

The background of the slide is a composite image of Earth from space. Two satellites are visible: one on the left with solar panels and one on the right with a large orange antenna. A blue network of lines is overlaid on the Earth's surface. The title text is centered over the image.

# Operational Wind Products at NOAA/NESDIS

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1: NOAA/NESDIS/OSPO/Satellite Products & Services Division

2: NOAA/NESDIS/STAR

April 23, 2018

14<sup>th</sup> International Winds Workshop  
Jeju City, South Korea

# TOPIC

- Status of GOES and POES Satellites
- Operational AMV System and Products
- Operational ASCAT Processes and Products
- New AMV Products and Operational Plan
- Satellite Product Distribution and Access

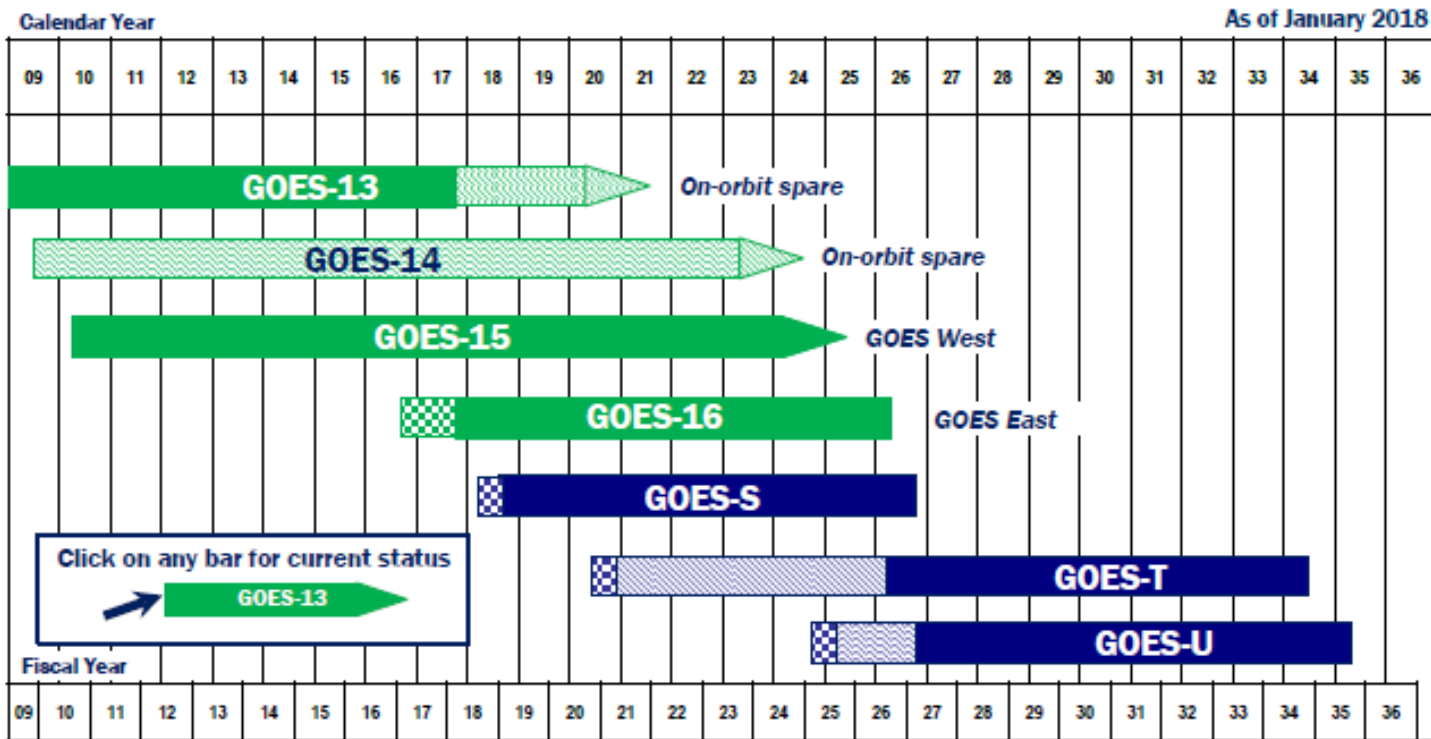
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# GOES Flyout Schedule



## NOAA Geostationary Satellite Programs Continuity of Weather Observations



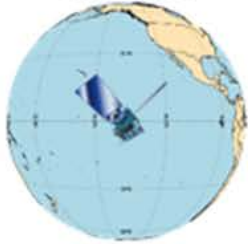
Approved:   
 Assistant Administrator for Satellite and Information Services



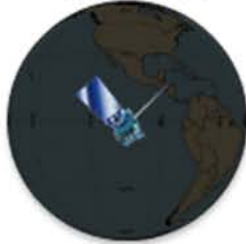
# GOES Constellation

Current as of April 10, 2018

GOES-West  
GOES-15  
135° West



Standby  
GOES-14  
105° West



Checkout  
GOES-17  
89.5° West



GOES-East  
GOES-16  
75.2° West



Storage  
GOES-13  
60° West



Future Plans as of April 10, 2018

GOES-West  
GOES-17  
137° West



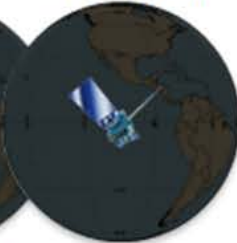
Drifting to  
137° West in  
October, 2018;  
Operational at  
137° West in  
November, 2018

Storage  
GOES-15  
105° West



Drifting to  
105° West  
for storage in  
November, 2018

Standby  
GOES-14  
105° West



Checkout  
GOES-18  
89.5° West



Launching in  
June, 2020

GOES-East  
GOES-16  
75.2° West



Storage  
GOES-13  
60° West



# GOES 16

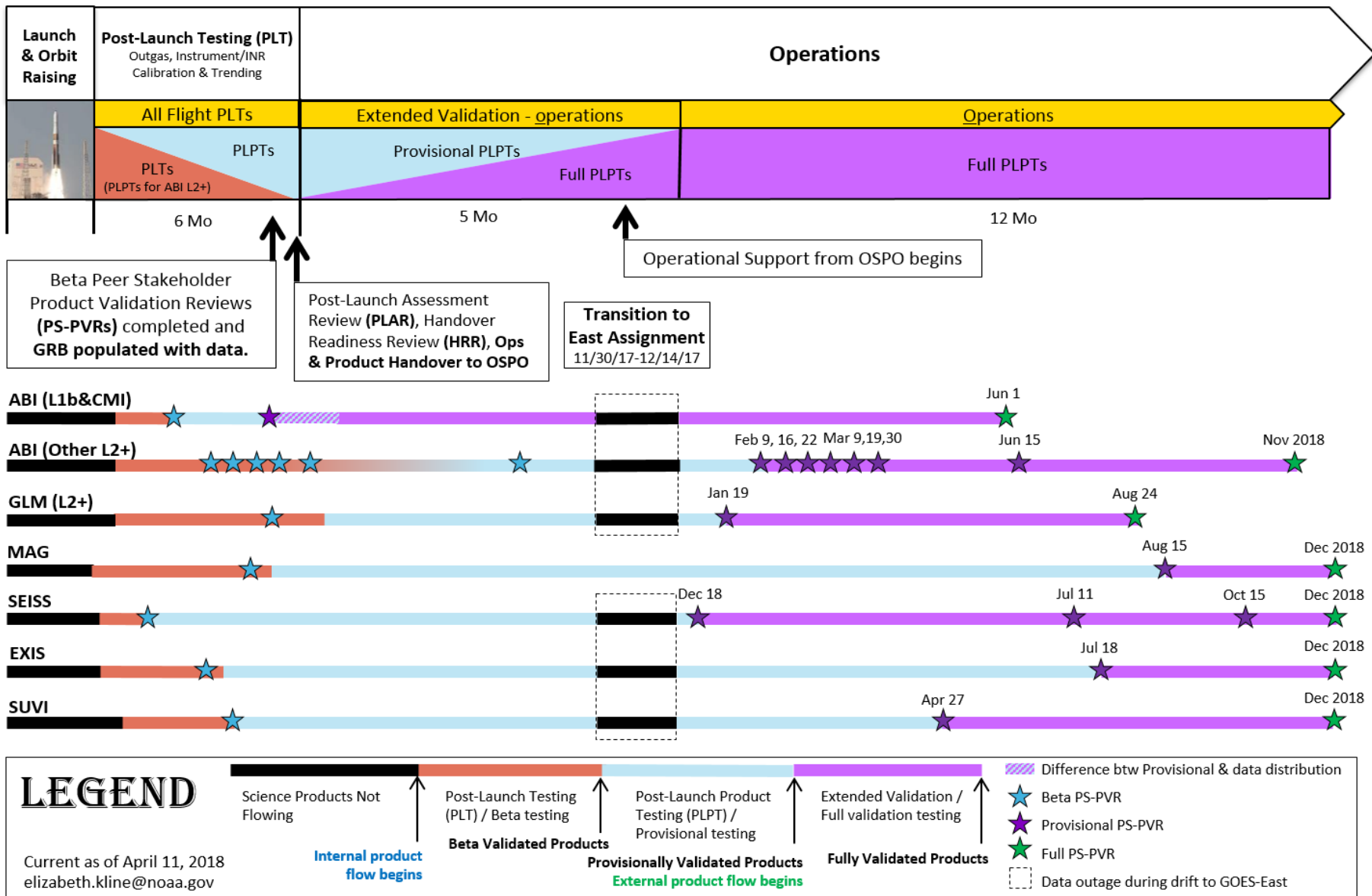
- Launched on November 19<sup>th</sup>, 2016
- Located at 75.2 West
- Post Launch Product Validation Schedule
- GOES 16 L2+ Product Validation Status



# GOES-16/17 Product Maturity Level

- **Beta**: Products are only made available to cal/val users via PDA to gain familiarity with data formats and parameters as well as provide assistance to the science teams. The Product has been minimally validated and may still contain significant errors and is not optimized for operational use.
- **Provisional**: Product ready for operational use but has documented known issues. Product analyses are sufficient to communicate product performance to users relative to expectations.
- **Full**: Product is operational. All known product anomalies are resolved and/or documented and shared with the user community

# GOES-16 Post-Launch Science Product Validation Schedule



Note: All dates are subject to change.



# GOES-16 L2+ Science Product Validation Status

ABI L2+ Products	Beta	Prov	Full
Cloud and Moisture Imagery (CMI) and Sectorized CMI (KPP)	2/28/17	6/1/17	6/1/18
Aerosol Detection (Smoke & Dust)	5/24/17	6/15/18	11/3/18
Aerosol Optical Depth (AOD)	5/24/17	6/15/18	11/3/18
Clear Sky Mask	4/19/17	2/16/18	11/3/18
Cloud Optical Depth	6/8/17	2/22/18	11/3/18
Cloud Particle Size Distribution	6/8/17	6/15/18	11/3/18
Cloud Top Height	5/16/17	2/16/18	11/3/18
Cloud Top Phase	5/16/17	2/22/18	11/3/18
Cloud Top Pressure	5/16/17	2/16/18	11/3/18
Cloud Top Temperature	5/16/17	2/16/18	11/3/18
Derived Motion Winds	6/8/17	2/9/18	11/3/18
Derived Stability Indices	5/16/17	2/22/18	11/3/18

ABI L2+ Products	Beta	Prov	Full
Downward S/W Radiation: Surface	6/23/17	6/15/18	11/3/18
Fire/Hot Spot Characterization	5/24/17	3/30/18	11/3/18
Hurricane Intensity Estimation	9/25/17	6/15/18	11/3/18
Land Surface Temperature	5/24/17	3/19/18	11/3/18
Legacy Vertical Moisture Profile	5/16/17	2/22/18	11/3/18
Legacy Vertical Temperature Profile	5/16/17	2/22/18	11/3/18
Rainfall Rate/QPE	9/13/17	3/30/18	11/3/18
Reflected S/W Radiation: TOA	6/23/17	6/15/18	11/3/18
Sea Surface Temperature	6/14/17	3/9/18	11/3/18
Snow Cover	TBD*	TBD*	TBD*
Total Precipitable Water	5/16/17	2/22/18	11/3/18
Volcanic Ash: Detection and Height	9/13/17	6/15/18	11/3/18

4/6/18

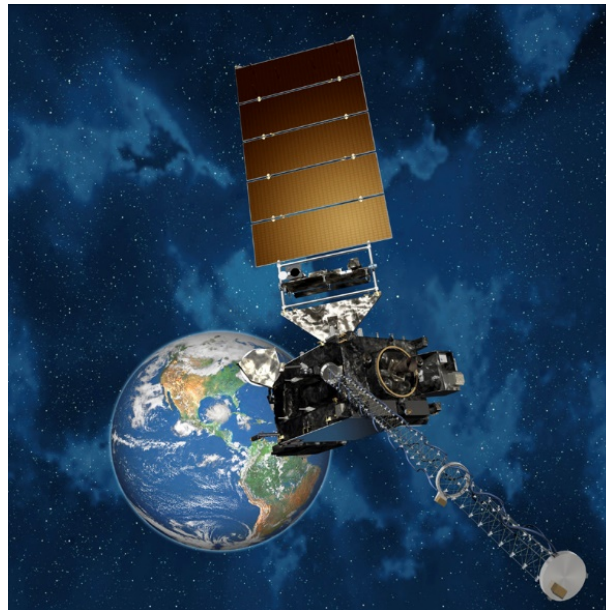
Validation Maturity Levels:

Not Validated	Beta Maturity	Provisional Maturity	Full Maturity
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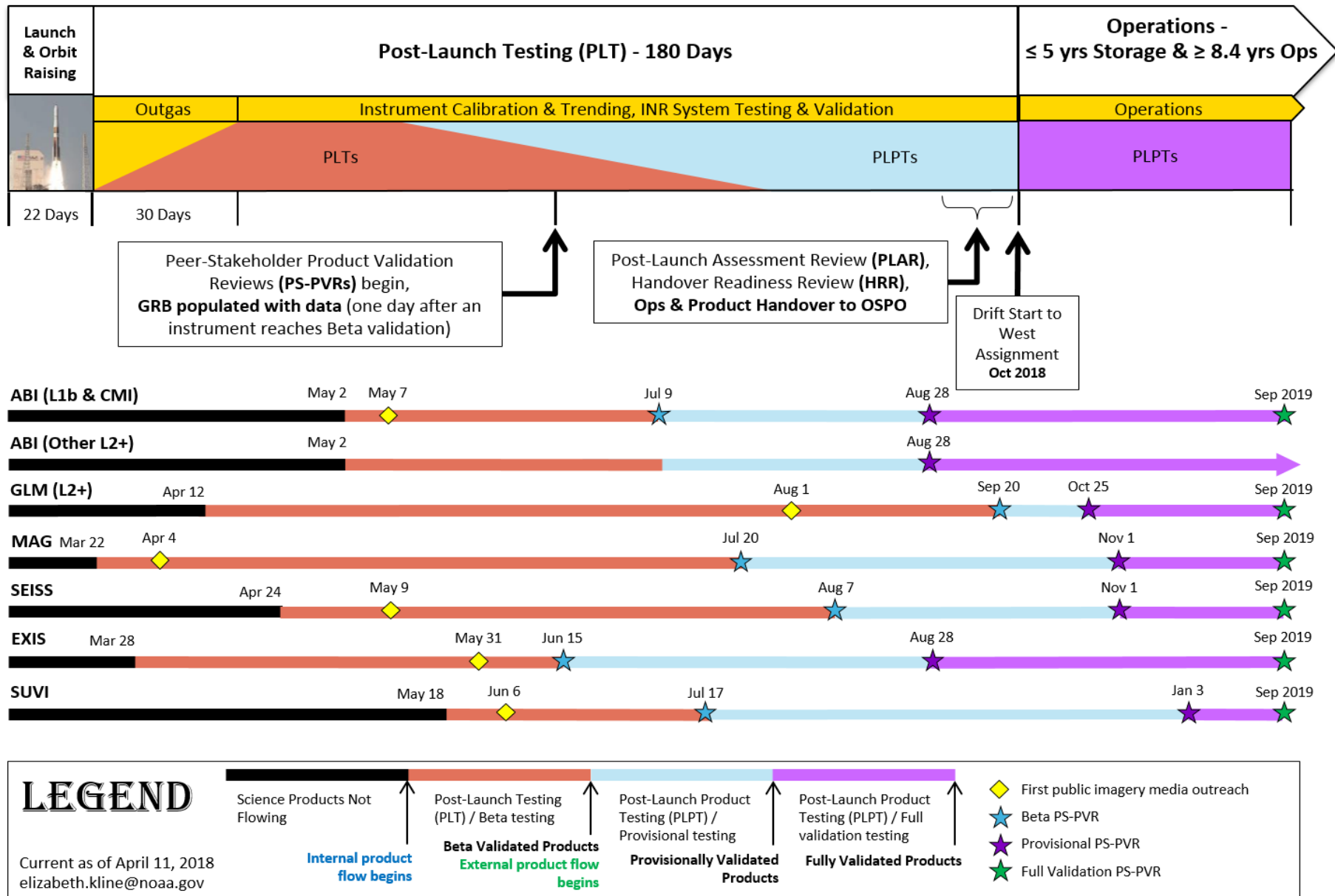
\* Snow Cover has a waiver. It is dependent upon a non-baseline Albedo Product which is in development.

# GOES 17

- Launched on March 1<sup>st</sup>, 2018
- Located at 89.5 West
- Post Launch Product Validation Schedule



# GOES-17 Post-Launch Science Product Validation Schedule



Note: All dates are coordinated with Flight/MOST PLT SOE group and are subject to change.

# POES Flyout Schedule

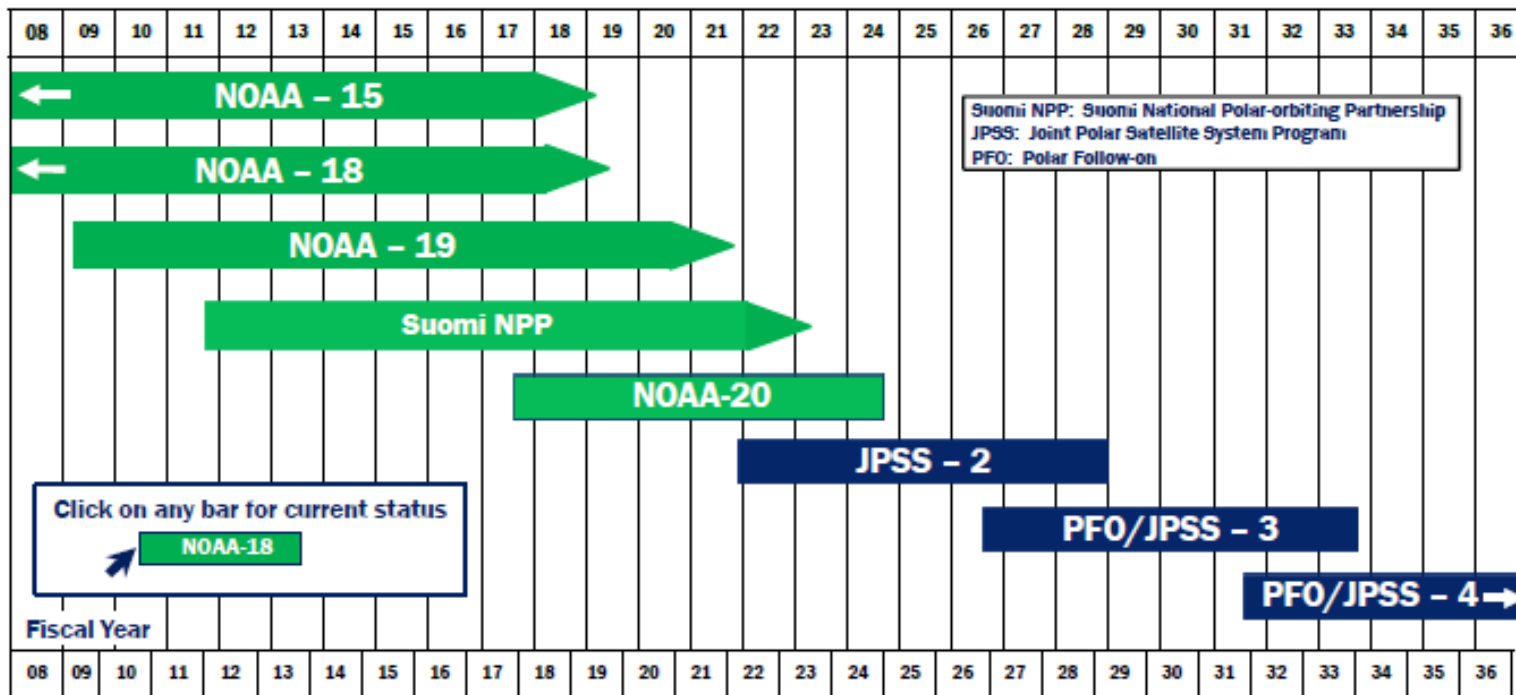


## NOAA Polar Satellite Programs Continuity of Weather Observations



Calendar Year

As of January 2018



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

Click on any bar for current status  
→ NOAA-18

Fiscal Year

Approved: Stephens  
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		

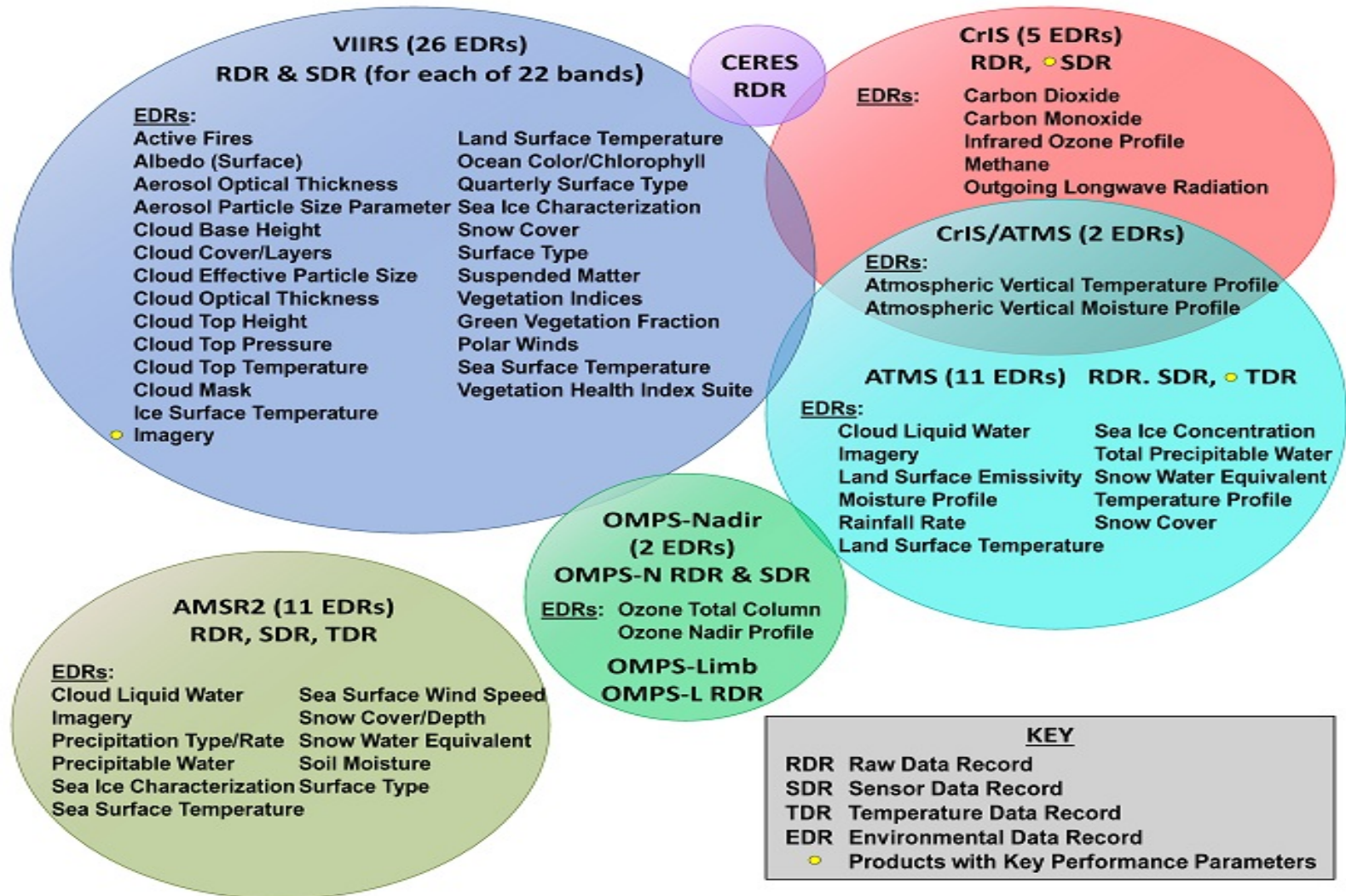


# S-NPP and NOAA-20

- SUOMI NPP (launched in October 2011) is the predecessor to the JPSS series spacecraft
- NOAA-20 (formerly JPSS-1) was launched on November 18, 2017 and the first spacecraft of NOAA's next generation of polar-orbiting satellites



# JPSS Program Data Products



# TOPIC

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# Operational AMV System

- GOES-R Ground System
  - Generate GOES-16 AMV products in NetCDF4
  - Will generate GOES-17 AMV products
- OSPO NDE System
  - Generate S-NPP VIIRS Polar Winds
  - Convert GOES-16 AMV into BUFR format
  - Will generate NOAA-20 VIIRS Polar Winds



# Operational AMV System

- Legacy GOES and POES AMV System
  - Continue to generate GOES-15, MODIS, and AVHRR AMV products
  - Heritage Winds algorithm

# Updates on Ops AMV Products

- GOES-13 AMV was terminated in January 2018
- GOES-16 AMV products reach the provisional maturity level in February 2018
- GOES-16 AMV is in NetCDF4 and BUFR (Heritage and New)
- GOES-16 AMV is available on OSPO PDA and GTS

# Operational AMV Products (1/5)

AMV Products	Frequency (min)	Image Sectors	Image Interval (min)	WMO Header
<b>GOES-16 (GOES East)</b>				
LWIR (11.2um) Cloud-drift	5	MESO	5	INRX01 (Heritage) INRX11 (New)
	15	CONUS	5	
	60	FULL DISK	15	
SWIR (3.9um) Cloud-drift	5	MESO	5	INRX02 (Heritage) INRX12 (New)
	15	CONUS	5	
	60	FULL DISK	15	
Visible (0.64um) Cloud-drift	5	MESO	5	INRX03 (Heritage) INRX13 (New)
	15	CONUS	5	
	60	FULL DISK	15	

# Operational AMV Products (2/5)

AMV Products	Frequency (min)	Image Sectors	Image Interval (min)	WMO Header
<b>GOES-16 (GOES East)</b>				
Water Vapor-Cloud Top (6.2um)	5	MESO	5	INRX04 (Heritage) INRX14 (New)
	15	CONUS	5	
	60	FULL DISK	15	
Water Vapor-Clear Sky (6.2um)	5	MESO	30	INRX05 (Heritage) INRX15 (New)
	15	CONUS	30	
	60	FULL DISK	30	
Water Vapor-Clear Sky (6.9um)	5	MESO	30	INRX06 (Heritage) INRX16 (New)
	15	CONUS	30	
	60	FULL DISK	30	
Water Vapor-Clear Sky (7.3um)	5	MESO	30	INRX07 (Heritage) INRX17 (New)
	15	CONUS	30	
	60	FULL DISK	30	

# Operational AMV Products (3/5)

AMV Products	Frequency (min)	Image Sectors	Image Interval (min)	WMO Header
<b>GOES-15 (GOES West)</b>				
LWIR (10.68um) Cloud-drift	60	PACUS	15	JCCX11
	60	NHEM/SHEM	30	
SWIR (3.9um) Cloud-drift	60	PACUS	15	JRCX11
	60	NHEM/SHEM	30	
Water Vapor (6.55um)	60	NHEM/SHEM	30	JGCX11
Visible (0.625um) Cloud-drift	60	PACUS	15	JJCX11
	60	NHEM/SHEM	30	

# Operational AMV Products (4/5)

AMV Products	Frequency (min)	Image Sectors	Image Interval (min)	WMO Header
<b>GOES-15 (GOES West) SOUNDER</b>				
Sounder WV (7.4um)	60	Tropical	60	JMCX11
Sounder WV (7.0um)	60	Tropical	60	JPCX11
<b>AQUA/TERRA MODIS</b>				
LWIR (11um) Cloud-drift	100	NHEM/SHEM (poleward 65°)	100	JBCX11 (TERRA) JICX11 (AQUA)
Water Vapor (6.7um)	100	NHEM/SHEM (poleward 65°)	100	JLCX11 (AQUA)

# Operational AMV Products (5/5)

AMV Products	Frequency (min)	Image Sectors	Image Interval (min)	WMO Header
<b>AVHRR</b>				
LWIR Cloud-drift	100	NHEM/SHEM (poleward 65°)	100	JCVX98 (Metop-B) JCVX95(N19) JCVX97(Metop-A) JCVX94(N18) JCVX91(N15)
<b>S-NPP VIIRS</b>				
LWIR (10.76um) Cloud-drift	100	NHEM/SHEM (poleward 65°)	100	IN VX01 IN VX02 IN VX03

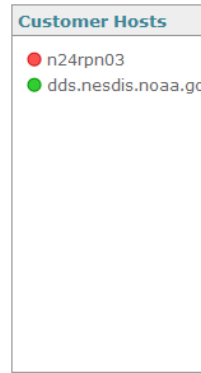
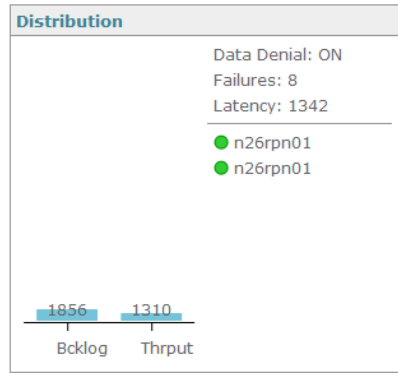
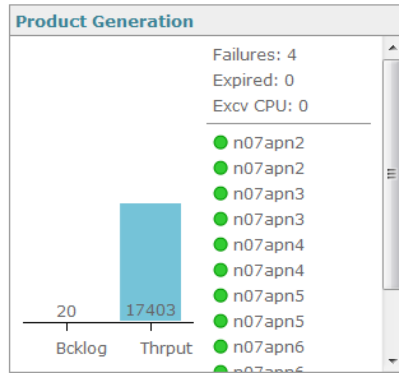
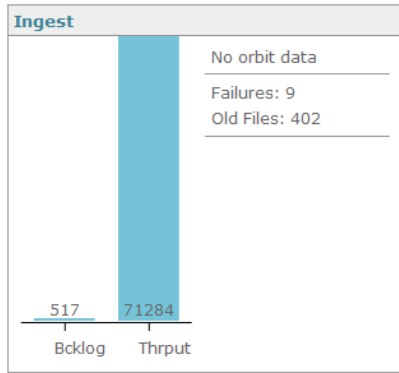
# OSPO NDE Process Monitoring

## NDE DATA HANDLING SYSTEM

NDE\_OP1

System ▾ Product Management ▾ Ingest ▾ Product Generation ▾ Distribution ▾ 0586 secs ▾ Last 24 hrs ▾ adminuser ▾

<b>SAN</b>	<b>NaN% Used</b> Cleanup: 15 sec ago	<b>Notices</b>	There are no notices at this time	< 1 / 1 > view all
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**Log/Alert Summaries**

Type	Host	Count	Message	Last Occurred
NOTIFY	6	1	Resource ( Res ID: 6) is DOWN	2013-06-27 08:45:04
NOTIFY	7	1	Resource ( Res ID: 7) is DOWN	2013-06-27 08:45:04
NOTIFY	13	1	Resource ( Res ID: 13) is DOWN	2013-06-27 08:45:04
NOTIFY	16	1	Resource ( Res ID: 16) is DOWN	2013-06-27 08:45:04
NOTIFY	17	1	Resource ( Res ID: 17) is DOWN	2013-06-27 08:45:04
NOTIFY	23	1	Resource ( Res ID: 23) is DOWN	2013-06-27 08:45:04
NOTIFY	26	1	Resource ( Res ID: 26) is DOWN	2013-06-27 08:45:04
NOTIFY	27	1	Resource ( Res ID: 27) is DOWN	2013-06-27 08:45:04



# VPW Quality Monitoring

## Product Monitor

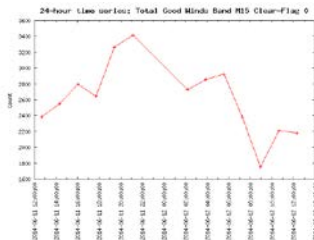
ings

[Manual Plotting Tool](#)

< 2014-06-10 > Today

● Good ● Warning ● Bad ● Unknown

Product	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
ACSPO_SST	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
NPR_MIRS	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
NUCAPS_Rad	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
NUCAPS_Ret	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
VPW_NH	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
VPW_SH	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●



- The real time quality monitoring tool has one database as the backend
- More information of the process and products on metadata and database
- Benefit the monitoring of AMV product quality in the longer term
- Automatic email warning notification

# OSPO AMV Products Web Pages

The image is a collage of several screenshots from the NOAA Office of Satellite and Product Operations (OSPO) website, specifically focusing on High Density Winds (HD Winds) and GOES East Northern Hemisphere Infrared products.

**High Density Winds Page:** The top screenshot shows the NOAA logo and navigation menu. The main heading is "High Density Winds". The text describes the satellite derived winds (AMV - Atmospheric Motion Vectors) generated by incorporating GOES and POES imager and forecast data from a numerical model. It explains the principle of wind derivation: following a recognizable tracer (cloud and water vapor features in infrared window and water vapor bands) in a sequence of images to derive its apparent velocity. It lists the current operational wind products derived from satellites: GOES East, GOES West, NOAA KLINN, Metop-A, Aqua and Terra. The operational satellite derived winds are available in BUFR format. A note states: "Wind data is available in [McIDAS](#) MD file and ASCII formats via FTP."

**GOES East Northern Hemisphere Infrared Page:** The middle screenshot shows the "GOES East: Northern Hemisphere Infrared" page. It features a large satellite image with overlaid wind vectors (colorful arrows) and cloud features. Navigation controls include "Hour: 16" and "Animation: Start Stop". A sidebar on the right lists product options for Northern Hemisphere, Southern Hemisphere, and GOES West, including Infrared, Water Vapor, Visible, Short Wave IR, and Sounder Channel 10 and 11. There are also options for Antarctic and Data (FTP).

**AVHRR HD Winds (Metop B - ARCTIC):** A smaller screenshot shows the "AVHRR HD Winds (Metop B - ARCTIC)" page, displaying a polar projection map of the Arctic region with wind vectors.

**Product Selection Screens:** Two other screenshots show the product selection interface, including a list of products for Northern Hemisphere, Southern Hemisphere, and Antarctic regions, and a "Data" section with an "FTP" option.

<http://www.ospo.noaa.gov/Products/atmosphere/hdwinds/index.html>

# Operational AMV Products Distribution

- The former DDS server at OSPO has been replaced by the enterprise PDA (Product Distribution and Access) system
- All operational GOES 15/16, AVHRR, MODIS, and S-NPP AMV products are distributed via PDA and are also available via GTS

# TOPIC

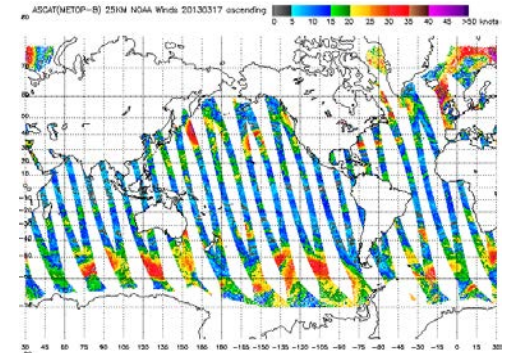
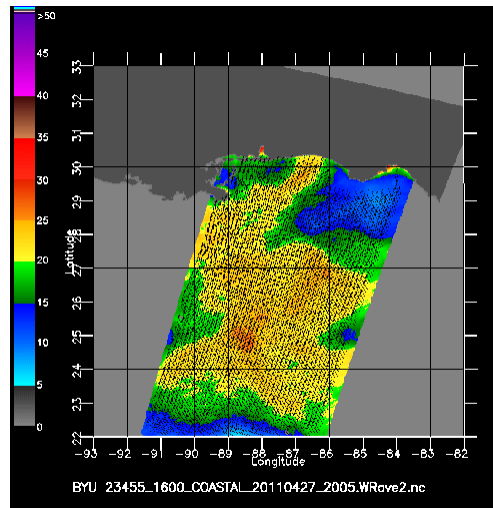
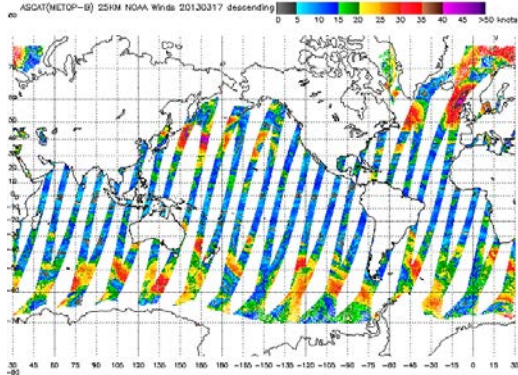
- Status of GOES and POES Satellites
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# Operational ASCAT Winds (1/2)

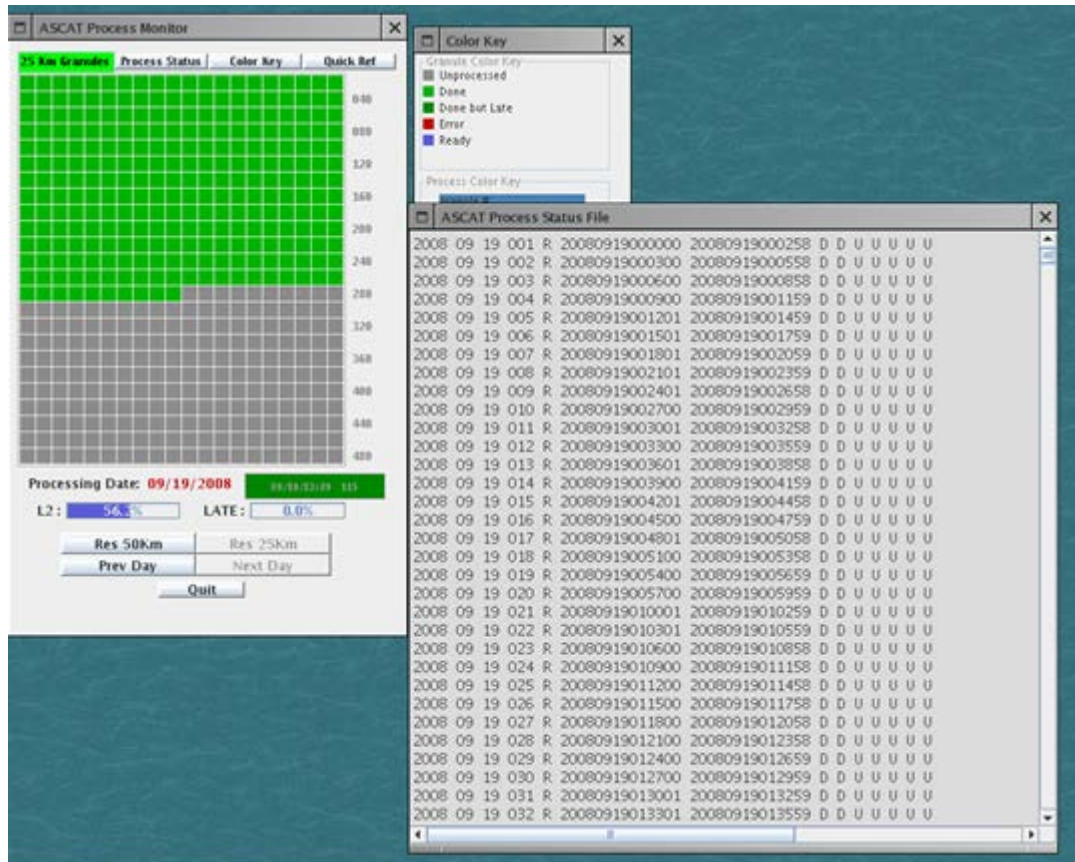
- Metop-B and Metop-A ASCAT
  - 50 km and 25 km OSVW products
    - 50 km
      - 3-min granule files in BUFR and binary
      - 3-min ASCAT-lite files for NAWIPS (binary)
    - 25 km
      - 3-min granule files in BUFR and binary
      - 3-min ASCAT-lite files for NAWIPS (binary)
      - 3-min ASCAT-lite files for AWIPS (BUFR)

# Operational ASCAT Winds (2/2)

- Enhanced resolution wind products
  - Tropical cyclone storm sector wind speed imagery



# ASCAT Winds Monitoring



- A Java based automatic monitoring tool for ASCAT winds
- Monitoring the process on 3-minute granule level
- Ability to display the status from data ingest, process and distribution

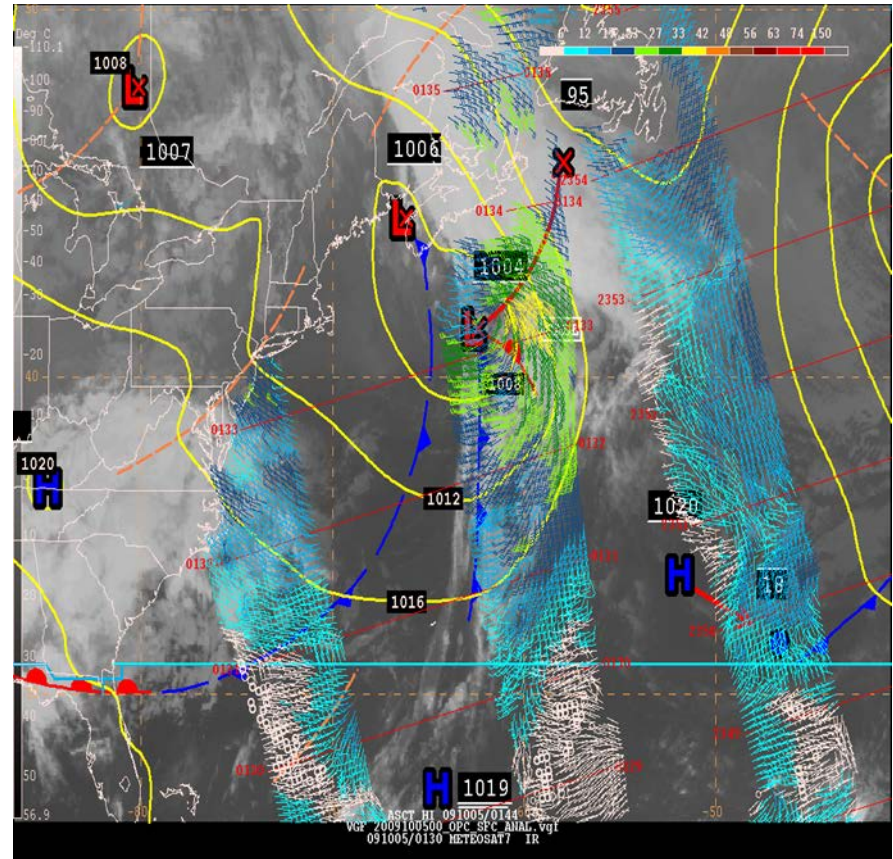
# Operational ASCAT Winds Distribution

- ASCAT winds are distributed via PDA system
- Main NOAA users
  - National Hurricane Center (NHC)/Tropical Prediction Center (TPC)
  - Ocean Prediction Center
  - Alaska and Pacific Regions
  - Coastal Weather Forecast Offices
  - Great Lakes Weather Forecast Offices
  - Environmental Modeling Center (EMC)



# Day to Day Uses of ASCAT at NOAA's Ocean Prediction Center (OPC)

- Identify weather features
- Marine wind warnings
- Short term marine forecasts
- Real-time Verification



# TOPIC

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# GOES-17 AMV

- GOES-17 will replace GOES-15 as operational GOES West in November, 2018 (Exact date is TBD)
- GOES-17 AMV products will be at provisional maturity level in September, 2018
- NOAA/NESDIS will provide users GOES-17 AMV in NetCDF4 and BUFR (Heritage and New)
- Will be distributed via PDA and GTS

# GOES-17 AMV Products (1/2)

AMV Products	Frequency (min)	Image Sectors	Image Interval (min)	WMO Header
<b>GOES-17 (GOES West)</b>				
LWIR (11.2um) Cloud-drift	5	MESO	5	INLX01 (Heritage) INLX11 (New)
	15	CONUS	5	
	60	FULL DISK	15	
SWIR (3.9um) Cloud-drift	5	MESO	5	INLX02 (Heritage) INLX12 (New)
	15	CONUS	5	
	60	FULL DISK	15	
Visible (0.64um) Cloud-drift	5	MESO	5	INLX03 (Heritage) INLX13 (New)
	15	CONUS	5	
	60	FULL DISK	15	

# GOES-17 AMV Products (2/2)

AMV Products	Frequency (min)	Image Sectors	Image Interval (min)	WMO Header
<b>GOES-17 (GOES East)</b>				
Water Vapor-Cloud Top (6.2um)	5	MESO	5	INLX04 (Heritage) INLX14 (New)
	15	CONUS	5	
	60	FULL DISK	15	
Water Vapor-Clear Sky (6.2um)	5	MESO	30	INLX05 (Heritage) INLX15 (New)
	15	CONUS	30	
	60	FULL DISK	30	
Water Vapor-Clear Sky (6.9um)	5	MESO	30	INLX06 (Heritage) INLX16 (New)
	15	CONUS	30	
	60	FULL DISK	30	
Water Vapor-Clear Sky (7.3um)	5	MESO	30	INLX07 (Heritage) INLX17 (New)
	15	CONUS	30	
	60	FULL DISK	30	

# NOAA-20 VPW

- Similar to S-NPP VPW, OSPO will generate VPW from NOAA-20 with GOES-R winds algorithm
- Expected to be operational in March 2019

# AVHRR AMV Products

- Current AVHRR AMV products are generated from the legacy winds algorithm. The updated AVHRR AMV products will be generated from GOES-R winds algorithm
- NOAA/NESDIS is going to generate them in operation on OSPO NDE system around October 2019
- Metop-C AVHRR AMV will be generated too

# MODIS AMV Products

- MODIS AMV products will continue to be generated from the legacy system. The legacy system will be retired in 2022
- Currently there is no plan to transition MODIS AMV products into OSPO NDE system. MODIS will have to be ended in 2022 with the retired legacy system



# Heritage BUFR Product

- New WMO-approved AMV BUFR table will replace the heritage BUFR table in operation
  - The GOES-16/17 AMV in the heritage BUFR table will be provided till the end of April, 2019
  - NOAA-20 VPW product and the updated AVHRR AMV products will be generated only in new BUFR table (Need the heritage BUFR products?)

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# PDA at OSPO

- PDA – Product Distribution and Access System
- All near real time distribution is done from PDA
  - GOES-16/17 data and products
  - S-NPP and NOAA-20 products
  - Other products from currently supported missions

# PDA at OSPO

- Highly automated, user driven process
- User managed search and tailoring
- OSPO to manage and update international user subscriptions
- Due to capacity constraints, user access to NOAA's near real-time terrestrial data distribution systems, such as the PDA, must be justified with a critical 24x7 public mission need.

# ESPC Notifications, Status, and Contacts

24/7 Help Desk	<a href="mailto:ESPCOperations@noaa.gov">ESPCOperations@noaa.gov</a>
ESPC Messages	<a href="http://www.ssd.noaa.gov/PS/SATS/messages.html">http://www.ssd.noaa.gov/PS/SATS/messages.html</a>
User Services	<a href="mailto:SPSD.UserServices@noaa.gov">SPSD.UserServices@noaa.gov</a>
Data Access	<a href="mailto:NESDIS.Data.Access@noaa.gov">NESDIS.Data.Access@noaa.gov</a>
Facebook	<a href="http://www.facebook.com/NOAANESDIS">www.facebook.com/NOAANESDIS</a>
Twitter	<a href="http://www.twitter.com/noaasatellites">www.twitter.com/noaasatellites</a>
Press releases	<a href="http://www.nesdis.noaa.gov/news_archives/">http://www.nesdis.noaa.gov/news_archives/</a>
Data Access Policy	<a href="http://www.ospo.noaa.gov/Organization/About/access.html">http://www.ospo.noaa.gov/Organization/About/access.html</a>

# Contact Information for Operational Wind Products

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**THANK YOU!**