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 Proving Ground?
The GOES-R Proving Ground engages the National Weather Service (NWS) forecast and warning community in pre-operational demonstrations of select capabilities of GOES-R. This venture facilitates the examination and validation of new ideas, technologies and products through the Advanced Weather Information Processing System (AWIPS). Emphasis is placed on the transition from AWIPS-I (AWIPS Legacy) to AWIPS-II (AWIPS Migration), the next-generation decision support system for forecasters. Pre-operational analysis will prepare users for the new types of satellite imagery and tools that will become available with GOES-R.

How does the Proving Ground work?
This project joins National Environmental Satellite, Data and Information Service (NESDIS), NOAA’s cooperative institutes, and its affiliated partners to participate in early-stage product evaluation. The Proving Ground provides
simulated GOES-R products for operational assessment. Testing methodology includes the combination of current GOES channels with other satellite channels, utilization of analogous Moderate Resolution Imaging Spectroradiometer (MODIS) channels, and the use of synthetic, model-generated imagery to replicate GOES-R products.

What products are being tested?
Three initial severe-weather products have been tested at NOAA’s Hazardous Weather Testbed (HWT), located at the NWS Storm Prediction Center (SPC) in Norman, Okla. Convective Initiation (CI), developed by the Cooperative Institute for Meteorological Satellite Studies (CIMSS), detects rapidly forming cumulus clouds in a pre-convective initiation state throughout day and night. The CI nowcast can be used by forecasters to objectively determine where significant convection is presently developing. Atmospheric wind shear and stability parameters can be analyzed for the surrounding environment of newly developed storms to estimate their future severity. The product offers up to a 30–45-minute lead time before significant radar echoes and cloud-to-ground lightning are present.

Lightning Detection identifies total lightning activity occurring over land and water. Researchers at NASA’s Short-term Prediction Research and Transition (SPoRT) center are using ground-based Lightning Mapping Array (LMA) data to demonstrate Lightning Detection and GLM’s capabilities. Lightning Detection will give the forecast and warning community a new means by which to observe all lightning with near-uniform coverage of the United States and adjacent oceans. This product will offer early indication of storm intensification and severe-weather events, providing increased warning lead time.

Statistical hail is a risk-reduction product developed by the Cooperative Institute for Research in the Atmosphere (CIRA). It uses Rapid Update Cycle (RUC) regional forecasting model data to diagnose the environment and combines the satellite infrared brightness temperature to identify where cold clouds are present, forecasting the probability of severe hail.

What are the benefits?
The GOES-R Proving Ground bridges the gap between research and operations, providing sustained interaction between developers and end users for the purposes of training, product evaluation, and user feedback-based development. Proving Ground activities will enable day-one readiness. These efforts will maximize utilization of GOES-R products and services and provide an effective transition to operations. The severe-weather tools being tested through the Proving Ground will improve lead time and accuracy in the watch and warning process.