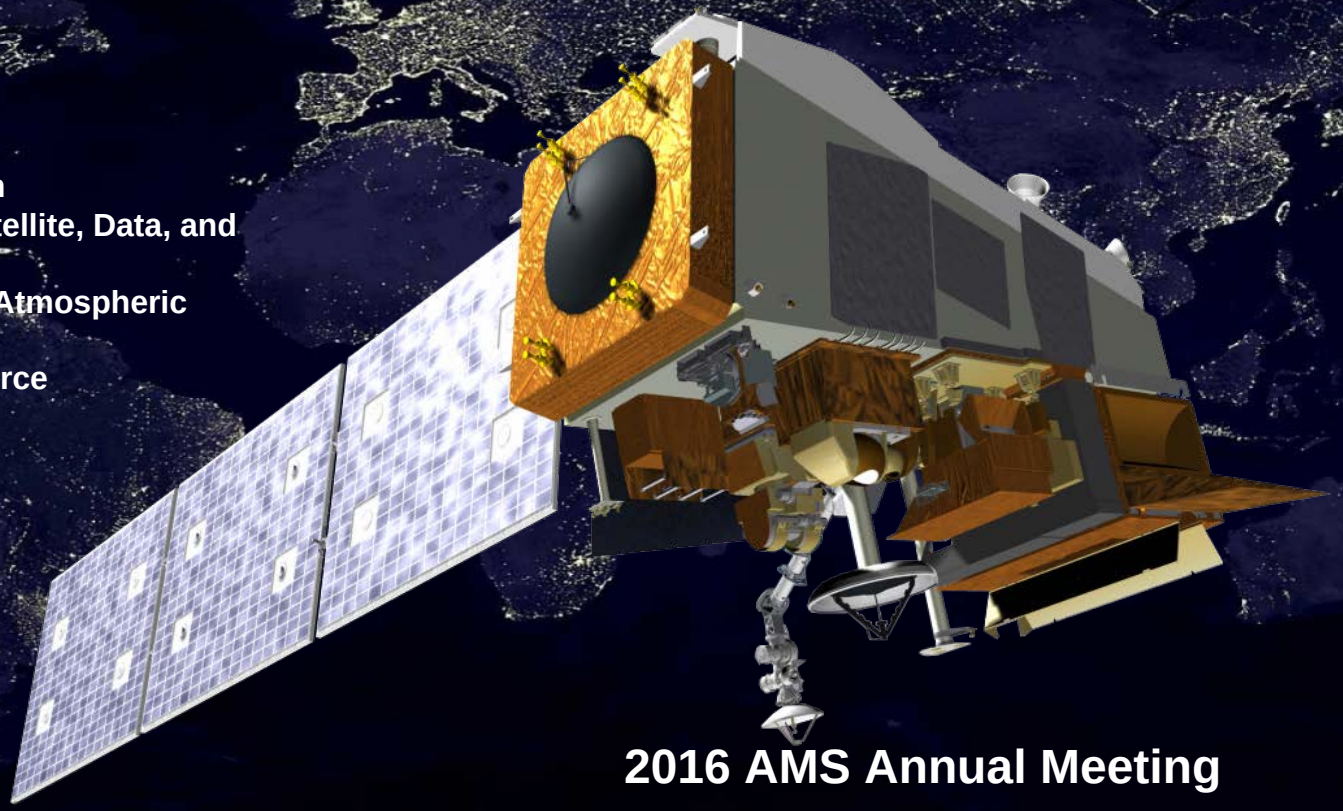
Joint Polar Satellite System (JPSS)

JPSS: The United States next Generation Civilian Polar Orbiting Environmental Satellite System

Harry Cikanek, Director

Joint Polar Satellite System
National Environmental Satellite, Data, and Information Service
U.S. National Oceanic and Atmospheric Administration
U.S. Department of Commerce

12 Jan 2016



2016 AMS Annual Meeting

www.jpss.noaa.gov

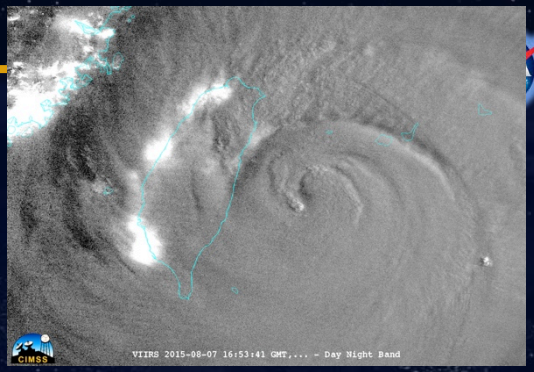
JPSS provides…

…the most critical data for numerical weather prediction to enable accurate 3-7 day ahead forecasts, giving high confidence to emergency managers in advance of severe weather events

…operational weather and environment satellite observations for Alaska and Polar Regions operational forecasting

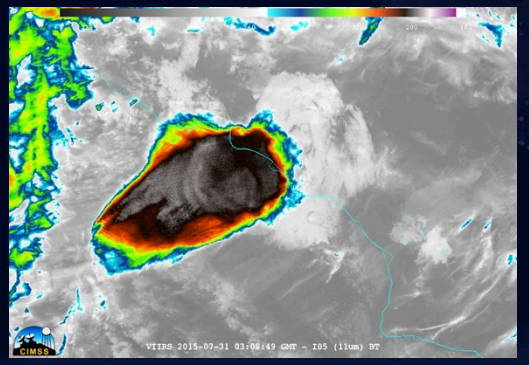
…global coverage and unique day and night imaging capabilities in support of broad environmental monitoring and forecasting needs

Without JPSS, the U.S. would experience an immediate degradation in weather forecasting capability

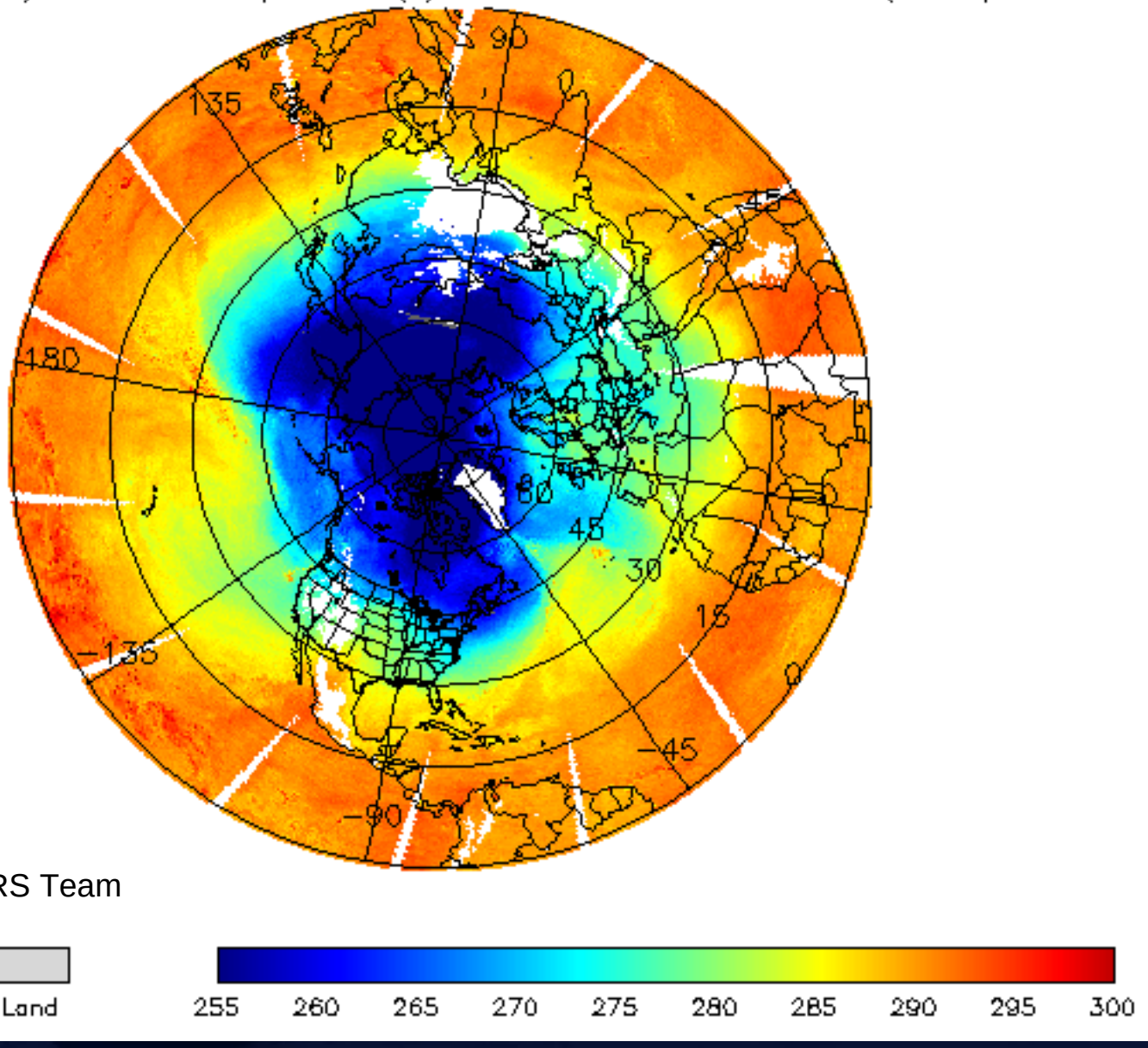


August 2015 - Soudelor

August 2015 – Washington State Fires



July 2015 Manam Volcanic Eruption in Papua New Guinea (12 km altitude)

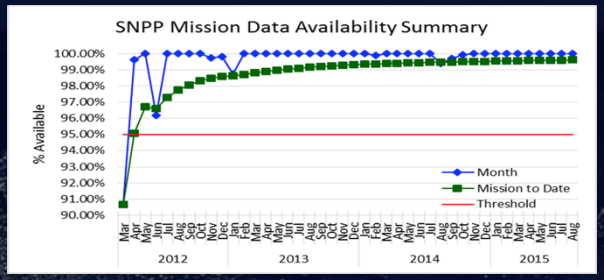


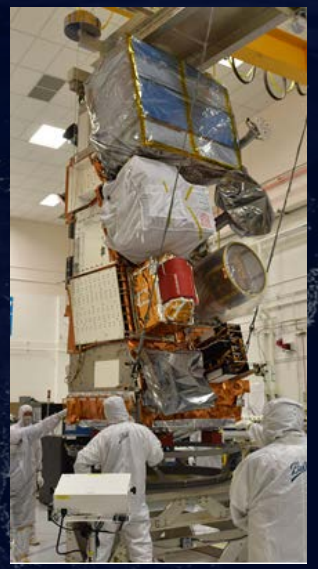
Credit: STAR/MIRS Team

Mission Status

S-NPP

- 4 years on orbit - October 28
- Rapid data product transition to operational use
- Primary for weather since 1 MAY 2014
- Excellent health and data availability





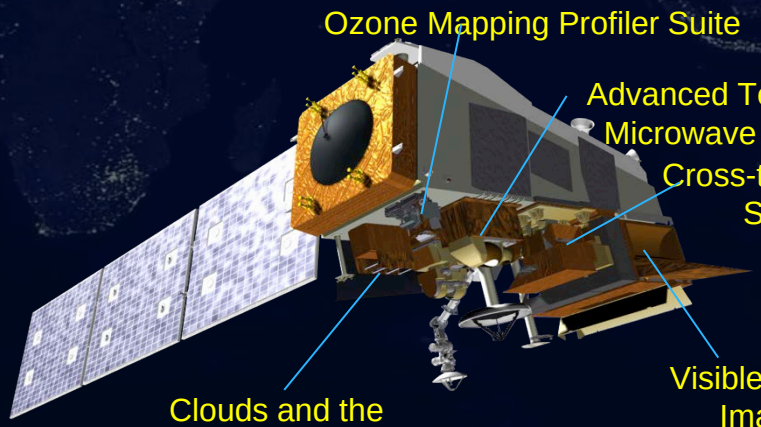
JPSS-1

- Integrated satellite test phase
- On track for early 2017 launch

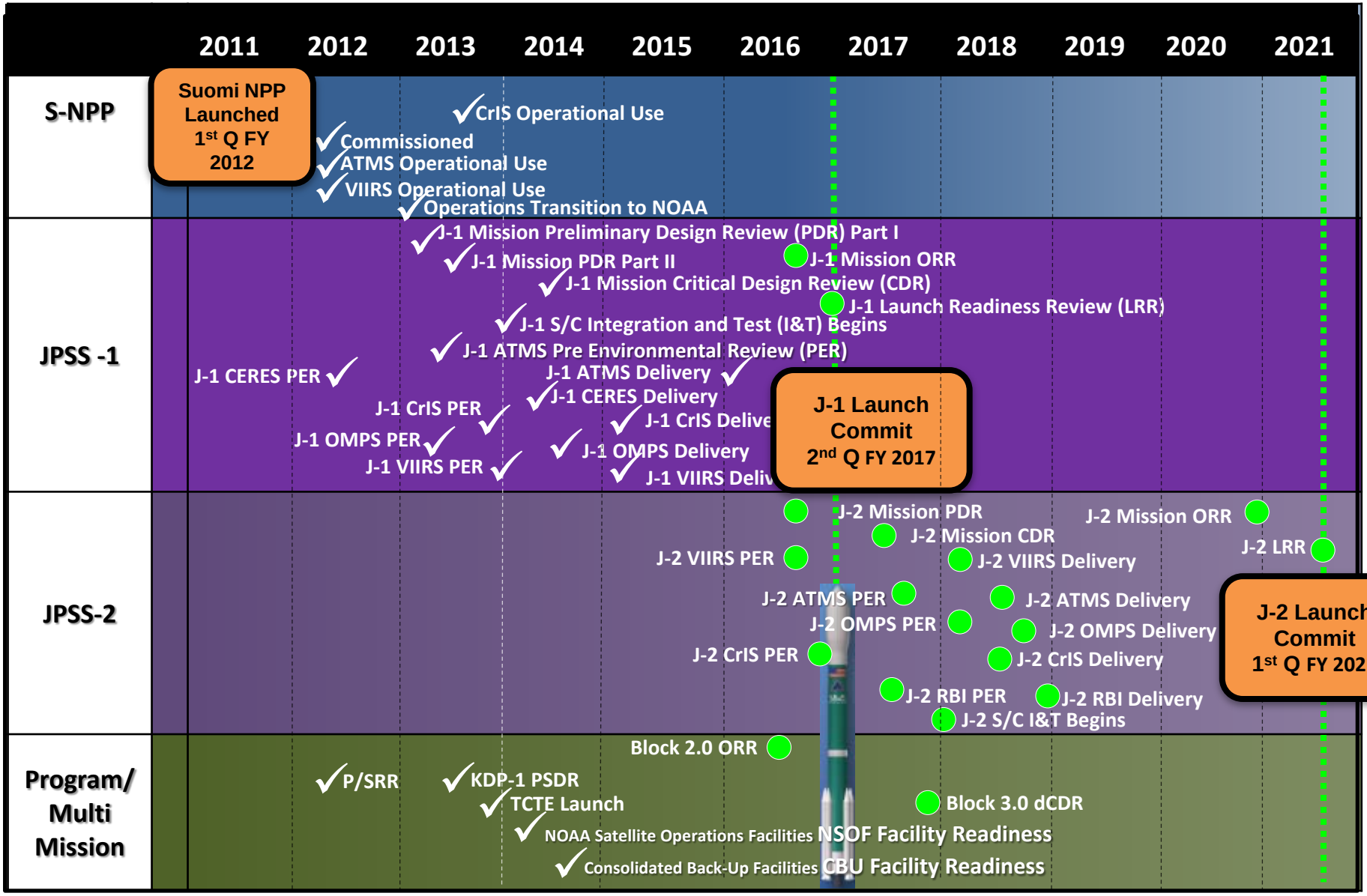
JPSS-2

- Instrument parts/assembly phase
- Spacecraft kick-off phase

JPSS-1 Spacecraft



JPSS Milestones



*Milestones are reflected in the calendar year unless otherwise noted

NOAA • NESDIS
JPSS
Joint Polar Satellite System

JPSS-1 Flight Segment Progress

Fit Check Completed for JPSS-1 Spacecraft

JPSS-1 Cross-Track Infrared Sounder (CrIS) is prepared for Shipment

The advanced Ozone Mapping and Profiler Suite (OMPS) is installed onto the JPSS spacecraft

The VIIRS instrument attached to the JPSS-1 spacecraft

The CERES instrument is attached to the JPSS-1 spacecraft

JPSS is on time and within budget

NOAA • NESDIS
JPSS
Joint Polar Satellite System

Flight Segment Progress

JPSS-1 Delta II Booster Assembly

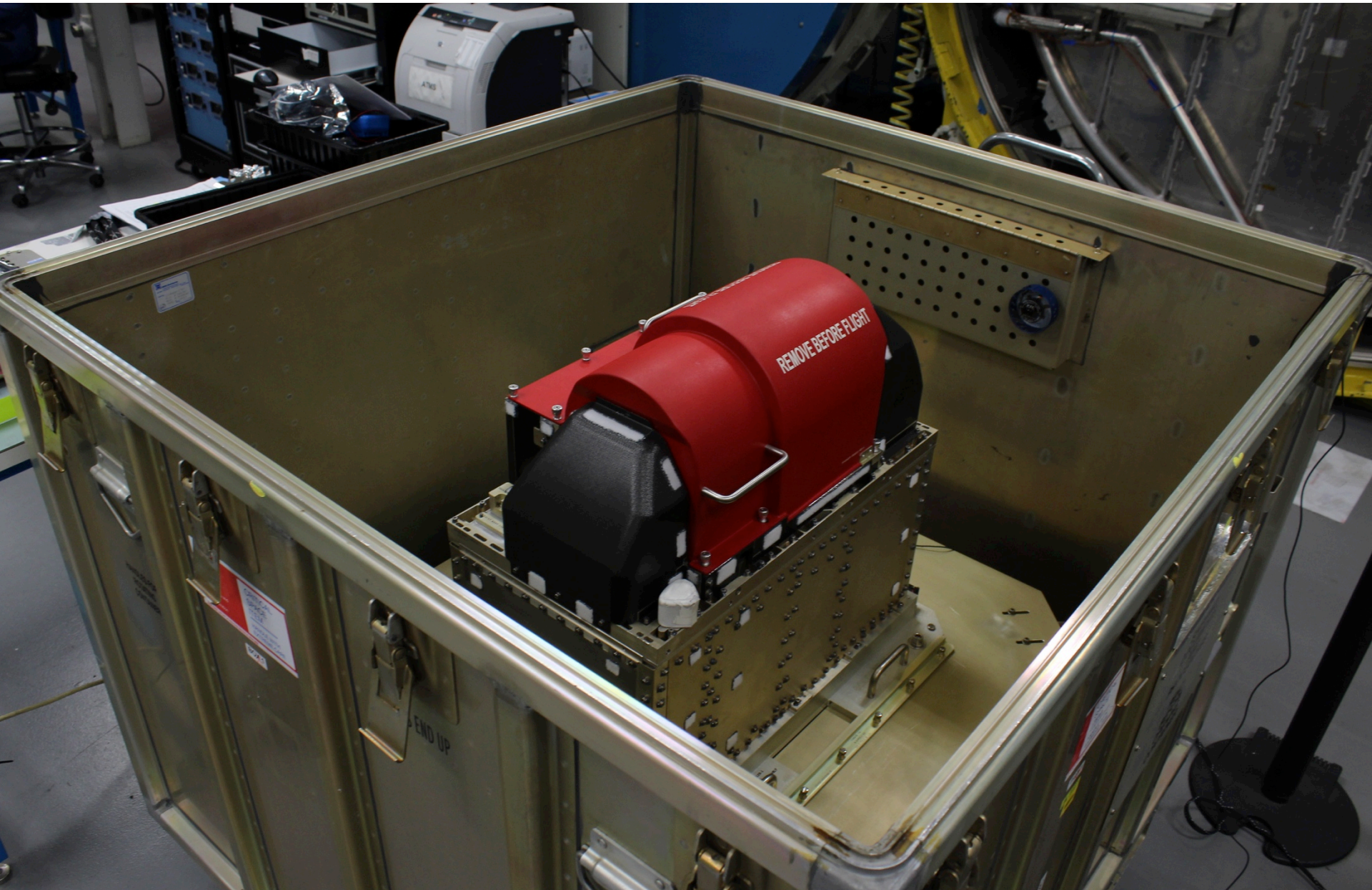
SRM for the Joint Polar Satellite System-1

JPSS-1 Delta II Fairing Bi-Sector with Blankets

JPSS-1 Delta II 6915 Payload Attach Fitting

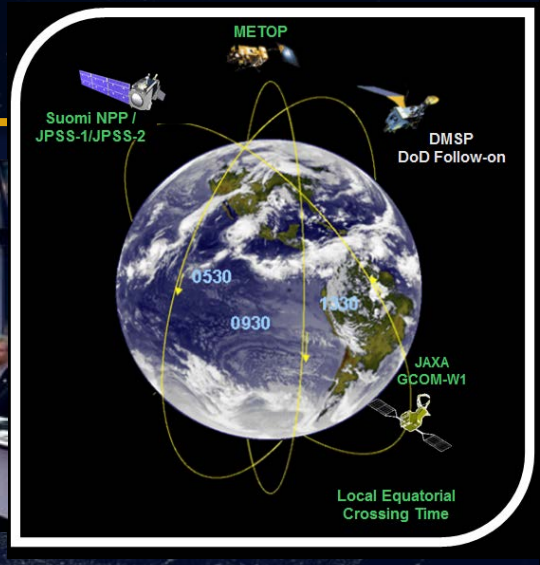
NOAA • NESDIS
JPSS
Joint Polar Satellite System

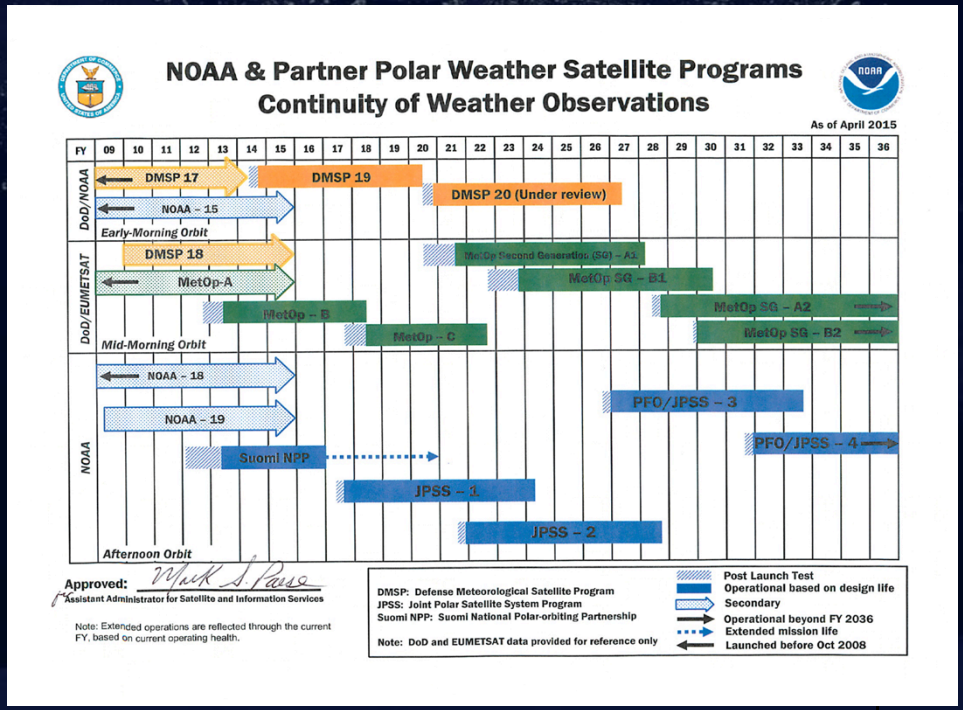
ATMS shipping and handling



Since AMS 2015:

- Signed the JPS agreement with EUMETSAT to secure the operation of a 2 orbit constellation to include MeTOP Second Generation
- Government approval of the JPSS Polar Follow-on (PFO) program
- Delivered the last instrument for spacecraft integration and on track for early 2017 launch
- Day Night Band became a Key Performance Parameter





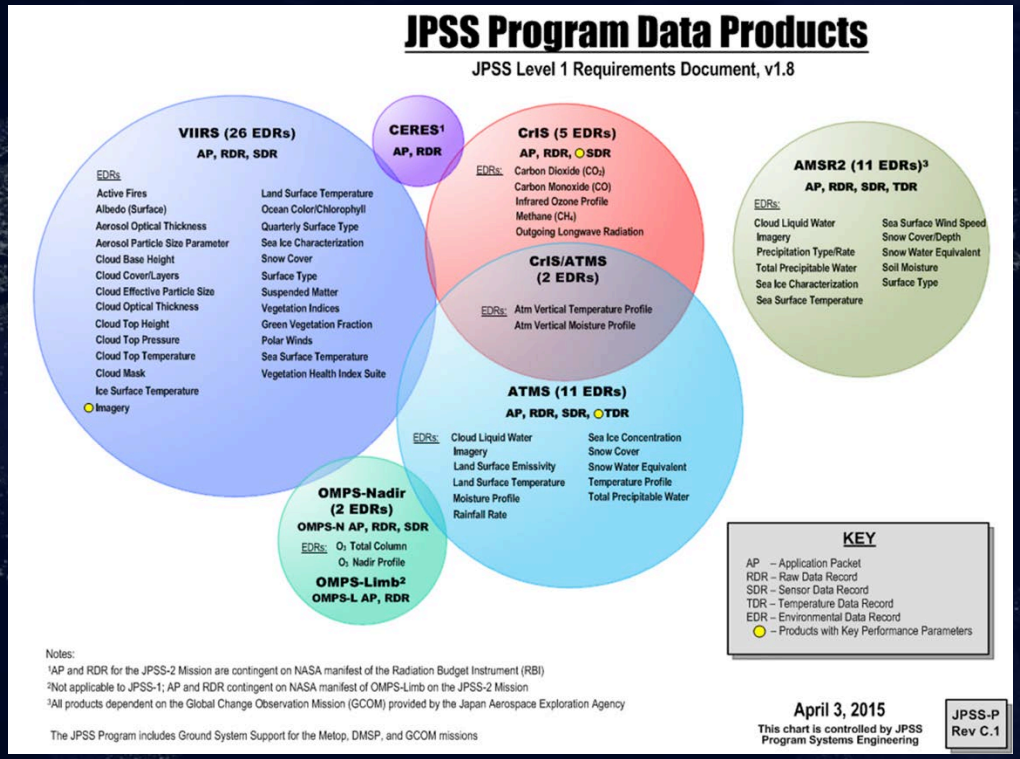
JPSS Performance for Users

Data Products Cal/Val and quality

- Three maturity levels
- Traceability to NIST standards
- Constant quality monitoring

Transition to enterprise algorithms

- JPSS inherited NOAA legacy and NPOESS heritage
- Developed sustainable / maintainable/compatible suite

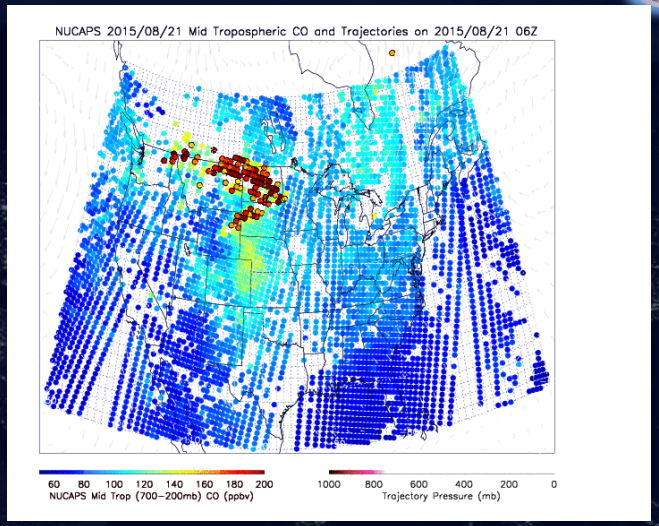


User Focused Improvements

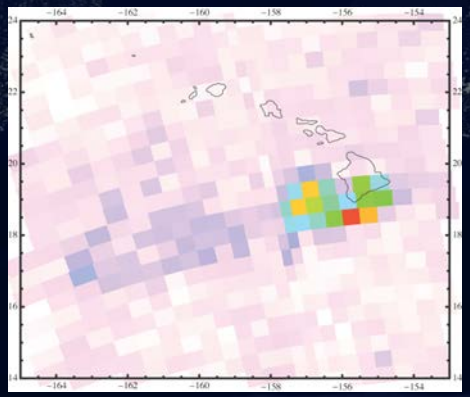
- Full spectrum CrIS, direct readout improvements
- Program Science -user readiness/risk reduction to enable quicker/broader utilization
- Half orbit latency, 17km resolution OMPS introduced with JPSS-1

Two significant product improvements

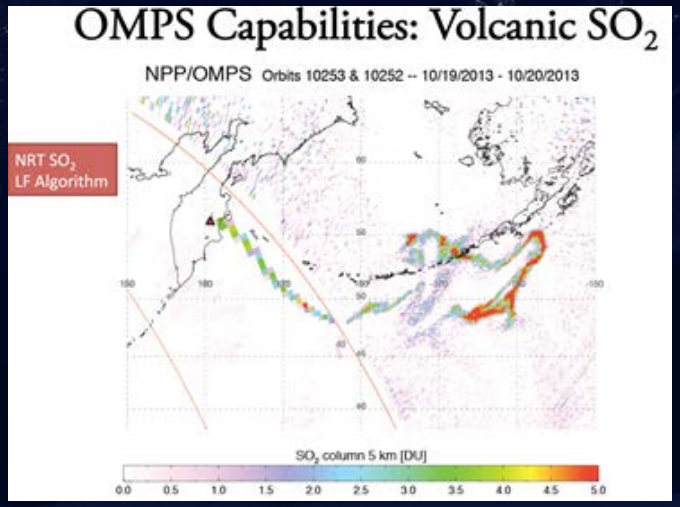
The full CrIS spectral resolution which will enable carbon monoxide products (SNPP/JPSS-1….)



The improved OMPS spatial resolution providing total ozone at 17 km instead of 50 km, and ozone profiles at 50 km instead of 250 km (J1..)

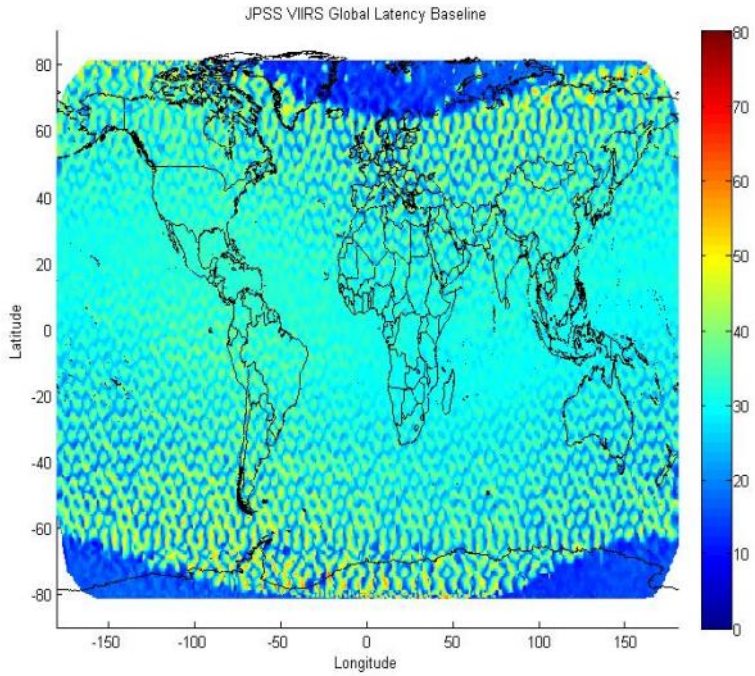


OMP- Volcano SO2 degassing @ 50 km

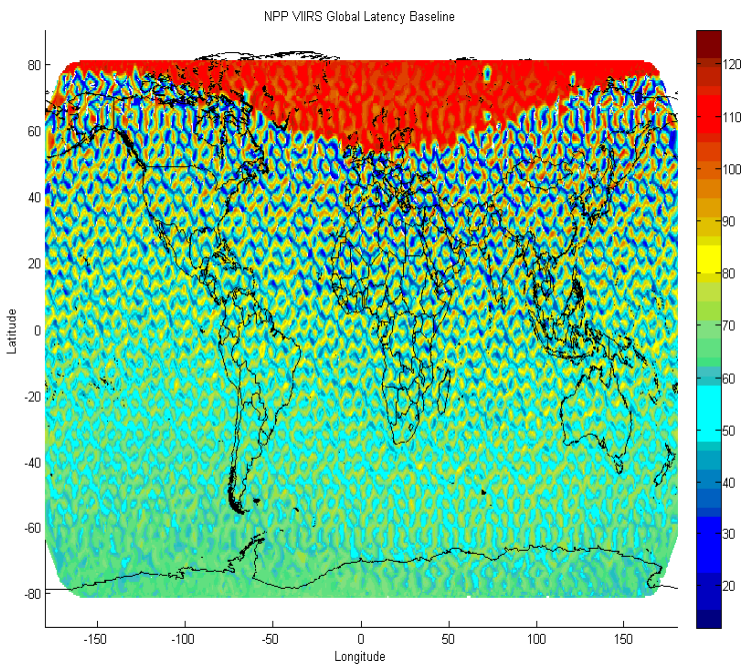


Significant improvement in latency

JPSS



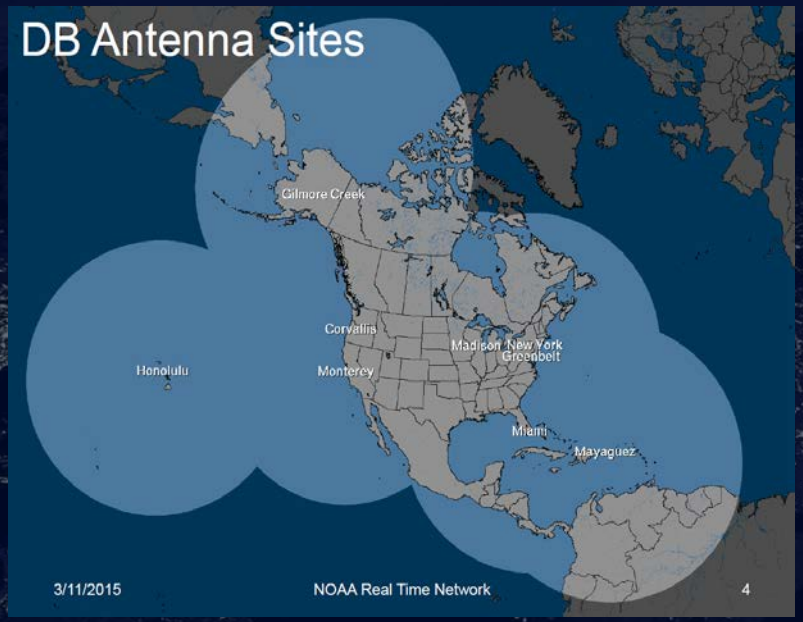
SNPP

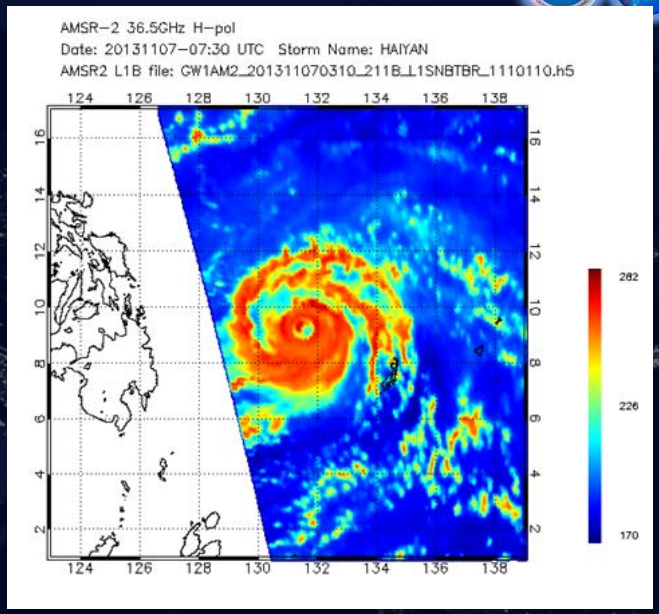


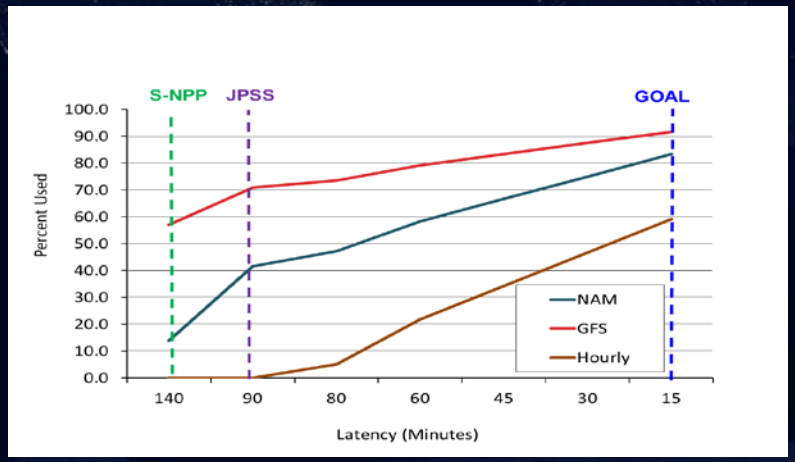
Polar region latency improved from 2 hours to 10 minutes
95% of the data is within 50 minutes (taking into account BUFR conversion, etc.)
Between +- 50 degrees latitude ~ 30 minutes
Actual performance will be 50% better than specification

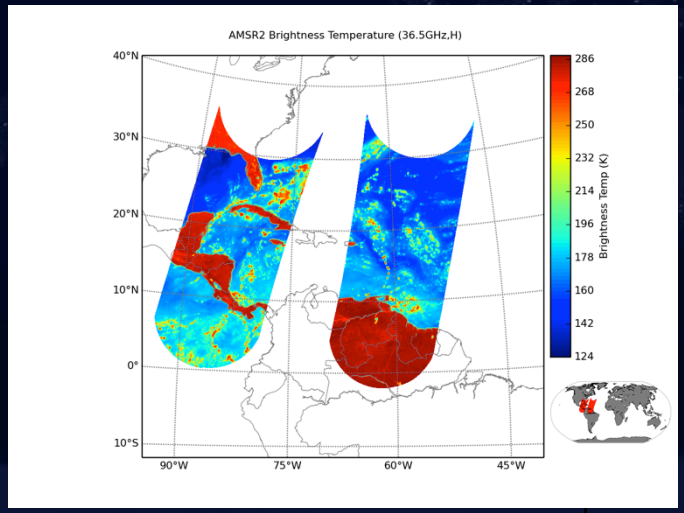
NOAA Demo Direct Readout Sites to reduce latency for rapid update forecast models and for more timely situational awareness

Currently antennas at Hawaii, Alaska, and Wisconsin, are being used routinely by weather forecast offices using AWIPS's Local Data Acquisition and Dissemination (LDAD) System

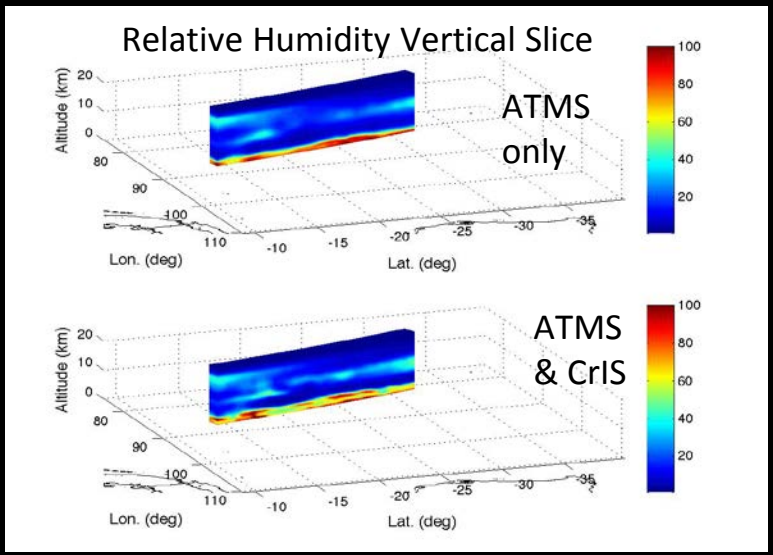


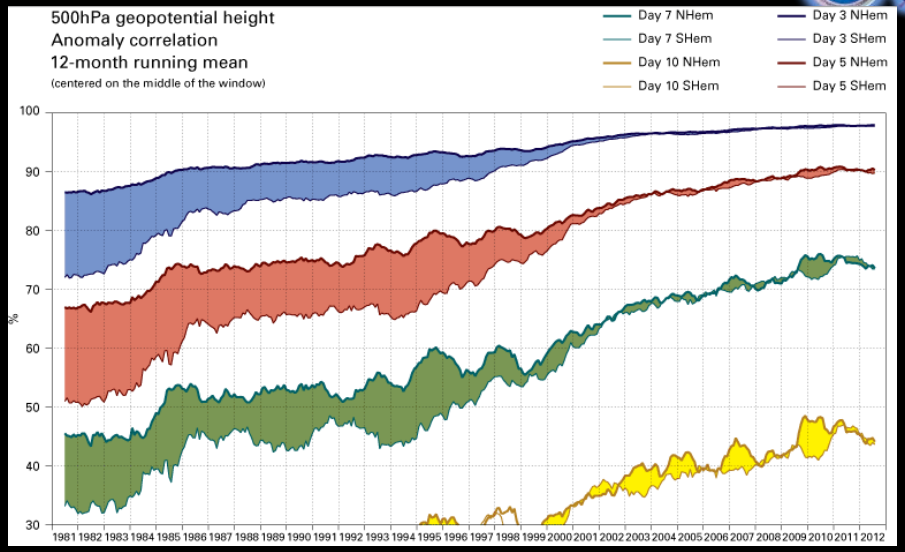


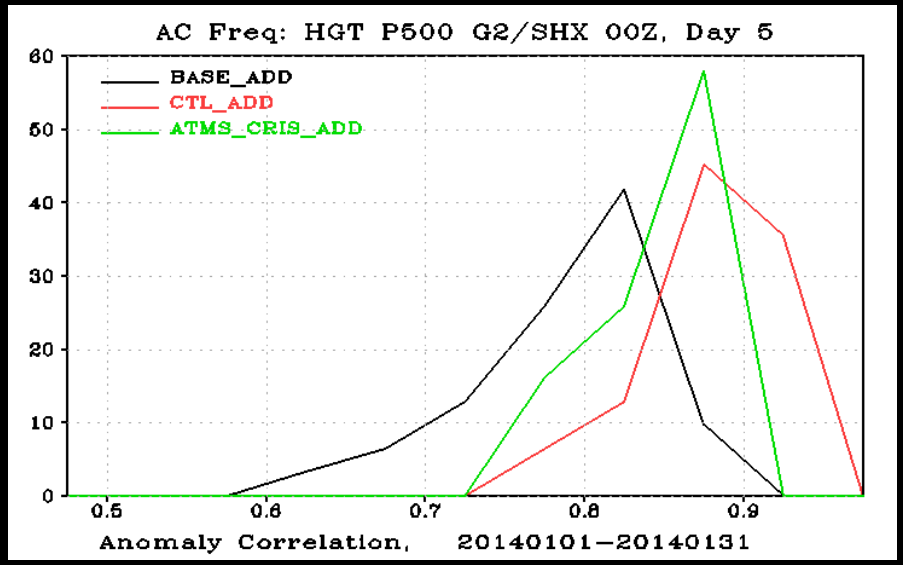




Top priority is supporting the 5 -7 day forecast SUCCESSFUL!!



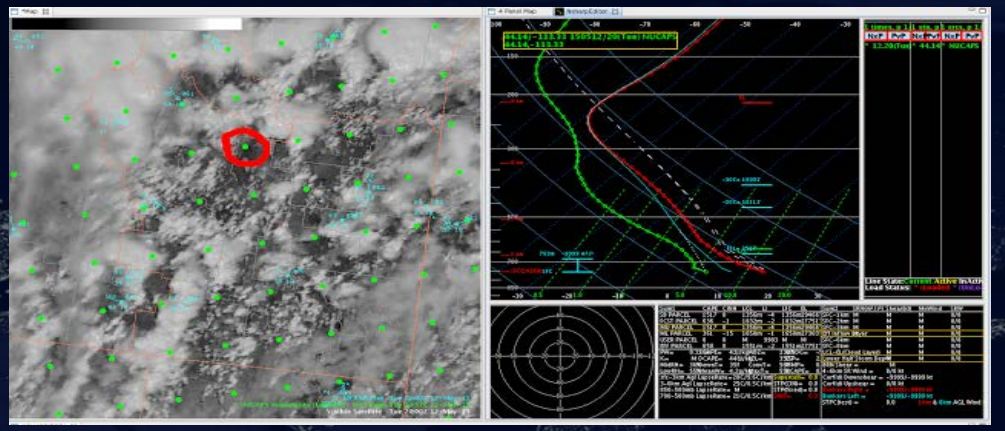




JPSS Applications Advancements

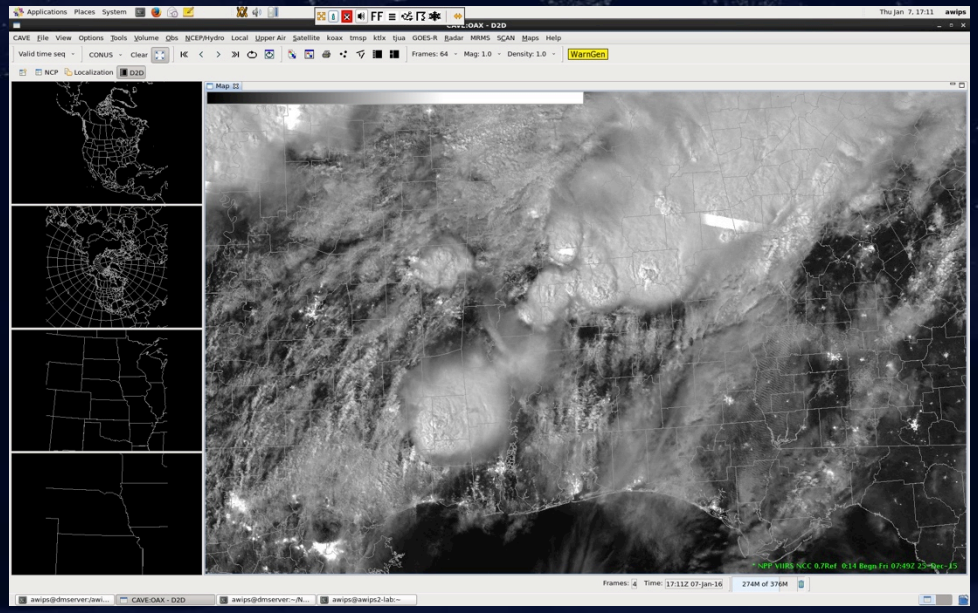
Sounding Products

- Demonstrations with operational forecasters
- Support storm watches and warnings
- CO product for tracking smoke emissions from forest fires



Day Night Band

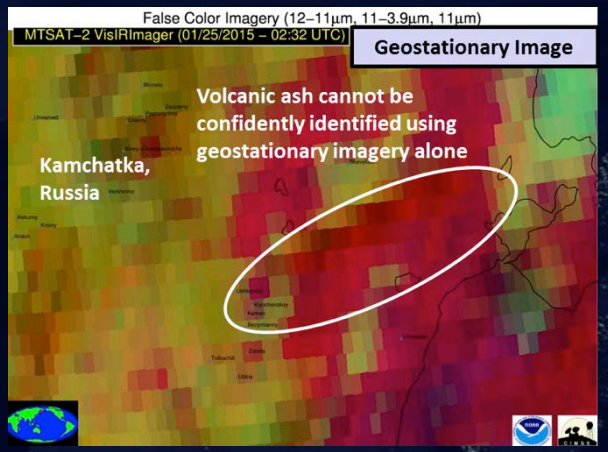
- Sea Ice
- Storm tracking at night
- Ground Fog
- Active fires and smoke
- Socio / Economic / Impact assessment

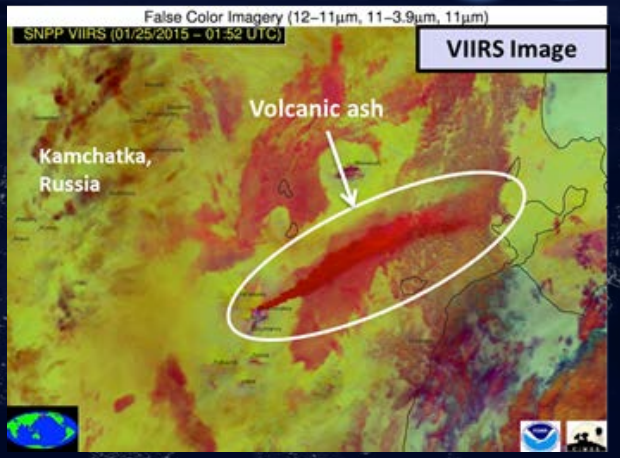


JPSS Applications Advancements

Volcanic Ash

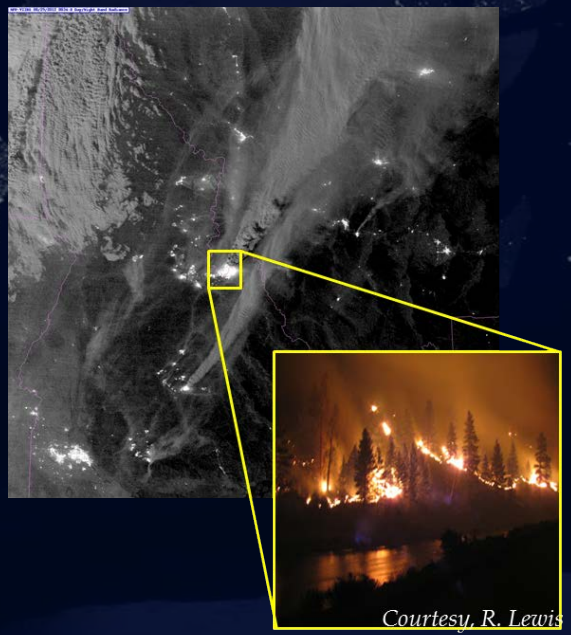
- Wide swath, near constant resolution
- More detections, better plume monitoring / predictions





Active Fires

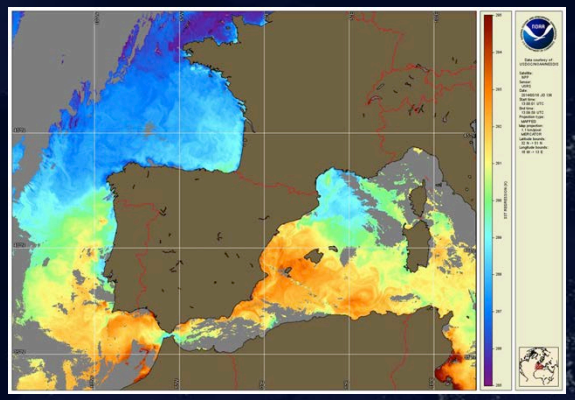
- Fire radiative power
- DNB tracking
- Improved visible resolution/ swath
- Successful field studies

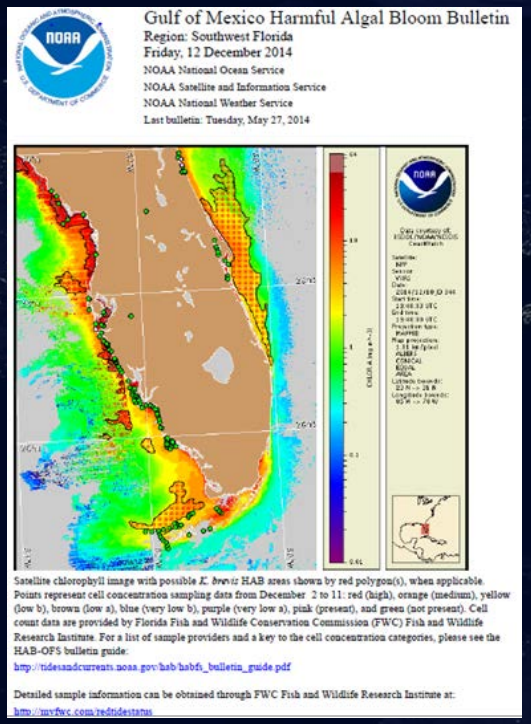


JPSS Applications Advancements

Oceanography

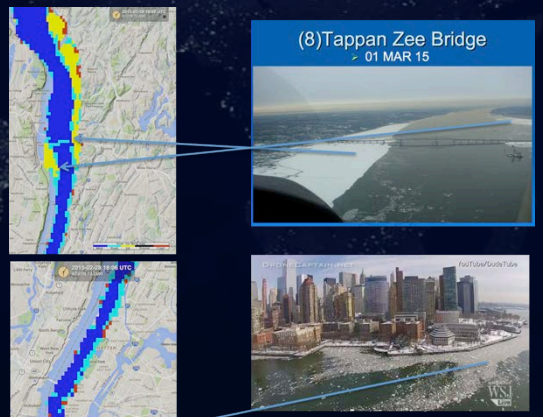
- Improved sea surface temperature
- Highly calibrated global ocean color





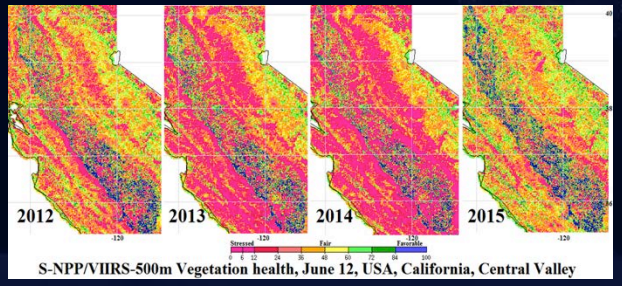
Hydrology

- Ice blockage
- Flood prediction / monitoring

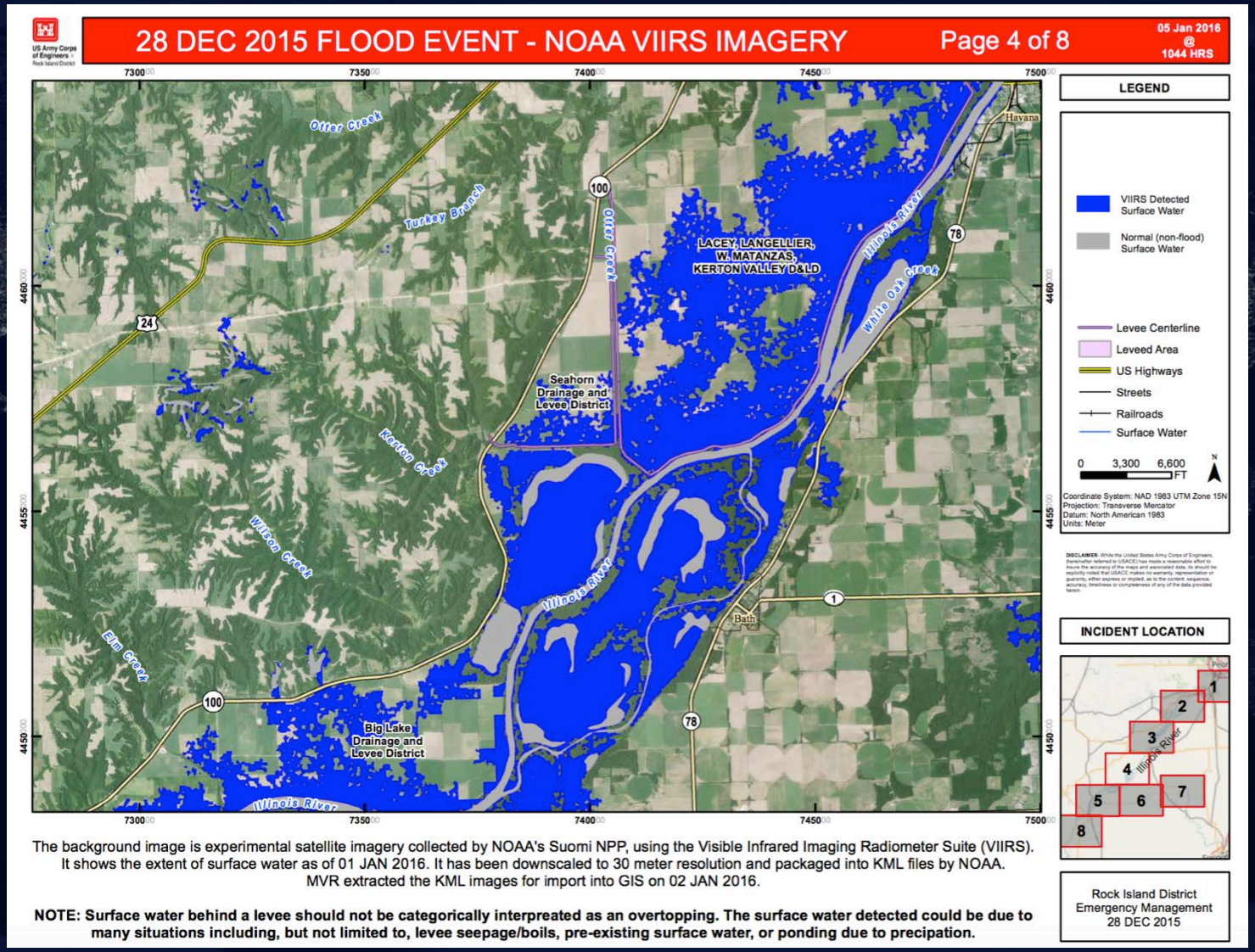


Land

- Green Vegetation Fraction
- Vegetation Stress



Recent VIIRS flood product being used by Army Corp of Engineers



The background image is experimental satellite imagery collected by NOAA's Suomi NPP, using the Visible Infrared Imaging Radiometer Suite (VIIRS). It shows the extent of surface water as of 01 JAN 2016. It has been downscaled to 30 meter resolution and packaged into KML files by NOAA. MVR extracted the KML images for import into GIS on 02 JAN 2016.

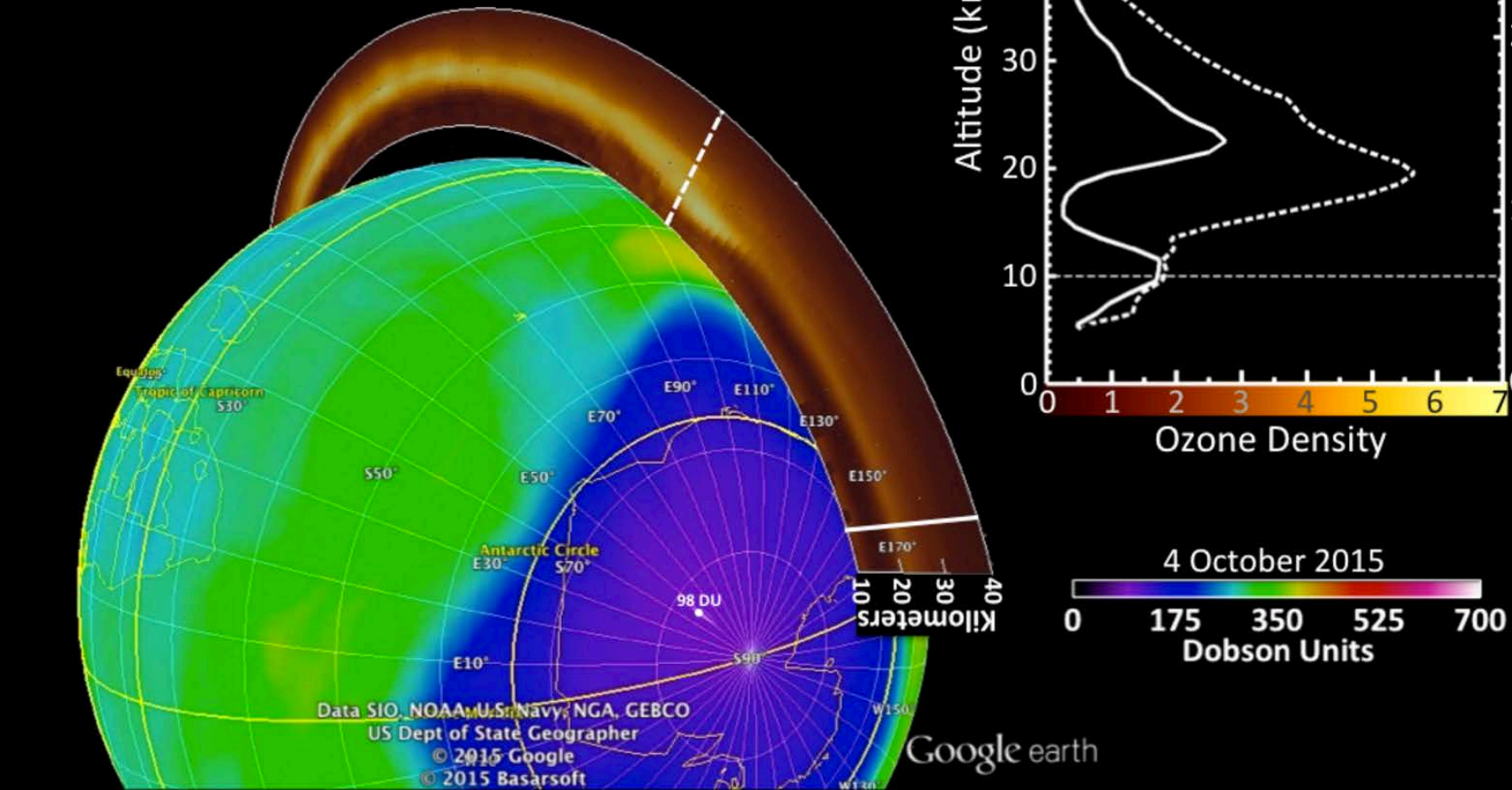
NOTE: Surface water behind a levee should not be categorically interpreated as an overtopping. The surface water detected could be due to many situations including, but not limited to, levee seepage/boils, pre-existing surface water, or ponding due to precipation.

The 2015 Antarctic ozone hole area was larger and formed later than in recent years, according to scientists from NOAA and NASA.

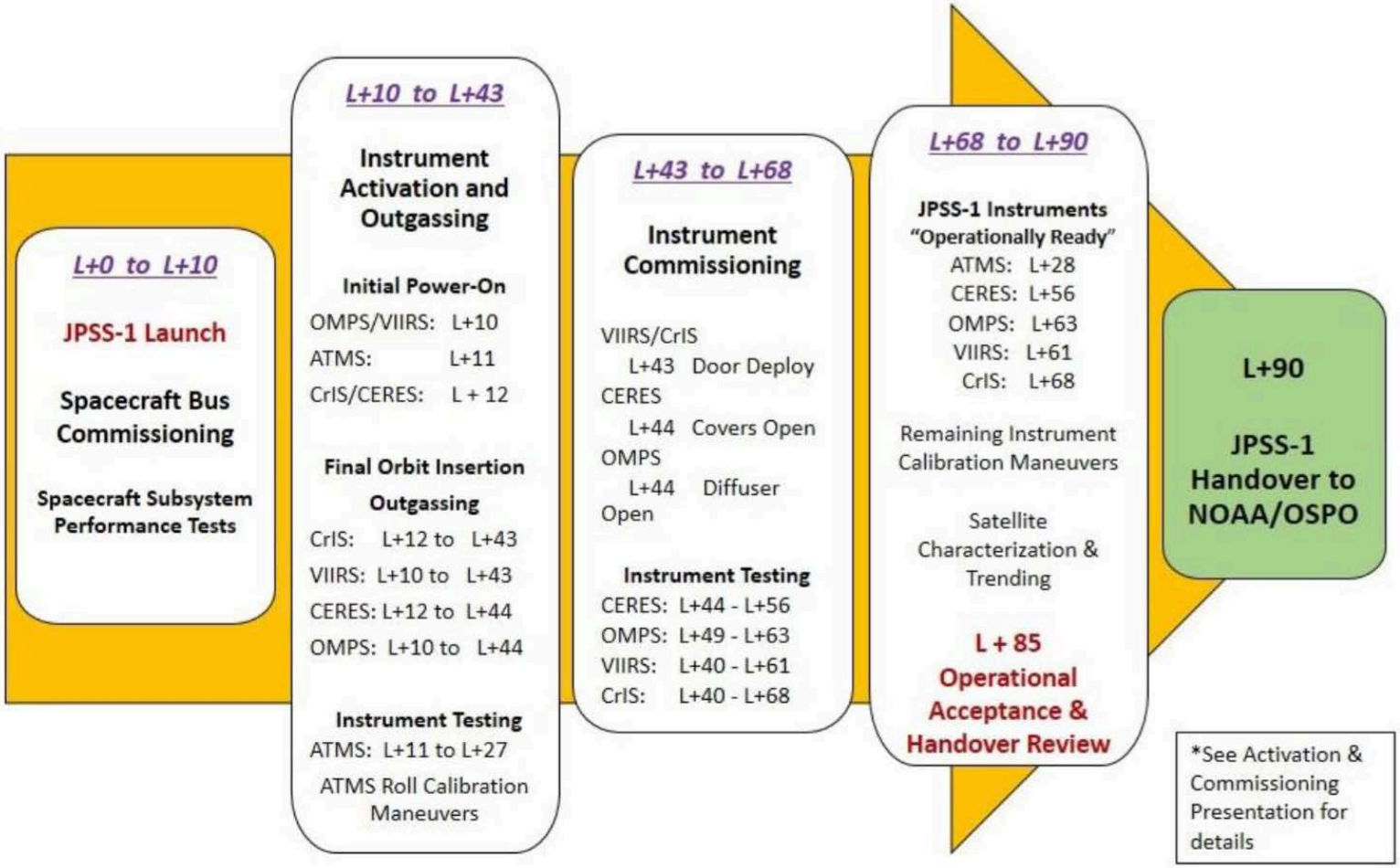
On Oct. 2, 2015, the ozone hole expanded to its peak of 28.2 million square kilometers (10.9 million square miles), an area larger than the continent of North America. Throughout October, the hole remained large and set many area daily records.

Cold temperatures fuel ozone loss

Unusually cold temperature and weak dynamics in the Antarctic stratosphere this year resulted in this larger ozone hole. In comparison, last year the ozone hole peaked at 24.1 million square kilometers (9.3 million square miles) on Sept. 11, 2014. Compared to the 1991-2014 period, the 2015 ozone hole average area was the fourth largest.



PLT Timeline Overview



Summary

Substantial Progress in 5 years since program started

- Program Base-lined to Focus on Weather mission
- 5 instrument suite; S-NPP, JPSS-1, JPSS-2 Missions, Block 2 Ground development
- Passed four years of S-NPP operations, observatory working well, excellent use feedback

Focus on Users

- Rapid user readiness, extensive calibration/ validation, risk reduction
- Increased performance

Plan for Continuity

- Impact Mitigations
- Robust plan
- Two new missions approved: PFO/ JPSS-3, JPSS-4

Thank you!

For more information visit

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