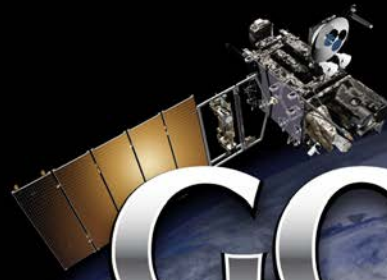




Quarterly Newsletter  
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Issue 10



# GOES-R

Geostationary Operational Environmental Satellite R-Series

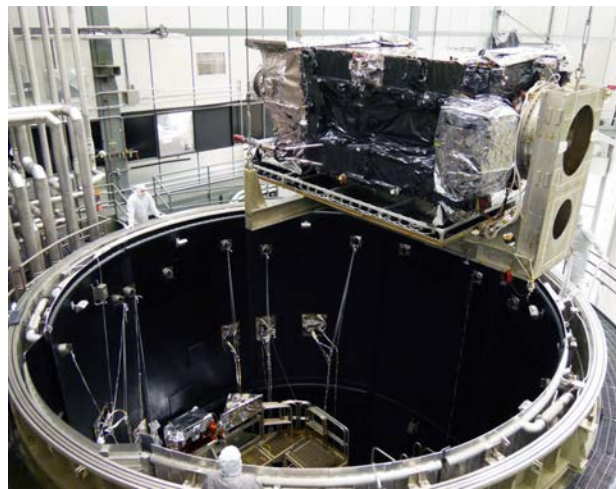


## A Note from Greg Mandt, GOES-R System Program Director

We've entered a critical phase for the GOES-R Series Program as the assembled and integrated GOES-R satellite begins environmental testing. Ground segment components are also being tested and user readiness continues to be a priority, with opportunities to connect through conferences, Proving Ground activities, and the first GOES-R short course for broadcast meteorologists. We also continue to make significant progress in the development of the GOES-S, T and U satellites. I'd like to thank all of our partners for the exceptional work that's been put in over these past few months.

## Highlights

In May, the GOES-R satellite completed final integration and concluded its pre-environmental review. The review cleared the satellite for environmental testing. Environmental testing is intended to simulate the harsh conditions of launch and the space environment once the satellite is in orbit. The GOES-R satellite and its instruments will undergo a variety of rigorous tests which include vibration, acoustics and subjecting the satellite to extreme thermal temperatures in a vacuum chamber.



ABOVE: The GOES-R satellite is lowered into the 29' x 65' vacuum chamber where it will undergo environmental testing. RIGHT: The GOES-R satellite is transported from the clean room to the testing chamber at Lockheed Martin. Credit: Lockheed Martin



On May 21, the GOES-R Series Program, NESDIS and NASA Goddard co-issued a [feature story](#) on the beginning of the environmental testing phase. The satellite was installed in the thermal vacuum chamber at Lockheed Martin Corporation's Littleton, Colorado, facility in late May where it underwent ambient testing prior to closure of the vacuum chamber door on July 1. Thermal vacuum testing will take approximately two months.



... during environmental testing, GOES-R will experience an extreme range of temperatures, with some parts reaching as high as 87 degrees Celsius and others dropping as low as -55 degrees Celsius?

**Prior to entering the vacuum chamber, engineers conducted a successful deployment test of the satellite's solar array panel.** On June 16, the GOES-R Series Program, NESDIS and NASA Goddard co-issued a [feature story](#) which included a Lockheed Martin [video](#) of the May 5 deployment test. Engineers unfurled the five panels on rails that simulate deployment in the zero-gravity environment of space. Once the satellite is launched, the solar array panel will generate more than 4,000 watts of electricity from sunlight to power GOES-R.



The fully-deployed GOES-R solar array panel. Credit: Lockheed Martin

**On the core ground system, Release Mission Management Flight Ready (MMFR) software baseline** was handed over to the government in April for the Operations Readiness Checkout Activity (ORCA). During the ORCA, the GOES-R Ground Readiness Team exercised the system's mission management functions using operational procedures to gain experience with the ground system to prepare for upcoming end-to-end tests with the GOES-R spacecraft.

**In June, ground system Data Operations Exercises (DOE) 1 and 2 were conducted.** These were the first tests of the ground system using the Release Final Product Set software that was delivered to the government in April. The tests occurred at all three GOES-R ground system facilities. Simulated data was delivered to the National Weather Service (NWS), the Product Distribution and Access system, and the Level Zero Storage System for six continuous days.

**The integration of the GOES-R Ground System Data Simulator (Raw GSSIM) at the NOAA Satellite Operations Facility (NSOF) was successfully completed on May 28.** The Raw GSSIM enables operations teams at NSOF and Wallops Command and Data Acquisition Station (WCDAS) to conduct operations readiness activities and allows the ground project's test team to execute requirements verification tests. Raw GSSIM generates a simulated GOES-R downlink data stream to exercise and test data ingest, processing and distribution capabilities.

**On the antenna system, the NSOF N-4 antenna Site Acceptance Test (SAT) was completed on April 27.** The W-2 antenna at WCDAS concluded its SAT in June.



Installation of the W-2 antenna feed at WCDAS. Credit: Harris Corporation

**Considerable progress has been made in the development of the GOES-S/T/U satellites:**

- o The Geostationary Lightning Mapper (GLM) that will fly on GOES-S completed its pre-environmental review (PER) in May and began thermal vacuum testing.
- o The GOES-S Space Environment In-Suite Suite sensors completed environmental testing in June.
- o The GOES-S spacecraft antenna wing assembly completed integration in June and is undergoing environmental testing.
- o The Solar Ultraviolet Imager (SUVI) that will fly on GOES-S completed its pre-shipment review in June and is being placed in storage to await delivery for integration with the GOES-S satellite.



GOES-S Solar Ultraviolet Imager. Credit: Lockheed Martin

- o Thermal vacuum testing for the GOES-T Advanced Baseline Imager was completed in May.
- o The Extreme Ultraviolet and X-ray Irradiance Sensors instrument that will fly on GOES-U completed its PER in May and began environmental testing.
- o The GOES-T SUVI completed its PER in May, followed by electromagnetic and vibration testing in June.
- o The GOES-T and GOES-U Magnetometer booms were delivered in June.

# Conferences and Events

The GOES-R program chief scientist and three GOES-R satellite liaisons presented results from the GOES-R Proving Ground at the [6th Annual NOAA Testbeds and Proving Grounds Workshop](#) held April 14–16 in Boulder, Colorado. The workshop focused on exchanging lessons learned and best practices and identifying opportunities for future cross-testbed collaboration. Each of the presenters addressed science priorities, project selection criteria, 2014 accomplishments, and 2015 plans. GOES-R satellite liaison Michael Folmer was awarded best paper of the workshop for his presentation, "Preparing for GOES-R at the Satellite Proving Ground for Marine, Precipitation, and Satellite Analysis." [Presentations](#) from the workshop are available on the NOAA testbeds website.



The **2015 NOAA Satellite Conference** was held April 27–May 1 in Greenbelt, Maryland, with more than 600 participants from 40 countries. The conference brought together users and providers of geostationary and polar-orbiting satellite data, products and applications from the public, private and academic sectors. Several sessions focused on GOES-R and included presentations on the new capabilities and products that will be available from the satellite series, data distribution and access, and preparing the user community through education and training. Each session featured a question and answer period to allow attendees to interact with presenters. In addition to oral presentations, 180 posters were submitted. [Posters](#) and [presentations](#) can be viewed and downloaded from the [conference website](#).



Ed Czopkiewicz of Harris Corporation demonstrated the GOES Rebroadcast simulator in the exhibition area at the 2015 NOAA Satellite Conference. Credit: GOES-R Series Program

July 23, 2015

The **2015 GOES-R/JPSS OCONUS (Outside the Contiguous United States) Proving Ground** meeting was held May 12–15 in Anchorage, Alaska. [Presentations](#) focused on capabilities and product demonstrations with NWS meteorologists in the Pacific and Alaska regions where meteorological satellite data is of particular importance to forecast operations.

**From June 10 to 12, broadcast meteorologists convened in Raleigh, North Carolina**, for the American Meteorological Society (AMS) 43rd Conference on Broadcast Meteorology. In conjunction with the conference, the GOES-R Series Program offered a short course on June 9, "[GOES-R Preview for Broadcasters](#)," designed to increase awareness of GOES-R capabilities and how the new satellite data can benefit the viewing public. The session also provided hands-on experience with proxy and simulated GOES-R data and products. Broadcasters were very enthusiastic about the revolutionary one-minute imagery and GLM data that will be available with the GOES-R series satellites. On July 1, the GOES-R Series Program and NOAA co-issued a [feature story](#) about the inaugural GOES-R short course. [Presentations](#) from the session are available on the GOES-R website. The next GOES-R short course is planned for the 2016 AMS Annual Meeting in New Orleans in January.



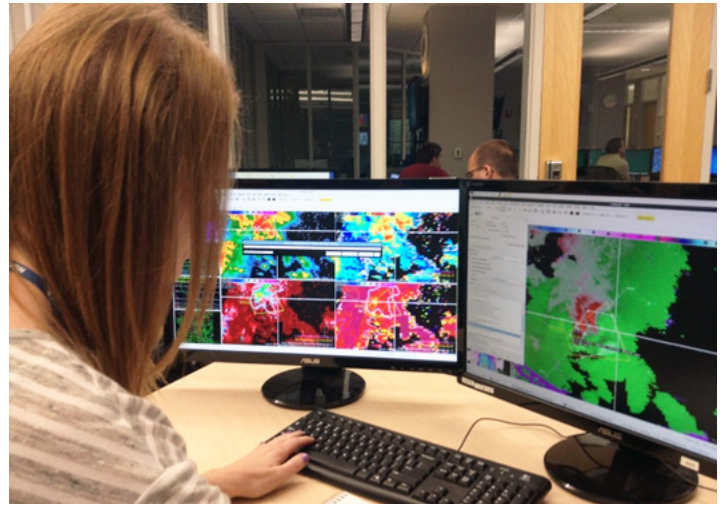
Dan Satterfield, Chief Meteorologist for WBOC TV in Salisbury, Maryland, speaks about his experience at NOAA's Hazardous Weather Testbed Spring Experiment during the GOES-R Preview for Broadcasters short course. Credit: GOES-R Series Program

The **2015 NOAA Satellite Proving Ground/User Readiness Meeting** was held June 15–19 at the NWS Training Center in Kansas City, Missouri. The purpose of the Satellite Proving Ground/User Readiness Meeting was to assess the status of GOES-R and JPSS user readiness for NWS and other NOAA staff while identifying needs to prepare the 2016 and 2017 launch targets. [Presentations](#) from the meeting are available on the GOES-R website.

# Proving Ground and Program Science

**This spring, NOAA satellite experts and weather forecasters** had the opportunity to work together at the [Hazardous Weather Testbed \(HWT\)](#) in Norman, Oklahoma, to evaluate new science, technology and products that will be available from the GOES-R satellite for improving short-range hazardous weather forecasts and warning decision-making. From May 4 to June 12 (during the height of severe weather season), NWS forecasters, TV broadcast meteorologists, and researchers worked side-by-side to evaluate new products and tools and participated in experimental forecast and warning generation exercises. This approach allows for a two-way path between research and operations and prepares weather forecasters to use the new capabilities that will be available from NOAA's next generation of geostationary weather satellites, the GOES-R series. In conjunction with the HWT spring experiment, NOAA's GOES-14 spare satellite was brought out of storage in its central orbit and operated in [Super Rapid Scan Operations](#) mode. This demonstration provided special one-minute imagery of severe storms

simulating the capabilities that will be available in the GOES-R era. The GOES-R Series Program and NOAA issued a [feature story](#) on June 29 highlighting the experiments.



Holly Obermeier, meteorologist at KETV-TV in Omaha, Nebraska, issued a tornado warning after utilizing the GOES-R ProbSevere product. Credit: Holly Obermeier

## Employee Spotlight

**In this issue, meet Marco Midon, Deputy Antenna Systems Manager.** A NASA civil servant, Marco has led the technical development of the GOES-R satellite series antennas since December 2014. His expertise has been invaluable in resolving complex technical issues relating to interference with antenna feeds.

His favorite part of his job is problem-solving. "I like to get things working," said Marco. He also believes in the GOES-R mission and is proud to work on a project that will improve weather prediction and have a positive impact on society.

As a visually-impaired engineer, Marco has faced many challenges throughout his career, including technology that evolves faster than accessibility. But, he says his GOES-R colleagues are always supportive and work with him if issues arise.

His greatest career achievement is developing a solution to capture and record data from a Russian Soyuz spacecraft re-entry from the International Space Station. During a normal Soyuz re-entry the Russian controllers typically lose communications with the capsule, resulting in an off-course re-entry. The Russian Space Agency asked NASA for help, and in less than a week, Marco solved the problem and was able to gather the necessary telemetry data.

Marco's passion for radio communications extends into his personal life. He's a ham, or amateur, radio operator with a 70 foot tower in his backyard, which he's used to communicate with the International Space Station. He's also a member of the NASA Goddard Amateur Radio Club and a past president of the organization.

A native of New Mexico, Marco has been with NASA since 1998. He holds a master's degree in electrical engineering from Florida International University.

