



# GOES-R Ground System



Credit: Nic Lehoux, arspace.com

## 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 temporal 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 UV Imager (SUVI). GOES-R is scheduled for launch in 2015.

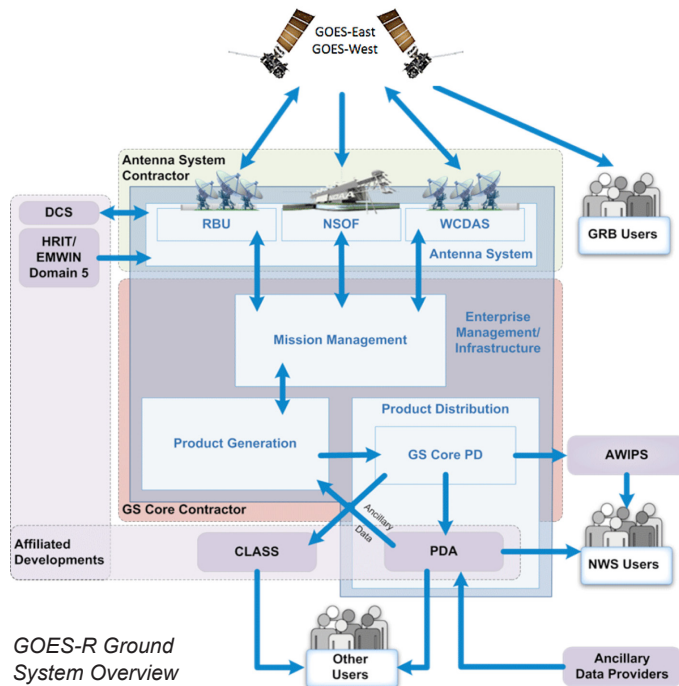
## What Is the GOES-R Ground System?

NOAA is developing a state-of-the-art ground system that will receive data from the GOES-R spacecraft and generate and distribute real-time GOES-R data products. The GOES-R Ground System (GS) will receive the raw data from GOES-R series spacecraft and generate Level 0, Level 1b and Level 2+ products and will make these products available to users in a timely manner consistent with GOES-R latency requirements. This will be accomplished via a core set of functional elements, an antenna system, and a product access element.

## What Are the Functions of the Core GS?

The GS operates through four primary functions: Mission Management (MM), Product Generation (PG), Product Distribution (PD), and Enterprise Management/Infrastructure (EM/IS).

The MM function encompasses all operational functions



of the spacecraft and instruments operations and health and safety.

The PG function generates all of the Level 0 and higher products from GOES-R raw data.

The PD function distributes the GOES-R products created by the PG function through a variety of means.

The EM/IS function supports MM, PG, and PD by monitoring, assessing, and controlling the configuration of the operational systems, networks, and communications for the GOES-R GS, as well as providing common infrastructure and services.

Data Levels	
• Level 0:	Unprocessed instrument data at full resolution
• Level 1b:	Level 0 data with radiometric and geometric correction applied to produce parameters in physical units
• Level 2+:	Derived environmental variables with comparable to Level 1 spatial and temporal resolution

# GOES-R (Geostationary Operational Environmental Satellite-R Series)



Left: Remote Backup Facility, Fairmont, WV.  
Right: Wallops Command Data Acquisition Center, Wallops Island, VA

## How do the Ground System Facilities and Antennas Support Operations?

GOES-R GS operations will take place at three locations. The NOAA Satellite Operations Facility (NSOF) in Suitland, MD will house the majority of GOES-R mission operations. The EM, PG, and PD functions will be performed here. The majority of operations and product staff will also be housed at NSOF. Wallops Command and Data Acquisition Station (WCDAS) on Wallops Island, VA will be the primary site for space-to-ground radio frequency communications. Level 1b data will be processed at WCDAS to produce GOES-R Rebroadcast (GRB) for satellite uplink. WCDAS will also provide uplink to the satellites to support the Unique Payload Services (UPS), which consist of transponder payloads providing communications relay services in addition to the primary GOES mission data. A third operations facility in Fairmont, WV will serve as Remote Backup (RBU). The primary function of the RBU will be to

support contingency operations and perform all of the critical functions of NSOF and WCDAS through the production and distribution of life and property products. The RBU will also serve as a backup during system/equipment testing or maintenance.

Six new 16.4-meter antennas will be constructed, three each at WCDAS and RBU. They are designed to withstand sustained winds of 110 mph (Category 2 hurricane) and gusts of up to 150 mph (Category 4 hurricane). The GS will also upgrade four 9.1-meter antennas at NSOF. All antennas will be compatible with existing GOES-N/O/P satellites and will operate continuously for the life of the GOES-R series.

## How Do Users Interface with the Ground Segment to Obtain GOES-R Data?

Users will be able to access GOES-R data in a number of ways, depending on user type and data latency needs. GOES-R product distribution services include: GOES-R Rebroadcast (GRB), the primary space relay of Level 1b products, providing full resolution, calibrated, navigated, near real-time direct broadcast data; the Advanced Weather Interactive Processing System (AWIPS), an interactive computer system that integrates meteorological and hydrological data, enabling forecasters to prepare forecasts and issue warnings; the Environmental Satellite Processing and Distribution System (ESPDS) system, responsible for receiving and storing real-time environmental satellite data and products and making them available to authorized users through Product Distribution and Access (PDA), which will provide real-time distribution and access services for GOES-R users; and The Comprehensive Large Array-data Stewardship System (CLASS), a web-based data archive and distribution system for NOAA's environmental data. CLASS will provide retrospective data access and distribution services of GOES-R data to all users.

**Contributors:** David Treat (Booz Allen Hamilton), John Bristow (NASA), Richard G. Reynolds (SGT, Inc.), and Andy Royle (Integrity Applications Incorporated).

### Research, Development, and Operations Partners for Ground Segment

- National Environmental Satellite, Data, and Information Service (NESDIS) Office of Satellite and Product Operations (OSPO)
- NESDIS Office of Systems Development, Ground Systems Division (OSD/GSD)
- NESDIS Center for Satellite Applications and Research (STAR)
- National Weather Service (NWS)
- Comprehensive Large Array-data Stewardship System (CLASS)
- National Geophysical Data Center (NGDC)
- National Climatic Data Center (NCDC)
- Harris Corporation, Government Communications Systems Division (Harris/GCSD)

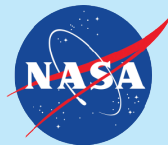
### On the Web

- <http://www.govcomm.harris.com/solutions/products/000042.asp>

### For More Information, Contact:

#### GOES-R Program Office

Code 410  
NASA Goddard Space Flight Center  
Greenbelt, MD 20771  
301-286-1355



**Jim Gurka**, [james.gurka@noaa.gov](mailto:james.gurka@noaa.gov)

**Steve Goodman**, [steve.goodman@noaa.gov](mailto:steve.goodman@noaa.gov)