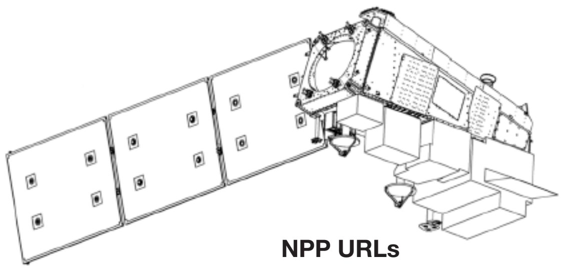
NPP

National Polar-orbiting Operational Environmental Satellite System (NPOESS) Preparatory Project



NPP URLs
jointmission.gsfc.nasa.gov
www.ipo.noaa.gov

Summary

NPP is a joint mission with the NPOESS Integrated Program Office (IPO). Its two main objectives are to provide NASA and the broader Earth science community with continuation of calibrated, validated, and geo-located global imaging and sounding products beyond the Earth Observing System (EOS) missions and to provide risk reduction for NPOESS through pseudo-operational demonstration and validation of instruments and algorithms prior to the first NPOESS flight. In this manner, NPP bridges the EOS missions to the NPOESS missions, supporting the transition of selected long-term systematic Earth-science measurements from EOS to operational systems. The launch is planned for 2008 with a mission duration of 5 years.

Instruments

- Advanced Technology Microwave Sounder (ATMS)
- Cross-track Infrared Sounder (CrIS)
- Ozone Mapping and Profiler Suite (OMPS)
- Visible Infrared Imaging Radiometer Suite (VIIRS)

Points of Contact

- *NPP Project Scientist:* James Gleason, NASA Goddard Space Flight Center
- *NPP Deputy Project Scientist:* Jeffrey Privette, NASA Goddard Space Flight Center
- *NPP Deputy Project Scientist for Calibration and Validation:* James Butler, NASA Goddard Space Flight Center

Key NPP Facts

Joint mission with the tri-agency Integrated Program Office [Department of Commerce (DoC), Department of Defense (DoD), and NASA]

International partners include the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) and the Japan Aerospace Exploration Agency (JAXA).

Orbit
Type: Sun-synchronous
Equatorial Crossing: 10:30 a.m.
Altitude: 824 km
Inclination: 97.1°
Period: 101 minutes
Repeat Cycle: 16 Day (8-day quasi-repeat)

Dimensions: 4.028 m × 2.610 m × 2.206 m

Mass: 2001 kg

Power: 2017 W

Downlink: Svalbard Ground Station once per orbit; backup telemetry and command via TDRSS

Design Life: 5 years

Direct Broadcast: Mission data on X-band; telemetry and command on S-Band

NPP Partners
Spacecraft: Ball Aerospace & Technologies Corp.
ATMS: Northrop Grumman Electronic Systems
CrIS: ITT Industries, Inc.
OMPS: Ball Aerospace, Inc.
VIIRS: Raytheon Santa Barbara Remote Sensing
Data Processing: NPOESS IDPS production facility at NOAA/NESDIS
Ground Operations: NPOESS IPO
Validation: Northrop Grumman Space Technology, IPO and NASA

NPP Organization
NPP's management is a joint venture between NASA and the IPO.

Other Key Personnel

- *NPP Program Scientist:* Diane Wickland, NASA Headquarters
- *NPP Program Executive:* Andrew Carson, NASA Headquarters

Mission Type

Next Generation Systematic Measurement

Launch

- *Date and Location:* No earlier than 2008, from Vandenberg Air Force Base, California

Relevant Science Focus Areas

(see NASA's Earth Science Program section)

- Atmospheric Composition
- Climate Variability and Change
- Carbon Cycle, Ecosystems, and Biogeochemistry
- Water and Energy Cycles
- Weather

Related Applications

(see Applied Sciences Program section)

- Agricultural Efficiency
- Air Quality
- Aviation
- Carbon Management
- Coastal Management
- Disaster Management
- Ecological Forecasting
- Homeland Security
- Invasive Species
- Public Health
- Water Management

NPP Science Goals

NPP will provide NASA with continuation of a set of global-change observations initiated by the EOS Terra, Aqua, and Aura missions. The observations will contribute to the Systematic Measurements element of NASA's ESE Research Strategy for 2000–2010. The systematic measurements will be used in the development of consistent, long-term data records from multi-instrument, multi-platform and multi-year observations, with due attention to calibration and validation. In that context, NPP's Environmental Data Records (EDRs), similar to EOS Level 2 swath products, will be generated in near-real time in NPOESS production facilities. NASA will help validate and enhance the algorithms, driving them toward science-grade quality where possible. NPP also serves as a risk-reduction demonstration for key aspects of NPOESS, the nation's future polar-orbiting operational satellite system. Together, NPP's objectives will allow NASA science programs to transition their systematic observation requirements from research grade missions to NPOESS and other operational missions.

NPP Instruments

ATMS

Advanced Technology Microwave Sounder

A 22-channel passive microwave radiometer with a swath width of 2300 km. Its heritage is the AMSU-A (A1/A2) and the AMSU-B (HSB and MHS). 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.

CrIS

Cross-track Infrared Sounder

A Michelson interferometer with a swath width of 2200 km and 1297 spectral channels. Its heritage is the High Resolution Infrared Radiation Sounder (HIRS), the Atmospheric Infrared Sounder (AIRS), and the Infrared Atmospheric Sounding Interferometer (IASI). It will produce daily global sets of high-resolution temperature and moisture profiles for scenes with < 50% cloud cover. It is co-registered with the ATMS and is designed to work in conjunction with it.

OMPS

Ozone Mapping and Profiler Suite

Comprises two sensors—a nadir sensor and a limb sensor, with the latter composed of three separate instruments. The suite measures solar-scattered radiation to map the vertical and horizontal distribution of ozone in Earth's atmosphere.

The nadir total-column UV spectrometer measures the scene radiance at 300–380 nm with a resolution of 1 nm sampled at 0.42 nm and a 23-hour ground revisit time with a resolution better than 50 km × 50 km. The nadir profile spectrometer measures at 250–320 nm with the same spectral sampling, in a single ground pixel of 250 km × 250 km. The UV/VIS limb sensor measures the along-track limb scattered solar radiance with 1-km vertical sampling in the spectral range 290–1000 nm.

NPP Mission Background

NPP has been formulated using an end-to-end mission-life-cycle methodology. The NPP payload includes four instruments: VIIRS, CrIS, ATMS, and OMPS. IPO will provide VIIRS, CrIS and OMPS, and NASA will provide ATMS. VIIRS will provide daily global imagery through a multispectral scanning radiometer. CrIS will adopt Michelson interferometer technology to provide high-spectral-resolution sounding of the Earth and atmosphere. Using advanced microwave-receiver electronics technologies, ATMS will combine the passive microwave observation capabilities of three heritage instruments (Advanced Microwave Sounding Unit (AMSU) A1/A2 and Microwave Humidity Sounder (MHS)) into a single small instrument. CrIS and ATMS are complementary, and together comprise the Cross-track Infrared Microwave Sounding Suite (CrIMS) sounding package. OMPS will continue the Total Ozone Mapping Spectrometer (TOMS)/ Solar Backscatter Ultraviolet (SBUV) heritage of ozone sounding and also provide new limb-profiling products. All sensors are new designs.

The spacecraft for NPP will directly transmit stored mission sensor data to a receiving station in Svalbard, Norway, and will also provide continuous direct broadcast of real-time sensor data. The mission data will be routed on communications networks from Svalbard to the continental United States. The NPOESS Interface Data Processing Segment (IDPS) will provide pseudo-operational processing of the mission data into Environmental Data Records (EDRs) for use by the operational community. NASA will assess sensor and algorithm performance through its Science Data Segment (SDS) and will attempt to improve the IDPS in cases where it is deemed insufficient to meet NASA's research goals. SDS will also support NASA-funded processing centers that use NPP data in the development of multimission long-term climate-quality data records. All products will be archived in NOAA's Comprehensive Large Array data Stewardship System (CLASS).

Spacecraft flight operations and the spacecraft operations control center will control the spacecraft and instruments, including on-orbit instrument-calibration activities. IPO will provide the communication, command, control, and IDPS systems, and NASA will provide the spacecraft. NASA will also provide state-of-the-art hardware, algorithms, and system technology to the operational program.

The NPP Project completed its Mission Confirmation Review in October 2003.

Project Science Group (PSG)

The PSG consists of government, university, and contractor staff located at or near NASA GSFC. Under the leadership of the Project Scientists, the group is responsible for coordinating NASA's NPP science activities, providing sensor calibration and characterization advice and augmentation to mission and sensor contractors, facilitating NASA NPP Science Team efforts to assess and enhance the industry-supplied algorithms, guiding the design and managing the Science Data Segment, and communicating Science Team suggestions for algorithm improvements to the IPO and mission

NPP Instruments *(cont.)*

VIIRS

Visible Infrared Imaging Radiometer Suite

A 22-band, multi-spectral scanning radiometer with a 3040-km swath width. Some bands have dual gains. It derives its heritage from the Advanced Very High Resolution Radiometer (AVHRR), Operational Linescan System (OLS), MODIS, and Sea-viewing Wide Field-of-view Sensor (SeaWiFS). There are both imagery and moderate-resolution bands with effective pixel sizes of 370 m and 740 m at nadir, respectively. Pixel-size variation across the swath is constrained.

prime contractor. PSG will also ensure that the SDS enables the production of long-term multi-mission climate data records in the future.

Science Team

The 24-member NASA NPP Science Team was competitively selected in September of 2003 to assess the usefulness of NPP's industry-supplied operational products for NASA's global change research program. In addition to reviewing algorithm theory and evaluating the pre-launch production codes, the team will analyze and suggest improvements to sensor calibration, product validation, and the IDPS and SDS components. Ultimately, the team seeks to develop approaches for the IDPS operational products to meet NASA's science requirements. The NPP Team will help lead the transition from NASA's traditional mission-oriented science teams, e.g., MODIS, to theme-based measurement-oriented science teams, e.g., land biophysical products, which bridge multiple missions and sensors.

ATMS

Advanced Technology Microwave Sounder

Provides high-spatial-resolution microwave data to support temperature- and humidity-sounding generation in cloud-covered conditions.

ATMS Background

ATMS extends the measurement series initiated by its heritage sensors AMSU-A, and AMSU-B (Humidity Sounder for Brazil (HSB) and MHS). It is already flying or planned to fly on NOAA-15, -16, -17, -18, and -19; METOP; and Aqua. ATMS has three more channels than AMSU, better sampling, and a sharper spatial resolution.

ATMS Science

ATMS is a total-power radiometer with cross-track scanning. Working in unison with CrIS, ATMS forms the sensor package called the Cross-track Infrared Microwave Sounding Suite (CrIMSS). This suite provides daily global observations of temperature and moisture profiles at high spatial resolution.

ATMS' temperature-sounding channels have 2.2° beams and are Nyquist-sampled in both the cross-track and the down-track directions. ATMS uses a stable onboard through-the-antenna calibration. For each complete scan cycle (8 scans/3 s), the detectors view 2 distinct calibration targets to keep the instrument calibration highly stable.

The data compiled by CrIMSS will be used to create global models of temperature and moisture profiles. This information will provide a much wider range of information on Earth's weather systems and allow for greater forecasting abilities than was previously possible. CrIMMS will provide soundings of the entire planet

Key ATMS Facts

Works in unison with CrIS

Heritage: AMSU-A and AMSU-B (HSB and MHS)

Heritage Missions: NOAA-15, -16, -17, Meteorological Operational Satellite (METOP), and Aqua

Instrument Type: Total Power Radiometer

Scan Type: Cross-track

Incidence Viewing: 2300 km

Calibration: On-board, two-point calibration

Field of View (FOV): Ch 1–2: 5.2°; Ch 3–16: 2.2°; Ch 17–22: 1.1°

Instrument IFOV: Ch 1–2: 75 km; Ch 3–16: 33 km; Ch 17–22: 15 km at nadir

Swath: 2300 km

Spatial Resolution: See IFOV

Spectral Range: 22 channels (23–183 GHz)

Dimensions: 70 cm (vel.) × 60 cm (nadir) × 40 cm

Mass: 85 kg

Power: 110 W

Data Rate: 30 Kbps

Direct Broadcast: Yes

at better than 1 K/500-m accuracy. It is hoped that the suite will greatly increase weather forecasting range and accuracy broadly across the globe.

CrIS

Cross-track Infrared Sounder

CrIS Background

CrIS is a Michelson interferometer infrared sounder designed to measure scene radiance and calculate the vertical distribution of temperature, moisture, and pressure in Earth's atmosphere. CrIS was designed to work in unison with the ATMS, together creating the CrIMSS. The objective of CrIMSS is to provide global three-dimensional soundings of atmospheric temperature and moisture as well as provide data on other geophysical parameters.

The technology implemented within NPP provides risk reduction for the NPOESS project. The High Resolution Infrared Radiation Sounder (HIRS), a heritage sensor of CrIS, has provided early soundings of Earth's atmosphere. The NPOESS Airborne Sounder Testbed (NAST) has conducted successful airplane simulations for both ATMS and CrIS, providing both flight validation and a preview of high-resolution spectral and spatial products. The CrIS is the follow-on sounder to the EOS Atmospheric Infrared Sounder (AIRS), which has proven results on its current operation on Aqua. The CrIS effort consists of a space-based sensor that produces Raw Data Records (RDRs) and ground-based science algorithms that produce calibrated Sensor Data Records (SDRs) and Environmental Data Records (EDRs). The CrIS sensor forms a key component of the larger CrIMSS and is intended to operate within the context of the CrIMSS architecture. CrIS EDR algorithms generate EDR products for the entire CrIMSS suite.

CrIS Science

CrIS will take high-spectral-resolution measurements of Earth's radiation to determine the vertical distribution of temperature, moisture, and pressure in the atmosphere. CrIS uses a Michelson interferometer infrared sounder covering the spectral range of approximately 3.9–14.4 μm (655–2550/cm). It is the primary instrument for satisfying three Environmental Data Records (EDRs), for atmospheric temperature, moisture, and pressure.

CrIS will provide over 1000 spectral channels of information in the infrared region at a high horizontal spatial resolution and will be able to measure temperature profiles with improved vertical resolution to an accuracy approaching 1 K. This improved accuracy is necessary for increasingly sophisticated forecast models. It will help both short-term weather 'nowcasting' and long-term forecasting. Its infrared sensors will provide high-resolution data that will also assist in understanding El Niño and other major climate phenomena.

Key CrIS Facts

Heritage: HIRS, AIRS, IASI

Instrument Type: Michelson interferometer infrared sounder

Scan Type: Step-scanning

Incidence Viewing: ± 48.33°

FOV:
# of FOV: 3 × 3
FOV Diameter (round): 14 km
FOV Shape Match: < 0.05%

Instrument FOV: 14 km

Swath: 2200 km

Spatial Resolution:
LWIR: 655–1095/cm
MWIR: < 1.25/cm
SWIR: < 2.50/cm

Spectral Range:
LWIR Band: 655–1095/cm
MWIR Band: 1210–1750/cm
SWIR Band: 2155–2550/cm

Dimensions: 87.8 cm × 93.8 cm × 73.1 cm

Mass: 148 kg

Power: 118 W

Data Rate: 1.48 Mbps

Direct Broadcast: Yes

OMPS

Ozone Mapping and Profiler Suite

OMPS Background

The NASA Solar Backscatter Ultraviolet (SBUV) and Total Ozone Mapping Spectrometer (TOMS) series of instruments began operation with the Nimbus-7 TOMS and the NOAA SBUV/2 series of instruments. They have been conducting measurements of atmospheric ozone since 1978 and 1984, respectively. The Earth Probe TOMS instrument has been used to continue the record of ozone measurements, and as of July 15, 2004, it was joined by the Ozone Monitoring Instrument on the Aura spacecraft. The observations provided by these two systems will be extended and augmented by the next generation of U.S. ozone-monitoring instruments, OMPS. OMPS will first fly on the NPP mission to demonstrate its performance and to further insure continuity and will then become operational on NPOESS.

The suite consists of three advanced hyperspectral-imaging spectrometers where each has its own thermoelectric CCD-array detectors. Two nadir instruments provide a continuation of TOMS and SBUV/2 total-column and ozone-profile measurements but with improved accuracy and precision using advanced algorithms in order to meet the EDR requirements. The Limb Profiler provides ozone profiles with 3-km resolution, which is improved over the SBUV/2 vertical resolution. The instrument views solar- scattered light in the ultraviolet and the visible. The instrument and algorithm have heritage from the Shuttle Ozone Limb Sounding Experiment/ Limb Ozone Retrieval Experiment (SOLSE/LORE) instruments flown on the Space Shuttle and Canadian and European instruments on free-flying satellites. OMPS is one of two NPP/NPOESS instruments that have long-term stability requirements to meet trend-monitoring requirements.

OMPS Science

The OMPS Nadir Mapper system will provide total-column-ozone estimates with full coverage of the sunlit Earth once per day. These will be augmented by total-column-ozone estimates from the NPP/NPOESS Cross-track Infrared Sounder (CrIS) measurements, which will be available for both day and night orbital views, including polar night.

The Nadir Mapper and Nadir and Limb Profiler records will extend the 25-year total-ozone and ozone-profile records used by ozone-assessment researchers and policy makers to track the health of the ozone layer. OMPS will monitor the Antarctic ozone hole and will also monitor the high-latitudes of the Northern Hemisphere during winter and spring, when the largest ozone trends are typically observed. The improved vertical resolution of the Limb Profiler estimates will allow better testing and monitoring of the complex chemistry involved in ozone destruction near the tropopause. Research algorithms will produce tropospheric aerosol characteristics and tropospheric ozone characteristics.

These ozone products will be assimilated into forecast models, where they will be combined with cloud predictions to produce

Key OMPS Facts

Heritage: TOMS, SBUV

Instrument Type: Three hyperspectral imaging spectrometers, two grating and one prism, named the Nadir Mapper, Nadir Profiler, and Limb Profiler, respectively. Each instrument has a thermoelectrically cooled charge-coupled device (CCD) array detector

Scan Type: The nadir instruments are pushbroom, and the limb instrument images the Earth limb on the detector

Calibration: Extensive prelaunch calibration. Onboard calibration includes light-emitting diode (LED) for CCD flat fielding, working, and reference solar diffusers. Wavelength calibration is achieved by observing solar Fraunhofer lines.

Instrument FOV:
- Nadir Mapper: 110 × 0.3°
- Nadir Profiler: 16.7 × 0.3°
- Limb Profiler: 1.95° (3 sets separated by 4.3°)

Spatial Resolution:
- Nadir Mapper: 50 km × 50 km with 2600 km swath
- Nadir Profiler: 250 km × 250 km horizontal, 8 km vertical over 0–60 km altitude range
- Limb Profiler: 3-km vertical over 0–60 km altitude range with retrievals from the tropopause to 60 km; three sets separated by 500 km

Spectral Range:
- Nadir Mapper: 300–380 nm
- Nadir Profiler: 250–310 nm
- Limb Profiler: 290–1000 nm

Spectral Sampling Interval (FWHM: full width half maximum):
- Nadir Mapper: 2.4 pixels per FWHM
- Nadir Profiler: 2.4 pixels per FWHM
- Limb Profiler: 2.0 pixels per FWHM

Spectral Resolution (FWHM):
- Nadir Mapper: 1.0 nm
- Nadir Profiler: 1.0 nm
- Limb Profiler: 1.5–40 nm

Revisit Time:
- Nadir Mapper: 24 hours
- Limb Profiler: 4 days (average)

Dimensions: 35 cm × 54 cm × 56 cm

Mass: 69 kg

Power: 108 W

Duty Cycle: Daytime only

Data Rate: 188 Kbps

Ultraviolet Index forecasts. The Nadir Profiler and Limb Profiler will provide estimates of the vertical ozone profile for the suborbital track on the sunlit portions of each orbit. The ozone column and profile estimates will be assimilated into numerical weather models to improve the fidelity of atmospheric heating calculations and into atmospheric chemistry models to improve air quality monitoring.

VIIRS

Visible Infrared Imaging Radiometer Suite

VIIRS Background

VIIRS extends the measurement series initiated by its heritage sensors, the polar-orbiting Advanced Very High Resolution Radiometer (AVHRR) and MODIS. VIIRS may be considered an evolved form of the MODIS, with similar performance, spatial resolution, and spectral sampling. Although VIIRS has just 22 bands compared to 36 for MODIS, it employs dual-gain technology such that most MODIS measurements are continued. VIIRS has a nadir pixel resolution comparable to MODIS, but VIIRS has constrained pixel growth with scan angle such that it has superior resolution at the edge of scan. The constrained growth is achieved through onboard detector aggregation as the telescope moves from the swath edge to nadir. Like MODIS, VIIRS has several onboard calibration systems. In contrast to MODIS, however, VIIRS uses a rotating telescope and all reflective (rather than transmissive) fore-optics. VIIRS and OMPS are the two NPP/NPOESS instruments that have long-term stability requirements to meet trend-monitoring requirements.

VIIRS Science

VIIRS will collect visible/infrared imagery and radiometric measurements of land, atmospheric, cryospheric, and oceanic parameters. These data will be used to generate 29 EDRs, which are roughly equivalent to NASA Level 2 swath products. The VIIRS EDRs cover a broad range of parameters, including cloud and aerosol properties, ocean color and sea surface temperature, ice motion and temperature, and a diverse set of land products, including active fire detection, land surface temperature, and albedo. Most products will be generated globally each day. The sensor and algorithm system was designed to meet IPO-specified requirements. These requirements are generally similar to MODIS product performance requirements. At night VIIRS operates 11 of its 22 spectral bands, and produces a reduced set of EDRs.

Key VIIRS Facts

Heritage: MODIS (onboard Terra and Aqua), AVHRR, and OLS

Instrument Type: Scanning radiometer

Calibration: Onboard blackbody radiator for thermal bands, onboard solar diffuser panel for solar reflective bands, and a space-view port

Instrument IFOV: Moderate-resolution detectors: 0.742 km along track, 0.318 along scan at nadir; Imagery-resolution detectors: 0.371 km along track, 0.095 along scan.

Number of Bands: 22

Spatial Resolution (3 imagery spatial resolutions):

- Imagery resolution bands: 375 m at nadir
- Moderate resolution bands: 750 m at nadir
- Near-constant-contrast band: 750 m across full scan

Spectral Bands:

- Wavelength Range: 0.412–12.013 μm
- Visible/Near IR: 9 plus day/night panchromatic band
- Mid-Wave IR: 8
- Long-Wave IR: 4

Imaging Optics: 20-cm aperture, 114-cm focal length

Dimensions: 133 cm × 143 cm × 85 cm

Mass: 252 kg

Power: Orbit average = 191 W

Direct Broadcast: Yes

Data-Acquisition Parameters:

- Scanned Swath: ± 55.84°, 3040 km
- Downtrack Swath: 11.8 km, 16–32 detectors in track
- Scan Period: 1.786 s
- Horizontal Sample Interval on Ground at End of Scan: Moderate bands < 1.6 km; Imagery bands < 0.80 km
- Data Quantization: 12–14 bit A/D converters for lower noise
- High-Rate Data (Rice Compression): 7.41 Mbps (Maximum: 10.5 Mbps)

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Additional NPP Documents

The IPO NPOESS Archive is a collection of documents both current and historical. Some date to the beginnings of NPOESS and IPO. The initial contents for this collection were obtained from the original NPOESS online library (npoesslib.ipo.noaa.gov) in July 2003.

IPO NPOESS Library URL:

npoesslib.ipo.noaa.gov/

NPP Data Products

NPP will provide Raw Data Records (RDRs) (roughly equivalent to NASA's Level 0 data definition), Sensor Data Records (SDRs) (NASA's Level 1b), and Environmental Data Records (EDRs) (NASA's Level 2). All RDRs and SDRs, and nearly all EDRs, will be provided in swath (granule)-format only. The data will be packaged in Hierarchical Data Format 5 (HDF5) with limited Quality Assurance bits and metadata.

Product Name	Spatial Resolution
CrIMSS	
Atmospheric Vertical Moisture Profile*	3 km at nadir
Atmospheric Vertical Temperature Profile*	3 km at nadir
Pressure Vertical Profile	3 km at nadir
Clear Column Radiances	3 km at nadir
OMPS	
Ozone Total Column/Profile	50 km at nadir
VIIRS	
Imagery*	0.4 km at nadir
Precipitable Water	0.75 km at nadir
Suspended Matter	1.6 km at nadir
Aerosol Optical Thickness	1.6 km (over ocean), 9.6 km (over land) at nadir
Aerosol Particle Size	1.6 km (over ocean), 9.6 km (over land) at nadir
Cloud Base Height	10 km at nadir
Cloud Cover/Layers	25 km at nadir
Cloud Effective Particle Size	5 km at nadir
Cloud Optical Thickness/Transmittance	5 km at nadir
Cloud-Top Height	5 km at nadir
Cloud-Top Pressure	5 km at nadir
Cloud-Top Temperature	5 km at nadir
Active Fires	0.75 km at nadir
Albedo (Surface)	0.75 km at nadir
Land Surface Temperature	0.75 km at nadir
Soil Moisture	0.75 km at nadir
Surface Type	1 km at nadir
Vegetation Index	0.38 km at nadir

NPP Data Products

Product Name	Spatial Resolution
VIIRS *(cont.)*	
Sea Surface Temperature*	0.75 km at nadir
Ocean Color and Chlorophyll	0.75 km at nadir
Net Heat Flux	20 km at nadir
Sea Ice Characterization	0.8 km at nadir
Ice Surface Temperature	10 km at nadir
Snow Cover and Depth	0.8 km at nadir

NPP Data Products