



GOES-O

GOES-O is the latest in a series of Earth monitoring satellites. Geostationary Operational Environmental Satellites (GOES) provide the kind of continuous monitoring necessary for intensive data analysis of Earth's weather and space weather events. Geostationary describes an orbit in which a satellite is always in the same position with respect to the rotating Earth. This orbit allows GOES to hover continuously over one position on Earth's surface. As a result, GOES provides a constant vigil for the atmospheric "triggers" for severe weather conditions such as tornadoes, flash floods, hail storms, and hurricanes.

GOES-O carries an imager, a sounder, and a collection of space environment monitoring instruments.

Imager: An imaging radiometer that uses data obtained from its five channels to continuously produce images of the Earth's surface, oceans, severe storm development, cloud cover, cloud temperature and height, surface temperature, and water vapor. The GOES-O&P Imagers have improved resolution in the 13- μ m channel from 8 km to 4 km. The finer spatial resolution allows an improved cloud-top product, height of atmospheric motion vectors, and volcanic ash detection.

Sounder: Gathers atmospheric data over an approximately circular area extending from 60°N to 60°S latitude, allowing meteorologists to deduce atmospheric temperature and moisture profiles, surface and cloud-top temperatures, and ozone distributions by mathematical analysis and by adding to data from the Imager.

Space Environment Monitor (SEM): Includes three instrument groups:

- (1) An energetic particle sensor package, which measures the energetic particles at geosynchronous orbit, including protons, electrons, and alpha particles.
- (2) Two magnetometer sensors that measure the magnitude, direction, and variation of Earth's geomagnetic field, and provide alerts of solar wind shocks or sudden impulses that impact the magnetosphere.
- (3) Solar x-ray and extreme ultraviolet sensors (XRS/EUVS)—x-ray and EUV telescopes that observe and measure solar x-ray emissions in two ranges and ultraviolet radiation in three ranges. In real time, they measure the intensity and duration of solar flares in order to provide warnings of potential disruption of radio communications and Global Positioning System (GPS) signals.

Solar X-ray Imager (SXI): Uses a telescope assembly to observe the Sun's x-ray emissions and provide early detection and location of solar disturbances. These observations allow space weather forecasters to monitor solar features and activities such as solar flares, loops, coronal holes, and coronal mass ejections—clouds of charged particles shooting toward Earth from the Sun. GOES-O incorporates enhanced software to protect the SXI when solar flares occur, thus ensuring a longer, high-quality observing lifetime from the instrument.

