



# GOES-R

GEOSTATIONARY OPERATIONAL ENVIRONMENTAL SATELLITE R-SERIES

QUARTERLY NEWSLETTER ■ OCTOBER – DECEMBER 2018 ■ ISSUE 24

### A Note from Pam Sullivan, GOES-R System Program Director:



Welcome back team! I am so happy to have everyone back at work after the government shutdown. I want to particularly thank our team members

who were working during the shutdown, doing their own jobs plus those of missing colleagues. You kept our satellites operating and helped us maintain progress as much as was possible on our critical GOES-T, U, and ground system efforts. Thank you for your commitment to our mission. Prior to the shutdown, we completed a major milestone with the successful GOES-17 Handover Readiness Review, which was followed by transitioning the satellite operations to NOAA's Office of Satellite and Product Operations. GOES-17 is now in its operational location at 137.2 west and is providing stunning imagery of the U.S. West Coast, Alaska, Hawaii, and even New Zealand. I look forward to GOES-17 being declared operational as GOES West very soon.

## GOES-17 HIGHLIGHTS

After successful Post-Launch Assessment and Handover Readiness reviews, GOES-17 was officially handed over from the GOES-R Program to the NOAA Office of Satellite and Product Operations (OSPO) operations team on October 22. [The satellite began drifting from its checkout location of 89.5 degrees west longitude to its permanent home at 137.2 west on October 24.](#) GOES-17 arrived at 137.2 west on November 13 and shortly after [began sending the first stunning \(preliminary and non-operational\) imagery from its new home.](#)



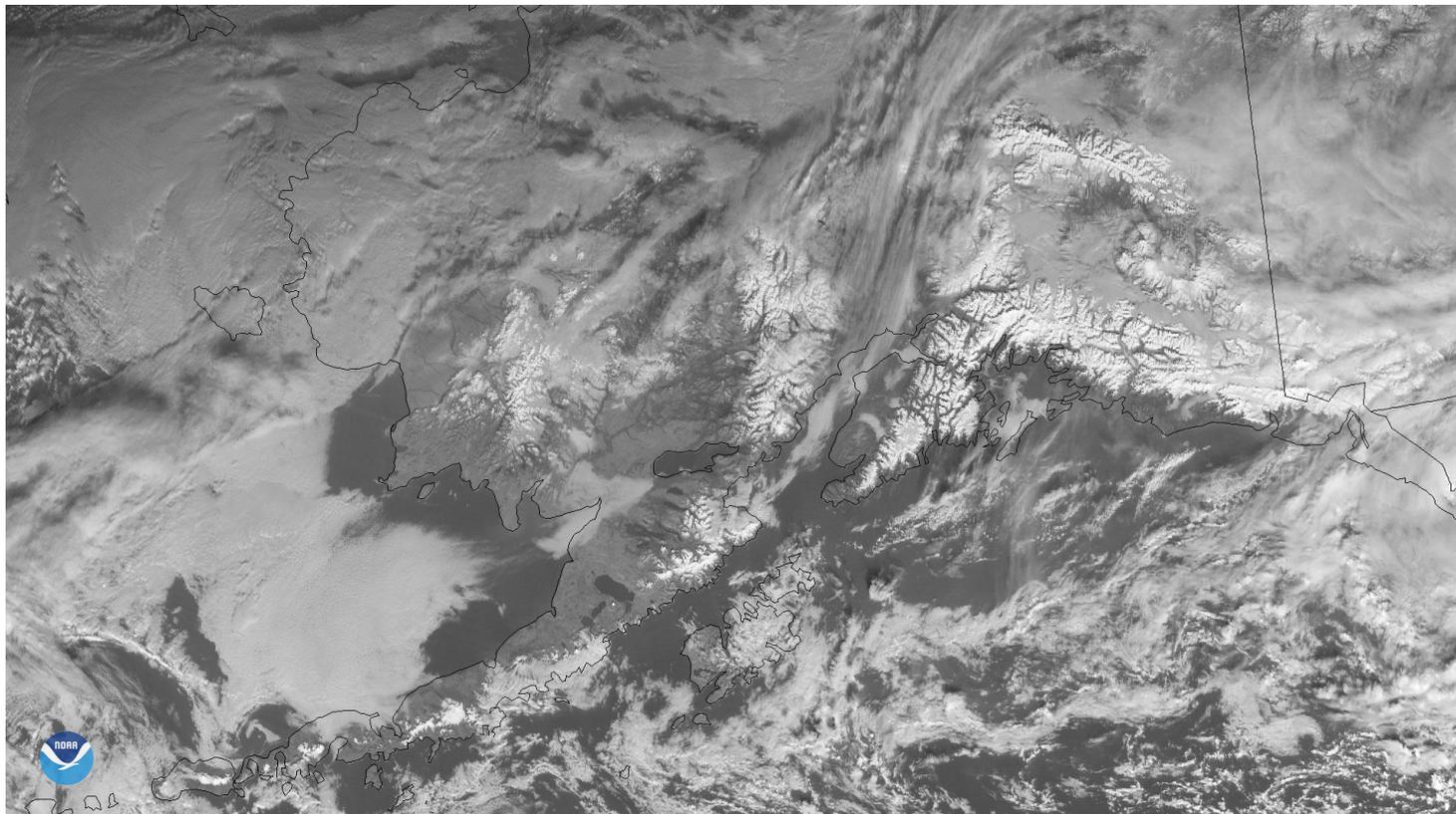
The Hawaiian Islands are seen in stunning detail in this GeoColor image from November 13. In this imagery, high-level clouds are moving over low clouds and convective clouds form on the windward side of the mountain slopes of the islands. Credit: NOAA/CIRA

### DID YOU KNOW?

2018 was the wettest year on record for many cities in the eastern United States. The National Weather Service reported [more than a dozen major cities had their wettest calendar year on record](#), including Washington, D.C., Baltimore, MD, and Wilmington, NC.

## GOES-17 HIGHLIGHTS (CONTINUED)

Once it becomes NOAA's operational GOES West satellite in early 2019, GOES-17 will significantly enhance our ability to forecast the weather in the western United States, especially in Alaska and Hawaii. With its expanded satellite coverage at high latitudes, GOES-17 provides a significantly clearer view of Alaska, where it will improve our ability to track environmental conditions, such as sea ice, volcanic ash, snow cover and wildfires. GOES-17 also provides more and better data over the northeastern Pacific Ocean, where many weather systems that affect the continental U.S. begin.



GOES-17 viewed the snow-covered peaks of southern Alaska on November 14, in this imagery from the Advanced Baseline Imager's "red" visible channel. Credit: NOAA

**GOES-15 moved from its operational location of 135 degrees west longitude to 128 west** to eliminate radio frequency interference with GOES-17. Due to the ongoing GOES-17 Advanced Baseline Imager (ABI) cooling system issue, GOES-15 and GOES-17 will operate in tandem for at least six months to allow for assessment of the performance of GOES-17 as the GOES West operational satellite.

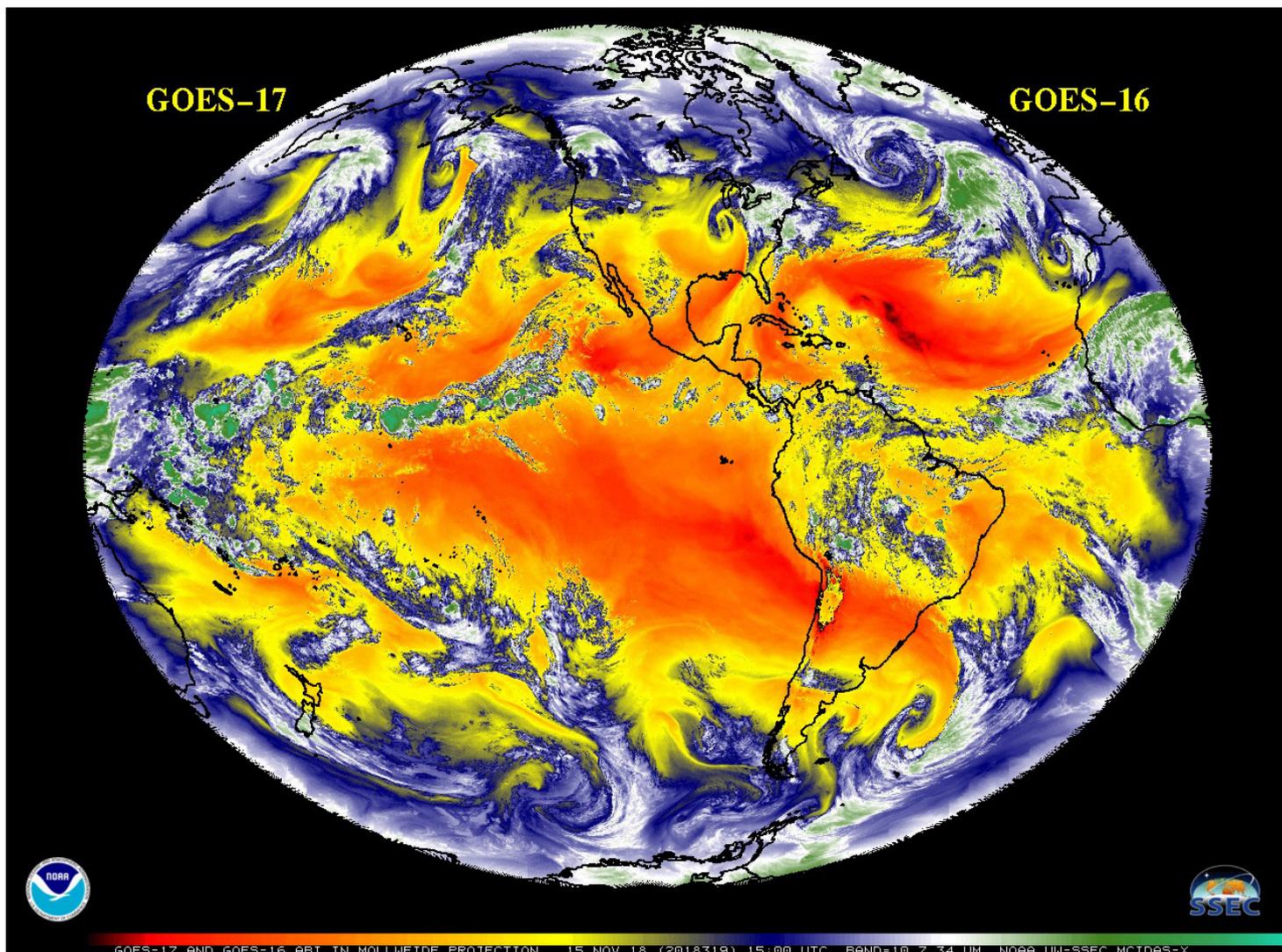
**The Independent Review Team (IRT) provided its final GOES-17 ABI cooling system anomaly outbrief on October 3.** The investigation concluded that the most likely cause of the thermal performance issue is foreign object debris (FOD) blocking the flow of the coolant in the loop heat pipes. A series of ground-based tests supported FOD as the most likely cause. A second potential cause, mechanical failure, was investigated and deemed unlikely.

The IRT recommended changes to the design of the ABI radiators for GOES-T and GOES-U to decrease the chance of future cooling system anomalies. The new design utilizes a simpler hardware configuration and ammonia loop heat pipes instead of propylene. Redesign efforts are underway and the delta Critical Design Review is scheduled to take place in early 2019.

**Several GOES-17 science products achieved provisional validation this quarter**, including the ABI cloud and moisture imagery (CMI) and sectorized CMI, Space Environment In-Situ Suite magnetospheric particles – high energy, and Geostationary Lightning Mapper (GLM) events, groups and flashes products. Now that these products are provisionally validated they are ready for operational use but not yet fully validated.

## GOES-17 HIGHLIGHTS (CONTINUED)

Now that GOES-17 is in position at 137.2 degrees west longitude, we get a full picture of how much of the globe the new GOES constellation covers. This view of the Western Hemisphere combines full-disk water vapor images from GOES-16 and GOES-17 in a Mollweide map projection.



This November 15, 2018, image, created by NOAA's partners at the Cooperative Institute for Meteorological Satellite Studies, uses data from ABI Band 10. This infrared channel helps us identify areas of high moisture content and precipitable water in the lower to mid-levels of Earth's atmosphere. Green, blue and white shades indicate higher atmospheric moisture, which typically correspond to storm systems such as hurricanes and mid-latitude cyclones.

**On November 20, an ABI error occurred which resulted in degraded infrared imagery from the instrument.** This anomaly was not due to the ongoing loop heat pipe issue. An engineering investigation determined that a recent software update which controls the ABI cryocooler system (which pumps heat away from the instrument's detectors to cool them to their required operating temperatures) experienced a memory error. Cryocooler operation was restored and there has been no additional degraded imagery as a result of this issue. An ABI cryocooler software patch was delivered on December 19 and the Mission Operations Support team conducted emulator testing on the patch. The software fix was implemented and GOES-17 is ready for operations.

## GOES-16 HIGHLIGHTS

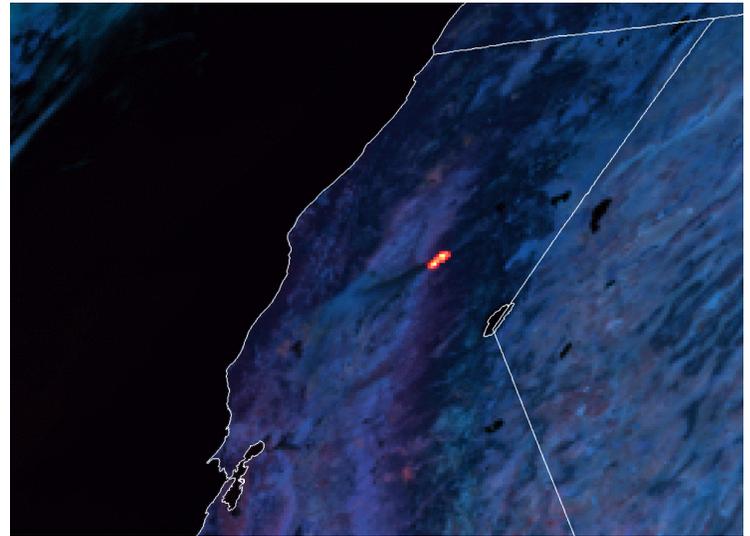
**The GOES-16 GLM events, groups and flashes product is now fully validated**, following a successful Peer Stakeholder-Product Validation Review on November 1. Once a product reaches full maturity it is fully validated and operational.

**Three GOES-16 ABI products reached provisional validation in October and December.** The ABI radiation, aerosol detection, and cloud particle size products are now provisionally validated.

## GOES-16 HIGHLIGHTS (CONTINUED)

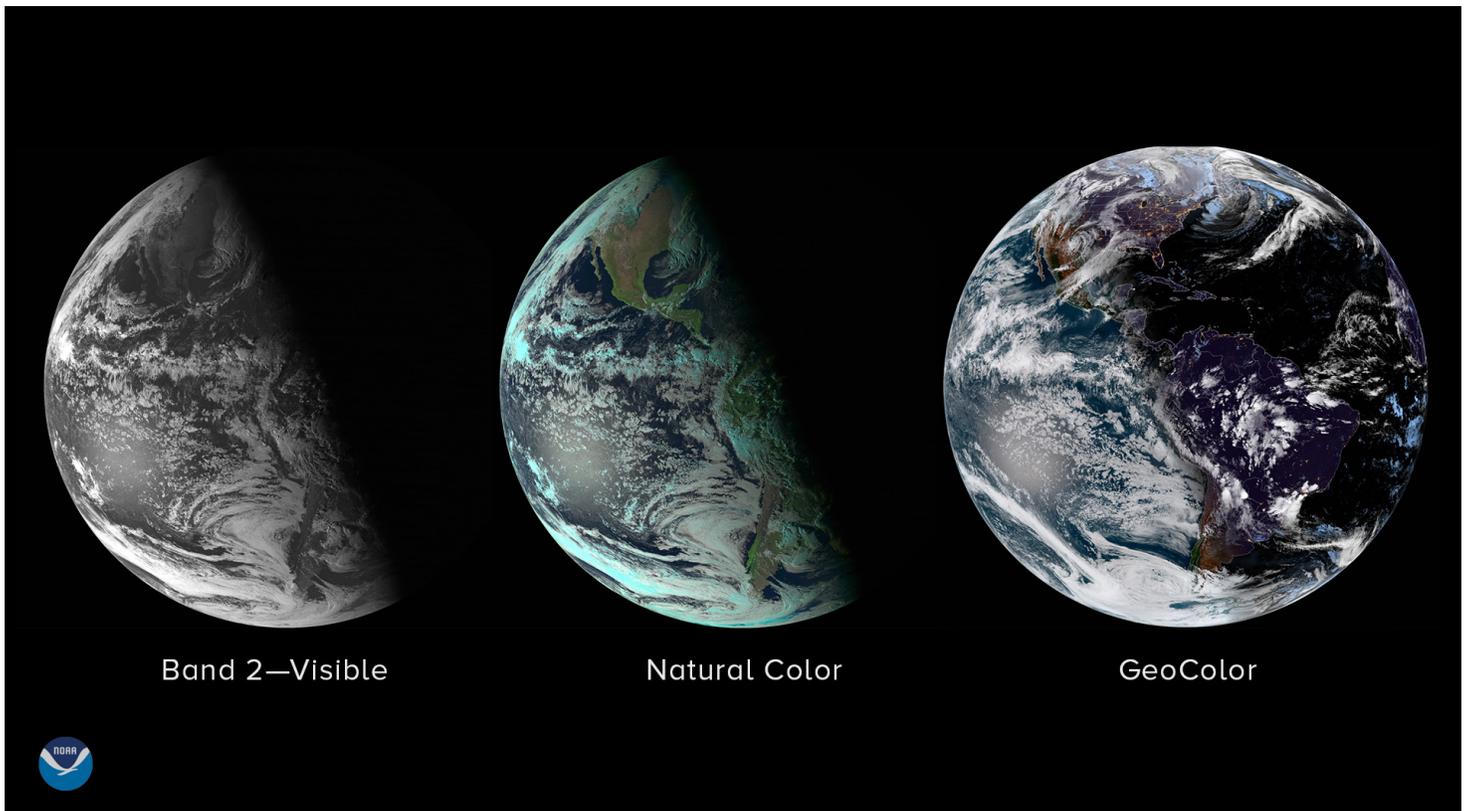
**GOES-16, operating as NOAA's GOES East, is proving to be an invaluable asset in detecting wildfires and helping forecasters provide proactive tactical decision-support services.** [The satellite provides a much more detailed look at fire conditions, faster detection of hot spots, and the ability to track fire progression and spread in real time.](#) National Weather Service (NWS) incident meteorologists (IMETs) are using GOES-16 data to assist firefighting efforts. Alex Hoon, the NWS IMET for both the Camp and Carr Fires in California in 2018, says GOES-16 is crucial to an IMET's mission to protect lives and property. "Now, forecasters are able to get incredible high-resolution images of the fire every single minute in the field, directly supporting firefighters who are engaged in the fire. Not only is this helping firefighters to more effectively fight fire, but more importantly, it's helping to keep firefighters safe so that they can also come home to their families," said Hoon. GOES-16 is also important in monitoring burn scars and predicting flash flood events from rain events after a

fire. GOES-16 provides critical data for the entire lifecycle of a fire disaster – from drought to fire to floods and landslides.



GOES East captured hot spots from the Camp Fire in California on November 9 in this fire temperature red-green-blue imagery. Credit: NOAA/CIRA

**The winter solstice, the official start of astronomical winter, arrived at 5:23 p.m. EST on December 21.** At that exact moment, Earth's Northern Hemisphere reached its greatest possible tilt away from the sun, and the sun's strongest rays shined on the Tropic of Capricorn (23.5°S latitude). For the 90 percent of Earth's population that lives north of the equator, the December solstice is the shortest day and longest night of the year.



These three images from NOAA's GOES East (GOES-16) satellite show what Earth looks like from space near the solstice. The images were captured about 24 hours before this year's solstice, at 5:30 p.m. on December 20. Notice how the daylight terminator, the shadow that separates day and night across Earth, appears highly slanted. As the Earth rotates on its axis, the North Pole is obscured in 24-hour darkness, while the South Pole sees 24-hour daylight. Credit: NOAA

## CONFERENCES AND EVENTS



Interim NOAA Administrator RDML Tim Gallaudet addressed JPSS and GOES-R employees during a visit to Goddard Space Flight Center on December 3. Credit: GOES-R Program

**On December 3, interim NOAA Administrator RDML Tim Gallaudet, Ph.D., USN Ret., Assistant Secretary of Commerce for Oceans and Atmosphere and Acting Under Secretary of Commerce for Oceans and Atmosphere, visited NASA Goddard Space Flight Center (GSFC) and held an all-hands meeting for JPSS and GOES-R employees. This was RDML Gallaudet's first**

visit to GSFC. At the all-hands meeting, RDML Gallaudet thanked the JPSS and GOES-R teams for their recent achievements, shared his vision for the future, and took questions from the audience.

**The 2018 American Geophysical Union (AGU) fall meeting was held December 10-14 in Washington, D.C.** The AGU fall meeting is the largest Earth and space science gathering in the world. This year's meeting launched the AGU's centennial, with events, sessions, and opportunities for all attendees to reflect on the scientific progress of the last century and glimpse what challenges and breakthroughs the next 100 years will bring. There were several GOES-R Series presentations at the conference and at the NOAA exhibit.



GOES-R Program Senior Scientific Advisor Dan Lindsey presents his work at the NOAA booth at AGU. Credit: GOES-R Program

**Students from grades 6-14 are invited to participate in the [GOES-R Education Proving Ground GOES-16/17 2019 Virtual Science Fair](#).** Students will use data from the GOES-16 and GOES-17 satellites to investigate weather and natural hazards. There will be one winning team in each of three categories: middle school, high school, and grades 13/14 (community college or university). Each team will consist of 2-4 students and one teacher/coach per entry. Entries will be accepted March 1 – May 3, 2019.

## MEET THE TEAM



**In this issue, meet GOES-R Flight Project Manager Candace Carlisle.** Candace joined the GOES-R Program in November and is responsible for managing

the spacecraft and instruments through development, launch, and on-orbit checkout. She has more than 35 years of experience at NASA, most recently as project manager for the Total and Spectral solar Irradiance Sensor-1 (TSIS-1), which is currently operational on the International Space Station. She was also the Global Precipitation Measurement (GPM) Deputy Project Manager beginning in the formulation phase and continuing through its successful handover to mission operations.

Candace is excited to join the program because of the great team and importance of the mission. "GOES-R really does preserve lives and property by helping predict hurricanes, tornadoes, lightning, flooding and impacts from solar flares," she said. Candace says she has a lot to learn but looks forward to the challenge.

Candace holds a Bachelor of Science degree in computer science and physics from the College of William and Mary, and Master of Science degrees in technical management and computer science from the Johns Hopkins University.

Outside of work, Candace's main hobby is cycling. She participates in local cycling groups and also Zwift, which is an online exercise game that allows users to ride on a series of courses with other riders from around the world.

## UPCOMING EVENTS

**GOES-16/17 Virtual Science Fair**  
March 1-May 3, 2019

**35<sup>th</sup> Space Symposium**  
April 8-11, 2019  
Colorado Springs, Colorado

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