

JPSS

Joint Polar Satellite System



A collaborative mission between NOAA and NASA

www.jpss.noaa.gov



Harry Cikanek
Director

From Harry

Welcome to the inaugural issue of the JPSS Quarterly Newsletter. This newsletter will provide highlights about what is happening within the JPSS program community on program milestones, upcoming events, product improvements and even some of the challenges we face. It is our goal for this newsletter to also present content that is interesting and useful for readers, helping you to gain an understanding of the important and exciting work underway as we move ever closer to launch of the next satellite in our series of next generation of polar-orbiting environmental satellites. We hope that you find this to be a helpful tool to keep informed about JPSS.

JPSS—An Overview

The Joint Polar Satellite System (JPSS) is the Nation's next generation of polar-orbiting environmental satellites. JPSS is a collaborative effort between NOAA and NASA, and represents significant technological and scientific advancements in observations and data products for severe weather prediction and environmental monitoring. Information from JPSS supports every area of NOAA's mission, to help ensure a more "weather-ready nation," healthy coasts, resilient coastal communities, and adapting and mitigating climate change.

Polar satellites circle the Earth 14 times each day and are considered the backbone of the global observing system. JPSS includes three polar-orbiting satellites, five instruments, a versatile ground system and one experimental payload. The satellites are the Suomi National Polar-orbiting Partnership (Suomi NPP), launched in 2011, JPSS-1 and JPSS-2, with scheduled launch dates in 2017 and 2021, respectively.

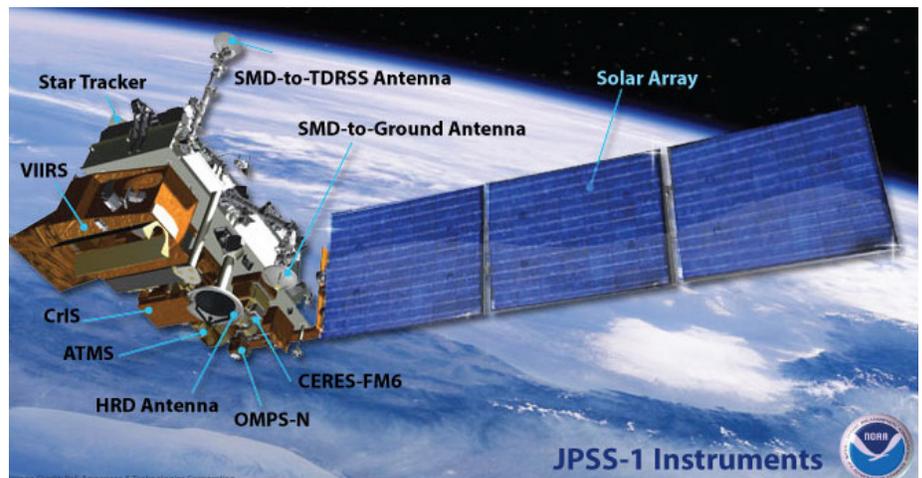


Figure 1. JPSS Observatory illustration showing instruments and major features

Satellites in the JPSS constellation gather global measurements of atmosphere, terrestrial and oceanic conditions—including atmospheric temperature, hurricane intensity, clouds, rainfall and dense fog, to name a few. These are accomplished with four instruments shown in Figure 1. They are: Advanced Technology Microwave Sounder (ATMS), Cross-track Infrared Sounder (CrIS), Visible Infra-



... JPSS-1 will produce 4.5 terabytes of data each day, as compared to 90 gigabytes per day for both POES and GOES combined.

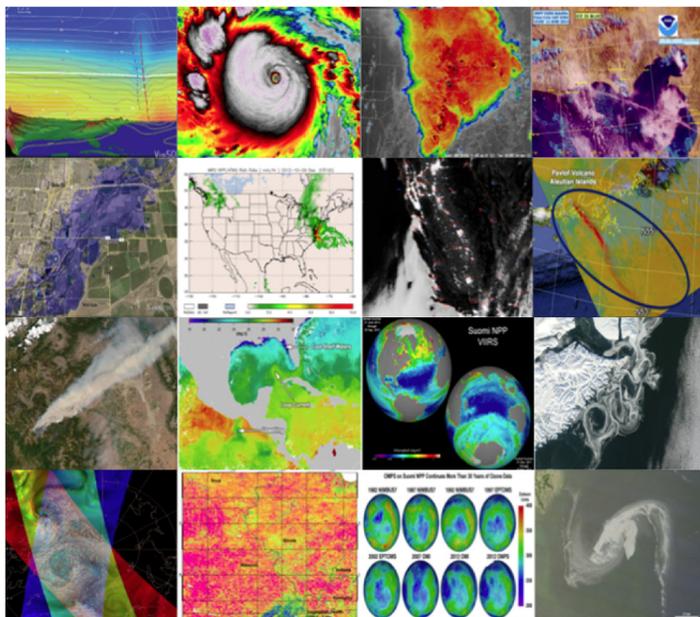
red Imaging Radiometer Suite (VIIRS) and Ozone Mapping and Profiler Suite (OMPS). JPSS also hosts earth radiation budget instruments: Clouds and Earth Radiant Energy System (CERES) on Suomi NPP and JPSS-1, and the new NASA provided Radiation Budget Instrument on JPSS-2.

JPSS also supports the Advanced Microwave Scanning Radiometer (AMSR) on the Japanese Aerospace Exploration Agency Global Climate Observation Mission – Water, and the Total Solar Irradiance Calibration Transfer Experiment (TCTE), an instrument that measures the sun’s energy output, was hosted aboard a U.S. Air Force spacecraft which launched in November 2013.

Why JPSS?

JPSS is the first operational system of satellites to simultaneously provide next generation meteorological data and observations of atmosphere, ocean and land for short-term, seasonal, and long-term monitoring and forecasting. Its most important function is to increase the timeliness and accuracy of forecasts three to seven days in advance of a severe weather event. These early warnings enable emergency managers to make timely decisions to protect American lives and property, including ordering effective evacuations. JPSS also provides support for zero to three day operational forecasting, particularly important in Polar Regions which are not covered well by geostationary weather satellites. In Alaska, JPSS will provide nearly all of the weather forecasting for aviation, as well as for the economically vital maritime, oil and gas industries.

Polar satellites are critical for all forecasts beyond 48 hours, and there is no substitute for the role they play in hurricane forecasting, aiding in evacuations, aviation safety from volcanic eruptions, fighting wildfires, and



What Industries Benefit from JPSS Data?

- Emergency Management (severe storm, hurricane, blizzards, fire, drought, flooding)
- Agriculture
- Transportation (air, water, land)
 - Commercial Aviation
 - Regional General Aviation
 - Maritime Transportation (weather, ice, fog)
 - Commercial fishing industry
 - Transoceanic container shipping industry
 - Recreational boating
 - Land Transportation
- Defense
- Coastal community preparedness
- Tourism (land and ocean)
- Energy
- Construction
- Insurance
- Conservation
- Oil Spill Trajectories (ocean)
- Vegetation Health

even helping troop deployment operations overseas.

Improved observations of atmospheric temperature/moisture profiles mean better understanding of hurricane intensity and position as well as severe thunderstorm development and tornado potential, both of which can also lead to significant precipitation and floods along with damaging winds.

Day/night instrument capabilities improve real-time weather observations at night that were previously not possible, enabling tracking major storms, critical ice detecting, measuring sea ice extent and monitoring clouds and snow cover at night.

The visual, ultraviolet and infrared imaging capabilities of JPSS instrumentation improve the ability to forecast dense fog and observe fire, smoke and even volcanic ash plumes, which is highly valuable for ensuring safe air travel.

JPSS technology will maintain a more than 30-year record of stratospheric ozone data to fulfill a U.S. treaty obligation to monitor global ozone concentrations. Views from the satellites provide valuable insights into vegetation health which inform agricultural land-use assessments (what to plant and when) and identify areas vulnerable for disease outbreak, drought and hazardous fire conditions.

JPSS also supports NOAA’s mission to ensure healthy oceans and coasts through observations of sea surface temperature, ocean color—which can indicate the pres-

ence of harmful algal blooms— and oil spills in coastal regions and open oceans.

NOAA weather satellites are the critical backbone for life-saving, three-to-seven-day-ahead weather forecasts and advance hazardous outlooks - relied upon by individuals, businesses, emergency responders and the military every day. In the last three years there were more than 30 disasters surpassing \$1B each. The demand for these products has never been greater.

JPSS-1 Satellite Development on Track

JPSS continues to reach critical milestones, and development of the JPSS-1 satellite is on track to meet to the 2017 scheduled launch date. All of the instruments for the satellite are now assembled and concurrently undergoing environmental testing with vendors around the country. All of the JPSS-1 instruments are scheduled to be shipped by early 2015 when instrument integration is scheduled to begin on the spacecraft.

The Ozone Mapping and Profiler Suite (OMPS) instrument undergoes post thermal inspection at a Ball facility in Boulder, Colo. Credit: Ball Aerospace and Technologies Corp. NOAA JPSS-1 Satellite

In addition, JPSS-2 procurement activities are well underway. The JPSS-2 satellite is scheduled to launch in 2021.



The Ozone Mapping and Profiler Suite (OMPS) instrument undergoes post thermal inspection at a Ball facility in Boulder, Colo. Credit: Ball Aerospace and Technologies Corp. NOAA JPSS-1 Satellite

Suomi NPP Data Users Applaud Its Performance

For more than two years, the Suomi NPP satellite has been heralded as the bridge between NOAA's current polar satellite fleet, NASA's Earth observing missions and JPSS. With more than 12,000 orbits since NASA officially handed over Suomi NPP to NOAA, scientists in the U.S. and around

April 4, 2014

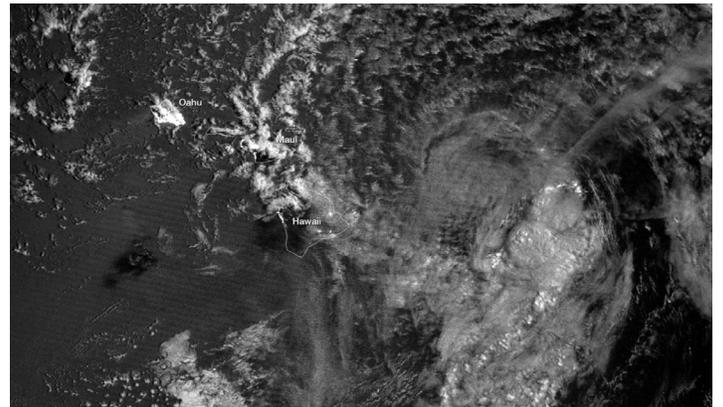
the world are seeing results in the improved quality of data from its five sophisticated instruments.

"Suomi NPP is fulfilling its intended purpose— to provide the first flight of the JPSS instrument suite, while producing high-quality, short-term weather and long-range environmental measurements for users," said Harry Cikanek, JPSS director. "The satellite continues to show great operational health, and this gives us confidence as we continue to build JPSS-1 and prepare it for an early 2017 launch."

For example, data from Suomi NPP have demonstrated improved capability to feed the NOAA National Weather Service's ability to accurately forecast three to seven days in advance of a severe weather event.

The primary archived data source for Suomi NPP products is NOAA's Comprehensive Large Array-Data Stewardship (CLASS) website, which currently houses more than 1.32 petabytes of data from the satellite. For a better sense of the volume of data, 1.32 petabytes of data is equal to the amount that could be stored on 82,500 (16GB) smartphones.

Data and imagery from Suomi NPP continues to receive praise, and stunning imagery is regularly featured by the NOAA Visualization Laboratory which can be found [here](#).



Suomi NPP captured this image of Tropical Storm Flossie at night. The powerful Day/Night Band revealed that the storm shifted to the north overnight, allowing NWS to predict a change in path that downgraded storm warnings for the island of Hawaii, which otherwise would have been warned that a direct hit was likely. Credit: NOAA/NASA

JPSS Proving Ground-From Research to Operations

JPSS bridges the gap between research and operations, preparing users to take full advantage of technological advances in satellite services and products. The Proving Ground provides a mechanism for sharing data, testing products and improving decision-making, and it supports the transition of improved JPSS capabilities from research to operation. It also works closely with the National Weather Service and other partner agencies to enhance

critical products and services, such as weather forecasting, forest fire warnings, drought assessments, ocean/coastal ecosystem assessments and Arctic access and resource management through innovative uses of new JPSS capabilities.

The Proving Ground also invests in ongoing science education, training and solicitations of user feedback. The first ever JPSS Science Digest was produced in 2013 and is a collection of technical articles that capture the importance of collaboration between product development and users to enhance the use of JPSS data.

The complete JPSS Science Digest is available for the public and readers to download [here](#).



Scientists and Engineers Wow at 94th AMS Annual Meeting

The American Meteorology Society's (AMS) 94th Annual Meeting was hosted in Atlanta this year during the week of February 2, 2014. The theme of the meeting was "Extreme Weather-Climate and the Built Environment: New Perspectives, Opportunities and Tools."

JPSS Director Harry Cikanek briefed attendees on the latest developments for the satellite systems and Chief Scientist Mitch Goldberg reported on JPSS satellite applications that support forecasting and environmental assessments. JPSS team members participated in presentations throughout the week on topics that included JPSS Proving Ground efforts, program status updates, and work underway with partners across NOAA and NASA.

This year, the NOAA booth provided a unique opportunity for JPSS to reach the international audience of weather enthusiasts, oceanographers and atmospheric scientists by displaying videos and other content on a kiosk. The kiosk informed visitors about the role JPSS plays in support

of NOAA's Weather-Ready Nation initiative.

More than 3,300 people representing 22 countries attended. Among them, hundreds of students and educators gained exposure to NOAA sciences, research, products, services and STEM (science, technology, engineering and mathematics) career pathways. The next AMS meeting will take place January 4–8, 2015, in Phoenix.



JPSS Communications Liaison Lauren Gaches demonstrates JPSS capabilities to students visiting the NOAA booth. Credit: NOAA

JPSS Science Seminars

Each month, JPSS hosts a Science Seminar to engage with the science community on the latest work underway with partners across the JPSS Proving Ground. Presentations are open to the public and all are encouraged to attend, participate and experience the exciting science work underway at JPSS.

GOT SCIENCE?

Talk to scientists and researchers first hand at JPSS Science Seminars as they share cutting-edge developments in satellite products and services. [Click here](#) to sign up for science seminar email list or get participant details.

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