



Quarterly Newsletter
April – June 2014
Issue 6



GOES-R

Geostationary Operational Environmental Satellite R-Series

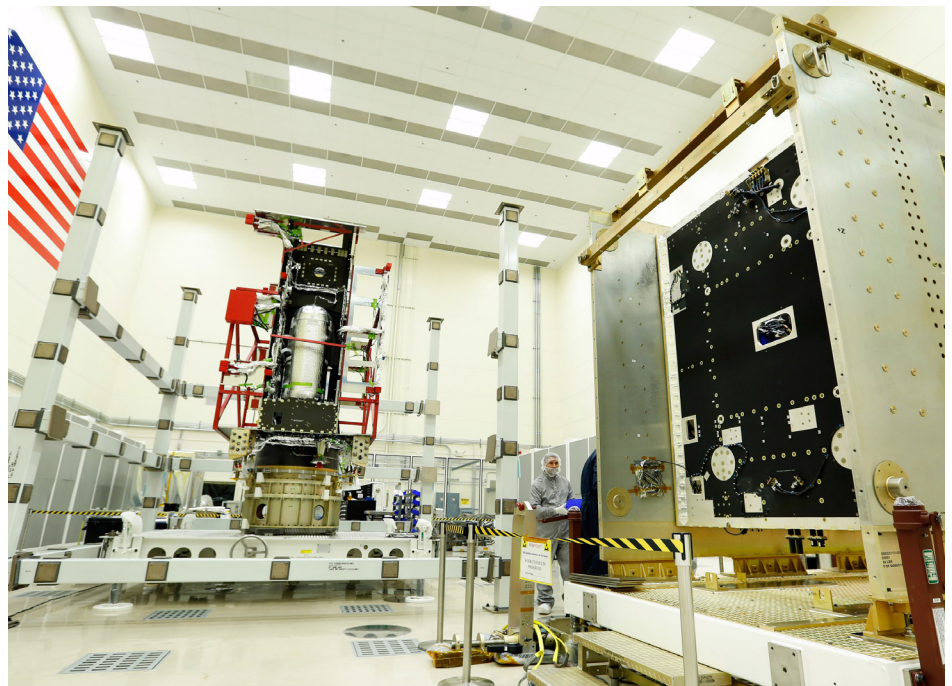


A Note from Greg Mandt, GOES-R System Program Director

The GOES-R Series Program marked a number of significant achievements this quarter. The GOES-R spacecraft system module and solar array were delivered. Ground segment development continues to progress, with the majority of the hardware and software that forms the network infrastructure now installed. In June, the program completed its Mission Operations Review, the largest review of the program to date. The GOES-R Proving Ground was part of a successful spring experiment at NOAA's Hazardous Weather Testbed, sponsoring broadcast meteorologist participation for the first time. GOES-14 provided special Super Rapid Scan Operations one-minute imagery for forecaster assessment of the utility of the types of imagery that will be routinely available from the GOES-R series satellites. Finally, check out the GOES-R images in the new NOAA Satellites [Flickr](#) photostream!

Highlights

The GOES-R spacecraft system module Pre-Shipment Review (PSR) was held April 11, at Lockheed Martin's facility in Newtown, Pennsylvania. The system module was shipped to Denver International Airport aboard a C-17 military transport aircraft, then completed its journey to Lockheed Martin's Littleton, Colorado, facility by convoy on April 16. The system module joined the propulsion module in the cleanroom and preparations are underway for the modules to undergo the integration and test phase of the GOES-R spacecraft development. The system and propulsion modules will be mated in July, prior to payload integration, functional testing and environmental testing in preparation for launch in 2016. Lockheed Martin issued a [press release](#) on May 1 to mark the milestone.



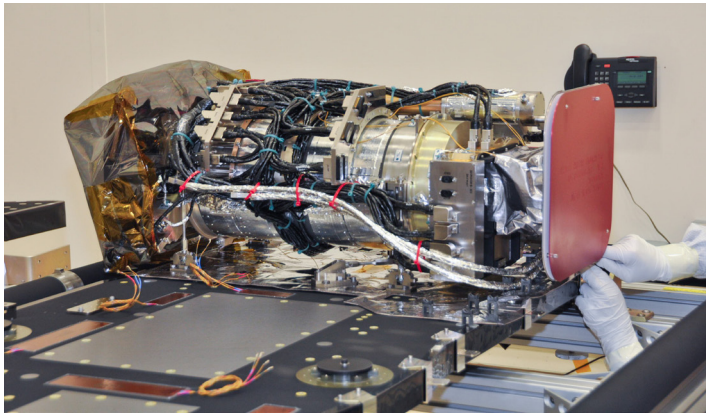
The GOES-R propulsion module (left) and system module (right) in the Lockheed Martin Littleton, Colorado, facility cleanroom. Credit: Lockheed Martin



...that space weather affects us here on Earth? The GOES-R series satellites will carry four instruments that will significantly improve detection of approaching space weather hazards that can disrupt power utilities, communication and navigation systems and cause harmful radiation.

Two of the six instruments that will fly on the GOES-R satellite completed integration with the spacecraft in April. The Solar Ultraviolet Imager (SUVI) and Extreme Ultraviolet and X-ray Irradiance Sensors (EXIS) were installed on the sun-pointing platform at Lockheed Martin's facility in Littleton, Colorado. SUVI was developed and built by Lockheed Martin Advanced Technology Center in Palo Alto, California, and the Laboratory for Atmospheric and Space Physics in Boulder, Colorado, delivered EXIS. On May 28, [NESDIS](#) and [NASA](#) issued web features about the instruments' installation along with a [video](#) featuring the effects of space weather on Earth and [resources](#) to help kids understand space weather.

Additional satellite components were integrated with the GOES-R spacecraft in April, including the data processing unit for the Space Environment In-situ Suite (SEISS) instrument, the Advanced Baseline Imager (ABI) electronics unit and cryocooler electronics, and the enhanced power conditioning unit.



SUVI is shown installed on the sun-pointing platform of the GOES-R satellite. Credit: Lockheed Martin



The EXIS instrument is installed on the sun-pointing platform of the GOES-R satellite. Credit: Lockheed Martin

The GOES-R ground segment Release Mission Management Upgrade (RMMU) was installed at the NOAA Satellite Operations Facility (NSOF) on April 7. Operationalization of RMMU was completed the next week, followed by a successful command and telemetry test

July 18, 2014

between NSOF and the Lockheed Martin spacecraft simulator in Denver. Harris Corporation completed training for RMMU and the system was turned over to the Mission Operations Support Team on April 23. The Release Mission Management software significantly improves ground segment capabilities including enhanced real-time command and control of satellites, complete mission planning and scheduling, and a telemetry archive system. Harris issued a [press release](#) on June 17 to highlight the ground segment infrastructure development progress.



RMMU installation at NSOF. Credit: Harris Corporation

The upgraded N-1 antenna at NSOF transitioned to operations in April and is now available for GOES-N, O and P operations. Work began in April to upgrade the N-2 antenna, and the site acceptance test of the N-2 antenna station was completed at the end of June.

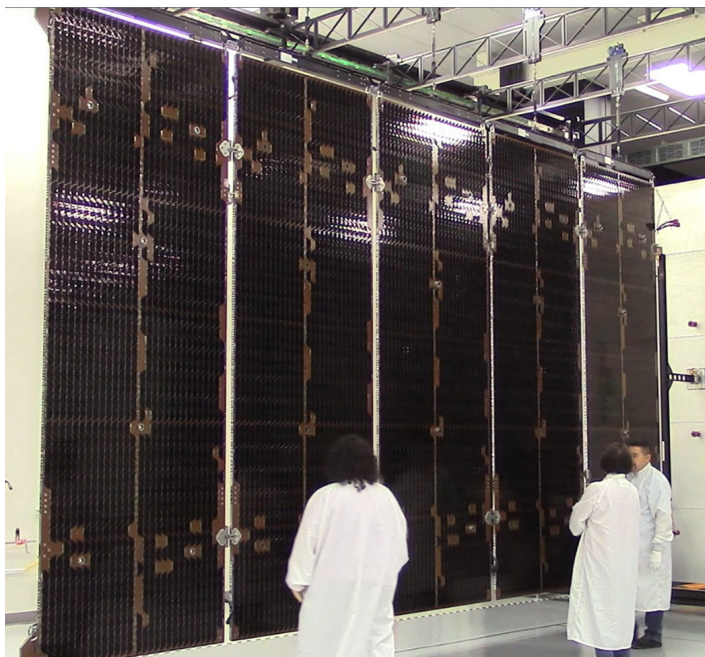
The PSR for the Remote Backup (RBU) facility R-2 antenna electronics was successfully held on April 22 in Richardson, Texas. The R-2 electronics were shipped to the RBU in Fairmont, West Virginia, in late April. In May, the R-2 electronics feed and R-3 antenna reflector panel were installed at RBU.



RBU R-2 antenna feed installation. Credit: Harris Corporation

The GOES-R ground segment Initial Product Set (IPS) completed factory testing and passed its PSR in May. The IPS was installed at NSOF in June, and site integration is underway. The IPS software baseline was installed and configured at both Wallops Command and Data Acquisition Station and the RBU in June.

The GOES-R spacecraft solar array panel was completed and delivered to Lockheed Martin's Littleton, Colorado, facility in May. The solar array is comprised of five solar panels that are folded up at launch. After the satellite is released by the launch vehicle, the solar panels will be deployed into a single solar array wing that will rotate once per day on orbit to continuously point its photovoltaic cells toward the sun to derive electricity for the satellite. The solar array was developed and built at Lockheed Martin in Sunnyvale, California.



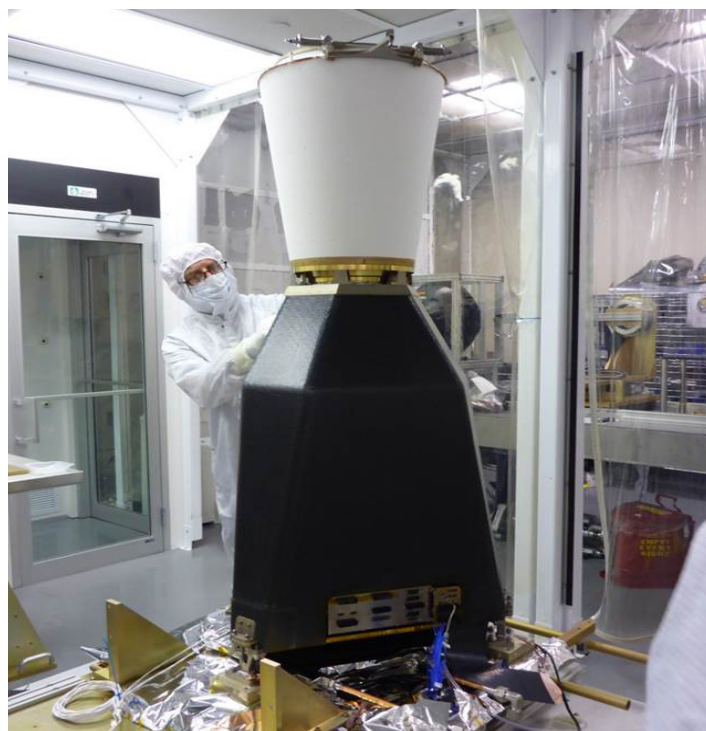
Successful deployment of the GOES-R satellite solar array panel. Credit: Lockheed Martin

The GOES-R Magnetometer sensors and electronics units completed development and testing and were delivered from MacIntyre Electronic Design Associates, Inc., in Sterling, Virginia, to Lockheed Martin in May. The electronics units were installed on the spacecraft panels in June. The Magnetometer boom has completed testing and will be delivered to Lockheed Martin from ATK in Goleta, California, in September.

The GOES-R Series Program successfully conducted its Mission Operations Review June 16–18. This was the largest review of the program to date and focused specifically on GOES-R's operational readiness and progress toward launch. An integrated independent review team assessed the program's concept of operations, project

management, operations and sustainment plans, safety and mission assurance, system design, technical management, training and product validation, along with other aspects of the program. The GOES-R Series Program will next undergo a System Integration Review (SIR) in July, which will determine if the flight and ground segment components are available and ready for integration with the overall system. The SIR will also review the readiness of the facilities, support personnel, plans and procedures for integration.

The GOES-R Geostationary Lightning Mapper (GLM) successfully completed environmental testing in June. Also in June, the GLM electronics unit passed its PSR and was delivered to Lockheed Martin in Littleton, Colorado, for integration with the GOES-R spacecraft.



The GOES-R GLM prepares to undergo vibration testing in May. Credit: Lockheed Martin

Significant progress continues with the development of the instrument flight models that will fly on the GOES-S, GOES-T and GOES-U satellites. The ABI Flight Model 2 (FM2) for GOES-S successfully completed thermal vacuum testing in April and electromagnetic testing in May. ABI FM2 was configured for the post-environmental test phase in June. EXIS FM3 (for GOES-T) successfully completed its Pre-Environmental Review (PER) in early May and electromagnetic testing in late May. Also in May, the SEISS FM3 (for GOES-T) data processing unit and FM3 and FM4 (for GOES-T and U, respectively) Energetic Heavy Ion Sensor PERs were successfully conducted. The SUVI FM2 instrument completed its PER in May and began vibration testing in June.

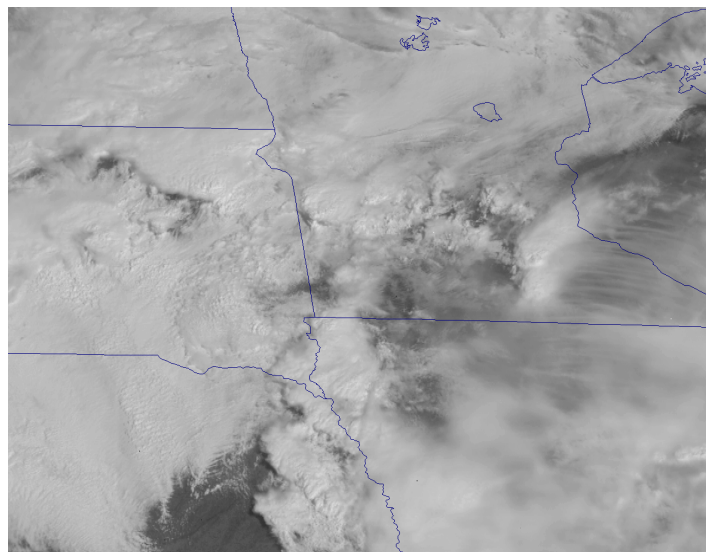
Proving Ground and Program Science

The GOES-R Proving Ground Hazardous Weather Testbed (HWT) 2014 Spring Experiment took place May 5–June 6, at NOAA’s HWT in Norman, Oklahoma. A number of GOES-R severe weather products and tools were evaluated during the experiment. The Spring Experiment is a unique opportunity for researchers and forecasters to work side-by-side to evaluate emerging research concepts and tools and to participate in experimental forecast and warning generation exercises. For the first time, broadcast meteorologists were invited to the HWT under the sponsorship of the GOES-R program with the goal of understanding future capabilities and products from GOES-R and preparing for the production and dissemination of the new high-resolution information to the public. Details of the experiment, including demonstrations and forecaster feedback, can be found on the NOAA Hazardous Weather Testbed [website](#) and GOES-R Proving Ground Hazardous Weather Testbed [blog](#).



Forecaster/investigator interaction during the HWT 2014 Spring Experiment. Credit: NOAA

The GOES-14 Super Rapid Scan Operations for GOES-R (SRSOR) experiment successfully conducted phase one of its 2014 campaign May 8–25. Numerous GOES-14 [one-minute data sets](#) of severe and high-impact weather phenomena were collected across the country. The special datasets were provided to select National Weather Service (NWS) centers, Weather Forecast Offices and NOAA testbeds in real time for forecaster assessment of the utility of the one-minute imagery that will be routinely available from the GOES-R series satellite’s ABI. The unique data collected during the experiment provided a rich dataset for research and operational assessment as well as algorithm refinement. Phase two of the experiment will take place August 14–28.



GOES-14 visible imagery of severe thunderstorms over the South Dakota/Nebraska/Minnesota/Iowa region on May 8. See also an [animation](#) of the event. Credit: Cooperative Institute for Meteorological Satellite Studies

Conferences and Events

The Warn-on-Forecast and High-Impact Weather Workshop was held April 1–3, at the National Weather Center (NWC) in Norman, Oklahoma. Co-organized by the National Severe Storms Laboratory, the NWS Storm Prediction Center and the GOES-R Program Science Office, the meeting addressed the state of science for storm-scale numerical weather prediction and new and on-going collaborations between the research and operational communities and among the NOAA weather radar, satellite and mesoscale weather forecasting communities.

Select GOES-R science team members participated in the 2014 European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) Convection Working [July 18, 2014](#)

Group (CWG) workshop held April 7–11, in Zagreb, Croatia. Topics included the use of geostationary satellite data for understanding the pre-convective storm environment, early convection, mature convection, rapid update imagery (such as Meteosat two-and-a-half-minute imagery and GOES-14 one-minute imagery) and combining datasets for storm diagnostics and nowcasting severe storms.

The GOES-R Program Science Office, National Environmental Satellite, Data and Information Service (NESDIS) Center for Satellite Applications and Research and the NWS participated in the International Association of Meteorology and Atmospheric Sciences Conference on Atmospheric Electricity (ICAE) held June 16–20, at the

NWC in Norman, Oklahoma. More than 200 scientists from 30 countries were in attendance. The ICAE is the major international forum for lightning-related research and is held every four years. Following the ICAE, the annual GOES-R GLM Science Team Meeting was held at the NWC to inform the international community of the program status, calibration and validation plans, and user readiness activities for GLM. [Presentations](#) from the GLM Science Team Meeting are available on the GOES-R.gov website.

The 2014 NOAA Satellite Proving Ground/User Readiness Meeting was held June 6, at the NWS Training Center in Kansas City, Missouri. The overarching goal of the meeting was to determine the path for operational forecasters to achieve GOES-R/JPSS user readiness. User readiness will be achieved when operational NWS meteorologists have the skills, competencies and ability to use GOES-R/JPSS data in the forecast process once the data are available. [Presentations](#) from the meeting are available on the GOES-R.gov website.



Participants at the 2014 NOAA Satellite Proving Ground/User Readiness Meeting. Credit: Chad Gravelle

Awards and Accolades

On April 25, the GOES-R Series Program held an all-hands meeting and awards ceremony for the time period of July 2013 to March 2014. Quarterly awards were presented for Outstanding Team Member, Outstanding Team, Esprit de Corps, Outstanding Communications, and Process Improvement/Innovation. A [complete list](#) of award recipients and photos from the ceremony can be found on the GOES-R.gov website.



Esprit de Corps award winner for first quarter of fiscal year 2014, Douglas Freesland, with GOES-R System Program Director Greg Mandt.
Credit: GOES-R program

Meet the Team

We have added a new segment to the newsletter. “Meet the Team” will profile a member of the GOES-R series satellites team each quarter. In this issue, we feature Budget Analyst Kay Collins. Kay is responsible for the execution and allocation of all funds for the GOES-R Series Program. She earned the 2013 Outstanding Team Member of the Year award for her exceptional job performance and superb execution of the fiscal year 2013 GOES-R budget through the challenges of sequestration and late appropriations. This required the generation of numerous execution plans and countless hours of coordination to create an executable budget plan that caused minimum impact to the program. Through Kay’s expert guidance, monitoring and coordination, GOES-R obligated more than 99.9% of the funds the program received—by far



the highest percentage of allocation by any NESDIS organization. Kay has spent her entire career with the federal government, including 36 years with NOAA, and has been with the GOES-R program since its inception. Her favorite part of her job is the great people she works with, especially her supportive boss. She also strongly believes in the GOES-R mission and the value of the critical services NOAA satellites provide to the nation.

