Unique Payload Services

Remote environmental sensing is only part of the GOES-R Series mission. The satellites also provide unique capabilities to relay data directly to users to meet critical needs.

Data Collection System (DCS)

DCS is a satellite relay system used to collect information from Earth-based data collection platforms that transmit in-situ environmental sensor data from more than 20,000 platforms across the hemisphere.

GOES Rebroadcast (GRB)

GRB is the primary space relay of data products, replacing the GVAR (GOES VARiable) service. GRB provides full resolution, calibrated, navigated, near real-time direct broadcast data.

High Rate Information Transmission/Emergency Managers Weather Information Network (HRIT/EMWIN)

EMWIN is a direct service that provides users with weather forecasts, warnings, graphics and other information directly from the National Weather Service in near-real time. HRIT is a new high data rate version of LRIT (Low Rate Information Transmission), broadcasting GOES-R Series satellite imagery and selected products to remotely-located user terminals.

Search and Rescue Satellite Aided Tracking (SARSAT)

The SARSAT system detects and locates mariners, aviators and other recreational users in distress. The GOES-R Series continues the legacy function of the SARSAT system on board NOAA's GOES. This system uses a network of satellites to quickly detect and locate signals from emergency beacons on board aircraft and vessels, and from handheld personal locator beacons. The GOES-R Series transponder operates with a lower uplink power than the previous system, enabling GOES-R Series satellites to detect weaker beacon signals.

Program Overview and System Architecture

NOAA’s most advanced fleet of geostationary satellites, the GOES-R Series, is a four-satellite program (GOES-R, S, T and U) that will extend the availability of the operational GOES system through 2036. The GOES-R Series Program is a collaborative effort between NOAA and NASA to develop, deploy and operate the satellites.

GOES satellites are designated with a letter prior to launch and a number after reaching geostationary orbit. GOES-R, now GOES-16, is NOAA’s GOES-East operational satellite. GOES-S is scheduled to join GOES-16 in orbit as GOES-17 in March 2018 and be operational as GOES-West in late 2018. Together GOES-16 and GOES-17 will watch over the Western Hemisphere from the west coast of Africa all the way to New Zealand.

GOES fleet in the GOES-R era

Ground support is critical to the GOES-R Series mission. The GOES-R ground system operates the satellites, receives data from the spacecraft, and generates and distributes real-time data products. This is accomplished via a core set of functional elements which include space/ground communications, raw data processing, monitoring the satellite’s health and safety, and commanding the spacecraft and instruments, as well as an antenna system and a product access component. The ground system operates from two primary locations: the NOAA Satellite Operations Facility (NSOF), in Suitland, Md., and the Wallops Command and Data Acquisition Station (WCDAS) in Wallops, Va. A third facility in Fairmont, W. Va., serves as the Consolidated Backup in case of a systems or communications failure at either or both NSOF and WCDAS.

nesdis.goesr@noaa.gov
www.goes-r.gov
www.facebook.com/GOESRsatellite
Why the GOES-R Series?

■ Improved hurricane track and intensity forecasts
■ Increased thunderstorm and tornado warning lead time
■ Improved detection of low cloud/fog
■ Improved transportation safety and aviation flight route planning
■ Improved air quality warnings and alerts
■ Better fire detection and intensity estimation
■ Improved solar flare warnings for communications and navigation disruptions
■ More accurate monitoring of energetic particles responsible for radiation hazards to humans and spacecraft

GOES-R Series Instruments

Advanced Baseline Imager (ABI)

ABI is the primary instrument on the GOES-R Series for imaging Earth’s weather, climate, oceans and the environment. ABI views the Earth with 16 spectral bands (compared to five on previous GOES) and provides three times more spectral information, four times the spatial resolution, and more than five times faster coverage than the current system.

Previous GOES 5-minute capability

GOES-R Series 5-minute capability

ABI covers the Earth five times faster than the previous imager.

Geostationary Lightning Mapper (GLM)

GLM is the first-ever operational lightning mapper flown in geostationary orbit and measures total lightning (in-cloud and cloud-to-ground) activity. Developing severe storms often exhibit a significant increase in total lightning activity, and data from the GOES-R Series lightning mapper has great potential to increase lead time for severe thunderstorm and tornado warnings.

Space Environment In-Situ Suite (SEISS)

SEISS is an array of sensors that monitor proton, electron and heavy ion fluxes at geosynchronous orbit. Information provided by SEISS is used for assessing radiation hazards to astronauts and satellites and to warn of high flux events, mitigating damage to radio communications.

Magnetometer

The Magnetometer provides measurements of the space environment magnetic field that controls charged particle dynamics in the outer region of the magnetosphere. These particles can be dangerous to spacecraft and human spaceflight. The geomagnetic field measurements provide alerts and warnings to satellite operators and power utilities.

Extreme Ultraviolet and X-ray Irradiance Sensors (EXIS)

EXIS detects and monitors solar irradiance in the upper atmosphere. The X-Ray Sensor monitors solar flares that can disrupt communications and degrade navigational accuracy, affecting satellites, astronauts, high-latitude airline passengers and power grid performance. The Extreme Ultraviolet Sensor monitors solar variations that directly affect satellite drag and tracking and ionospheric changes, which impact communications and navigation operations.

Solar Ultraviolet Imager (SUVI)

SUVI is a telescope that observes and characterizes coronal holes, solar flares and coronal mass ejection source regions. SUVI data enables improved forecasting of space weather and early warnings of possible impacts to the Earth environment, including disruption of power utilities and communication and navigation systems as well as possible damage to orbiting satellites and the International Space Station.