch of the subcommittee on Mar. 28.

NOAA released its 2022 Science Report on Mar. 29, 2023. The report features a number of geostationary satellite science applications, including enhancing observation quality and coverage of sparsely monitored areas, informing numerical weather prediction, reducing societal impacts from hazardous weather, improving lake-effect snow situational awareness, and improving air quality forecasts. The GeoXO economic assessment, which studied potential societal benefits from GeoXO, was also highlighted in the report.

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 nine "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.



GOES-16 infrared imagery of a severe storm over Texas on Mar. 2, 2023. Image credit: NOAA/NASA Goddard Space Flight Center/CIRA

NOAA physical scientist and lightning expert Scott Rudlosky, Ph.D., was interviewed on the WeatherBrains podcast on Feb. 27, 2023. Rudlosky highlighted observational capabilities of the GOES-R Geostationary Lightning Mapper (GLM), including applications for severe weather, tropical cyclones, wildfires, volcanic eruptions, commercial aviation, and meteor detection. He also spoke about how GLM data complements ground-based lightning detection networks, and how important GLM data is in areas with gaps in radar coverage.

GOES-R Chief of Staff Kevin Fryar participated in the Pathways to the Federal Space Workforce session of the Space STEM Task Force on Mar. 29, 2023. The virtual interactive session provided information for students, early-career professionals, and job seekers regarding joining the federal space workforce. The Space STEM Task Force is a White House program created to support space-related STEM initiatives to inspire, prepare, and employ the next generation of the space workforce.

Registration is now open for the 2023 GOES-R DataJam. The DataJam will be a two-week virtual competition for college undergraduate and graduate students to showcase their best use of GOES-R Series data. The goal of this educational event is to expand the remote sensing knowledge base and technical skillset of the participating students, while also providing them the opportunity to network with NOAA and NASA professionals and gain recognition for great ideas, leadership, and teamwork. The GOES-R DataJam is planned for October 2023.

CONFERENCES AND EVENTS

On Jan. 8, 2023, as part of the AMS Annual Meeting, NOAA facilitated a short course, "Making Beautiful Images of NOAA Satellite Data using Python." Observations from NOAA's geostationary (GOES-R) and polar-orbiting (JPSS) satellites provide vital information for a myriad of research and operational applications in atmospheric and oceanic sciences. NOAA satellite data are distributed in netCDF4 format and the process of accessing the files and processing the contents can be challenging. The short course taught participants how to use Python to perform the basic steps necessary to work the netCDF4 satellite data files to make professional-quality imagery suitable for use in scientific presentations, journal articles, or in social media.

Several GOES-R/GeoXO team members presented at the 103rd Annual AMS Meeting, held Jan. 8-12, 2023, in Denver. There were sessions and panel discussions dedicated to GOES-R and GeoXO and additional presentations and posters throughout the week highlighting applications from GOES-R Series satellites and future capabilities from GeoXO. The NOAA booth in the exhibition hall featured several GOES-R and GeoXO presentations as well as outreach materials. The AMS annual meeting is the world's largest yearly gathering for the weather, water and climate community.

GOES-R program scientist Dan Lindsey provides an update on GOES-18 at the NOAA booth at the AMS annual meeting. Photo credit: NOAA

GOES-R Program team members from NOAA, NASA, and industry gathered for a program summit Mar. 22-23 at Lockheed Martin in Littleton, Colorado. The summit brought personnel from across the country together to share the latest status and developments in the program and various projects, identify lessons learned, discuss future plans, and collaborate in person. The team also had the opportunity to see the GOES-U spacecraft in the Lockheed Martin clean room.

Zachary Hiris, meteorologist at the NWS Weather Forecast Office in Boulder, Colorado, speaks at the GOES-R summit about how the NWS uses GOES data in its forecasting and warning operations. Photo credit: Lockheed Martin

GOES-R participated in the National Science Teaching Association (NSTA) National Conference in Atlanta on Mar. 22-25, 2023. Outreach Specialist Alysha Payne staffed the NOAA Education booth at the conference and supplied GOES-R education materials and information about our satellite program. The NSTA National Conference brought to together K-12 teachers, professors, informal educators, administrators, and curriculum specialists to explore best practices, innovative instructional strategies and techniques, and next-level engagement approaches for inspiring students in science and STEM.

GOES-R outreach specialist Alysha Payne explains the benefits of geostationary satellites to NSTA National Conference attendees. Photo credit: NOAA

CONFERENCES AND EVENTS (CONTINUED)

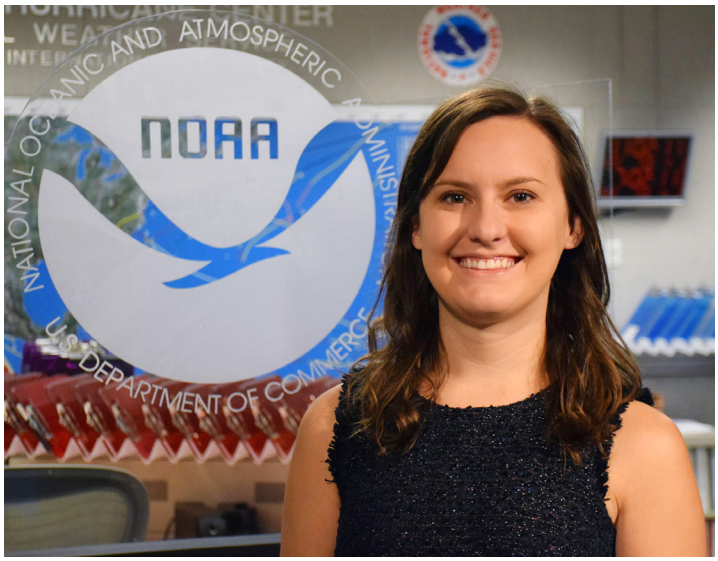
NOAA, along with the Ministerio de Medio Ambiente y Recursos Naturales in El Salvador, conducted a virtual training workshop for participants from the World Meteorological Organization North America, Central America, and Caribbean Region IV on Mar. 27-30, 2023. The Satellite Applications Workshop was conducted in Spanish and provided an overview of GOES-R and JPSS satellite capabilities, instructed participants on accessing data and products, addressed forecasting challenges, and helped improve decision-making. Attendees participated in hands-on exercises using local case studies to investigate potential severe weather events.

AWARDS

The GOES-R Program Office and the NOAA Office of Satellite and Product Operations (OSPO) were recipients of a Department of Commerce (DOC) Silver Medal Award at the 74th Annual Honor Awards Ceremony on Jan. 24, 2022. The team was honored for integrating, testing, preparing, and launching the third satellite (GOES-T) of the GOES-R series on schedule during a global pandemic. The DOC Silver Medal recognizes exceptional performance characterized by noteworthy or superlative contributions that have a direct and lasting impact within the department.

OSPO director Greg Marlow (left) and GOES-R/GeoXO chief of staff Kevin Fryar (right) at the Department of Commerce annual honor awards ceremony. Photo credit: NOAA

Stephanie Stevenson, Ph.D., was selected as the 2023 winner of NOAA's prestigious David. S. Johnson Award. Dr. Stevenson, a meteorologist at the NOAA/NWS National Hurricane Center, received the award on Mar. 10, 2023, at the 66th Annual Dr. Robert H. Goddard Memorial Dinner in Washington, D.C. Dr. Stevenson was recognized for her ground-breaking study on the link between GOES-R GLM observations and hurricane intensification. From her research, Dr. Stevenson learned that the structure of a tropical cyclone matters when looking for a relationship between lightning and intensity change. The David S. Johnson Award is named after the first assistant administrator of NOAA's Satellite and Information Service and honors professional scientists who have shown outstanding innovation in the use of satellite data for operational environmental applications.



Stephanie Stevenson. Photo credit: NOAA

GOES-R/GeoXO chief of staff Kevin Fryar received the 2023 NESDIS Outstanding Support and Policy Team Member of the Year award. Fryar was honored for deftly handling his normal duties while taking on additional tasks to help improve program and NESDIS processes as well as serving on a rotational assignment with OSPO and being the "face" of NOAA on the TV broadcast of the GOES-T launch.

AWARDS (CONTINUED)

Several GOES-R and GeoXO individuals and teams received 2022 NASA Agency Honor Awards. The Agency Honor Awards are approved by the NASA Administrator and presented to the most highly-deserving individuals and groups who have distinguished themselves by making outstanding contributions to the Agency's mission. NASA will recognize the winners in May 2023.

Outstanding Leadership Medal

- Syed Aziz
- Monica Todirita

Exceptional Engineering Achievement Medal

- Melissa Dahya

Exceptional Public Achievement Medal

- Joe Deausen

Group Achievement Award

- GeoXO Program Science Working Group
- GOES-R Data Interleave Development Team

MEET THE TEAM

In this issue, meet Melissa Dahya, who recently served as the GOES-18 post-launch test (PLT) director and will assume the role of GOES-R mission operations manager (MOM) in April 2023. As the PLT director, Melissa was in charge of the entire G-18 PLT process, which spanned more than 1,800 activities and required coordination with spacecraft and instrument vendors, the mission operations and data operations support teams, flight and ground projects, scientists, and product readiness and operations team. For GOES-18, the team needed to drift early on during PLT so that the satellite's Advanced Baseline Imager could provide operational data during GOES-17's fall hot season, which added an extra layer of complexity and risk. Melissa received the 2022 NESDIS Outstanding Mission Operations Team Member Award and the 2022 NASA Exceptional Engineering Achievement Medal for her exemplary engineering leadership as the GOES-18 PLT director.

As the new MOM, Melissa will lead the mission operations support team (MOST) to make sure that GOES-U is fully tested and ready to go for launch and orbit-raising, PLT, and operations. GOES-U will utilize a new launch vehicle and has a new instrument (CCOR), so even though this is our fourth launch, the team will face new challenges.

"When I see our data on TV and know that we are helping save lives in severe weather situations, which are happening more and more, I feel a huge sense of pride," said Dahya. "I also love talking to young kids, especially girls, about what I do for work and showing them that they can do anything they want and make a change in the world."

Melissa has a Bachelor of Science degree in aerospace engineering from Penn State. She's been with the GOES-R MOST for nearly 10 years and previously worked as a NASA contractor. She and her husband, Kevin, have a five-year-old son, Jackson, and a boxer dog named Daisy. In her free time, Melissa is a runner and plays ice hockey.

UPCOMING EVENTS

Space Symposium	**TEMPO/ACX/TOLNet Science Team Meeting**
Apr. 17-20, 2023	May 1-5, 2023

CONNECT WITH US!