

NOAA

Satellite and
Information
Service

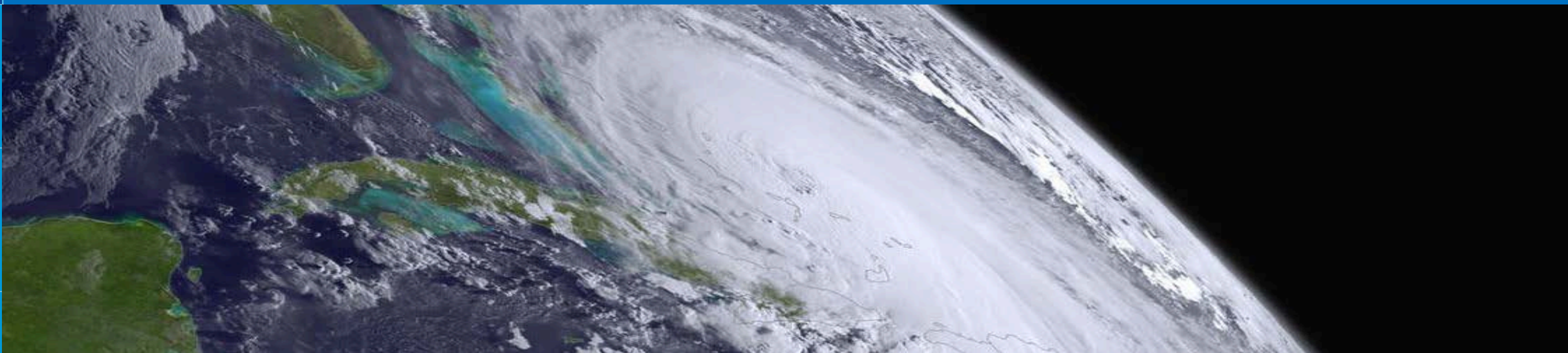
29 October 2018



NOAA Update to the ICWG-2

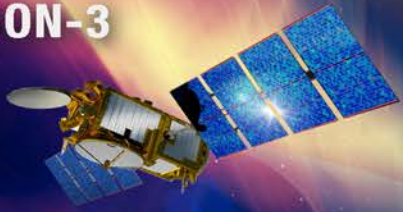
Andrew Heidinger, NOAA Rep to CGMS ICWG
International Cloud Working Group II
Madison, WI

With slides from Mitch Goldberg and Pam Sullivan



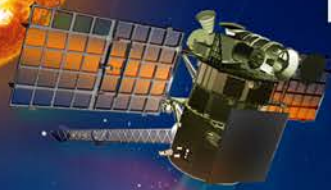
JASON-3

OPERATIONAL JULY 1, 2016



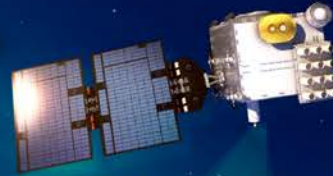
DSCOVR

OPERATIONAL JULY 27, 2016



COSMIC-2

COSMIC-2A - 2018



GOES-R SERIES



GOES-16 - OPERATIONAL DEC 18, 2017
GOES-17 - LAUNCHED March 1, 2018
GOES-T - FY 2020
GOES-U - FY 2025

JPSS SERIES



NOAA-20 - OPERATIONAL MAY 30, 2018
JPSS-2 - FY 2022
JPSS-3 - FY 2026
JPSS-4 - FY 2031



GOES-R Launch Nov 2016



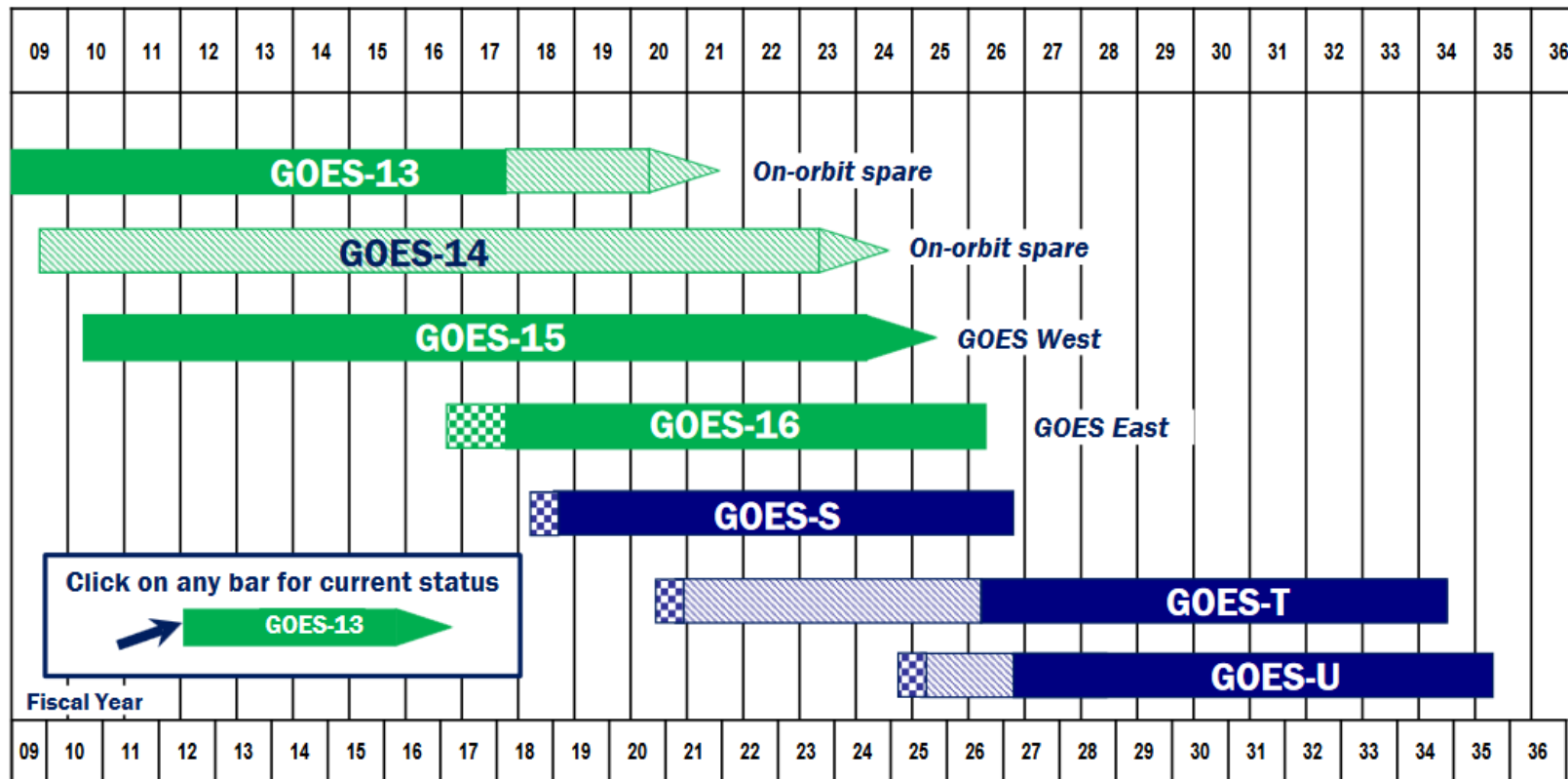
GOES-S Launch Mar 2018



JPSS-1 Launch Nov 2017



GOES Flyout Chart



Click on any bar for current status



Approved: 
 Assistant Administrator for Satellite and Information Services

	In orbit, operational		Planned in-orbit Storage
	In orbit, storage		Planned in-orbit Checkout
	Planned Mission Life		Reliability analysis-based extended weather observation life estimate (60% confidence) for satellites on orbit for a minimum of one year – Most recent analysis: March 2017

<https://www.nesdis.noaa.gov/content/our-satellites>

GOES-R Series: The Future of Forecasting



3X MORE CHANNELS



Improves every product from current GOES Imager and will offer new products for severe weather forecasting, fire and smoke monitoring, volcanic ash advisories, and more.

4X BETTER RESOLUTION



The GOES-R series of satellites will offer images with greater clarity and 4x better resolution than earlier GOES satellites.

5X FASTER SCANS



Faster scans every 30 seconds of severe weather events and can scan the entire full disk of the Earth 5x faster than before.

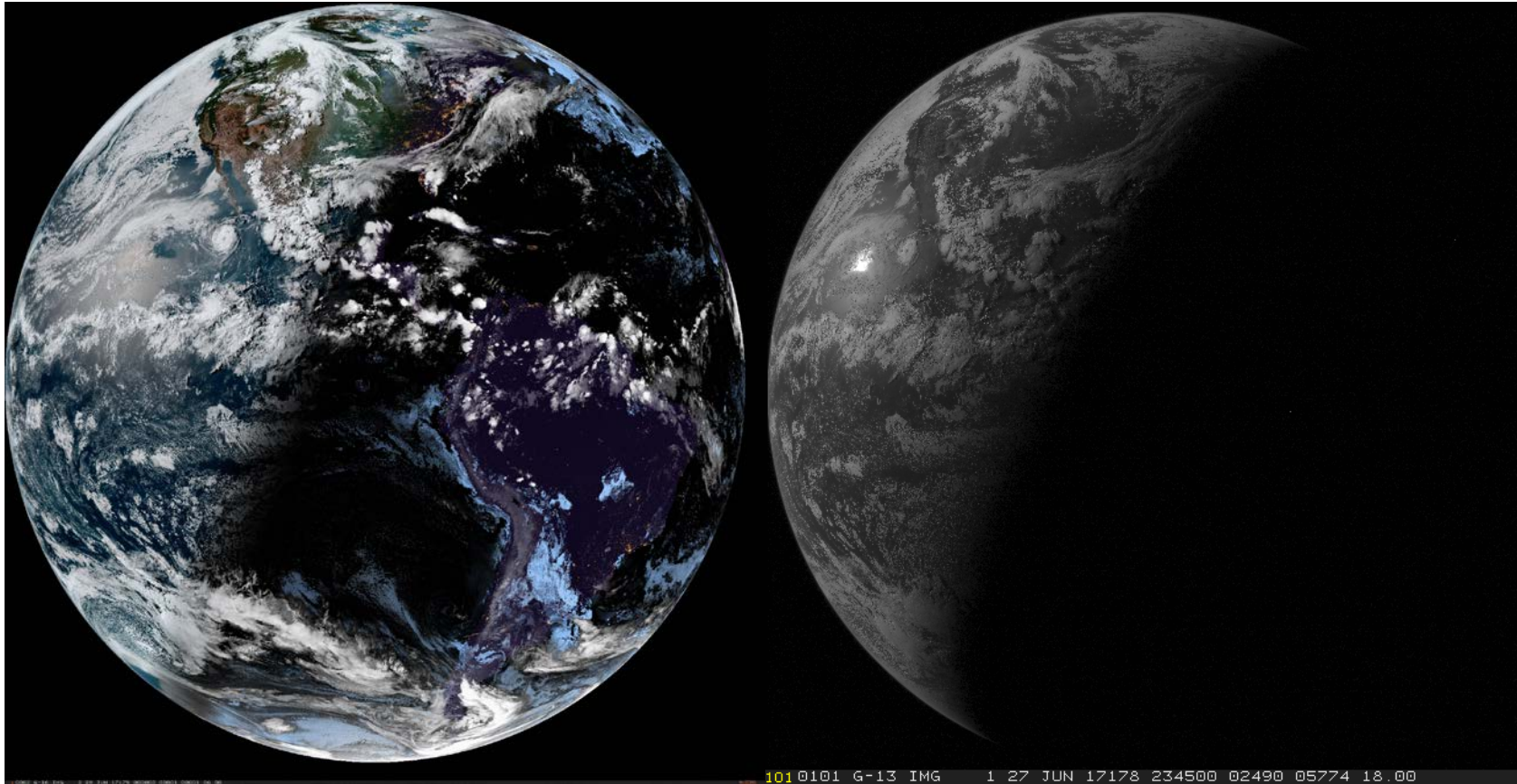


Full Disk Imagery Increased From 8X to 96X per Day



GOES-16 every 15 minutes

GOES-13 every 3 hours









5



GOES-R Series Payload Capability



	<i>GOES-R Series Instruments</i>		<i>Measurements & Products</i>	<i>Vendor</i>
Earth-Observing		ABI – Advanced Baseline Imager	Provides Earth weather, climate, ocean, and environment imagery, 4x spatial resolution, 5x faster	Harris
		GLM – Geostationary Lightning Mapper	Maps in-cloud and cloud-to-ground lightning activity	Lockheed Martin
Solar-Observing		SEISS – Space Environment In-Situ Suite	Monitors proton, electron, and heavy ion fluxes	ATC
		Magnetometer	Measures space environment magnetic field	Lockheed Martin
		EXIS – Extreme Ultraviolet and X-Ray Irradiance Sensors	Monitors solar flares and solar variations	LASP
		SUVI – Solar Ultraviolet Imager	Observes coronal holes, solar flares, and coronal mass ejections	Lockheed Martin



GOES-17 Status



- Reached geostationary orbit on March 12, 2018 and renamed GOES-17
- Reached 89.5°W longitude checkout location March 18
- Post-launch testing began March 26; planned to complete late September
- Data/imagery released from all six instruments
- Addressing issue with Advanced Baseline Imager (ABI) cooling system





Current Assessment of GOES-17 ABI Channel Availability



As of Sep 13, 2018

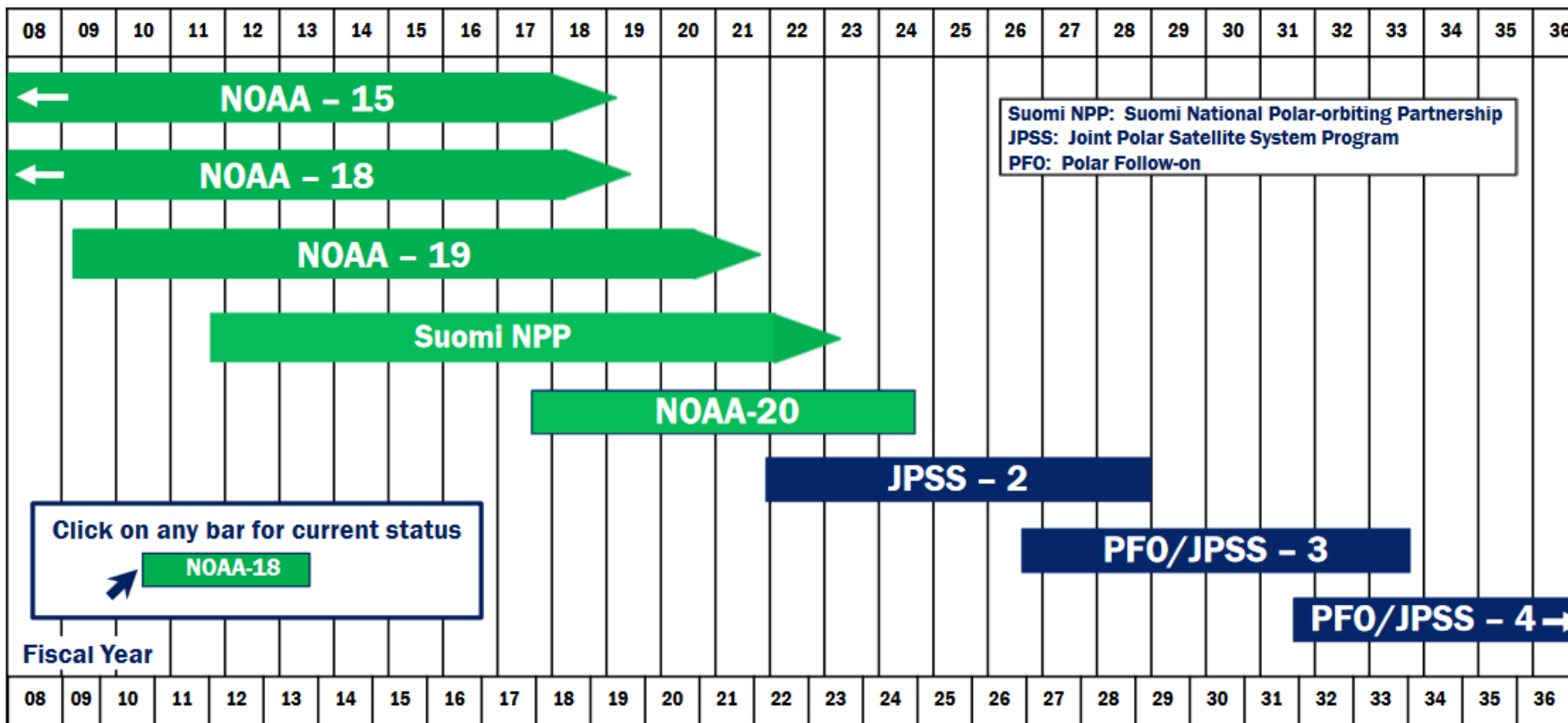
Band	Channel (μm)	Function	GOES-15	GOES-17 Availability (Hours)		
				Initial Estimate (5/6/18)	Current Estimate (Cold Season) ⁽¹⁾	Current Estimate (Warm Season) ⁽²⁾
1	0.47	Blue		24	24	24
2	0.64	Red	Yes (0.63μm)	24	24	24
3	0.86	Green (Veggie)		24	24	24
4	1.38	Cirrus		22	24	24
5	1.61	Snow/Ice		22	24	24
6	2.25	Cloud Particle Size		22	24	24
7	3.90	Shortwave Window	Yes	14	24	24
8	6.18	Upper-Level Water Vapor	Yes (6.48μm)	14	24	18-20
9	6.95	Mid-Level Water Vapor		14	24	18-20
10	7.34	Lower-Level Water Vapor		14	24	18.20
11	8.50	Cloud Top Phase		14	24	21
12	9.61	Ozone		12	24	18-20
13	10.35	Clean IR Longwave Window		12	24	24
14	11.20	IR Longwave Window	Yes (10.7μm)	12	24	24
15	12.30	Dirty Longwave Window		12	24	21
16	13.30	CO ₂ Longwave Infrared	Yes	12	24	18-20

NOTE: Preliminary estimate; subject to change.





Polar Flyout Chart



Click on any bar for current status

Suomi NPP: Suomi National Polar-orbiting Partnership
 JPSS: Joint Polar Satellite System Program
 PFO: Polar Follow-on

Approved:
 Assistant Administrator for Satellite and Information Services






- In orbit and operating
- Planned Mission Life, from Planned Launch Date
- Launched before Jan 2008
- Planned Mission Life Beyond 2036
- Reliability analysis-based extended weather observation life estimate (60% confidence) for satellites on orbit for a minimum of one year – Most recent analysis: September 2017

<https://www.nesdis.noaa.gov/content/our-satellites>



JPSS Payload Capability



<i>JPSS Instruments</i>		<i>Measurements & Products</i>	<i>Vendor</i>
	ATMS – Advanced Technology Microwave Sounder	High vertical resolution temperature and water vapor information critical for forecasting extreme weather events, 5 to 7 days in advance	NGES
	CRIS – Cross-track Infrared Sounder		Harris
	VIIRS – Visible Infrared Imaging Radiometer Suite	Critical Imagery products, including snow/ice cover, clouds, fog, aerosols, fire smoke plume, vegetation health, phytoplankton abundance/chlorophyll	Raytheon
	OMPS – Ozone Mapping Profiler Suite (Nadir Mapper, Nadir Profiler, Limb - S-NPP, JPSS-2+)	Ozone spectrometers for monitoring ozone hole health, recovery of stratospheric ozone, and for UV index forecast	Ball Aerospace
	CERES – Clouds and the Earth's Radiant Energy System (S-NPP & JPSS-1) New procurement (JPSS-3, 4)	Scanning radiometer that supports studies of Earth Radiation	CERES – NGAS

NESDIS Program Overview and Decadal Survey Priorities, 2016

Twice the VIIRS



2018-08-22
13:04:52 UTC

(H)ide

Play (space) < >

(L)oop (R)ock Re(v)

Speed

Zoom (+) Zoom (-) Max (Z)oom

(M)aps Lat/Lo(n) Slide(r)

(S)atellite JPSS

Se(c)tor Northern Hemis...

(P)roduct Day Night Band

Add (O)verlay M Band 14

of (I)mages 28

(T)ime Step 51 min

Day Night Band

Hide

(A)rchived Imagery

(B)egin D... Begin Ti...

End Date... End Tim...

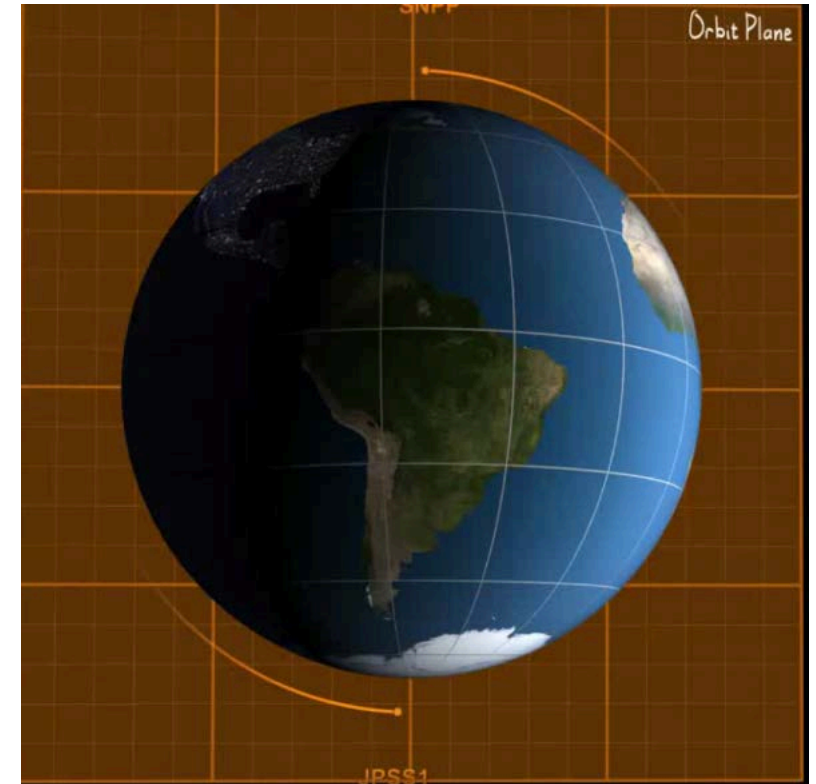
Home (y) Share (U)RL Help (?)

Flow-Following

Mouse (D)raw Clear Drawin(g)s

[SLIDER by RAMMB / CIRA @ CSU](#)
[Experimental Products Disclaimer](#)

2018-08-22 13:04:52 UTC



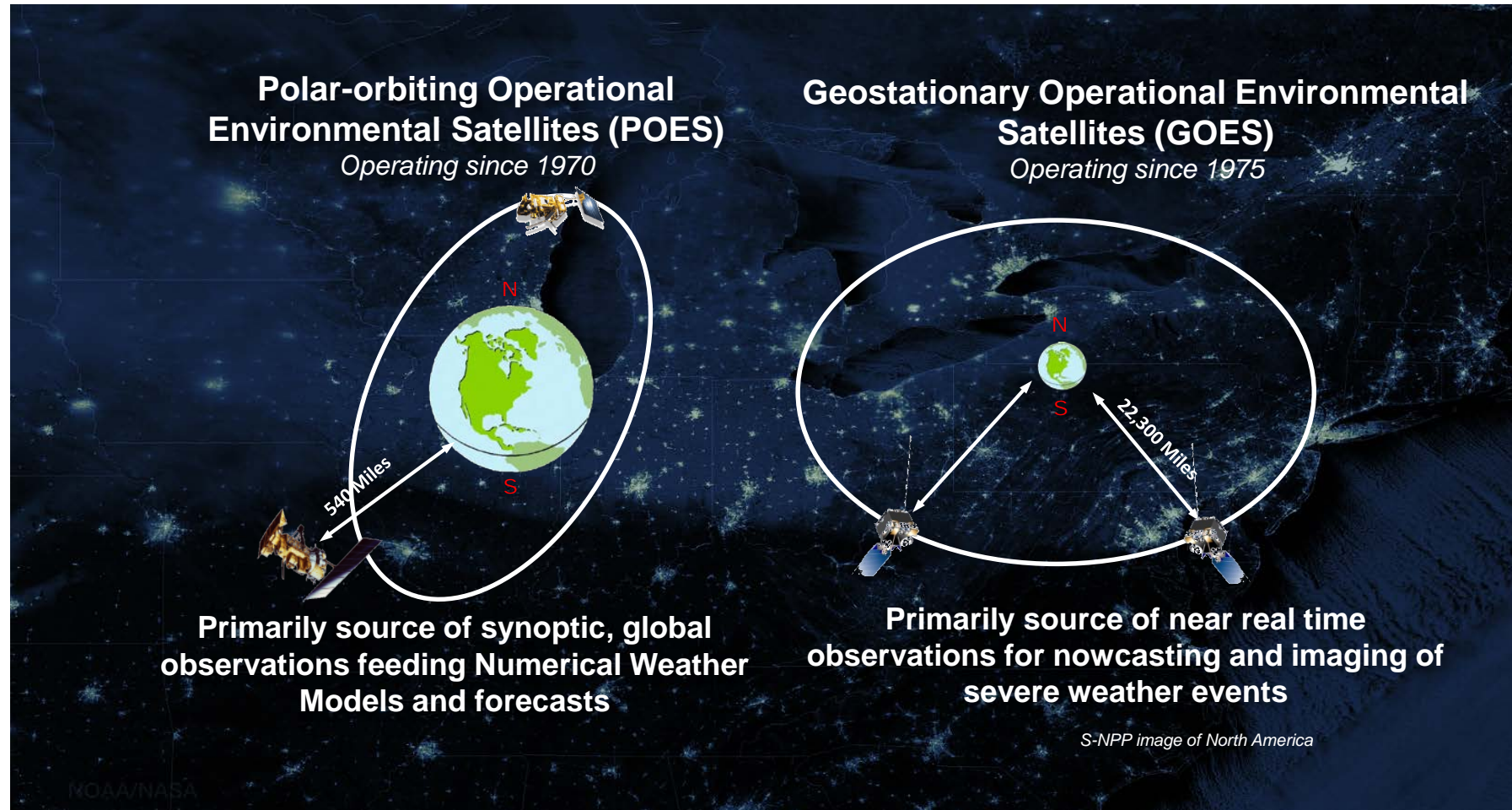
NOAA Satellites



NOAA and International Partners



NOAA's Observational Paradigm Has Been: Two Orbits, One Mission





Evolution Space Architecture

- Conduct an architecture level review of NOAA requirements and partnership agreements with other nations and entities as well as evaluate emergent technologies and innovations in both space and ground systems approximately every five years.
- Develop an architecture that can accommodate emerging technologies, shorten development and production timelines and reduce technical and programmatic (e.g., budget) risk.
- Explore launch strategies and partnerships to allow rapid, reliable and affordable access to space.
- Annually explore the feasibility of commercially provided instrument, data, payload and communications solutions to further meet NOAA's operational needs from space.
- NESDIS is only one part of the global environmental observing constellation.
- **Partnerships are essential,... define our role in the global Earth observing system as well as maintain our commitment to full and open data policies.**





Operational Cloud Products from Imagers

Maturity Levels:

Beta = minimal validation, available to internal users

Provisional = modest validation, made available to external users.

Validated = fully validated and fully archived.

- cloud probability, cloud mask, cloud type/phase
- cloud-top pressure, height, temperature, altitude
- cloud-base height (of highest cloud)
- cloud geometrical thickness
- cloud-cover and layers
- cloud optical depth, particle size, water path (day/night/ir)



	Beta	Provisional	Validated
AVHRR/GOES-15	n/a	n/a	n/a
GOES-16/ABI	✓	✓	Late 2019
GOES-17/ABI	✓	March, 2019	Late 2019
SNPP/VIIRS	✓	✓	March 2019
NOAA-20/VIIRS	✓	✓	March, 2019
PATMOS-x (climate)	n/a	n/a	n/a



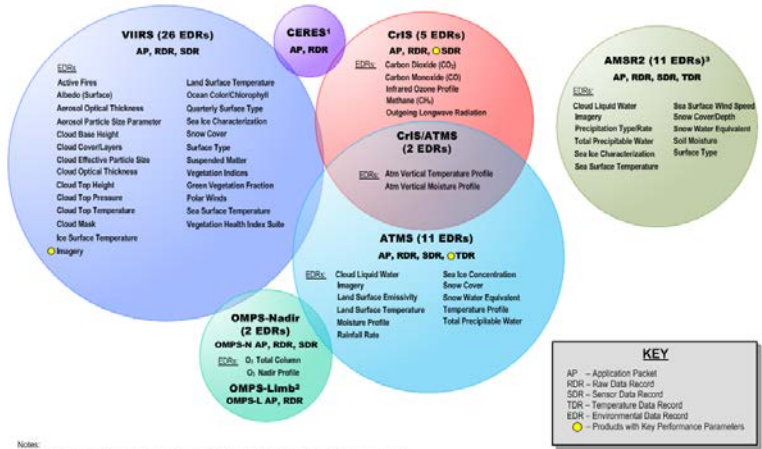
Thank you



Satellite Proving Ground: Goal is to improve NOAA Services through optimizing the use of satellite data along with other sources of data & information: Observations to Services to Stakeholders

JPSS Program Data Products

JPSS Level 1 Requirements Document, v1.8



Notes:
1) AP and RDR for the JPSS-2 Mission are contingent on NASA manifest of the Radiation Budget Instrument (RBI)
2) Not applicable to JPSS-1; AP and RDR contingent on NASA manifest of OMPSS-Limb on the JPSS-2 Mission
3) All products dependent on the Global Change Observation Mission (GCOM) provided by the Japan Aerospace Exploration Agency
The JPSS Program includes Ground System Support for the Metop, DMSP, and GCOM missions

April 3, 2015
This chart is controlled by JPSS Program Systems Engineering
JPSS-P Rev C.1

<p>ADVANCED BASELINE IMAGER (ABI)</p> <ul style="list-style-type: none"> Aerosol Detection (Including Smoke and Dust) Aerosol Optical Depth (AOD) Clear Sky Masks Cloud and Moisture Imagery Cloud Optical Depth Cloud Particle Size Distribution Cloud Top Height Cloud Top Phase Cloud Top Pressure Cloud Top Temperature Derived Motion Winds Derived Stability Indices Downward Shortwave Radiation: Surface Fire/Hot Spot Characterization Hurricane Intensity Estimation Land Surface Temperature (Skin) Legacy Vertical Moisture Profile Legacy Vertical Temperature Profile Radiances Rainfall Rate / QPE Reflected Shortwave Radiation: TOA Sea Surface Temperature (Skin) Snow Cover Total Precipitable Water Volcanic Ash: Detection and Height 	<p>GEOSTATIONARY LIGHTNING MAPPER (GLM)</p> <ul style="list-style-type: none"> Lightning Detection: Events, Groups & Flashes <p>SPACE ENVIRONMENT IN-SITU SUITE (SEISS)</p> <ul style="list-style-type: none"> Energetic Heavy Ions Magnetospheric Electrons & Protons: Low Energy Magnetospheric Electrons & Protons: Med & High Energy Solar & Galactic Protons <p>MAGNETOMETER (MAG)</p> <ul style="list-style-type: none"> Geomagnetic Field <p>EXTREME ULTRAVIOLET AND X-RAY IRRADIANCE SUITE (EXIS)</p> <ul style="list-style-type: none"> Solar Flux: EUV Solar Flux: X-ray Irradiance <p>SOLAR ULTRAVIOLET IMAGER (SUVI)</p> <ul style="list-style-type: none"> Solar EUV Imagery
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GOES-R Baseline Products



Application Pyramid



NESDIS Strategic Metric " The utilization of NESDIS developed science by internal and external partners and stakeholders through enhanced coordination with partners and the user community"