

# **NPOESS PREPARATORY PROJECT (NPP)**

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## **1. INTRODUCTION**

The NPOESS Preparatory Project (NPP) mission is designed to bridge the gap between the next-generation research environmental satellite data provided by NASA's EOS program and the next-generation operational environmental satellite data to be provide by the NPOESS program.

The NPP mission carries five instruments, Visible-InfraRed Radiometer Suite (VIIRS), Cross-track Infrared Sounder (CrIS), Advanced Technology Microwave Sounder ATMS and Ozone Mapping and Profiler Suite (OMPS), and Clouds and the Earth's Radiant Energy Suite (CERES.) The data from these instruments will provide 30 data products to two primary user communities; operational users in the weather and environmental conditions forecasting communities requiring guaranteed access to real-time data and scientific users primarily interested in studying longer-term climate processes.

## **2. NPP Instruments**

The VIIRS instrument is a multi-spectral scanning radiometer with 21 bands from 412 nm to 12.1  $\mu\text{m}$  with a 3000 km swath width and derives its heritage from AVHRR, OLS, MODIS, and Sea WiFS.

The CrIS instrument is a Michelson interferometer. The spectral range goes from 650  $\text{cm}^{-1}$  to 2550  $\text{cm}^{-1}$ . Its heritage is the HIRS, AIRS, and the IASI. CrIS will produce daily global sets of high-resolution temperature and moisture profiles for scenes with <50% cloud cover.

The ATMS instrument is a 22 channel, passive microwave radiometer with a swath width of 2300 km. Its heritage is the AMSU A1, A2 and the HSB. It provides the initial estimate of temperature and moisture profiles for input to an infrared algorithm as well as an all-weather set of profiles.

The CERES instrument is a 3-channel radiometer with a limb-to-limb swath width. It measures both solar-reflected and Earth-emitted radiation from the top of the atmosphere to the Earth's surface. Its heritage is the Earth Radiation Budget Experiment (ERBE) and previous flights of CERES on the Tropical Rainfall Measuring Mission (TRMM) and the Terra and Aqua satellites.

The Ozone Mapping and Profiler Suite (OMPS), which measures solar back-scattered radiation to map the vertical and horizontal distribution of ozone in the Earth's atmosphere using a nadir ultra-violet (UV) sensor and limb-scanning UV/visible (VIS) sensors.

### **3. NPP Data Products**

Twenty four operational environmental data records (EDRs) scheduled to be produced by the Interface Data Processing Segment (IDPS) from the NPP data, distributed to the weather forecasting centers and then archived at the National Climatic Data Center. These data products will be evaluated by the Science Data Segment (SDS) for their applicability for answering broader scientific questions. The various elements of the SDS will be described in detail by the subsequent talks in this session.

### **4. NPP Science**

The NPP mission has two high level requirements: Provide risk reduction for the NPOESS mission and Continue the satellite data record started by the NASA EOS missions. Several key climate variables, measured from space using operational satellite data, now have multi-decadal records. The EOS mission, coupled with NPP data, will expand the set of climate variables having multi-decadal records. This talk will review some of the outstanding science questions that can be answered using NPP measurements are expected to address and show NPP data could be used to provide answers.