GOES-R

GOES-R Series

The Geostationary Operational Environmental Satellite "R" Series (GOES-R) program is a key element to meeting the National Oceanic and Atmospheric Administration's (NOAA) mission. The advanced spacecraft and instrument technology used on the GOES-R series will result in more timely and accurate weather forecasts. It will improve support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The first launch of the GOES-R series satellite is scheduled for 2015.

GOES-R is a collaborative development and acquisition effort between NOAA and NASA.

Find out the latest news on GOES-R development at www.GOES-R.gov

Image Courtesy of Lockheed Martin.

GOES-R

Mapping Lightning from Space

One of the instruments on the GOES-R series is the Geostationary Lightning Mapper (GLM). It detects the very rapid and transient bursts of light produced by lightning at near-infrared wavelengths. Both day and night, it continuously detects all in-cloud and cloud-to-ground lightning flashes. It maps all such events at a resolution of around 10 kilometers—about the scale of a storm—and does so with nearly uniform resolution over the whole western hemisphere. GLM's data will give early warning of intensifying storms and severe weather events, including tornado warning times of up to 20 minutes or more. It will also provide data for long-term climate variability studies.

Image from International Space Station, showing the Aurora Australis and lightning.

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Image Courtesy of Lockheed Martin.

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Monitoring the Ultraviolet Sun

One of the instruments on the GOES-R series is the Solar Ultraviolet Imager (SUVI). This instrument detects extreme ultraviolet radiation from the Sun. This is the most energetic light with the shortest wavelength in the UV range. SUVI can locate coronal holes, solar flares, and regions where coronal mass ejections originate. SUVI data characterize complex active regions of the Sun, enabling improved forecasting of space weather and early warnings of possible impacts to the Earth environment. This extreme ultraviolet image of the Sun was taken by the Extreme Ultraviolet Imaging Telescope (EIT) on the Solar and Heliospheric Observatory (SOHO).

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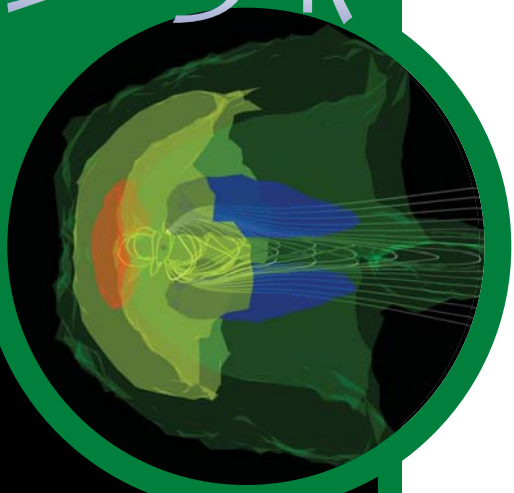
Image Courtesy of Lockheed Martin.

GOES-R



Monitoring Charged Particles in the Magnetosphere

The Space Environment In-Situ Suite (SEISS) will characterize the charged particles along the GOES orbit path. The suite includes the Energetic Heavy Ion Sensor, two Magnetospheric Electron and Proton Sensors, and a Solar and Galactic Proton instrument. These data are essential to the Solar Radiation Storm portion of NOAA's Space Weather Prediction Center and other NOAA operational alerts and warnings.

This computer-generated model of Earth's magnetosphere represents particle density (red is high, blue is low) and magnetic field lines.

Credit: NASA/Goddard Space Flight Center, Scientific Visualization Studio.

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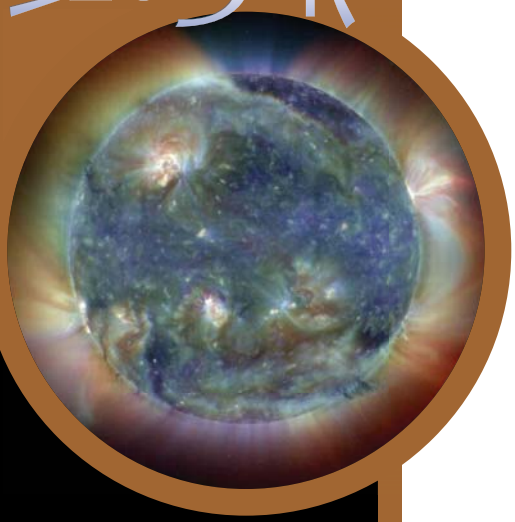

Monitoring the Ultraviolet Sun

The Extreme UV/X-ray Irradiance Sensor (EXIS) includes two instruments that will measure the absolute brightness of the full disk of the Sun. The Extreme UV Sensor will detect solar variations that directly affect satellite drag and tracking. It will also monitor changes in the ionosphere. The X-Ray Sensor will monitor solar flares that can disrupt communications and impair navigational accuracy. The instruments include spectrographs, which break apart sunlight into its different wavelengths, and photometers, which use a filter that selects a wavelength's range and measures the spectrum.

This image of the Sun is a composite from the Extreme UV Imaging Telescope on NASA's Solar and Heliospheric Observatory.

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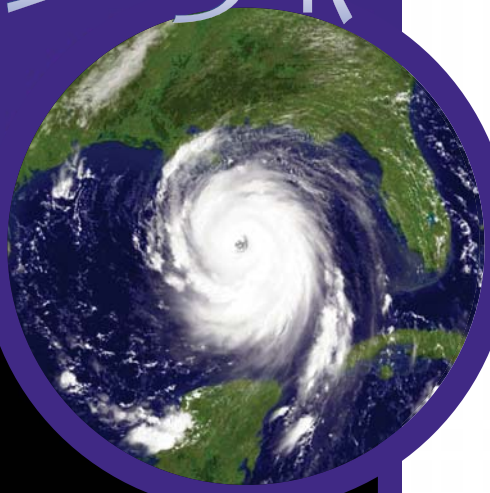

Imaging Weather, Climate, and Environment

The Advanced Baseline Imager (ABI) on GOES-R will improve upon the current GOES Imager with more spectral bands, faster imaging, higher spatial resolution, better navigation, and more accurate calibration. It will be used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). ABI will improve every product from the current GOES Imager and will introduce a host of new products.

This image of hurricane Katrina is derived from GOES-12 visible wavelength data.

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Image Courtesy of Lockheed Martin.

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Measuring Earth's Magnetic Field

The Magnetometer will measure the Earth's geomagnetic field at geosynchronous orbit in three directions. These data will provide a map of the space environment that controls charged particle dynamics in the outer region of the magnetosphere. This information on the general level of geomagnetic activity and the current systems in space will facilitate the detection of events in the magnetosphere. GOES-R's magnetometer will be similar to that onboard GOES-N.

Credit: Space Plasma Physics Group, NASA Marshall Space Flight Center.

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