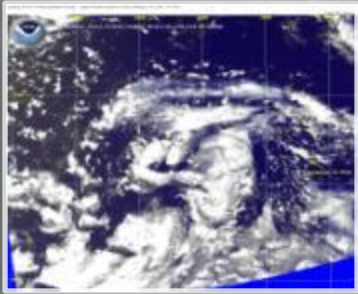
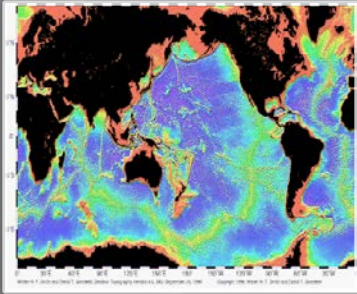
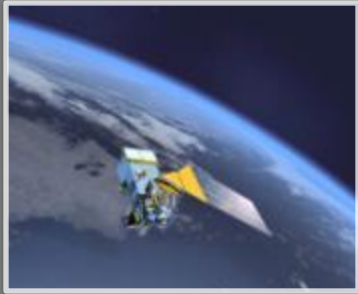


STATUS OF CURRENT AND FUTURE NOAA SATELLITE PROGRAMS



Second Asia/Oceania Meteorological Satellite Users' Conference
Tokyo, Japan, December 6, 2011

Gregory Robinson, Deputy Assistant Administrator, Systems
NOAA Satellite and Information Service



Contents

Current and Future Polar-orbiting Satellites

Current and Future Geostationary Satellites

Research to Operations

- ✓ COSMIC
- ✓ Solar Wind Follow-on Mission
- ✓ Jason-3 and Jason-CS

International Cooperation

Summary



Polar-orbiting Operational Environmental Satellite Series (POES)

NOAA-19

PM Primary IJPS

Metop-A

AM Primary IJPS

NOAA-18

PM Secondary

NOAA-17

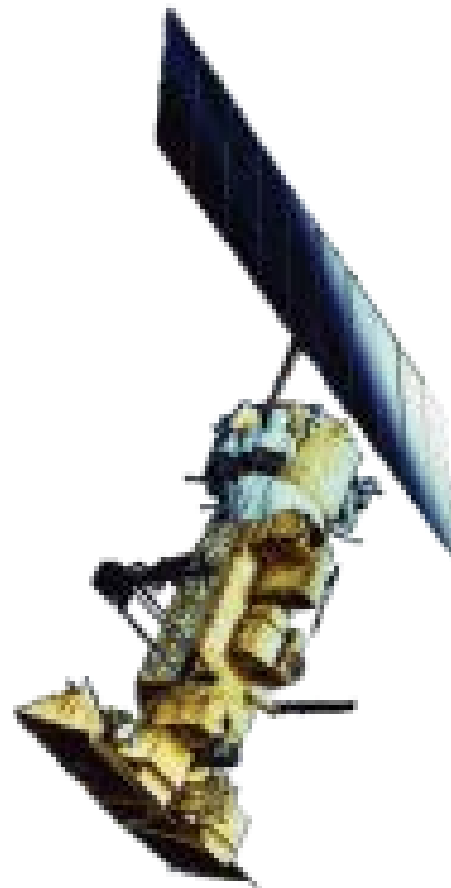
AM Backup

NOAA-16

PM Secondary

NOAA-15

AM Secondary





NPOESS Preparatory Project

Launched successfully on October 28, 2011

NPP is the first of a new generation of satellites and features improvements in the instruments that capture high-resolution data for monitoring and predicting weather and climate patterns and atmospheric, oceanic, and land measurements.

NPP is at mission orbit, with spacecraft and instruments performing nominally. NPP is undergoing a series of tests for approximately 9-15 months before it is turned over to NOAA for operations and joins the Nation's fleet of polar-orbiting environmental satellites.

Suite of Instruments:

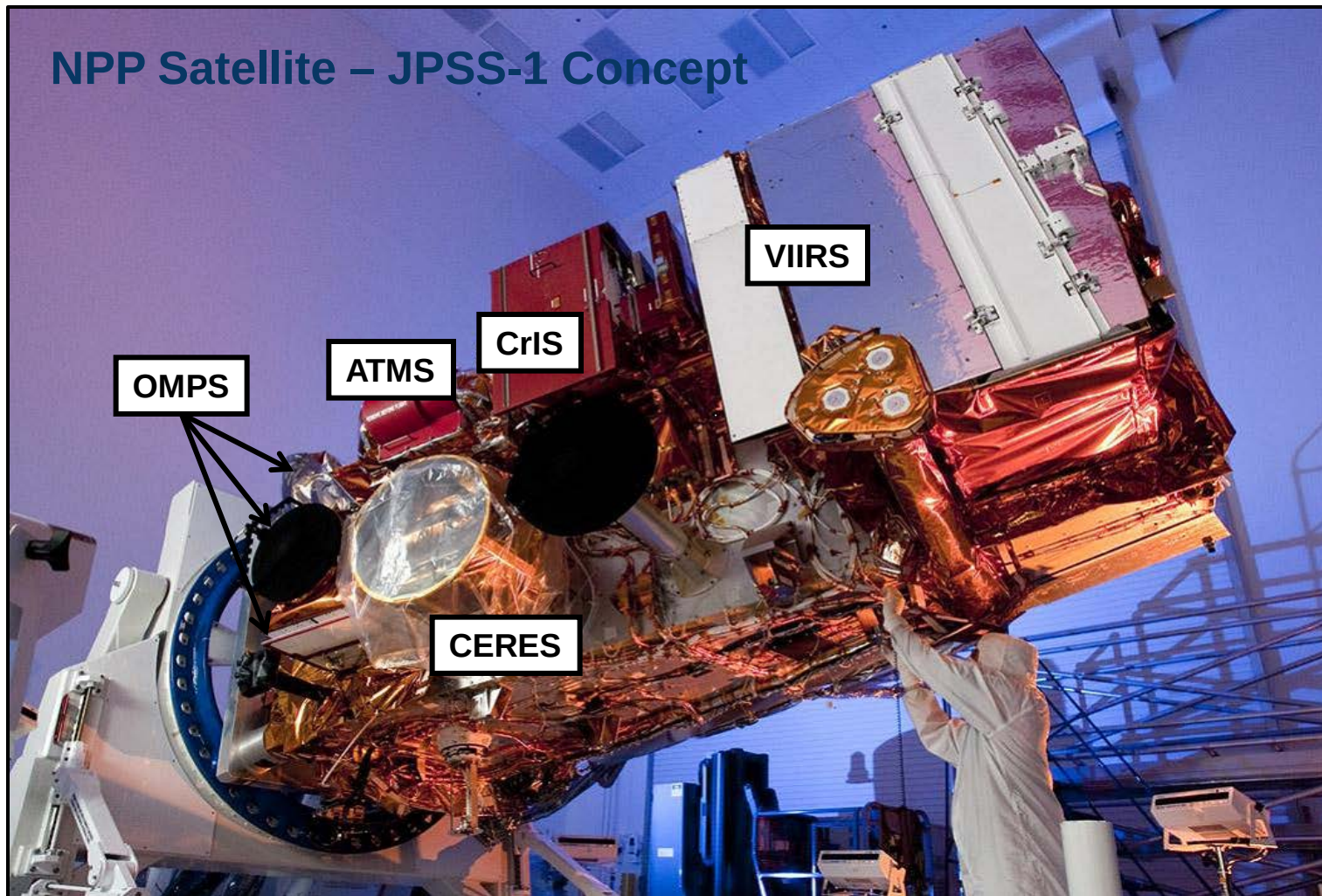
- ✓ Visible/Infrared Imager/Radiometer Suite (VIIRS)
- ✓ Advanced Technology Microwave Sounder (ATMS)
- ✓ Cross-track Infrared Sounder (CrIS)
- ✓ Ozone Mapping Profiler Suite (OMPS)
- ✓ Clouds and Earth's Radiant Energy System (CERES)

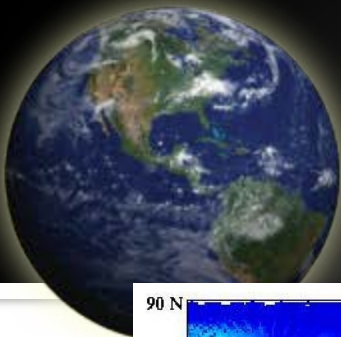


System Description

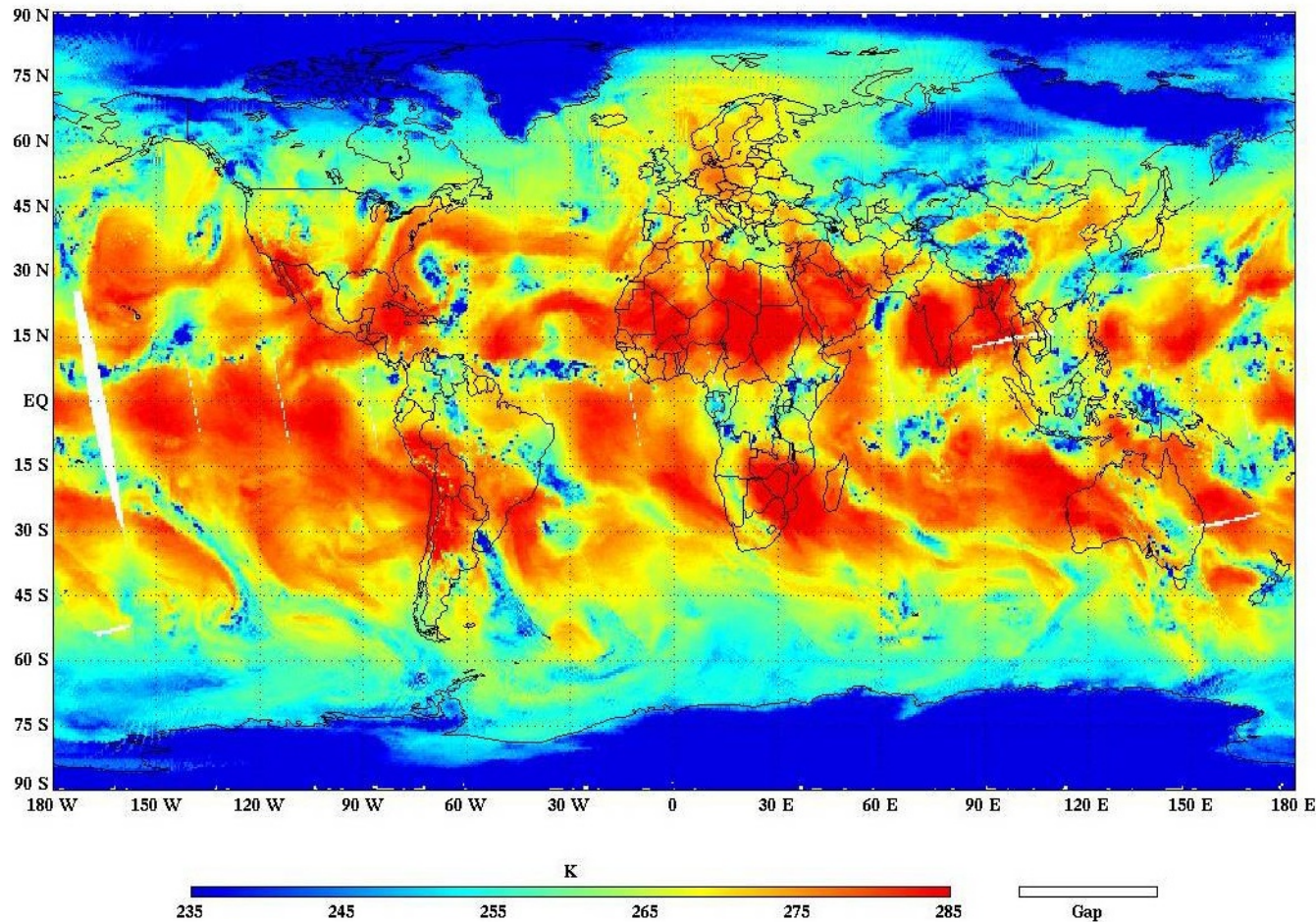
(Space Segment)

NPP Satellite – JPSS-1 Concept





First global ATMS image showing the channel 18-microwave antenna temperature at 183.3 GHz on November 8, 2011



The ATMS data were processed at the NOAA Satellite Operations Facility (NSOF) in Suitland, MD and the image was generated by STAR

Quality of the image is superb, no indication of instrument artifacts, and by design no orbital gaps

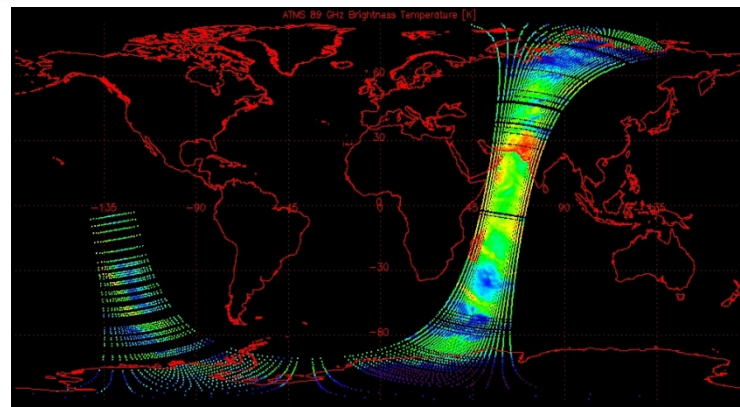
ATMS provides critical water vapor information for weather forecasting and storm intensity assessments

This channel measures atmospheric water vapor; note that Tropical Storm Sean is visible in the data, as the blue patch due to heavy precipitation, in the Atlantic off the coast of the Southeastern United States.

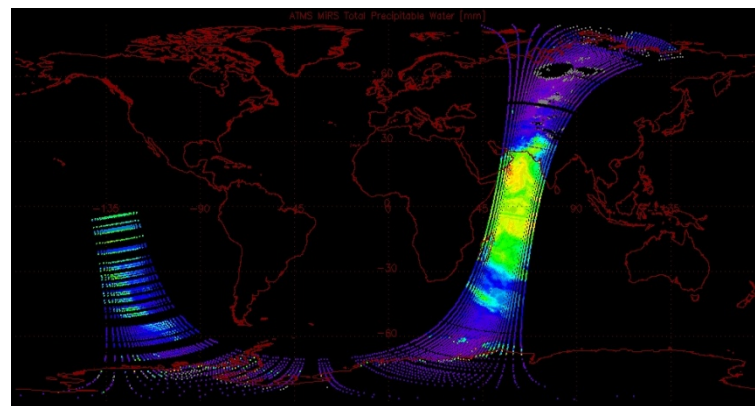


NDE's 1st ATMS Products From NPP

- NOAA's NPP Data Exploitation (NDE) Project produced their first NPP ATMS images on 8 Nov 2011
 - ATMS 89 GHz Brightness Temperature images are used by tropical storm centers to determine location and intensity of tropical storms
 - TPW is a measure of moisture in a column of the atmosphere and is used in hydrological applications



ATMS 89 GHz Brightness Temps

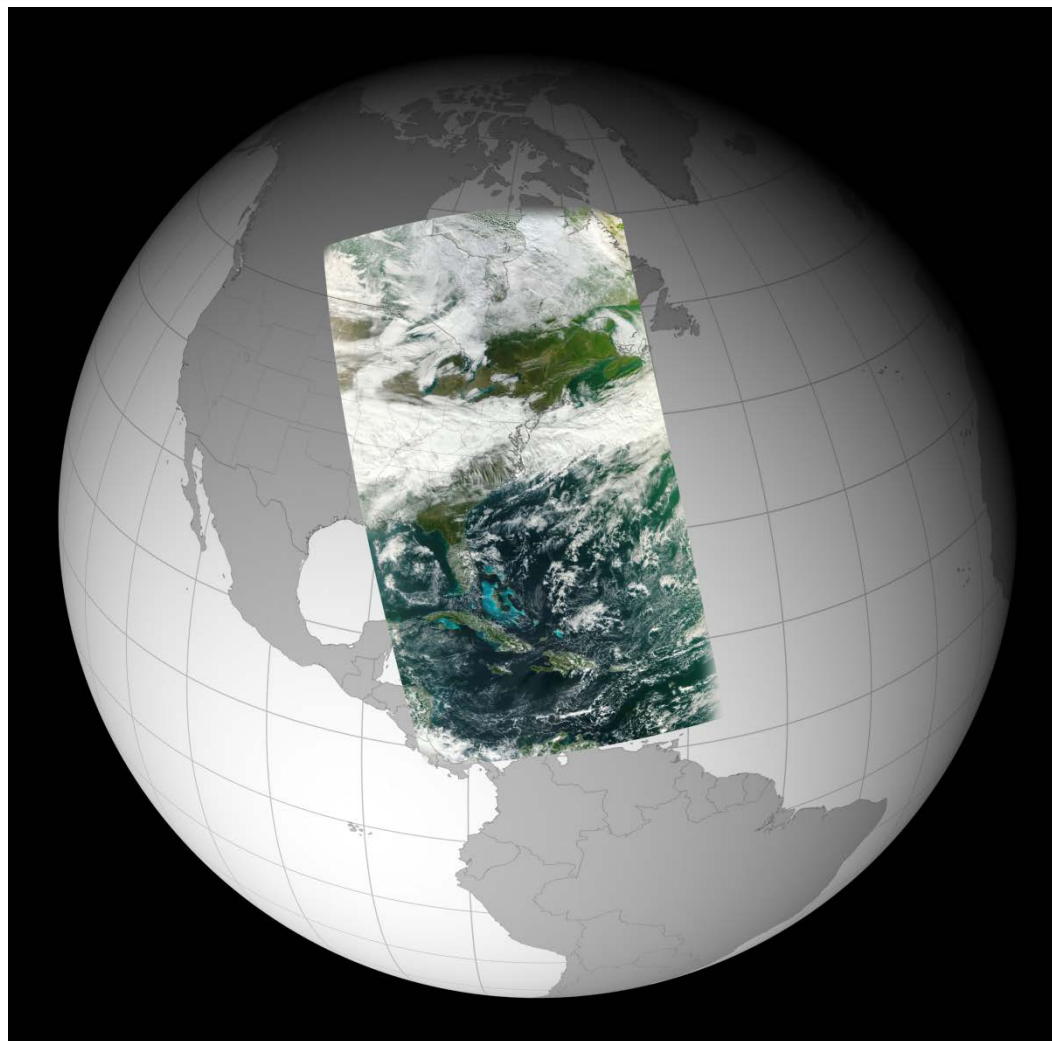


Total Precipitable Water (TPW)



First VIIRS Image From NPP

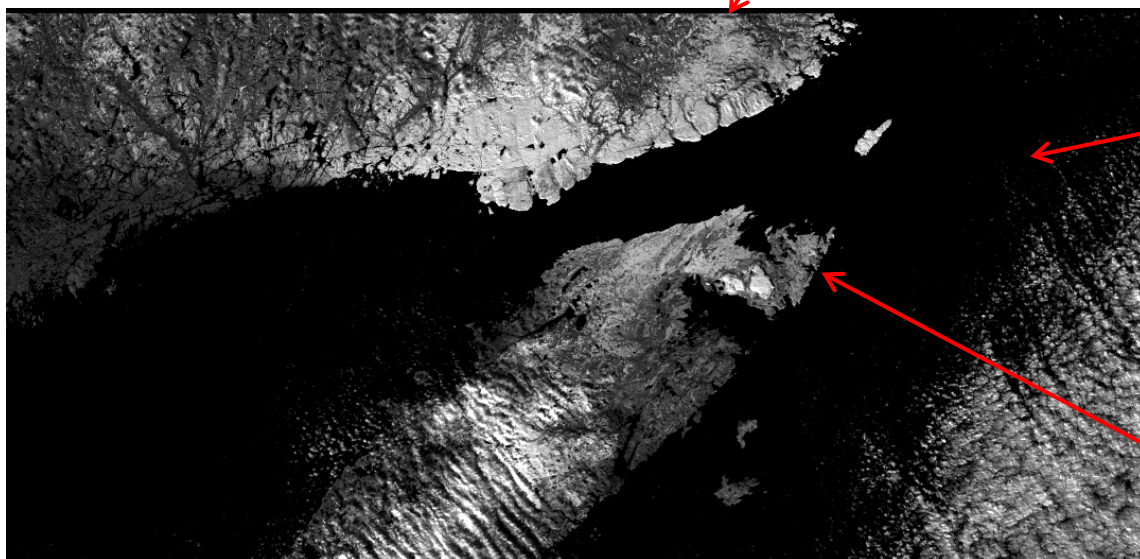
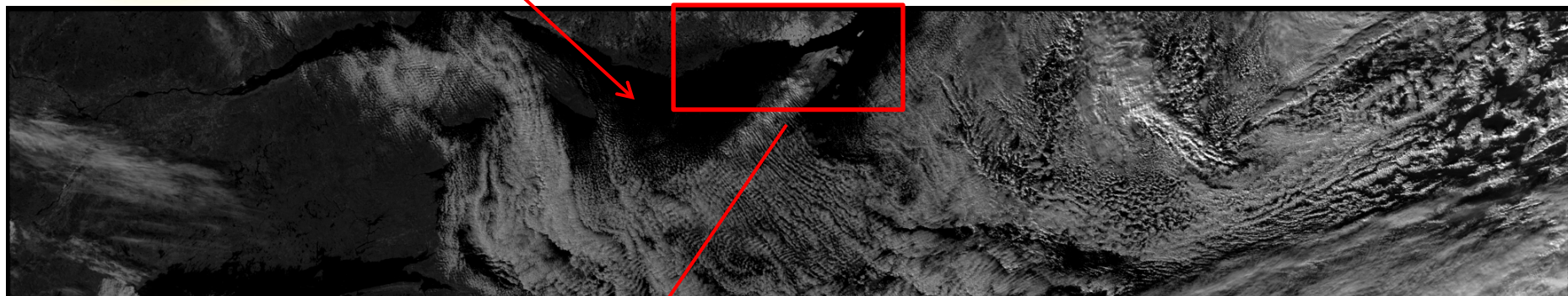
The Visible Infrared Imager Radiometer Suite (VIIRS) onboard NASA's newest Earth-observing satellite, NPP, acquired its first measurements on Nov. 21, 2011. This high-resolution image is wrapped on a globe and shows a broad swath of Eastern North America from Canada's Hudson Bay past Florida to the northern coast of Venezuela. The VIIRS data were processed at the NOAA Satellite Operations Facility (NSOF) in Suitland, Md. The NASA NPP Team at the Space Science and Engineering Center, UW-Madison created the image using 3 channels (red, green and blue) of VIIRS data. **Credit: NASA/NPP Team**





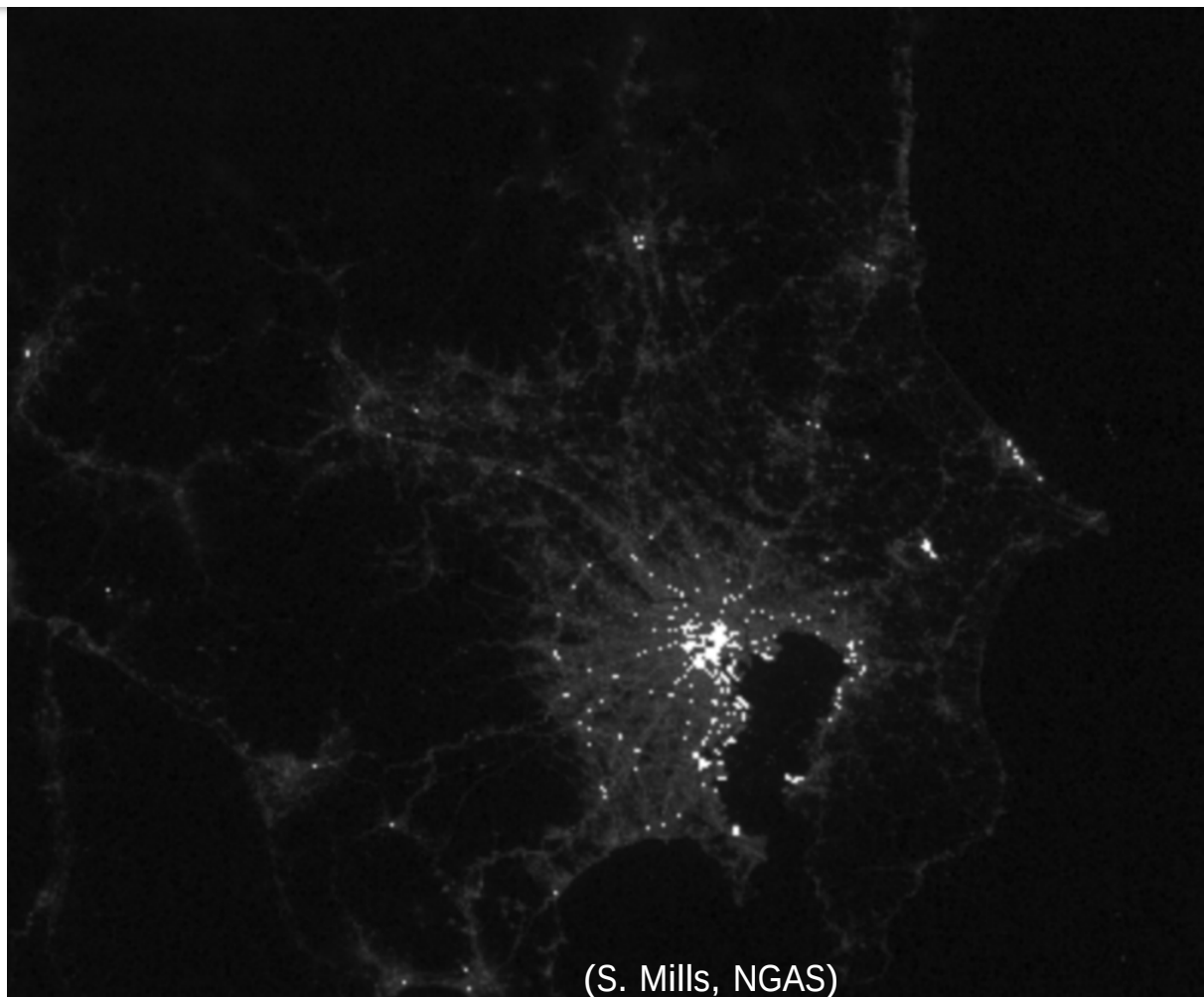
VIIRS I2 band Image

Gulf of St. Lawrence





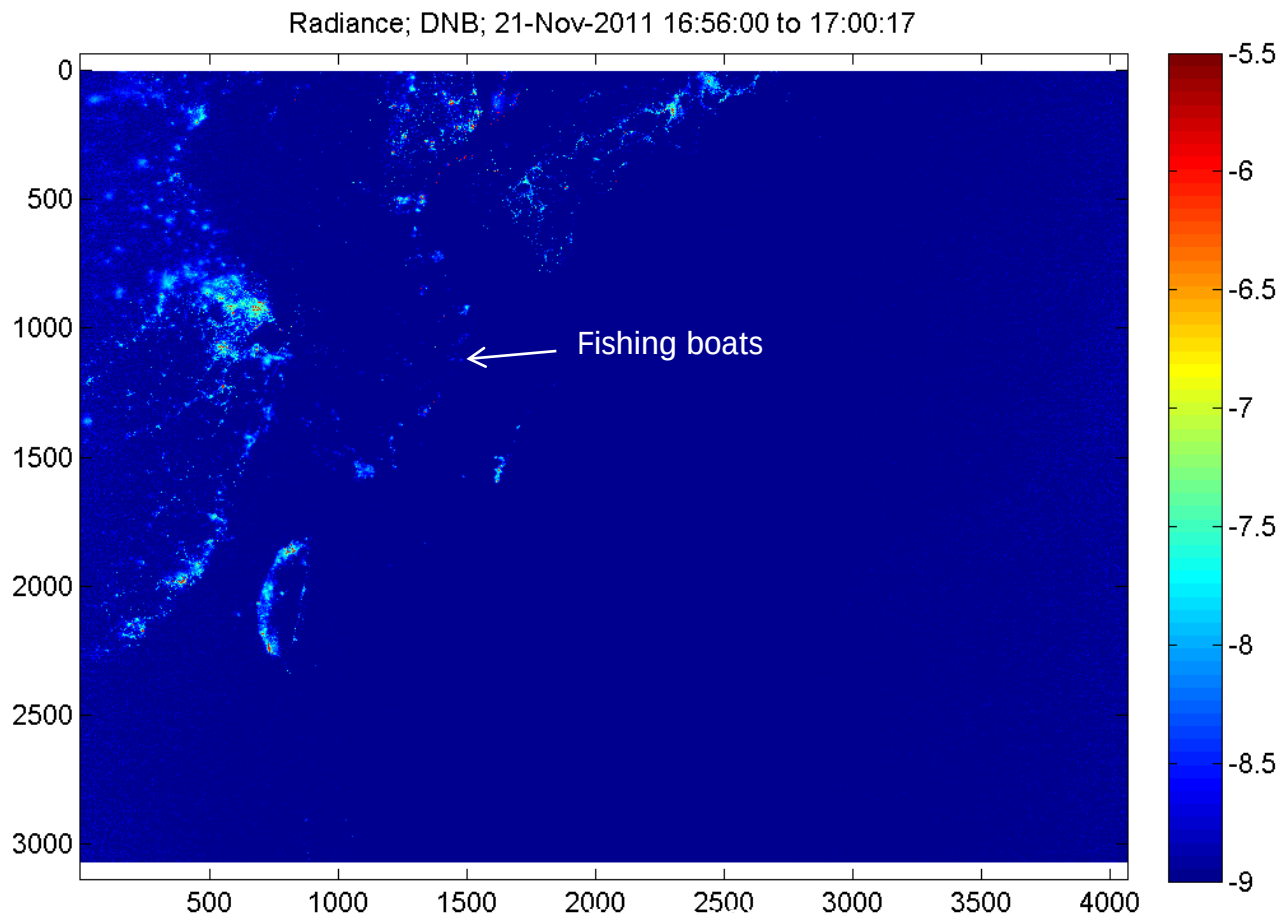
VIIRS DNB First Light Images - Tokyo



(S. Mills, NGAS)

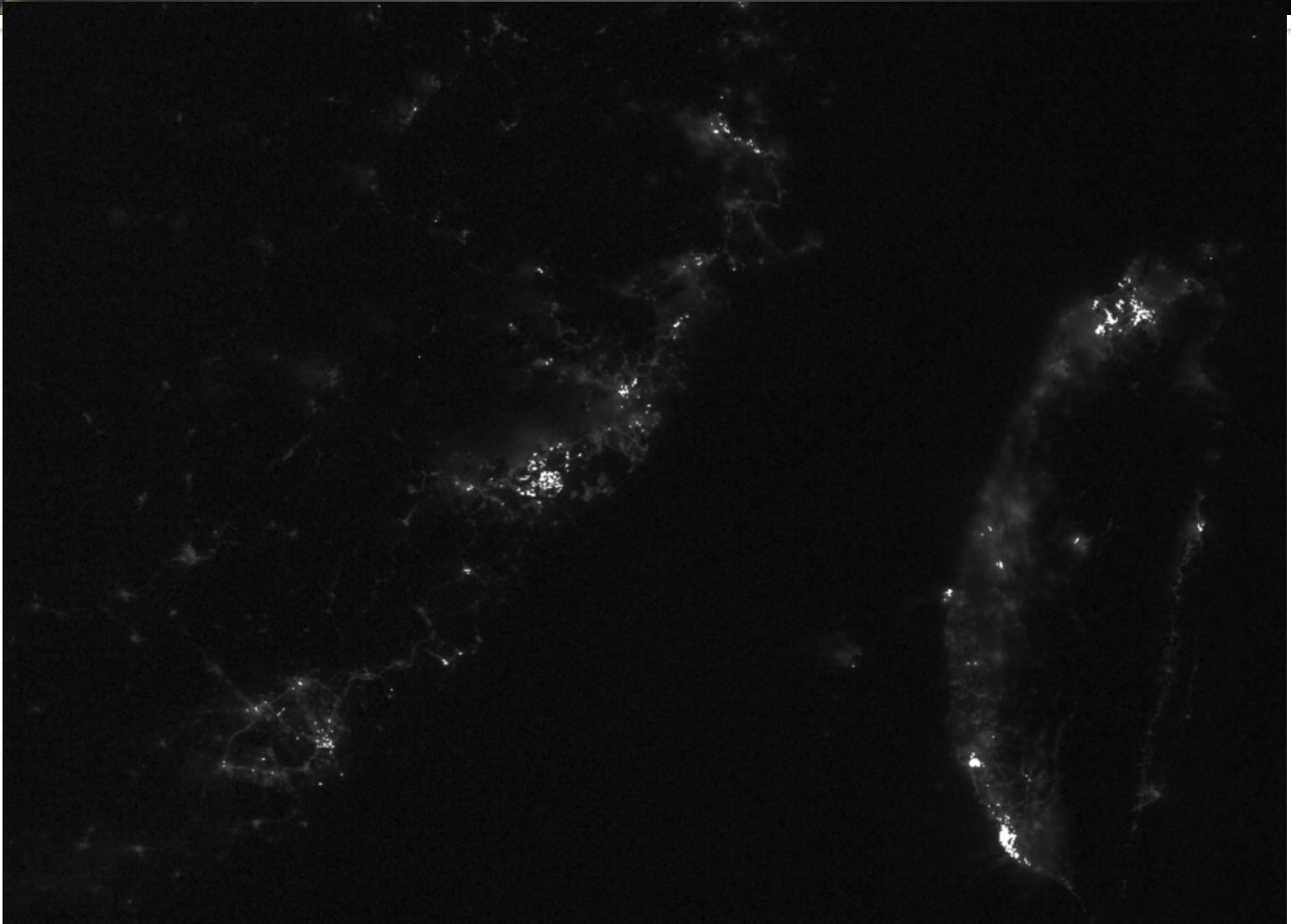


VIIRS DNB First Light Images - China, South Korea, Southern Japan





VIIRSS DNB - China Coast



(S. Mills, NGAS)



Next Generation Polar-orbiting Satellites: Joint Polar Satellite System (JPSS)

- ✓ JPSS is NOAA's portion of the restructured National Polar-orbiting Operational Environmental Satellite System (NPOESS) program as announced on February 1, 2010 by the Executive Office of the President.
- ✓ JPSS will provide operational continuity of satellite-based observations and products for NOAA Polar-orbiting Operational Environmental Satellites (POES) and the NPOESS Preparatory Project (NPP) mission.
- ✓ Ground systems and Distributed Receptor Network deployment underway; International cooperation with EUMETSAT and JAXA confirmed.
- ✓ JPSS will fly the following instruments in the afternoon orbit:
 - ✓ Visible/Infrared Imager/Radiometer Suite (VIIRS)
 - ✓ Cross-track Infrared Sounder (CrIS)
 - ✓ Advanced Technology Microwave Sounder (ATMS)
 - ✓ Ozone Mapping and Profiler Suite –Nadir (OMPS-Nadir)
- ✓ JPSS is responsible for accommodations of sensors from NOAA Climate Sensor Program and data communications packages (DCS and SARSAT)
- ✓ Spacecraft bus
 - ✓ Decision made to procure NPP-like spacecraft for JPSS-1 with addition of Ka-band downlink
 - ✓ JPSS-2 will be subject to open competition

Launch Readiness Date	2016 (JPSS-1)*; 2018 (JPSS-2)
Program Architecture	2 Satellites (JPSS-1 and JPSS-2)
Program Operational Life	FY 2016 – FY 2026
Program FY 2011 President's Budget (FY 2011 through FY 2024)	\$11.9 billion (of which NOAA has already spent \$2.9 billion through FY 2010)

*Current Launch Readiness Date based on 2011 "ask" for 2012-2017 PBR



Defense Weather Satellite System

DWSS is the Department of Defense portion of the restructured NPOESS program as announced on February 1, 2010 by the Executive Office of the President.

The Defense Weather Satellite System (DWSS) will share a common ground system with JPSS

Flying in the early morning orbit, DWSS will accommodate

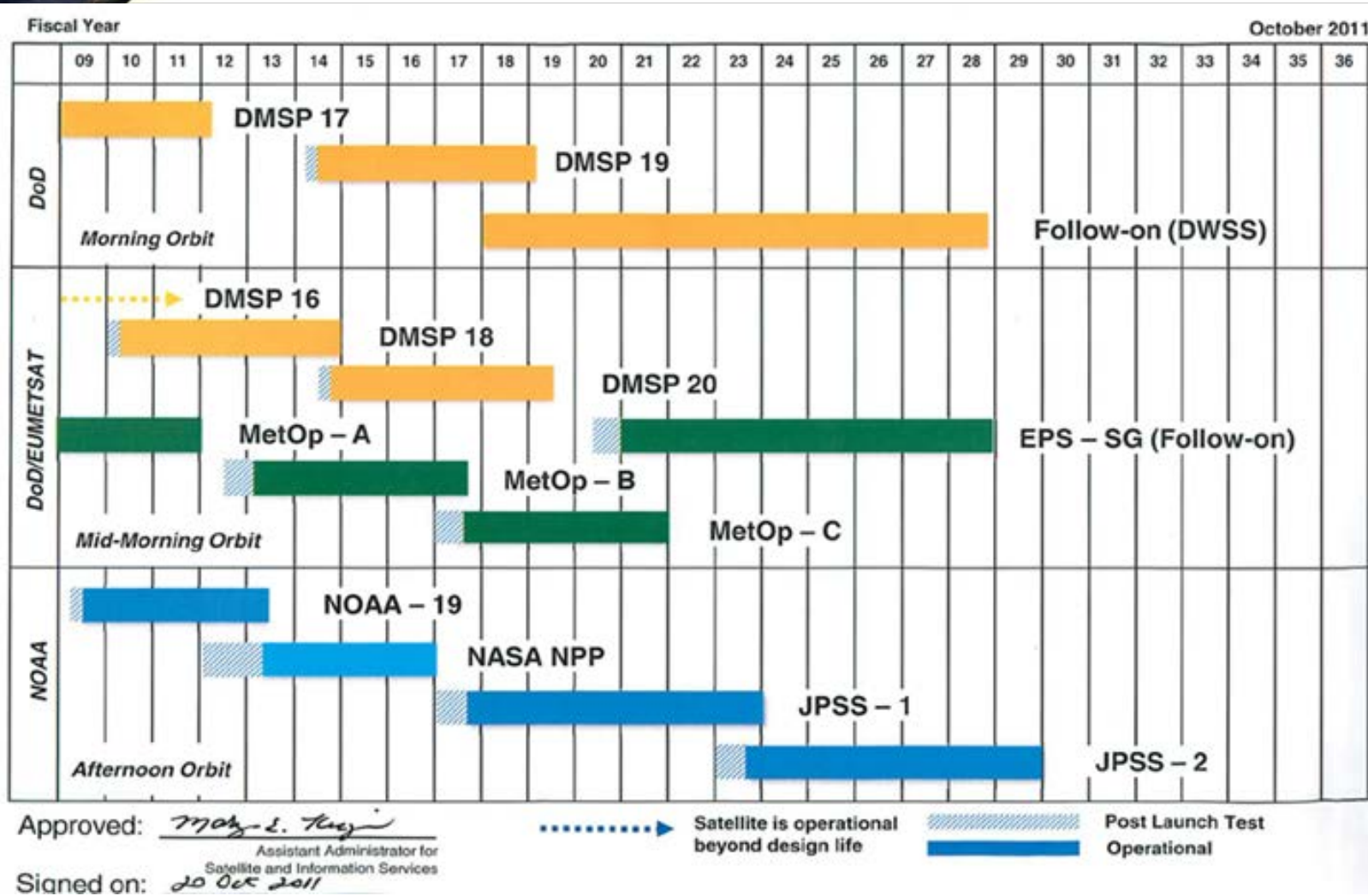
- ✓ Visible/Infrared Imager/Radiometer Suite (VIIRS)
- ✓ Microwave Imager/Sounder (MIS)
- ✓ Space Environment Monitor (SEM-N)

DWSS has faced many of the same funding challenges as JPSS

Scheduled for first launch in 2018



Continuity of Polar Satellites





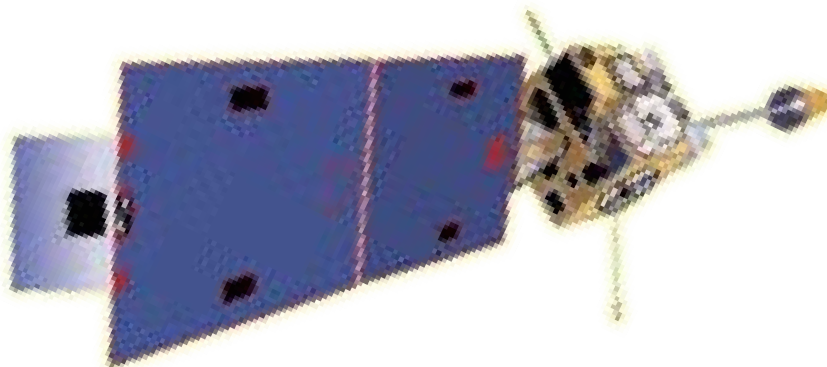
Partnerships

- EUMETSAT
 - Provision of mid-morning orbit
 - Exchange of instruments under Joint Transition Agreement
 - Planning and operations (e.g., Antarctic Data Acquisition)
- Japan (Japan Aerospace Exploration Agency)
 - Global Change Observation Mission – Water (GCOM-W1) provides AMSR-2 data – continuity for NASA's Aqua satellite
 - NOAA provides ground system services in exchange for data from AMSR2
- Norway (Norwegian Space Centre)
 - Satellite tracking and environmental data acquisition
- Canada (DND) and France (CNES) for SARSAT Program
- France (CNES) – Argos Program



Geostationary Operational Environmental Satellite (GOES)

GOES-13	Primary East Satellite (75 W. degrees)
GOES-11	Primary West Satellite (135 W. degrees); To Be Decommissioned
GOES-12	South American Support (60 degrees)
GOES-14	On-orbit storage (105 W. degrees)
GOES-15	Now drifting to the west, GOES-15 will replace GOES-11 as Primary West Satellite on December 6, 2011; GOES-15 will be at 135 W on December 14, 2011





GOES-R Program Overview

Benefits

- ☑ Maintains continuity of weather observations and critical environmental data from geostationary orbit
- ☑ Provides faster scanning of entire hemisphere while simultaneously observing individual storms
- ☑ Provides a new lightning mapping capability for improved early warnings of severe weather
- ☑ Provides improved warning of solar events to minimize impact to communications, navigation systems, and power grids

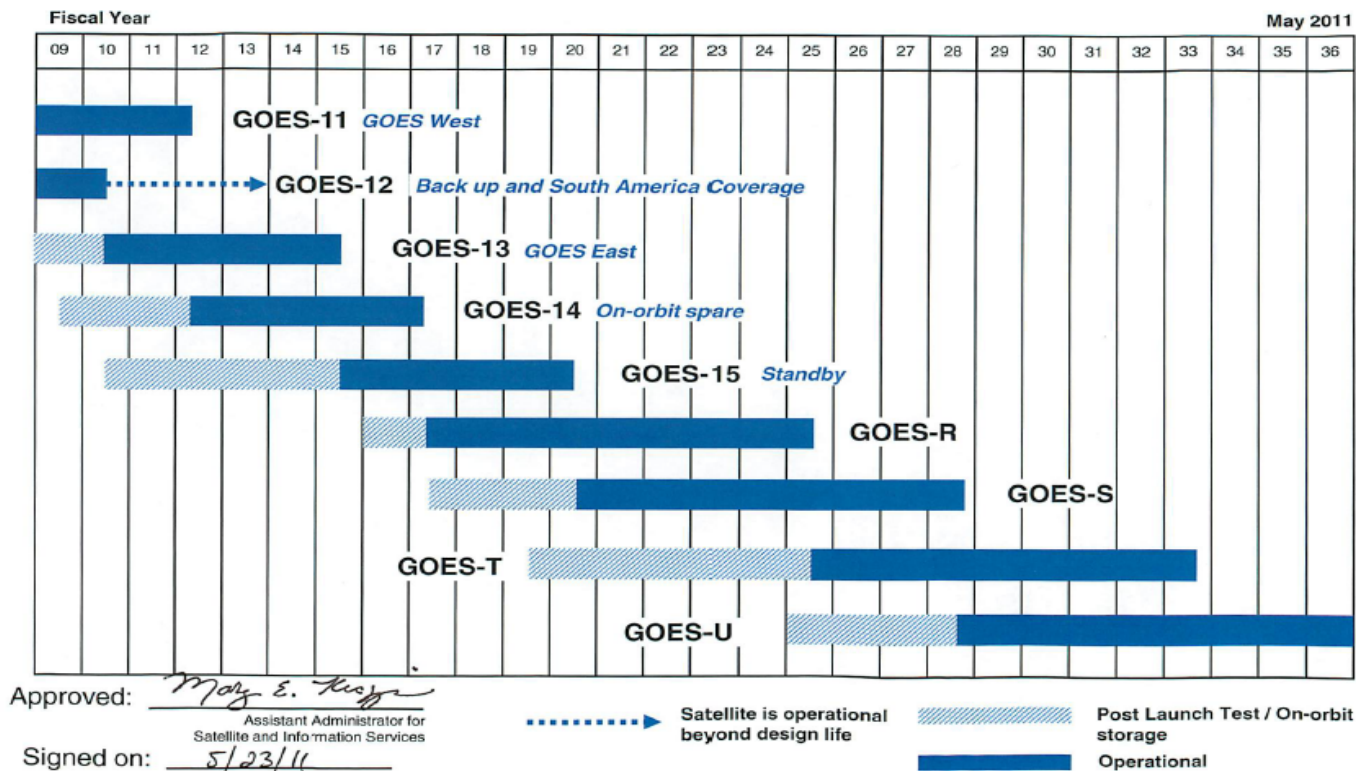


GOES-R Launch Readiness Date	October 2015
Program Architecture	2 Satellites (GOES R&S), with options for 2 additional (GOES-T& -U); 10 year operational design life
Program Operational Life	FY 2017 – FY 2028
Program Life-cycle FY 2011 President's Budget	\$7.672 billion (GOES-R and GOES-S only; LCC does not include GOES-T &-U)



Continuity of GEO Satellites

Continuity of NOAA's Geostationary Operational Satellite Programs



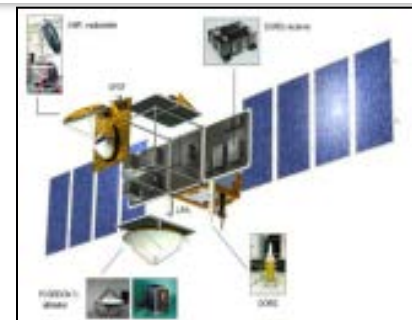


Research to Operations

Jason-2 mission, to be continued with Jason-3, is a successful partnership among NOAA, NASA, EUMETSAT, and CNES

NOAA has partnered with NASA and Air Force to refurbish and launch the Deep Space Climate Observatory (DSCOVR) as a space weather mission

In partnership with Taiwan, COSMIC-1 provides real-time global atmospheric temperature and moisture data that are valuable in improving weather forecast accuracy



Jason Satellite



Artist's concept of
DSCOVER in space

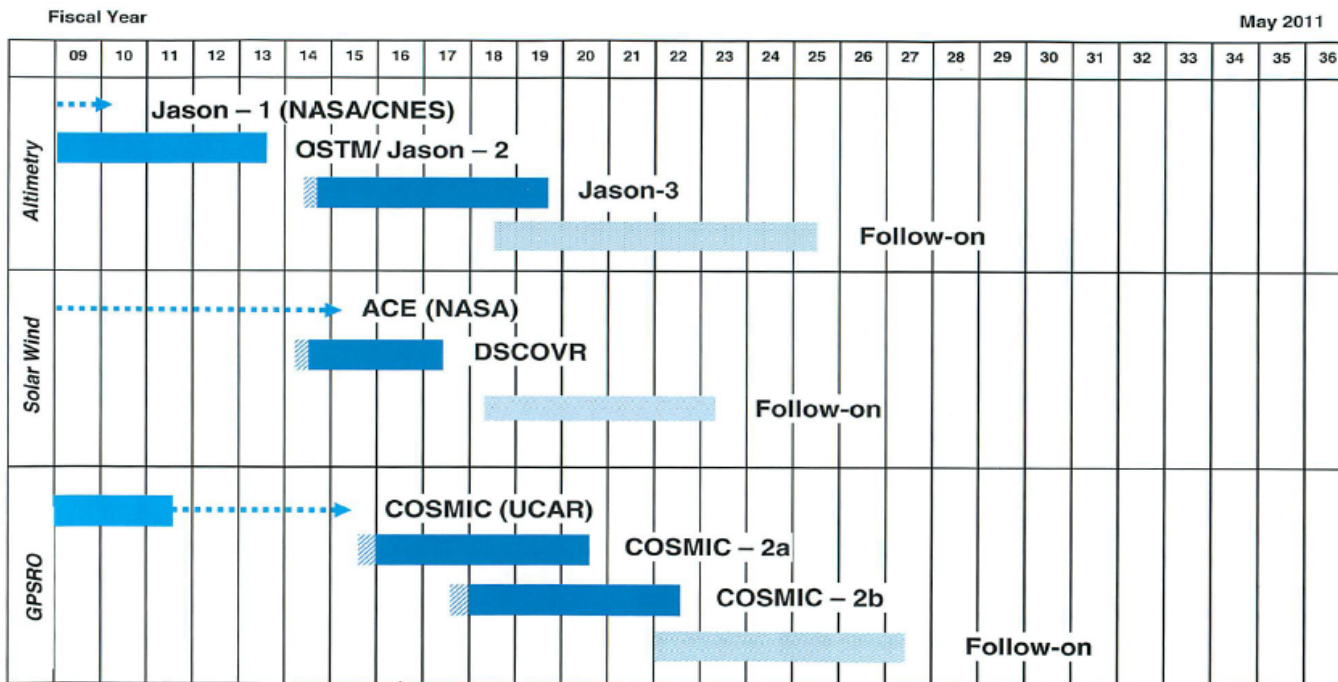


COSMIC



Research to Operations

Research to Operations



Approved: Mary E. Kasper
 Assistant Administrator for
 Satellite and Information Services

Signed on: 5/23/11

.....> Satellite is operational beyond design life
 Unfunded Follow-on
 Post Launch Test
 Operational



International Partnerships

International partnerships are integral to NOAA's mission:

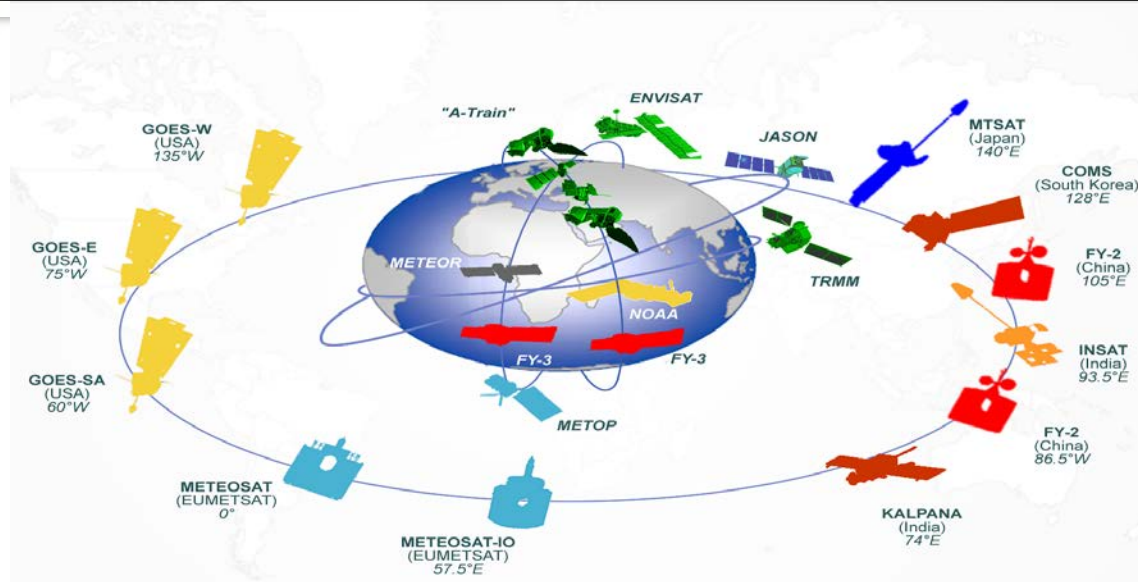
- Working together is crucial to obtaining continuity, global coverage, and filling gaps
- International data sharing/data access
- International opportunities for research to operations

U.S. National Space Policy supports NOAA leadership and engagement in a variety of international forums:

- Group on Earth Observations (GEO)
- Committee on Earth Observation Satellites (CEOS)
- Coordination Group for Meteorological Satellites (CGMS)
- International Charter on Space and Major Disasters (ICSMD)
- World Meteorological Organization (WMO)
- U.N. Committee on the Peaceful Uses of Outer Space (UNCOPUOS)



Space-based Global Observing System Schematic



CGMS Goals

- Exchange of technical information on operational meteorological satellite systems and research & development missions
- Harmonize mission parameters such as orbits, sensors, data formats and downlink frequencies (including optimization of data dissemination networks)
- Encourage complementarity, compatibility and possible mutual back-up in the event of system failure through:
 - o cooperative mission planning,
 - o compatible meteorological data products and services





Summary

- NOAA's current constellation of polar-orbiting and geostationary satellites remains robust. The current budget environment, however, poses challenges for continuity of space-based Earth observations.
- Demand for weather, ocean, and climate data has expanded significantly, and working with international partners to transition research missions to operations must be a priority as we cooperatively plan for the future.
- NOAA is committed to working with international partners to provide continuous, high-quality, and timely observations in support of societal and economic decision-making.