Quarterly Newsletter
July - September 2015
Issue 3

NOAA NESDIS

JPSS

Joint Polar Satellite System

A collaborative mission between NOAA and NASA

www.jpss.noaa.gov

Harry Cikanek
Director

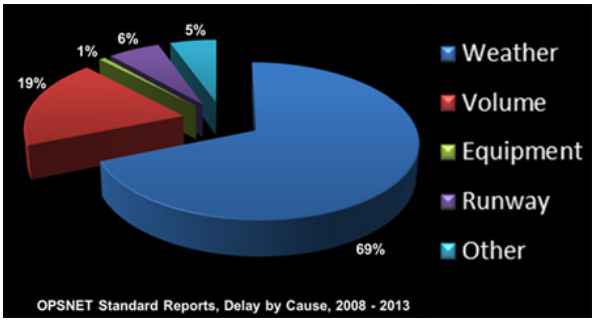
From Harry

Thank you for reading the JPSS Newsletter. This edition will highlight some of the ways that JPSS' significant technological and scientific advances are being used to provide timely and high quality data for decision support for aviation forecasts, fire and smoke incidents in Alaska, monitoring historic droughts, and oceanic research. We also highlight that JPSS-1 will be called NOAA-20 once it reaches orbit and recent solar array delivery and deployment testing. Successful completion of this test is another notable milestone toward launch. To learn more about past JPSS news and achievements, you can read previous issues of the JPSS Newsletter here.

NOAA Weather Satellites' Eye on the Sky

August 19th marked National Aviation Day, a United States national observation originally established in 1939 by President Franklin Delano Roosevelt in honor of Orville Wright's birthday. Orville and his brother Wilbur are credited with inventing and building the world's first successful airplane and making the first controlled, powered and sustained heavier-than-air human flight, on December 17, 1903. To prepare for their historic flight, the Wrights contacted the U.S. Weather Bureau, the precursor to NOAA's National Weather Service (NWS), seeking information on locations with sufficient wind conditions to suit their needs.

The U.S. Weather Bureau created the first official aviation weather forecast for the Aerial Mail Service route from New York to Chicago on December 1, 1918. In the early years of forecasting, meteorologists used basic tools like kites and balloons flown with instruments attached to forecast temperature and wind direction to create aviation forecasts. NOAA's NWS now uses advanced satellite data to support all aspects of flight, from planning, takeoff and departure, en-route, and through arrival and landing.



Causes of air traffic delay in the National Airspace System. Credit: Federal Aviation Administration

NOAA's Polar-orbiting Operational Satellites (POES) and Geostationary Operational Environmental Satellites (GOES) weather satellites, like the JPSS and Geostationary Operational Environmental Satellites – R Series (GOES-R), provide vital observations of issues such as turbulence, icing, thunderstorms, and low ceilings and visibility as inputs to NWS aviation weather analyses and forecasts. Airline delays in the National Airspace System due to these weather issues have steadily decreased over the last five years; but still constitute the majority of all delays with over 192,000 weather delays occurring last year. The data from NOAA weather satellites are used to create products for specific conditions and locations to predict and monitor weather conditions that impact or provide danger to flight. As the nation's aviation system continues

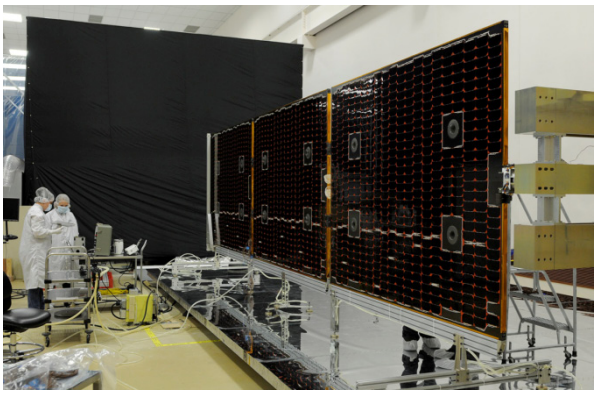
Did You Know?

Did you know that JPSS has an Outreach Program which works on building strong relationships with JPSS constituents and stakeholders. The Outreach Program is one of our most effective avenues for communicating information about JPSS and gathering important feedback about JPSS products, programs, and services. Learn more here.

to grow, and a greater number of people are expected to fly more miles each year, accurate and timely aviation forecasts are critical.

NOAA's satellite data continues to provide vital observations of weather helping protect life and property and promote economic efficiency, helping to secure a more "Weather-Ready Nation." Read the full story here to learn how satellites also help monitor volcanos, volcanic ash, fog conditions, thunderstorms, dust storms and icing conditions.

Solar Array for JPSS-1 Completes Successful Deployment Testing



JPSS-1 Solar Array. Credit: Ball Aerospace and Technologies Corp.

The solar panel array on NOAA's polar-orbiting satellite JPSS-1 spacecraft successfully completed deployment testing at Ball Aerospace and Technologies Corp.

Engineers unfurled the three panels of the solar array on a special friction reducing floor that helps simulate deployment in the zero-gravity environment of space. The solar array is folded up at launch and deploys on orbit, resembling a giant black wing and generating more than 2775 watts of power for NOAA's JPSS-1 satellite.

Photovoltaic cells in the solar array derive electricity from sunlight and convert solar radiation into direct current electricity. The JPSS-1 photovoltaics in the solar panel array will power the entire satellite including all of the instruments, computers, data processors, and telecommunications equipment.

JPSS-1 Designated NOAA-20 at Orbit

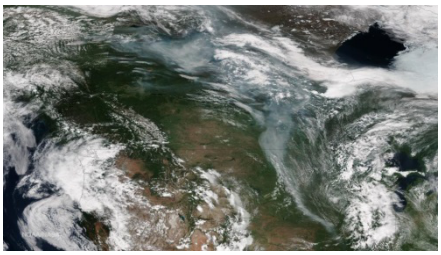
Rendering of JPSS-1. Credit: NOAA

Once it reaches orbit, the JPSS-1 satellite will be known as NOAA- 20. This naming ensures the satellite will be identified consistently with previous NOAA operational polar satellite missions dating back to 1978. The previous satellite launched in 2011, the NOAA/NASA Suomi NPP satellite, served as a bridge from legacy missions to JPSS serves as the first JPSS mission.

Alaska Firefighters Get Help from NOAA Satellites

5.1 million acres have burned in Alaska in 2015. It's the second highest total on record, eclipsed only by the devastating 2004 fire season, which left more than six million acres burned. And the number of acres burned keeps climbing.

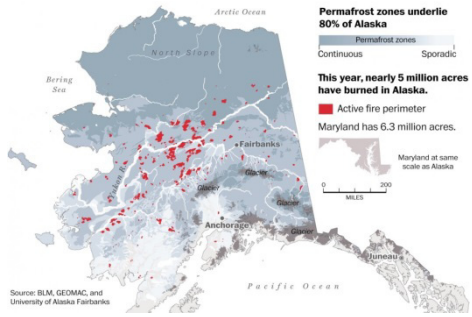
Firefighters with the Alaska Fire Service (AFS) are having a rough time of it, to say the least. With few roads to reach many remote areas, the AFS has to use aircraft to provide supplies to ground crews. But the large drifting smoke plumes can make air travel a hazard, further complicating the ability to deliver supplies to areas in need. That is why forecasters, using data from JPSS satellites, are helping the AFS stay on top of weather conditions that trigger fires and track the resulting smoke drifting across the state.



This image of smoke stretching from fires in Alaska and Canada was captured by the VIIRS instrument on the NOAA/NASA Suomi NPP satellites on June 29, 2015. Credit: NOAA Visualization Lab.

For two weeks during the month of July, JPSS satellite liaison Eric Stevens from the Geographic Information Net-

work of Alaska (GINA) was embedded with AFS. "Alaska is very data-sparse, so imagery from satellites helps fill an important need," said Stevens. "Polar-orbiting satellites like the JPSS series provide very frequent coverage at high-latitude locations like Alaska, so there is a lot of good data to work with."



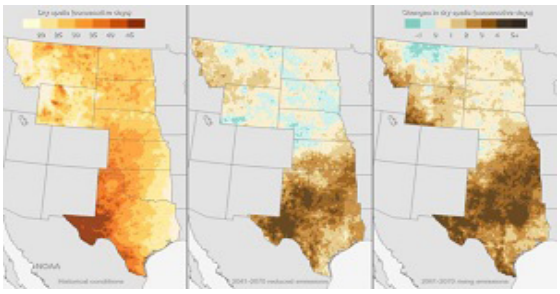
Credit: University of Alaska, Fairbanks

Because of the close working relationship between JPSS and AFS, access to operational NOAA satellite data today is better than ever before. In fact, the Visible Infrared Imaging Radiometer Suite (VIIRS) instrument that flies on satellites in the JPSS constellation is now a key contributor to the satellite data products that provide critical observations of fire and smoke across the state.

Click here for more information about the science behind the satellites at JPSS, or here to learn more about the Alaska Fire Service.

During Historic Droughts, JPSS Data Proves Vital

In recent years, droughts have become both more prevalent and severe, wreaking havoc in all 50 states and costing billions of dollars of damage with the heaviest impact to the mid-west, southwest and western regions.

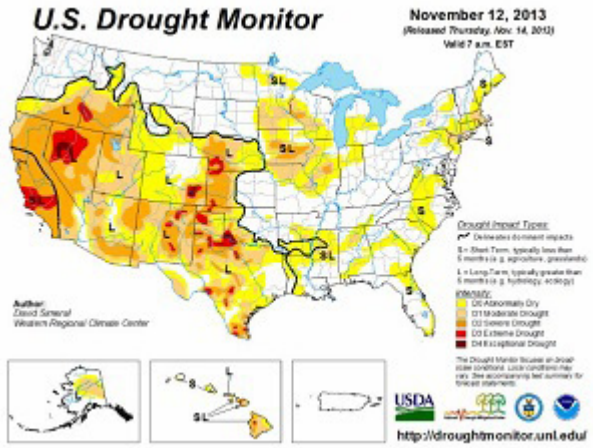


These maps, adapted from the U.S. National Climate Assessment issued in May 2014, show historical and projected patterns in the number of consecutive dry days experienced in different parts of the Great Plains. The historical map (left) shows the average annual maximum number of consecutive dry days during 1971-2000. Darker shades of orange signify longer dry spells. The projected maps show changes in consecutive dry days for 2041-2070, compared to 1971-2000. One scenario (center) assumes substantial reductions in emissions, and the other scenario (right) assumes continued rising emissions. Credit: NOAA

NOAA's National Centers for Environmental Information (NCEI) which monitors and tracks severe weather and climate events dating back to 1980, have recorded 21 droughts in the past 23 years that have exceeded $1 billion in losses. NOAA and its interagency partners are committed to predicting and monitoring drought location, intensity and duration to mitigate such extensive losses. Emergency managers use data from JPSS to plan, predict, and respond to dangerous drought conditions in the United States and throughout the world because of their global coverage.

The 2012 drought was the most severe drought in the United States since the 1930's, with 80 percent of agricultural land experiencing drought conditions resulting in costly widespread harvest failure for corn, sorghum and soybean crops. 2013 was less severe yet caused $10 billion in damages and drought conditions have continued with historical severity. For instance, it affected the majority of California for all of 2014, making it the worst drought on record for the state. Surrounding states and parts of Texas, Oklahoma and Kansas also experienced severe drought conditions.

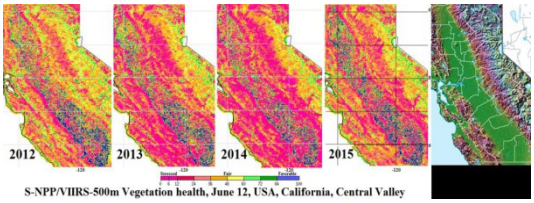
The damage from droughts also causes dry conditions that are prime for wildfires. Drought conditions have increased the quantity and magnitude of wildfires in western U.S. forests since the 1970s. The 2012 drought left dry ground conditions that combined with extreme heat and human error caused wildfires that devastated Colorado with fire sizes 1.5 times the 10-year average.



U.S Drought Monitor. Credit: NOAA

To help monitor and predict drought conditions, scientists will use a complement of JPSS land surface temperature, soil moisture and vegetation products derived from multiple instruments which are assimilated into the Global Land Data Assimilation System (GLDAS) and North America Land Data Assimilation System (NLDAS) systems. The NLDAS is the main information source for the current U.S. Drought Monitor.

"During eight of the last fifteen years large-scale droughts were responsible for huge losses of grain resulting in global production falling below steadily growing consumption," said Felix Kogan, NOAA Environmental Monitoring Branch Research Scientist. "Since drought prediction is very challenging, drought monitoring and impact assessment are very important to address food security." There are currently many drought detection and monitoring methods that include the U.S. Drought Monitor, which provide large-scale drought assessments, which media



The 2015 a drought affected large part of Central Valley, which is the principal agricultural area of California. The image above shows levels of vegetation health and stress in June of each year. The blue areas show where the vegetation is very healthy. These areas are agricultural farms in the central valley being supported by irrigation. The bright pink regions are where the vegetation is in extreme stress and/or the surface temperature is much higher than normal. The map on the far right is a false color topographic reference map, which clearly defines the central valley region. From the images, you can see the effect of late spring 2015 rains which temporarily improved the vegetation condition slightly when compared to June 2013 and June 2014. Credit: NOAA

use in discussions of drought and policy makers can use in allocating drought relief. Consistent measurements of drought conditions provide the necessary environmental intelligence data needed to make accurate forecasts and educated decisions.

Satellites have unique advantages over conventional observations of drought, due to their ability to acquire information over large geographical areas, measure and analyze key features of droughts routinely with relatively high repetition rates, and increased spatial detail of vegetation conditions.

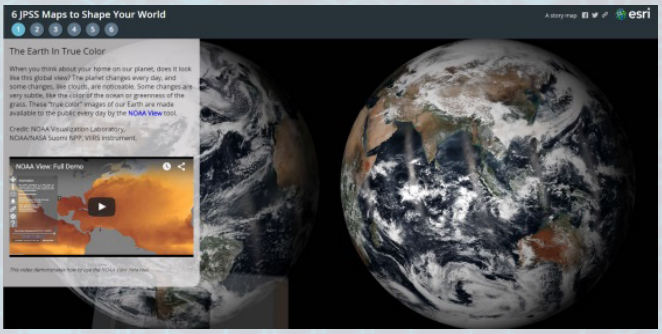
The next-generation instruments aboard satellites in the JPSS constellation provide critical information for drought forecasts that assist in monitoring and predicting drought severity as well as wildfire conditions. Proper drought predictions and monitoring assist farmers in scheduling and maximizing crops, preparing for water conservation actions and securing a more "Weather-Ready Nation." With extreme drought conditions expected to continue, JPSS data is vital for monitoring and understanding drought conditions, aiding forecaster's ability to detect drought events earlier and predict intensity, duration and impacts. Earlier and more accurate predictions help Nation's leaders, decision makers, emergency managers and media to better provide increased warnings to the public-at-large.

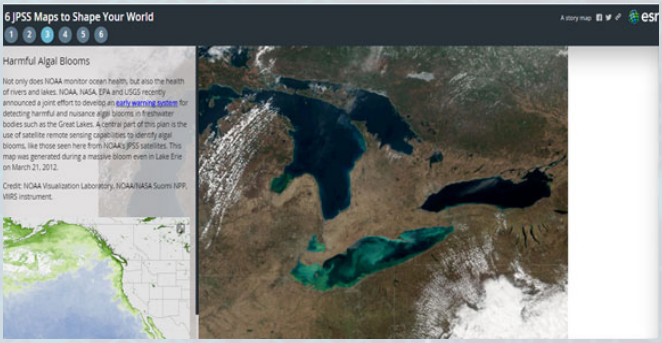
Click here to read more about how JPSS data is used to monitor drought conditions. For more information about current drought outlooks, visit Climate.gov.

JPSS Interactive Web Feature

NOAA has a new interactive web feature!

Check out JPPS' first foray into showing JPSS data in a new interactive way here, with 6 JPSS Maps that Shape the World.





Events and Conferences

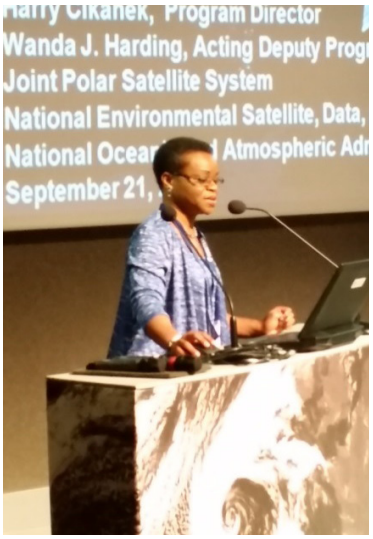
International Geoscience and Remote Sensing Symposium 2015

Hosted by the IEEE Geoscience and Remote Sensing Society, the International Geoscience and Remote Sensing Symposium 2015 (IGARSS 2015) was held from Sunday July 26th through Friday July 31th, 2015 at the Convention Center in Milan, Italy. The conference highlighted the role of remote sensing for assessing, monitoring, and managing risks related to natural disasters. Mitch Goldberg, PhD. JPSS Program Scientist, introduced the JPSS session with a talk about JPSS Proving Ground and Risk Reduction Activities. This was followed by additional discussions about how data from JPSS instruments contribute to forecasting tropical systems, monitoring fires, aerosols and volcanic clouds, detecting ice jams and analyzing drought information.

2015 STAR JPSS Annual Science Team Meeting

The 2015 STAR JPSS Annual Science Team Meeting was held August 24th - 28th, 2015, in the Auditorium and Conference Center at the NOAA Center for Weather and Climate Prediction (NCWCP) in College Park, Maryland. Over 300 virtual and in person attendees including academic and industry partners, as well as users from NOAA and around the world participated.
The second annual meeting focused on the readiness of STAR to utilize JPSS-1 data. STAR team members presented the accomplishments of the STAR JPSS program over the past year, and highlighted the progress in instrument calibration, ability, and algorithm upgrades as they prepare for the launch of JPSS-1.

2015 EUMETSAT Meteorological Satellite Conference

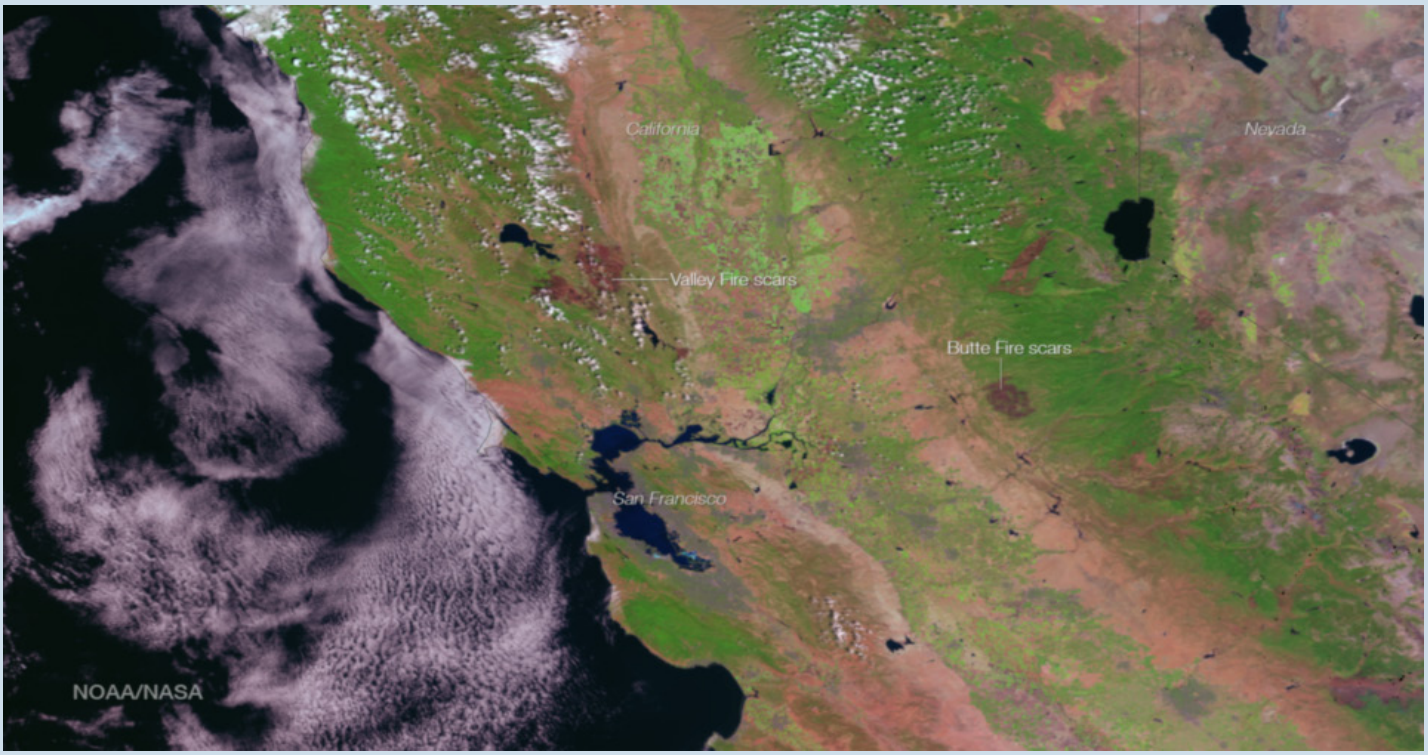


Wanda Harding, JPSS Technical Director, presents at EUMETSAT. Credit: NOAA

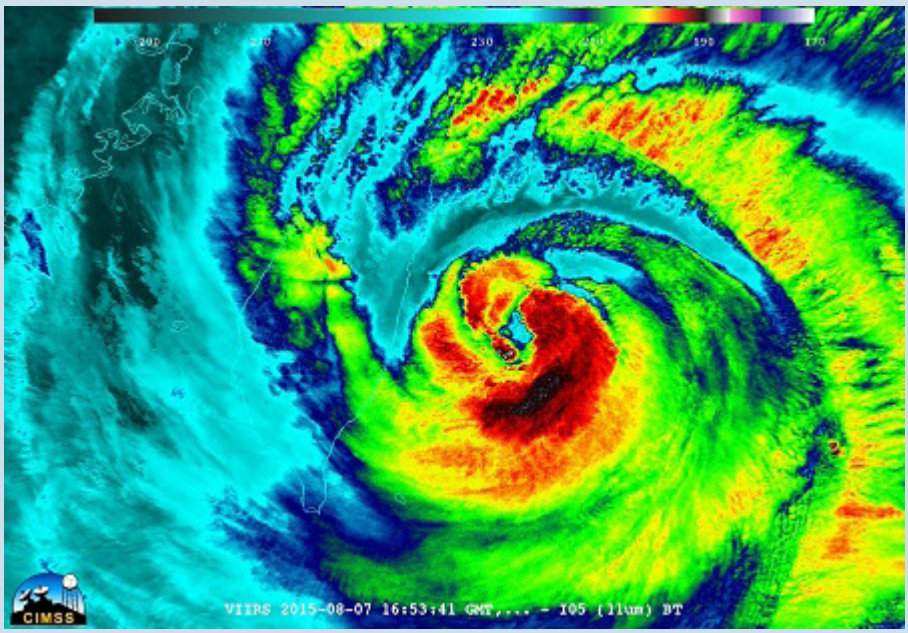
JPSS Program Science team members participated at the 2015 EUMETSAT Meteorological Satellite Conference, September 21-25th in Toulouse, France. The conference brought together meteorologists, scientists and researchers from around the world to share their experience and knowledge. In 2015, the conference focused on the advances in "nowcasting" and short-range numerical weather prediction and preparations for new geostationary and polar-orbiting satellites. Forecasters from European and African countries shared their research and operational applications of JPSS data.

Interesting Images

Sep 18, 2015 - **Valley and Butte Fire Scars Seen from Space**



Two deadly wildfires swept across Northern California during the late summer, burning over 70,000 acres of land each. The Valley and Butte Fires have destroyed over 1,211 buildings and homes to date and left scars across the landscape that are visible from space. This false colored image, taken on September 17, 2015, from the Suomi NPP satellite VIIRS instrument shows the large burn scars left behind by the fires as firefighters continue to combat the blazes. *Credit: NOAA.*



August 6, 2015

Suomi NPP Gets an Infrared look at Typhoon Soudelor

NOAA/NASA's Suomi NPP satellite passed over powerful Typhoon Soudelor when it was headed toward Taiwan. The VIIRS instrument aboard Suomi NPP captured an infrared image of the typhoon. The infrared image showed some thunderstorms within the typhoon with very cold cloud top temperatures, colder than -63F/-53C. Temperatures that cold stretch high into the troposphere and are capable of generating heavy rain.

Credit: UWM/CIMSS/SSEC, William Straka III

Connect with Us!