

NASA NPOESS Preparatory Project (NPP)
Mission Success Criteria

May 2004

National Aeronautics and Space Administration
Office of Earth Science

MISSION OVERVIEW

The NPP Project is a joint effort of the National Polar-orbiting Operational Environmental satellite system (NPOESS) Integrated Program Office (IPO), the National Oceanic and Atmospheric Administration (NOAA) and NASA.

The NPP spacecraft will be an Earth observing satellite carrying four instruments into a polar, sun-synchronous, 824 km orbit. NPP will be launched on a Delta II launch vehicle. The design lifetime of the NPP spacecraft is 5 years.

Instruments

The following instruments will be a part of the NP spacecraft:

- The Visible-Infrared Imager Radiometer Suite (VIIRS) instrument is a multispectral scanning radiometer with 3000 km swath width and derives its heritage from Advanced Very High Resolution Radiometer (AVHRR), Optical Line Scanner (OLS), Moderate Resolution Imaging Spectroradiometer (MODIS), and Sea-viewing Wide Field-of-View Sensor (SeaWiFS).
- The Cross Track Infrared Sounder (CrIS) instrument is a Michelson interferometer. Its heritage is the High Resolution Infrared Sounder (HIRS), Atmospheric Infrared Sounder (AIRS), and the Infrared Atmospheric Sounding Interferometer (IASI) radiometer. It is co-registered with the Advanced Technology Microwave Sounder (ATMS) and is designed to work in conjunction with it.
- The ATMS instrument is a passive microwave radiometer with a swath width of 2300 km. Its heritage is the Advanced Microwave Sounding Unit (AMSU) A1/A2 and the Humidity Sounder for Brazil (HSB).
- The Ozone Mapping and Profiler Suite (OMPS) measures solar 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. Its heritage is the Solar Backscatter Ultraviolet (SBUV)/2 radiometer, the Total ozone Mapping Spectrometer (TOMS), the Shuttle ozone Limb Scatter Experiment (SOLSE) and the Limb Ozone Retrieval Experiment (LORE).

MISSION SUCCESS CRITERIA

The NPP Mission Success is determined by its capabilities to provide continuation of a group of earth system observations initiated by the Earth Observing System (EOS) Terra, Aqua and Aura missions. The NPP Mission Success is also judged by its ability to reduce the risks associated with its advance observational capabilities as they are being transitioned from the NASA research program into the NPOESS operational program in support of both the Department of Defense (DoD) and NOAA. These include pre-operational risk reduction demonstration and validation for selected NPOESS instruments, and algorithms, as well as ground data processing, archive and distribution. Together these data records will fulfill the U.S. Climate Change Research Program (CCRP) objectives of understanding the earth's climate system and its variability on a decadal basis.

The specific NASA science criteria are:

1. Continue vertical temperature and moisture profiles of the Earth's atmosphere with accuracy, extent, and frequency consistent with those made with the Aqua satellite sensors.
2. Continue a record of sea surface temperature with accuracy, extent and frequency consistent with those made with Terra and Aqua sensors.
3. Continue a record of surface biophysical and climatic parameters with accuracy, extent and frequency consistent with those made with Terra and Aqua sensors.
4. Continue a record of cloud and aerosol properties with accuracy, extent, and frequency consistent with those made with Terra and Aqua sensors.
5. Continue a record of ozone total column abundance and vertical profile with accuracy, extent, and frequency consistent with those made with previous US spacecraft making comparable measurements.