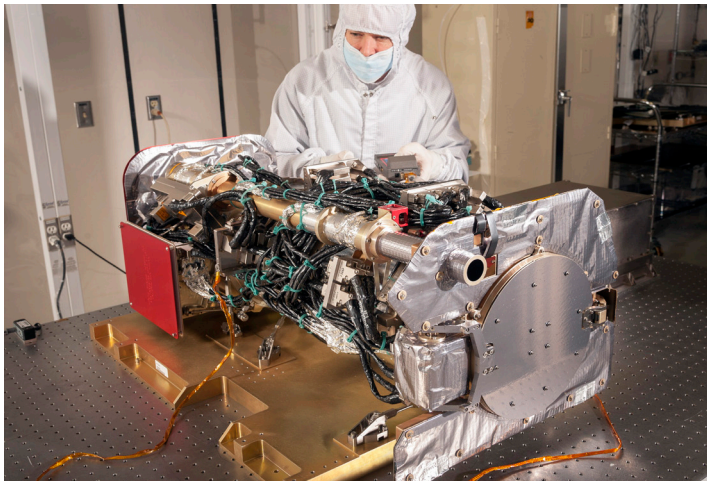# GOES-R
Geostationary Operational Environmental Satellite R-Series

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

As 2013 has drawn to a close, I am impressed with the noteworthy accomplishments we achieved across the GOES-R Series Program this year. To date, four of the GOES-R instruments are complete and ready to be integrated with the spacecraft and significant progress is being made in the development of the ground system. The GOES-R Proving Ground efforts continue to be critical to the preparation of the user community for the data that will be available from the GOES-R series satellites. I'm looking forward to another successful year for the program in 2014! As always, we want to hear from you. Email us at nesdis.goesr@noaa.gov.

Highlights

The first Solar Ultraviolet Imager (SUVI) flight unit for the GOES-R series of satellites is inspected by Lockheed Martin engineer Glenn S. Gradwohl, the SUVI Mechanical Lead, at LMATC in Palo Alto, Calif. Credit: Lockheed Martin

Two GOES-R space weather instruments passed their Pre-Shipment Reviews (PSRs) during the fourth quarter of 2013 and are ready for integration onto the first GOES-R series spacecraft. The Space Environment In-Situ Suite (SEISS) Flight Model 1 (FM1) PSR was successfully completed on November 14 at Assurance Technology Corporation (ATC)

in Carlisle, Mass. On November 26, NESDIS and NASA issued web features to mark the completion of the SEISS instrument. The Solar Ultraviolet Imager (SUVI) FM1 completed its PSR on December 12 at the Lockheed Martin Advanced Technology Center (LMATC) in Palo Alto, Calif. NESDIS, NASA and the GOES-R Series Program Office issued web features on December 17 to highlight the milestone. The
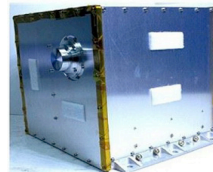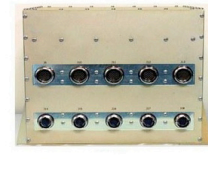

Sensors from the SEISS instrument work together to monitor radiation hazards in space. Shown clockwise: Magnetospheric Particle Sensor-Low Energy Range (MPS-LO), Magnetospheric Particle Sensor-High Energy Range (MPS-HI), Solar and Galactic Proton Sensors, Energetic Heavy Ion Sensor (EHIS) and Data Processing Unit (DPU). Credit: ATC

did you know? …that the GOES-R Geostationary Lightning Mapper will provide, for the first time, continuous surveillance of total lightning activity over the Western Hemisphere from geostationary orbit?

instruments will be shipped from their developers to the spacecraft developer, Lockheed Martin Space Systems Co. (LMSSC), in early 2014. To date, the Advanced Baseline Imager (ABI), Extreme Ultraviolet and X-ray Irradiance Sensors, SEISS and SUVI are complete and poised to be integrated onto the spacecraft. The remaining GOES-R instruments to be delivered are the Geostationary Lightning Mapper (GLM) and Magnetometer.

On October 25, the GOES-R Series Program held an industry day at the NOAA Science Center in Silver Spring, Md. for vendors interested in the GOES-R Rebroadcast (GRB) simulators. The simulators have been designated for loan to companies that manufacture GRB receivers and other users interested in testing their receive systems. Fourteen companies participated in the GRB training and demonstration session. More information about the GRB simulators can be found on the GOES-R.gov website.

Ed Czopkiewicz, GOES-R End User Transition Lead, demonstrates the functionality of the GRB simulators to vendors at an industry day held in October. Credit: Satya Kalluri, GOES-R Program

The GLM FM1 Pre-Environmental Review (PER) was conducted on November 7 at LMATC in Palo Alto, Calif. The electronics unit of the instrument was cleared to begin environmental testing and is expected to ship to the GOES-R spacecraft developer, LMSSC, in March 2014. The electronics unit and sensor unit will be delivered separately. The sensor unit is expected to be completed in summer 2014.
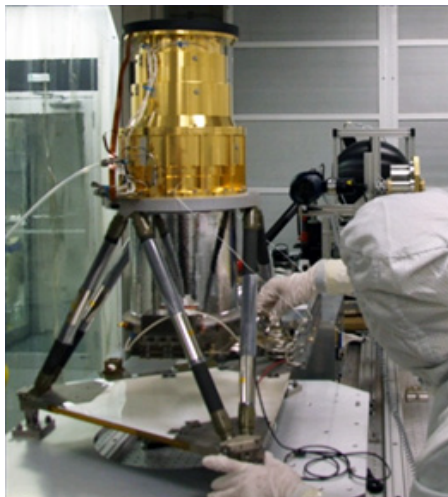
GLM FM1 sensor unit flight harness installation. Credit: LMATC

The ABI Flight Model 2 that will fly on board GOES-S completed its PER on November 20 at Exelis in Ft. Wayne, Ind. The instrument is currently undergoing environmental testing.

The GOES-R Ground Segment successfully completed Search-and-Rescue (SAR) radio frequency compatibility tests at Goddard Space Flight Center in November. Performance of the spacecraft engineering development unit matched that of the SAR simulator. Assistance was provided by the NASA SAR Mission Office and the NOAA Search and Rescue Satellite Aided Tracking (SARSAT) Program Office.
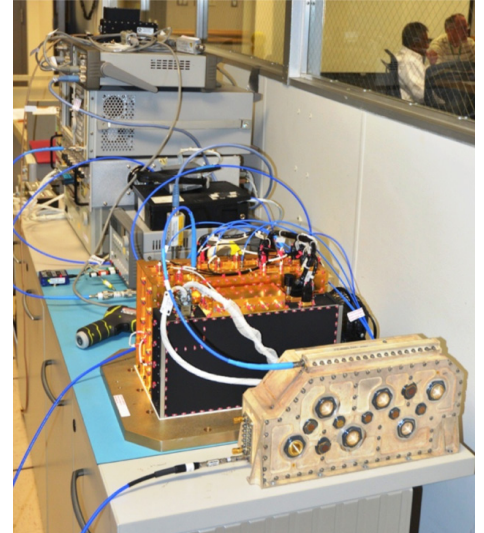
SARSAT radio frequency compatibility test. Credit: GOES-R Ground Segment Project

Upgrade of the N-1 GOES-R antenna at NOAA Satellite Operations Facility (NSOF) with the installation of a new feed was completed in late October. The antenna was successfully pointed at GOES-East and radio frequency downlink was received. The N-1 site acceptance test began at NSOF on December 16 and will continue through January 17.

The Wallops Command and Data Acquisition Station (WCDAS) W-1 and W-2 16.4 m antenna feeds successfully completed PSR on November 14. The feeds arrived at WCDAS from Richardson, Texas at the end of November and were installed into the two 16.4 m antenna structures.

Antenna feed installation at WCDAS. Credit: Harris Corporation

The Core Ground Segment Enterprise Infrastructure (EI) PSR was successfully conducted on December 23 at Harris Corp. in Melbourne, Fla. Harris is preparing 97 racks of computer equipment to be shipped to WCDAS, the Remote Backup facility in Fairmont, W. Va., and NSOF in January 2014.

The Magnetometer Sensor successfully completed its Delta Critical Design Review in late November. The instrument is working toward completion in April 2014 followed by spacecraft integration in July 2014.

Awards and Accolades

NOAA Center for Satellite Applications and Research (STAR) supervisory meteorologist Mark DeMaria, Ph.D., was honored in October as a finalist of the 2013 Samuel J. Heyman Service to America Medals for career achievement. These awards recognize dedicated federal employees for their significant contributions to the nation through their achievements in public service. A renowned expert in hurricane research, DeMaria was honored for his impressive body of work that has become the bedrock for the nation's hurricane forecasters. Over the last three decades, he has developed numerous unique and practical innovations for improving hurricane forecasting and tracking, including pioneering the use of microwave sounders to determine hurricane strength and structure, as well as analysis of lighting and oceanic heat content to improve hurricane intensity forecasts. He is currently working with the GOES-R GLM to further improve storm intensity measurement along with the Hurricane Forecast Improvement Project. Learn more about DeMaria's visit to the White House at the STAR website.

President Obama congratulates NOAA scientist Mark DeMaria, finalist for the Samuel J. Heyman Career Achievement Medal, at the White House on October 23. Credit: NOAA Center for Satellite Applications and Research

GOES-R satellite liaison Amanda Terborg received the NASA Short-term Prediction Research and Transition (SPoRT) Satellite Champion of the Year Award during the GOES-R Proving Ground satellite liaison technical interchange meeting held November 12–14 in Huntsville, Ala. Amanda was honored for her exceptional collaboration on the transition of new products to the Aviation Weather Center. The meeting was held to enhance the collaborative relationship between SPoRT personnel and the liaisons in order to better coordinate future collaborative activities in support of the GOES-R Proving Ground.
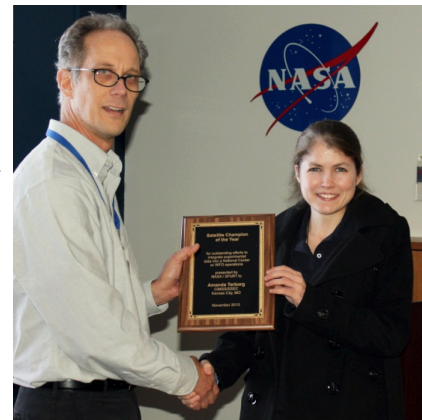
GOES-R satellite liaison Amanda Terborg accepts her award for Satellite Champion of the Year from Gary Jedlovec, Atmospheric Scientist at SPoRT. Credit: Steve Goodman, GOES-R Program

On November 1, the GOES-R Program held an all-hands meeting and awards ceremony covering the time period July 2012 through June 2013. Quarterly awards were presented for Outstanding Team Member, Outstanding Team, Esprit de Corps, Outstanding Communications and Process Improvement and Innovation. A complete list of award recipients and photos from the ceremony can be found on the GOES-R.gov website.

The Outstanding Team of the Quarter award for second quarter fiscal year 2013 went to the Antenna First Article Test Team for their detailed review of test procedures, witnessing over 20 First Article Tests, and reviewing post-test data resulting in the successful completion of First Article Testing on the GOES-R Antenna System. Credit: GOES-R Program

Proving Ground and Program Science

The GOES-R Proving Ground fiscal year 2013 [annual report](#) was issued on November 15. The report summarized the proving ground evaluations of the operational value of proxy GOES-R products and user feedback for future improvements.


The GOES-R and Joint Polar Satellite System (JPSS) Programs held a joint [virtual science seminar](#) on November 18. The seminar focused on tropical cyclone data assimilation including results from three projects to improve tropical cyclone model forecasts through the utilization of satellite observations.
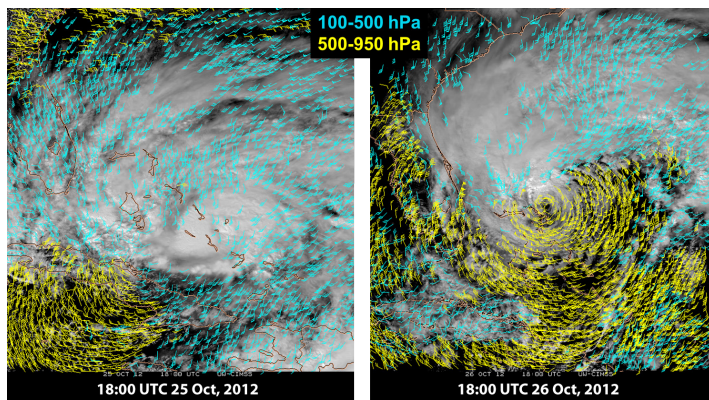
Atmospheric Motion Vectors (AMVs) from GOES 5-minute rapid-scans during Hurricane Sandy. Visible/infrared cloud-tracked winds from 5-minute image intervals derived using the current NESDIS operational AMV algorithm. Tests using the new GOES-R tracking algorithm in conjunction with data assimilation and model forecast impact experiments are planned. Credit: Christopher Velden, University of Wisconsin, Cooperative Institute for Meteorological Satellite Studies (CIMSS)

The GOES-14 Super Rapid Scan Operations for GOES-R experiment from August 16, 2012 to October 31, 2012 was featured in the December 2013 issue of the *Journal of Applied Remote Sensing*. GOES-14 was operated in a special one-minute rapid scan mode to emulate the observations that will be available from the GOES-R ABI. The [paper](#) details the data acquired from many phenomena, including clouds, convection, fires, smoke and hurricanes, including six days of Hurricane Sandy through landfall.

(a)   **(b)**
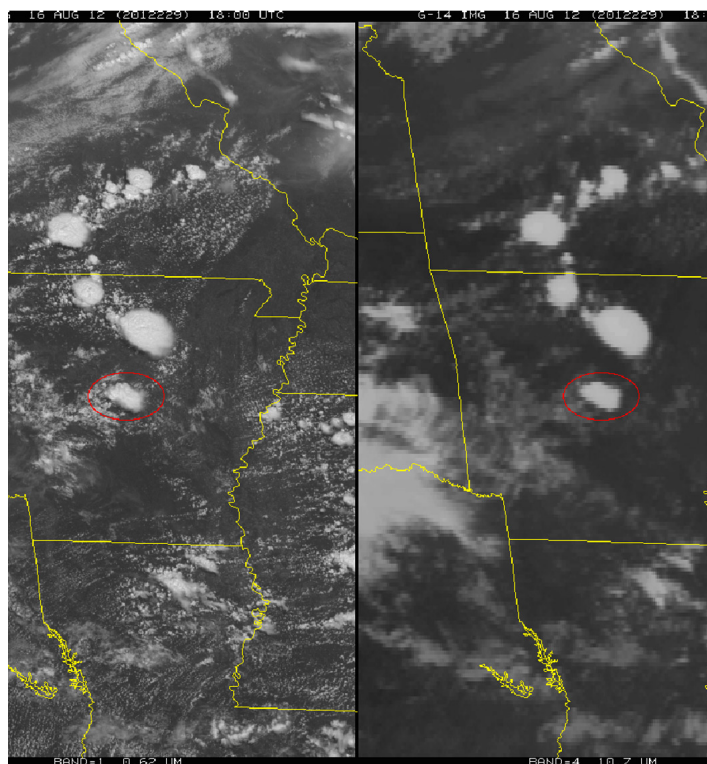
GOES-14 image of one storm (near the center of the state of Arkansas) for two of the spectral bands: visible band (a) and infrared window (b). The image start time is 18:00 UTC on August 16, 2012. Credit: CIMSS

Education and Outreach

In November, the GOES-R Series Program and its education partner, [SciJinks](#), introduced a new web-based game featuring the ABI. The game uses color tiles to illustrate how ABI will collect data in 16 frequency bands of light. Players combine the colored tiles to produce vital information about weather and the environment and must keep up as the flow of data increases. Play [Spectrix](#) and see how many data products you can create from the 16 colors of light from the GOES-R series satellites!