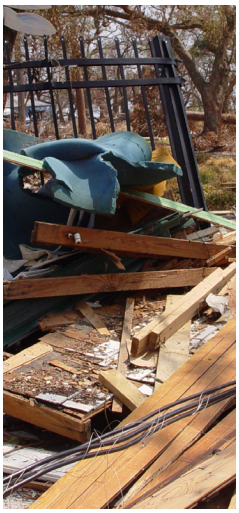
Updated July 2015

GOES-R Proving Ground
National Hurricane Center 2010 Experiment

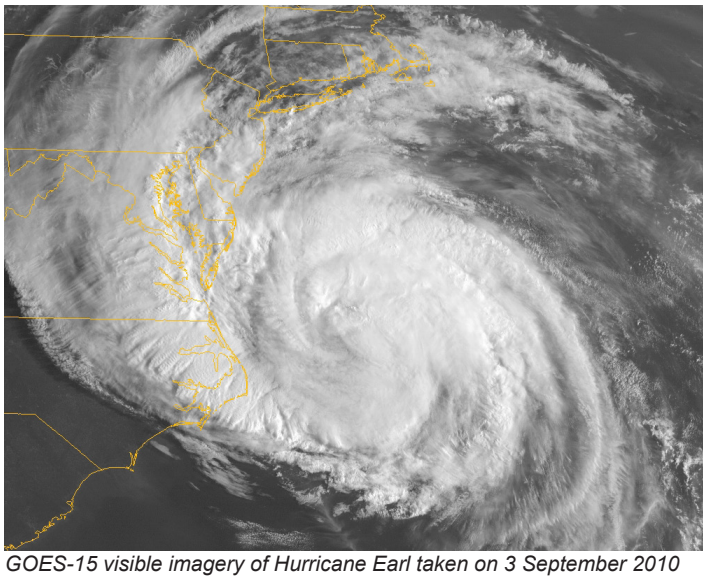


What is GOES-R?

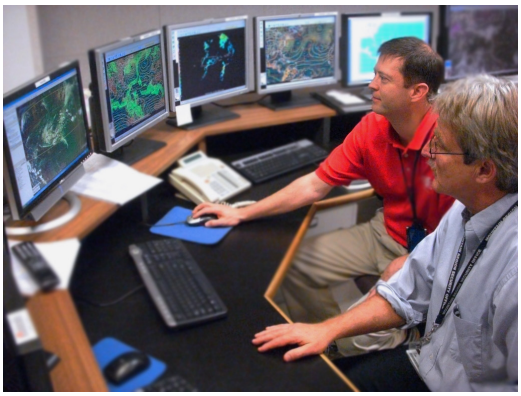
The Geostationary Operational Environmental Satellite - R Series (GOES-R) is the next generation of National Oceanic and Atmospheric Administration (NOAA) geostationary Earth-observing systems. Superior spacecraft and instrument technology will support expanded detection of environmental phenomena, resulting in more timely and accurate forecasts and warnings. The Advanced Baseline Imager (ABI), a sixteen channel imager with two visible channels, four near-infrared channels and ten infrared channels, will provide three times more spectral information, four times the spatial resolution and more than five times faster coverage than the current system. Other advancements over current GOES capabilities include total lightning detection (in-cloud and cloud-to-ground flashes) and mapping from the Geostationary Lightning Mapper (GLM) and increased dynamic range, resolution and sensitivity in monitoring solar X-ray flux with the Solar Ultraviolet Imager (SUVI). The first satellite in the GOES-R series is scheduled for launch in 2016.

What is the NHC 2010 experiment?

The GOES-R Proving Ground engages the National Weather Service forecast and warning community in pre-operational demonstrations of select capabilities of GOES-R to ensure user readiness. The objective of the National Hurricane Center (NHC) Hurricane Season Proving Ground Experiment is to demonstrate select GOES-R proxy products in near real-time at the NHC to allow forecasters to use and evaluate the products and provide valuable feedback to the GOES-R algorithm developers. The 2010 NHC GOES-R Proving Ground demonstration ran from Aug. 1, 2010 through Nov. 30, 2010. Proving Ground products evaluated during 2010 included a hurricane intensity estimate product, a lightning-based tropical cyclone rapid intensity product, three different Red-Green-Blue (RGB) decision aids and super rapid scan operations imagery from GOES-15.



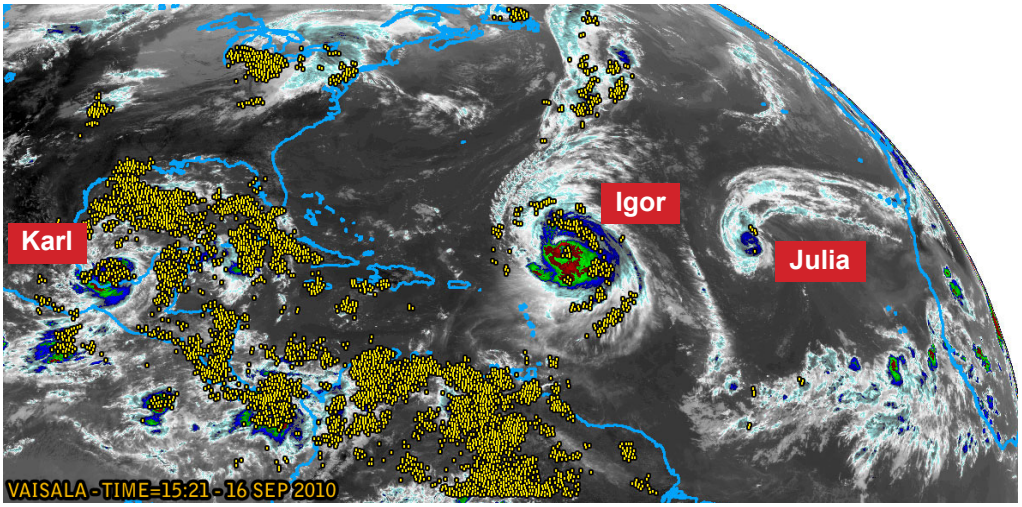
GOES-15 visible imagery of Hurricane Earl taken on 3 September 2010 at 12:45 UTC.



*Hurricane Forecaster Daniel Brown (back) and GOES-R product developer Mark DeMaria (front) viewing the **RGB Air Mass** product at NHC.*

What products are being tested?

The **Hurricane Intensity Estimate (HIE)** product is designed to estimate hurricane intensity (minimum sea-level pressure and maximum surface wind) from ABI infrared-window channel imagery. The code has been derived from the current operational Advanced Dvorak Technique. The Super Rapid Scan Operations (SRSO) imagery allows forecasters to gain experience with the utility of the high time resolution observations from the future GOES-R. The SRSO demonstration was possible because the GOES-15 science test coincided with the Atlantic hurricane season. Part of the science test included the collection of one-minute data over several tropical cyclone cases. The Rapid Intensity Index (RII) is based on simulated GLM data. The lightning data were received from the ground-based Vaisala Global



Left: 6 hour period of lightning locations (gold points) from 16 Sep 2010 at 15:21 UTC superimposed on a color-enhanced infrared GOES image which depicts 3 hurricanes: Hurricane Igor (center), Julia (east of Igor) and Karl (in the southern Gulf of Mexico).

Lightning Dataset (GLD360) cloud-to-ground lightning feed that was established at the Cooperative Institute for Research in the Atmosphere (CIRA). The product also uses input from other sources, including current GOES imagery and forecast model fields. The RII is a text product which informs forecasters about changes in lightning rates close to tropical cyclones, which can be used as an indication for intensity changes, especially rapid intensification.

To help prepare forecasters for new applications in the GOES-R ABI era, three RGB image decision aids were tested during the 2010 hurricane season. One of these aids is the **RGB Air Mass** product. Originally designed by scientists at the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), it has been adapted for tropical applications to highlight differences between dry, tropical and cold air masses. The **RGB Dust** product works in a similar fashion. This product is designed to monitor the evolution of dust storms during both day and night. Dust plumes in the tropical Atlantic have been hypothesized to slow tropical storm development and to affect sea surface temperatures directly where tropical cyclones form. The third product is the **RGB Saharan Air Layer** product. This is another example of an enhanced image product potentially related to tropical cyclone evolution by tracking dry, dusty air in the lower to middle levels of the atmosphere.

GOES-R Proving Ground NHC Experiment

- Cooperative Institute for Research in the Atmosphere (CIRA)
- Cooperative Institute for Meteorological Satellite Studies (CIMSS) at the University of Wisconsin
- NOAA National Environmental Satellite, Data, and Information Service, Center for Satellite Applications and Research (NESDIS/STAR)
- NOAA National Hurricane Center (NHC)

On the Web

http://rammb.cira.colostate.edu/research/tropical_cyclones/
http://cimss.ssec.wisc.edu/tropic2/
http://www.nhc.noaa.gov/

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What are the benefits?

The GOES-R Proving Ground accelerates user readiness, bridging the gap between research and operations and providing sustained interaction between developers and end users for the purposes of training, product evaluation and user feedback-based development. These efforts will maximize utilization of GOES-R products and services and provide an effective transition to operations. The advanced observational capabilities available from GOES-R will enable the NHC to make more accurate estimates of hurricane intensity, position and structure. The new information from the GLM and ABI will improve hurricane model initialization and forecast algorithms such as the RII, and therefore will result in improved forecasts and extended forecast lead times.

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