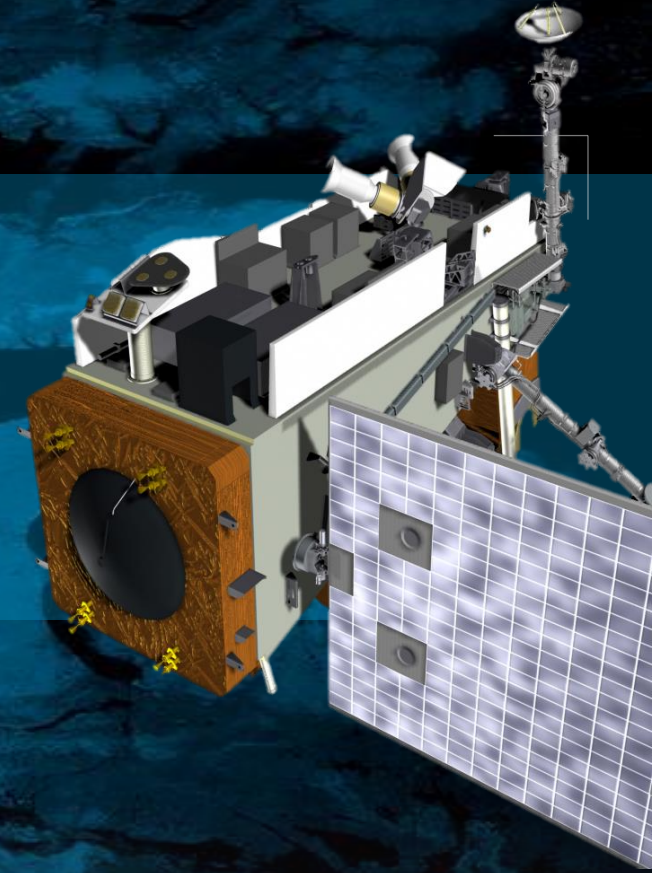


The Joint Polar Satellite System

Successes in the Proving Grounds and Risk Reduction Program



Greg Mandt

Program Director, Joint Polar Satellite System

GLOBAL DATA.
LOCAL WEATHER.



What is JPSS?

- ▶ The Joint Polar Satellite System, or JPSS, is the backbone of global satellite-based observations and products that feed U.S. forecasting models
- ▶ The JPSS Program consists of:
 - Five satellites (two in orbit and three in production), each with at least four instruments
 - A multi-mission ground system supporting JPSS and multiple partner satellites
- ▶ Right now, our primary focus is on increasing data availability through the launch of our next satellite, JPSS-2, and supporting partner missions



JPSS will provide a continuous on-orbit presence from 2011 through 2038



JPSS Instruments

ATMS

Advanced Technology
Microwave Sounder



ATMS and CrIS together provide high vertical resolution temperature and water vapor information needed to maintain and improve forecast skill out to 5 to 7 days in advance for extreme weather events, including hurricanes and severe weather outbreaks.

NORTHROP GRUMMAN

CrIS

Cross-track
Infrared Sounder



VIIRS

Visible Infrared Imaging
Radiometer Suite

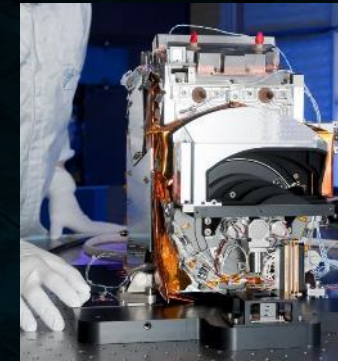


VIIRS provides many critical imagery products including snow/ice cover, clouds, fog, aerosols, fire, smoke plumes, vegetation health, phytoplankton and chlorophyll abundance.

Raytheon

OMPS

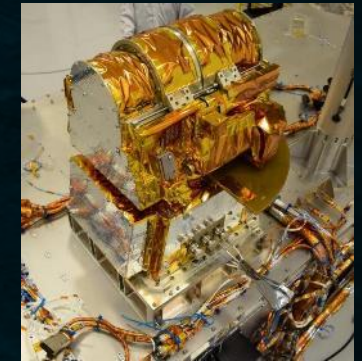
Ozone Mapping and
Profiler Suite



Ozone spectrometers for monitoring ozone hole and recovery of stratospheric ozone and for UV index forecasts.

CERES

Clouds and the Earth's
Radiant Energy System



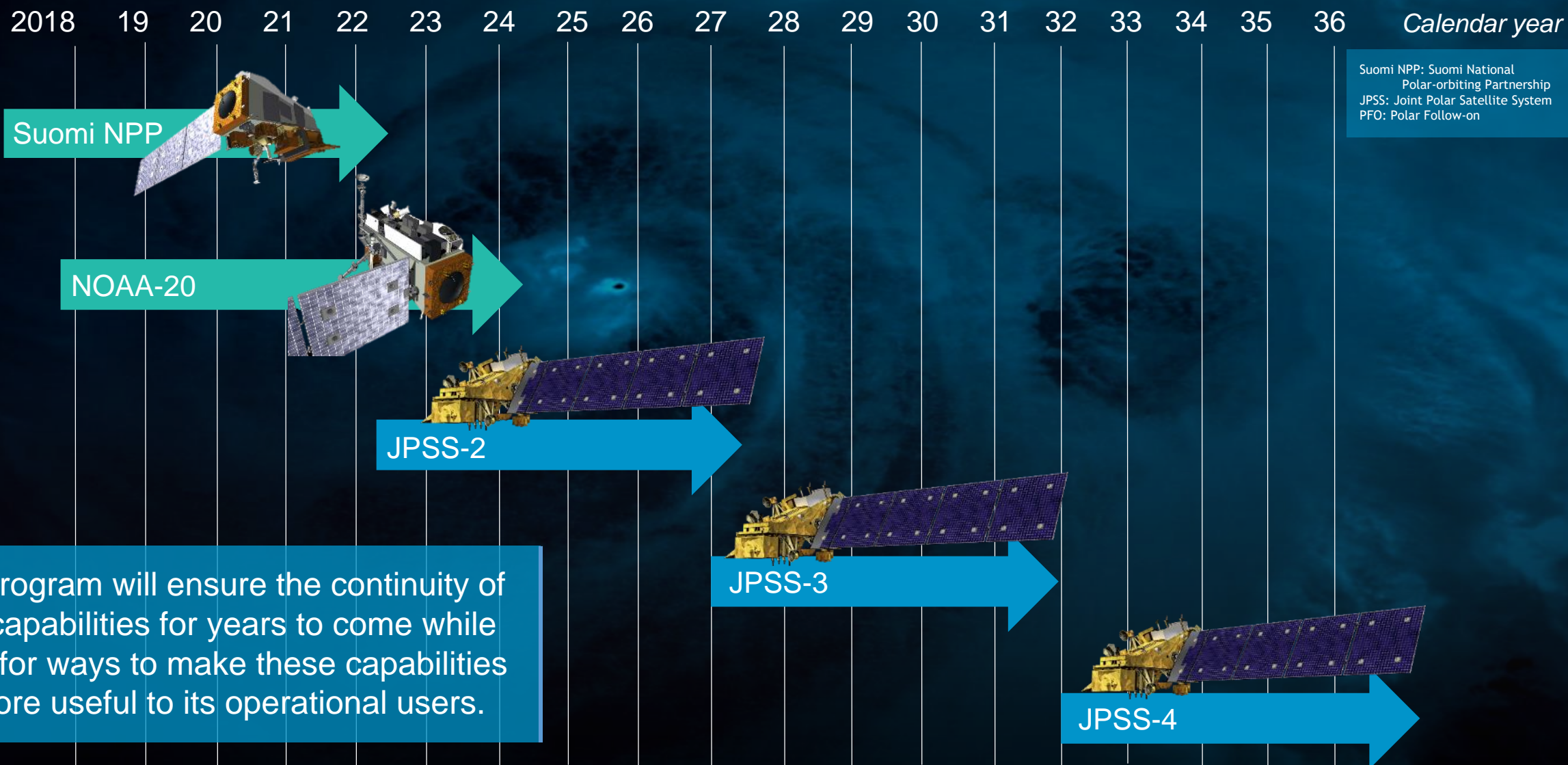
Scanning radiometer which supports studies of the Earth Radiation Budget (ERB).

**Discontinued after JPSS-1 (NOAA-20)*

NORTHROP GRUMMAN



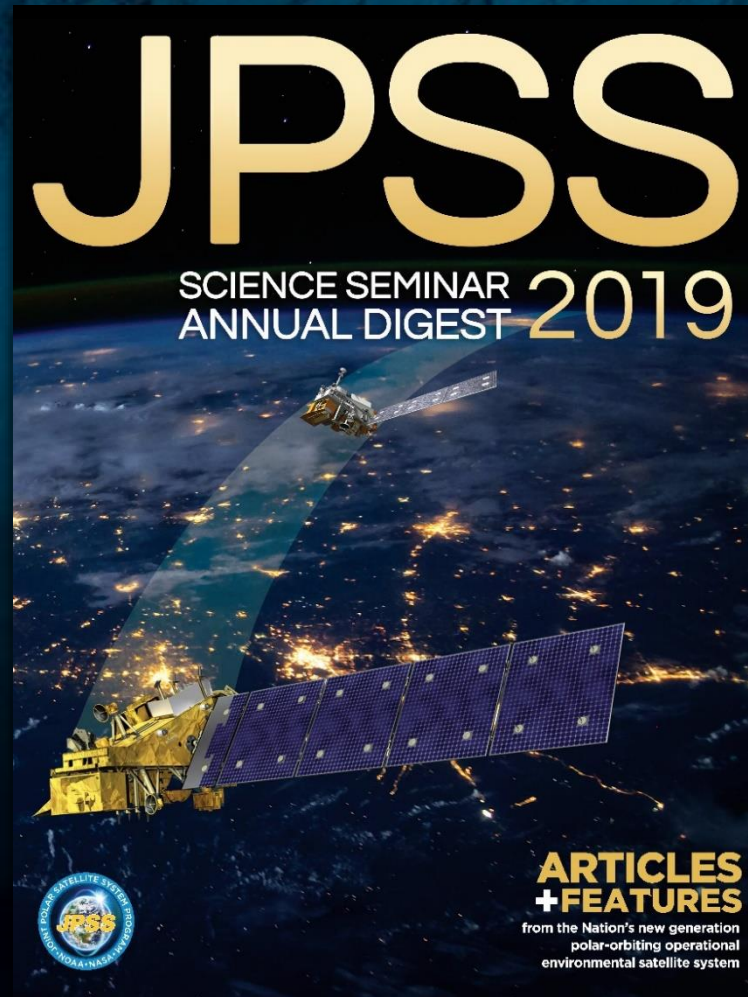
JPSS Continuity of Operations





Proving Ground and Risk Reduction Program (PGRR)

Improving NOAA services by facilitating collaboration between users and product developers to optimize the use of satellite data.



Project initiatives include:

- Hydrology
- Fire & Smoke
- Arctic
- Ocean & Coastal
- Hurricanes & Tropical Storms
- River Ice & Flooding
- Sounding Applications
- Numerical Weather Prediction Impact Studies & Critical Weather Applications
- Aviation Weather
- Volcanic Hazards
- Training



The new 2019 Science Digest can be found at the NOAA booth or at: <https://go.usa.gov/xpJ8S>



Flood Mapping

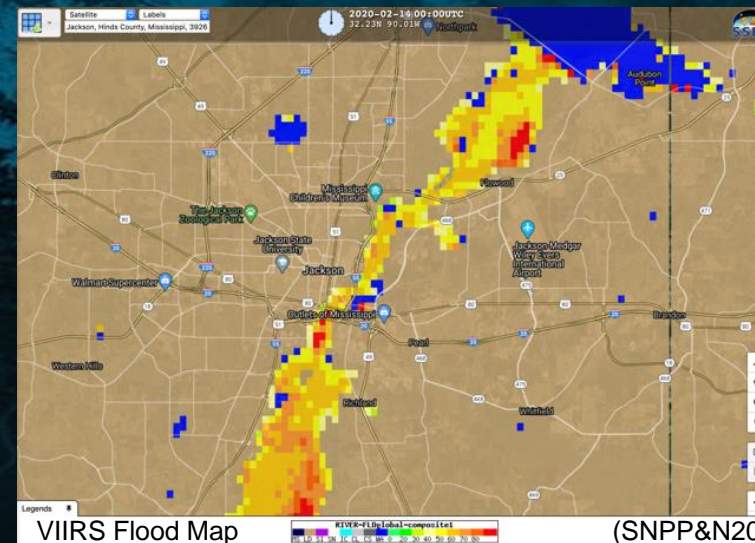
- ▶ Multi-satellite, multi-sensor product using both VIIRS and ABI
- ▶ Began with an identified user problem: Galena, AK flood
- ▶ Scientists worked directly with the user to solve the problem
- ▶ Product became a highly sought-after solution in the international community

“This additional source of geospatial intelligence has provided our forecasters with information needed to improve our model simulations, and subsequently provide more accurate and timely forecasts for stakeholders in flood planning and mitigation activities.”

- Development and Operations Hydrologist, North Central River Forecast Center, Minneapolis, MN



Predicted flood area if Pearl River reaches 34 feet (Feb 13)



Jackson, MS experienced record flooding from the Pearl River in February 2020.



Smoke Forecasting

- ▶ Idea for HRRR-Smoke model arose out of a user meeting, like this Summit
- ▶ Uses fire radiative power observations from VIIRS to forecast smoke based on how hot the fire is
- ▶ Forecasts smoke over CONUS every hour
- ▶ HRRR Smoke Model will become operational in May/June 2020.

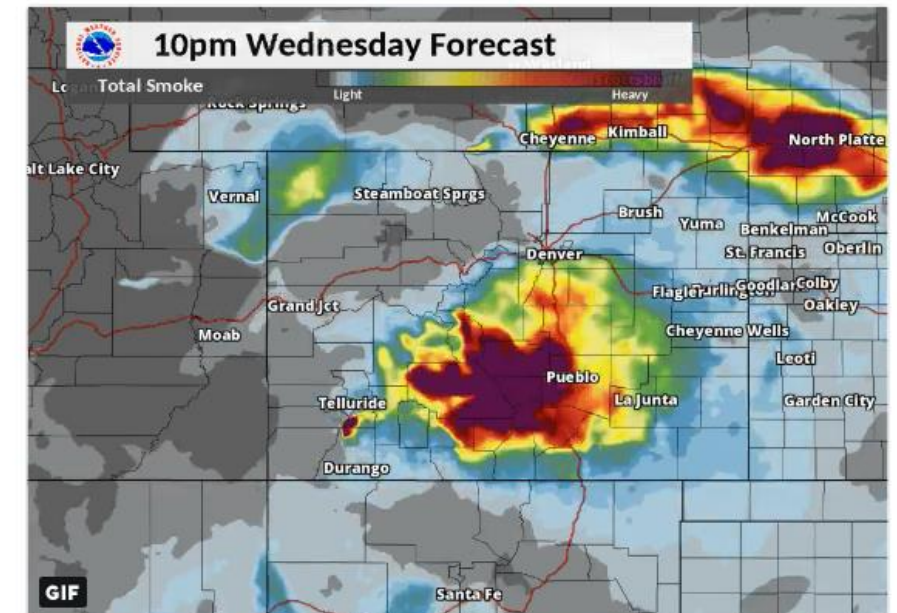


NWS Boulder

@NWSBoulder

Follow

We're getting lots of reports of smoke across [#Denver](#) and [#Boulder](#) this morning. Likely originating from the [#416Fire](#) per HRRR smoke model (animation 6 PM last eve through tomorrow eve). Should see improvement later today. [#COWx](#)

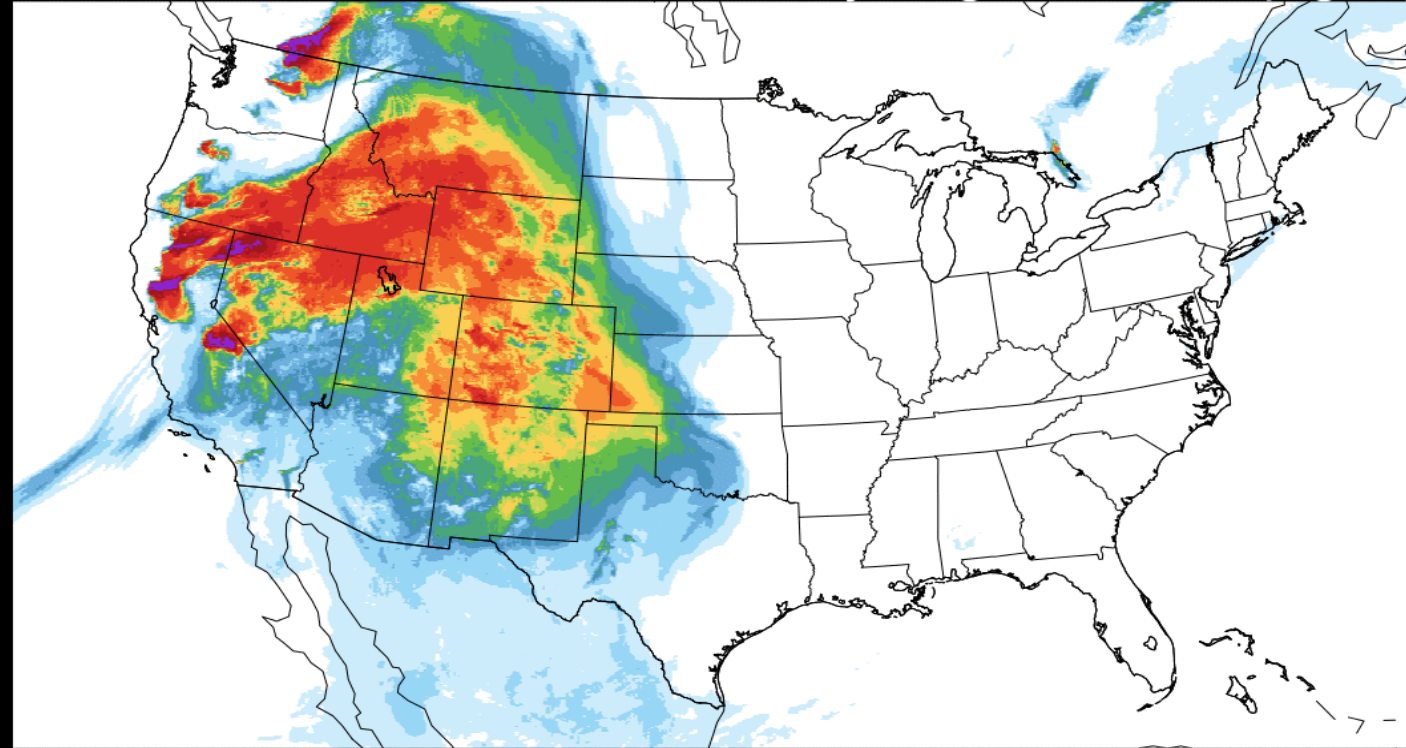


9:00 AM - 14 Jun 2018



Critical Environmental Intelligence—Fire and Smoke

HRRR-SMOKE 2018-08-02 00 UTC 0h fcst - EXPERIMENTAL Valid 08/02/2018 00:00 UTC
Vertically Integrated Smoke (mg/m^2)

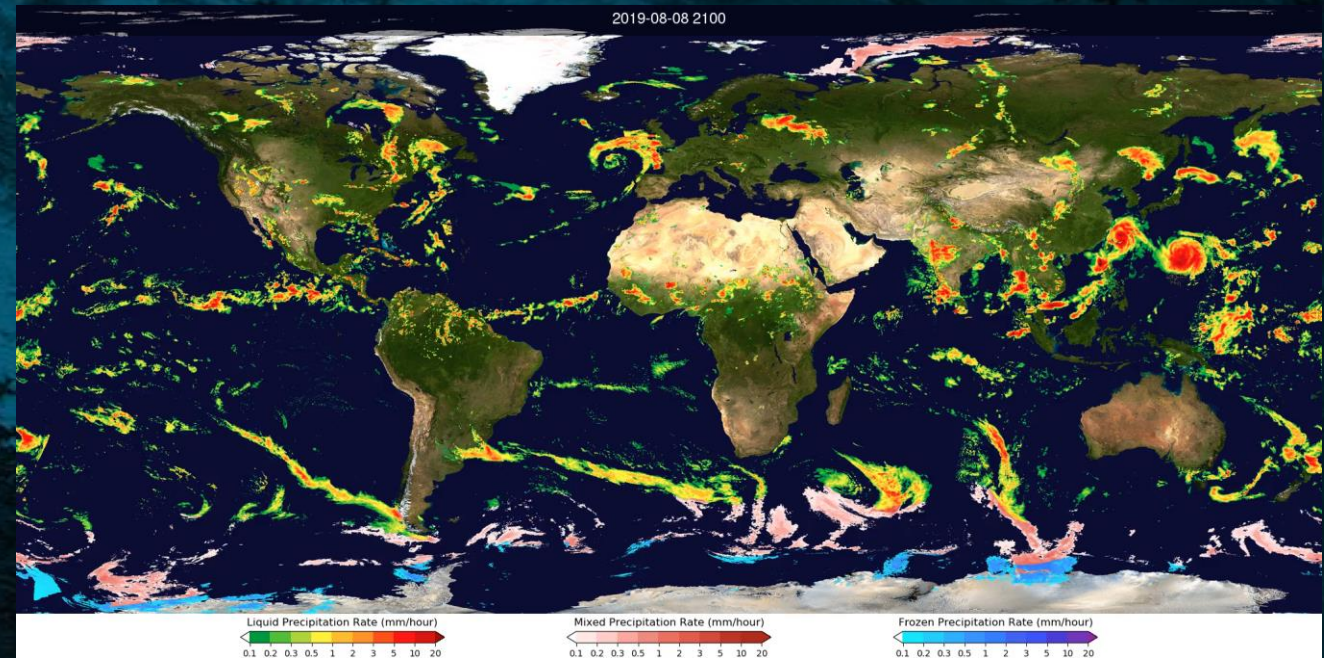


NOAA-20 predicted the smoke plume from the Mendocino Complex fire in California in Aug. 2018.



Predicting Flood and Drought Risk

- ▶ Proving Grounds initiative supports existing product from the Climate Prediction Center.
- ▶ Uses data from 17 satellites to provide nearly real-time precipitation estimates.
- ▶ Gives knowledge of rain rates where there is no radar and cumulates information about excessive or lacking rainfall, enabling monitoring of flood or drought risk.



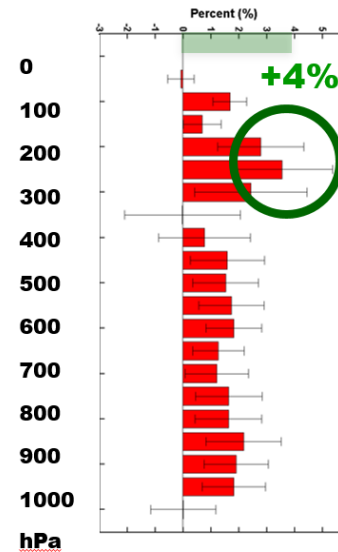


Direct Broadcast for Rapid Refresh Forecast Models

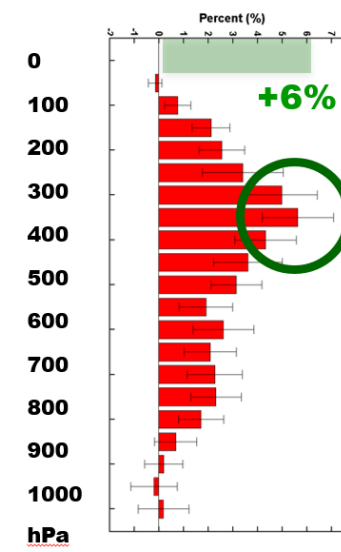
- Direct broadcast reduces latency for the hourly RAP Forecast Model, allowing triple the data to enter the model.
- Collaboration with multiple universities enabled this network.
- Direct broadcast will allow us to assess dramatic reductions in latency for future implementation.

6-h forecast % impact **ALL RADIANCE** data

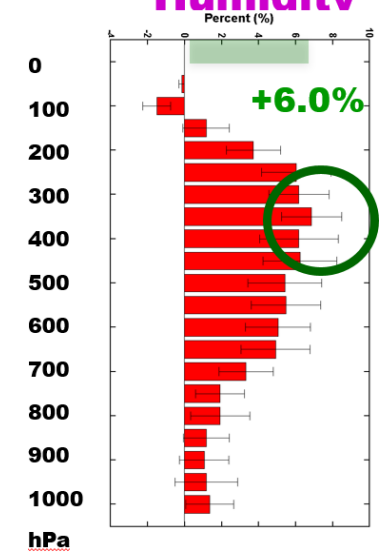
Temperature



Wind



Relative Humidity



Impact by pressure level

Radiosonde verification

Four-week retro (1-28 Sept. 2017)

Normalized Impact (%)

$$E_N = \frac{(EXPT - CNTL)}{CNTL}$$



Continuing to Optimize LEO Capabilities

Evolve LEO capabilities and work directly with data users to develop multi-sensor products that meet their needs.





THANK YOU!

For more information visit: www.jpss.noaa.gov

CONNECT WITH US!



JPSS.PROGRAM



@JPSSPROGRAM



@NOASATELLITES



/NOASATELLITES

A large satellite with multiple solar panel arrays is shown in orbit over the Earth. The satellite is positioned diagonally across the frame, with its solar panels extended. The Earth's surface, showing clouds and landmasses, is visible in the background. Another smaller satellite is visible in the upper right corner.

GOES-R and GEO-XO

Pam Sullivan

GOES-R System Program Director

1st JPSS/GOES-R Proving Ground /Risk Reduction Summit

February 24, 2020



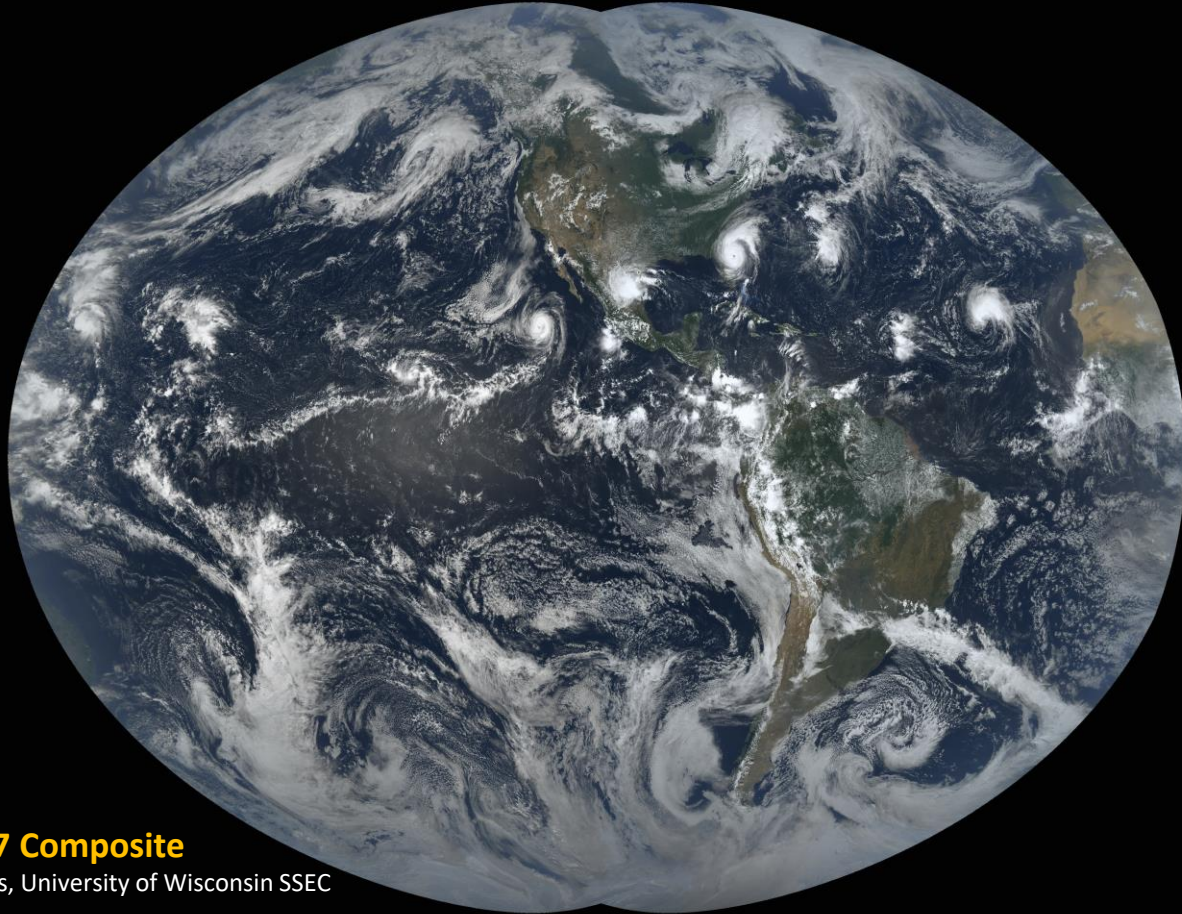
GOES-16 ABI 1st Light, January 7, 2017

RGB using 0.47um, 0.64um, 0.86um





GOES-R Series, From Africa to New Zealand



GOES-16 & 17 Composite

Courtesy Rick Kohrs, University of Wisconsin SSEC



GOES-16 & 17 Update



- GOES-16 in operational service as GOES East since December 2017
- GOES-17 in operational service as GOES West since February 2019
 - Default meso 2 location changed to Alaska on March 5
 - Mitigations for ABI Heat Pipe issue mostly complete; still underway are:
 - 'Cooling timeline' being evaluated
 - Conversion of ABI algorithms to enterprise version to enable spectral band substitution
 - Himawari-8 data operational distribution
 - Parallel op of GOES-15 during hot periods in February & August
- Both 16 & 17 transitioned to 10-minute full disk cadence on April 2, 2019
- All data products in operational use, at provisional or full maturity level
- New data products are in development
- *Many more new products being researched, as highlighted this week!*



GOES-T and GOES-U Status



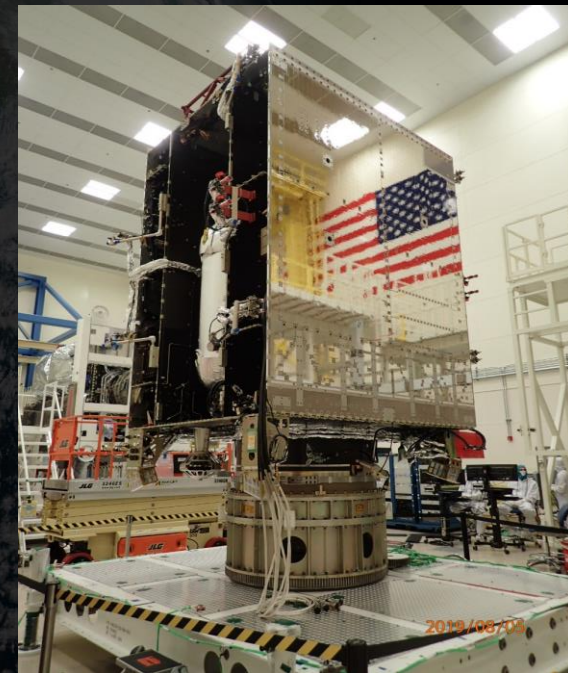
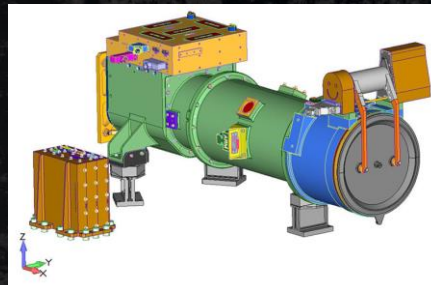
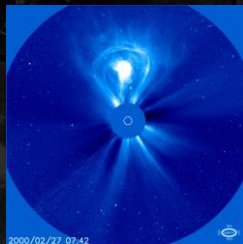
GOES-T

- Spacecraft assembled, awaiting ABI and GLM deliveries
- Selection of the Atlas V 541 to launch GOES-T announced in December 2019
- Launch planned in December 2021

GOES-U

- Integration is underway, including modifications to add the Compact Coronagraph (CCOR) coronal mass ejection detection instrument, which completed CDR in June
- Launch planned 2024

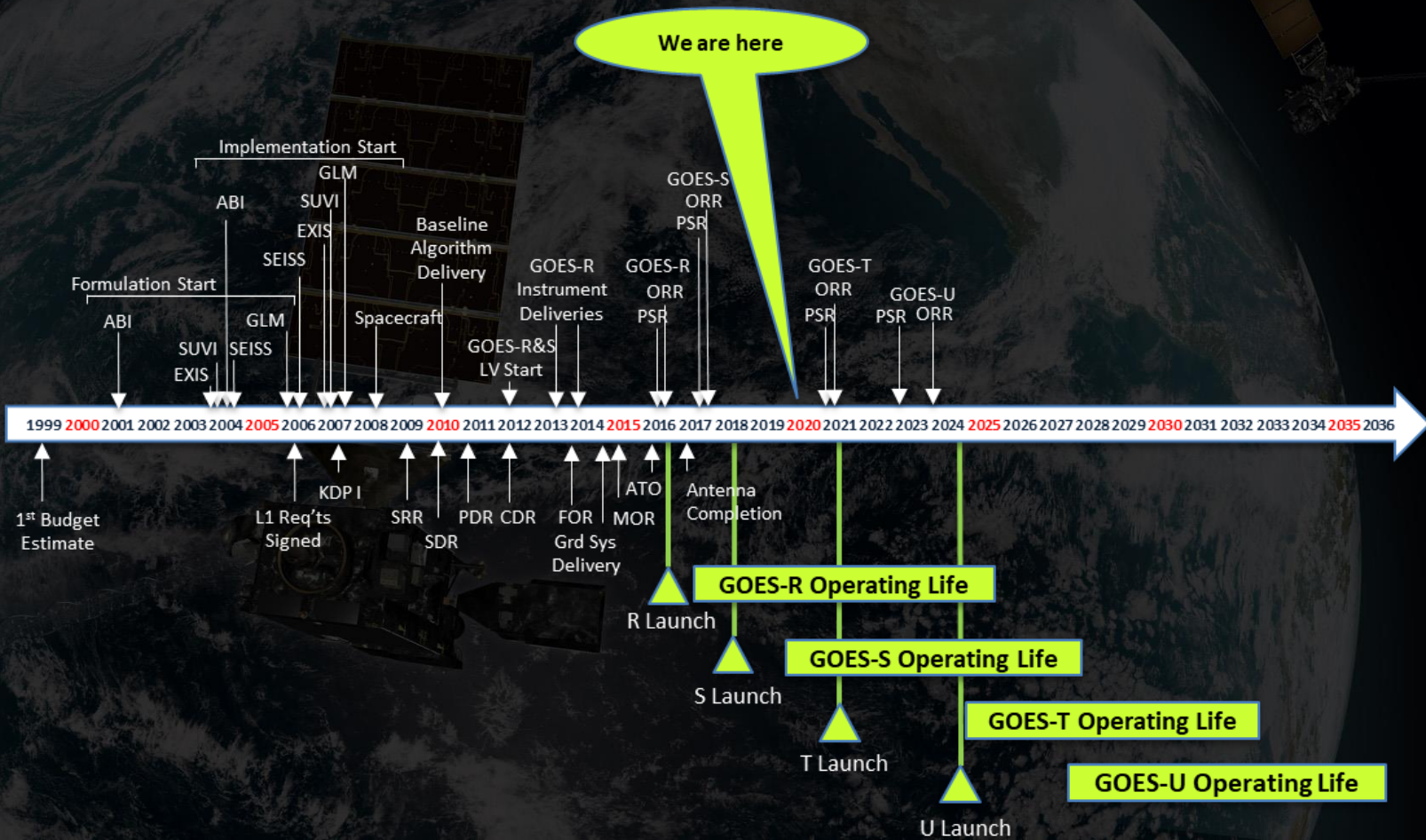
Coronal Mass
Ejection from
SOHO LASCO



GOES-U at Lockheed

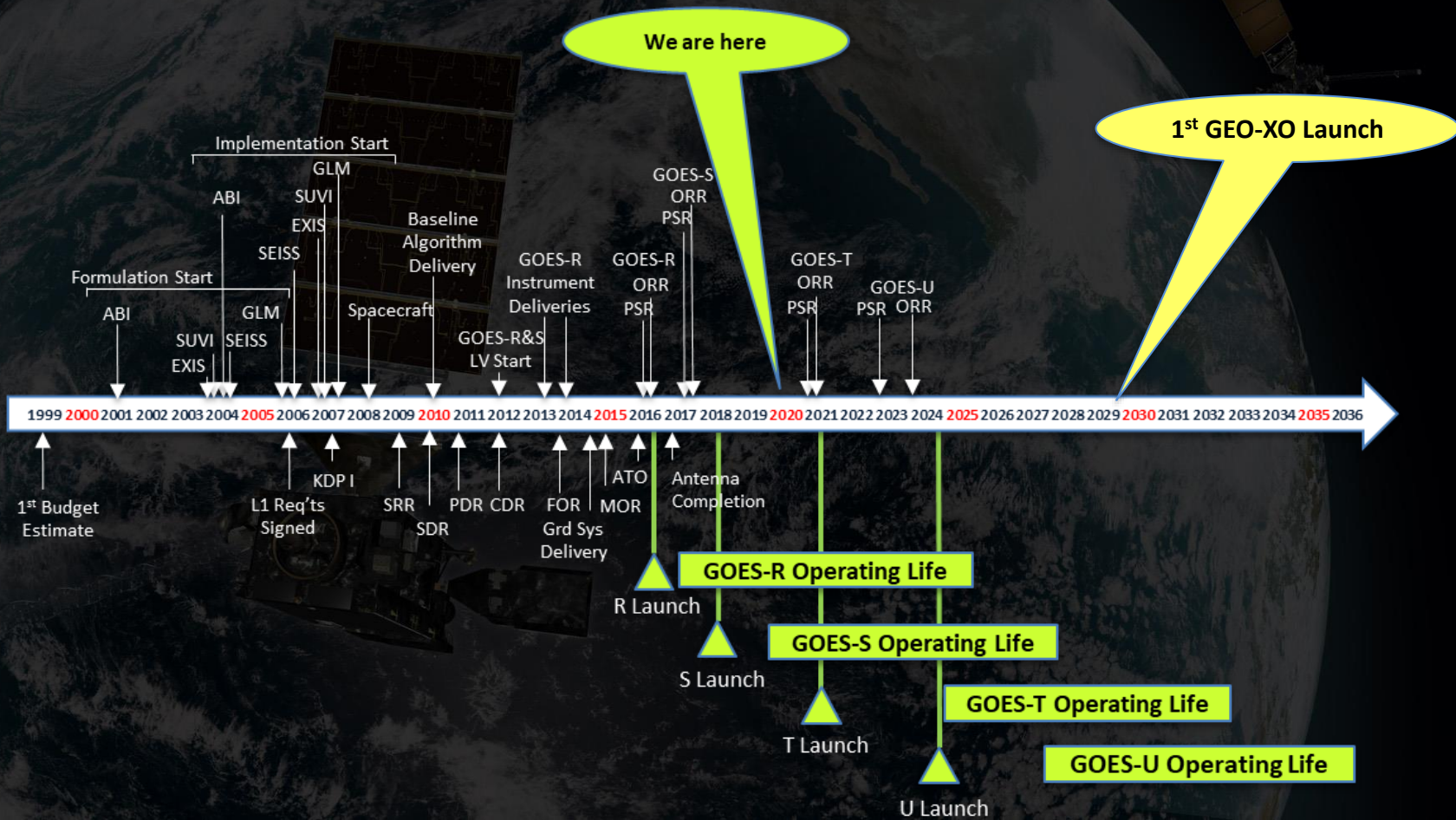


GOES-R Program Timeline





GOES-R Program Timeline





GEO-XO Introduction



- **GEO-XO = Geostationary and Extended Orbits**
 - The initiative planning the missions to follow GOES-R and SWFO
 - Will provide continuity for observations from GEO and Sun-Earth L1
 - Considering expanding to include observations from “Tundra” and L5
- Includes:
 - All NOAA assets deployed above LEO:
 - Government spacecraft
 - Instruments or payloads hosted on commercial or partner spacecraft
 - Potential use of commercial services and observational data
- Operational in the 2030-2050 timeframe
 - Within the next year:
 - Plan for formulation will be defined
 - Industry studies will begin
 - User engagement will begin

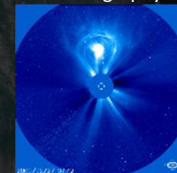
Visible & IR Imagery



Lightning Mapper



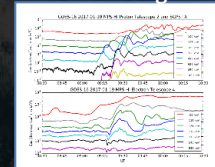
Coronagraphy



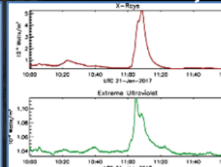
Solar Imaging



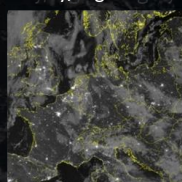
Particles & Mag Field



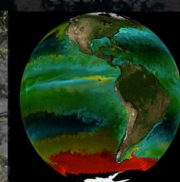
Solar EUV & X-Ray



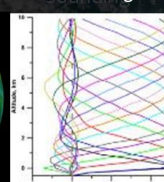
Day/Night Band



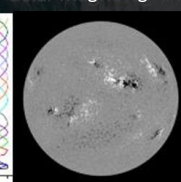
Ocean Color



Sounding



Solar Magnetogram



Auroral Imaging



Data Continuity, and Potential New Observations



Thank You





NOAA

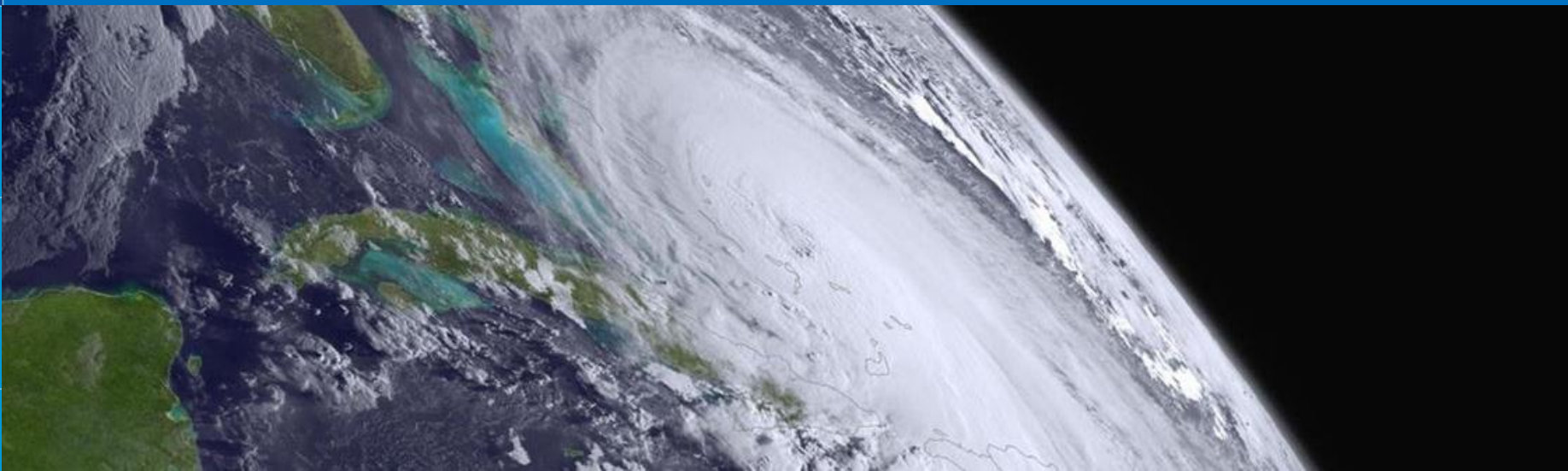
Satellite and
Information
Service

December 18, 2019

JPSS/GOES-R Proving Ground/ Risk Reduction Summit

February 24, 2020

Stephen Volz, Ph.D., Assistant Administrator for Satellites and
Information Services, National Oceanic and Atmospheric
Administration



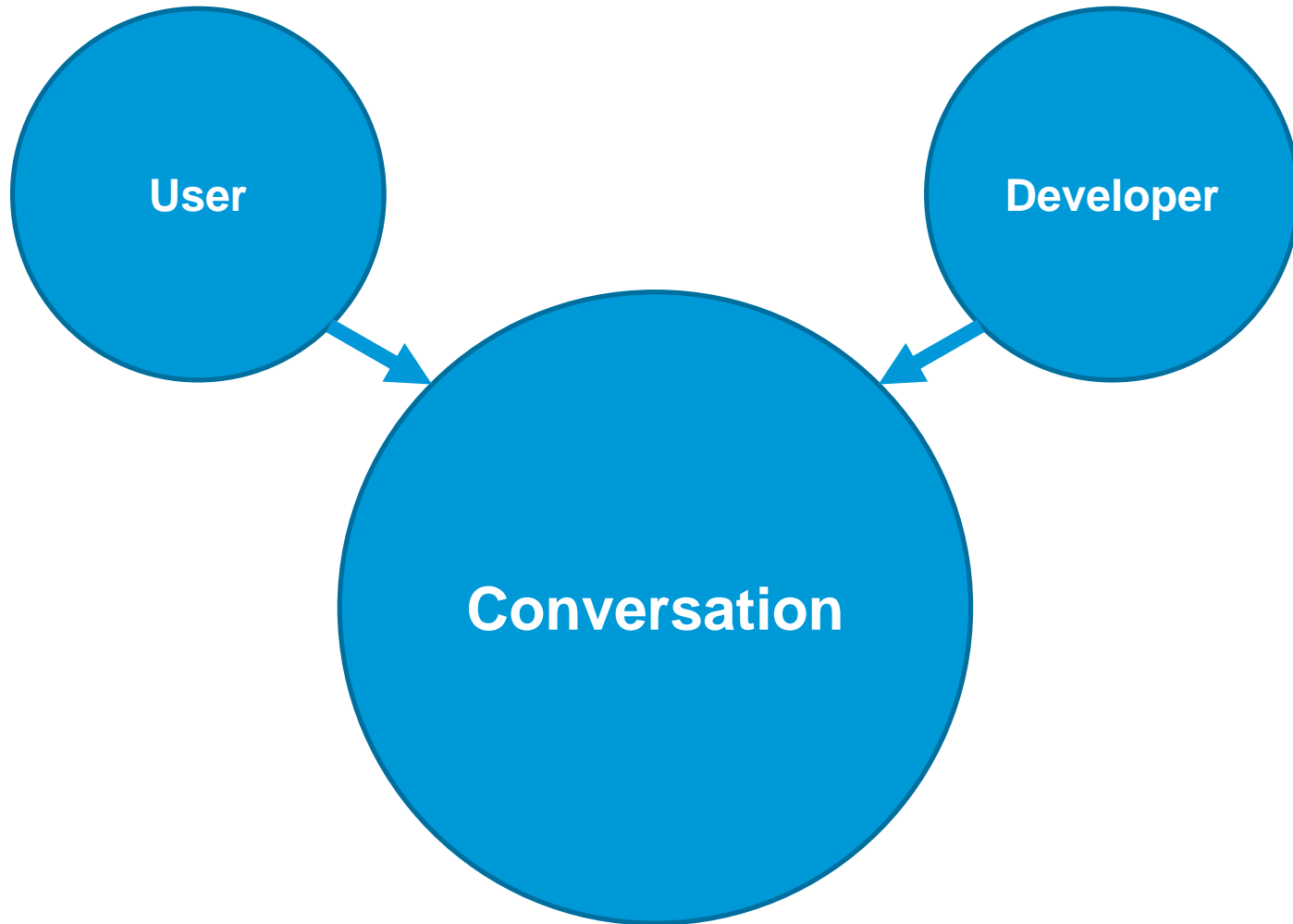


Our Aspiration

Provide a truly integrated digital understanding of our Earth environment that can evolve quickly to meet changing user expectations by leveraging our own capabilities and partnerships



Discover value through listening





NOAA

**Satellite and
Information
Service**

December 18, 2019

THANK YOU

Stephen Volz, Ph.D., Assistant Administrator for Satellites and Information Services, National Oceanic and Atmospheric Administration

