SATELLITE OPERATIONS

Status of NOAA Satellite Operations & McIDAS at ESPC

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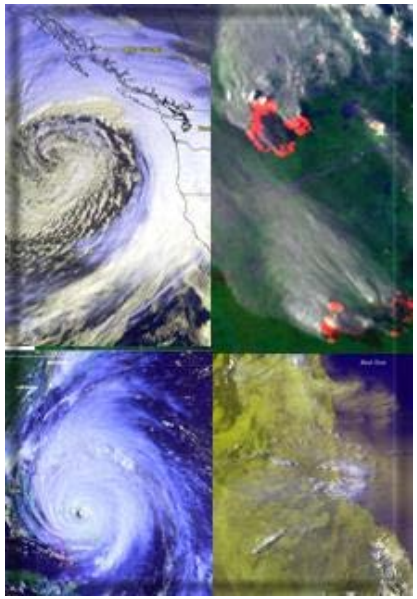
NESDIS/Office of Satellite and Product Operations (OSPO)

2019 McIDAS Users' Group Meeting
September 16-17, 2019
Madison, WI

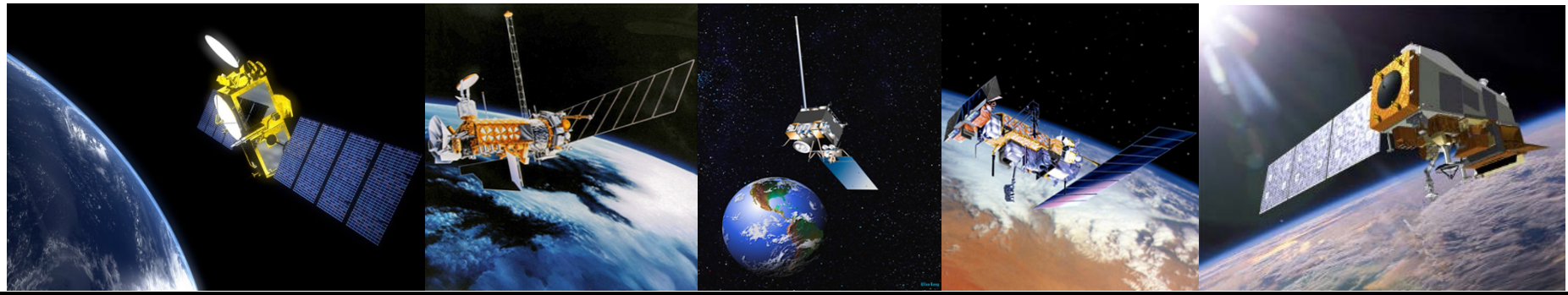
Presentation Outline

- Overview of the Office of Satellite and Product Operations (OSPO)
- Status of Satellite Operations
- Status of McIDAS at ESPC
- Q&A



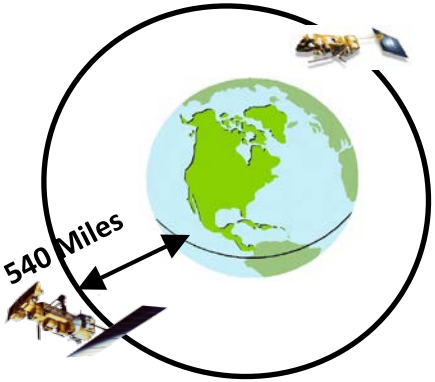
NESDIS Office of Satellite and Product Operations (OSPO)

- Operates the Nation's 17 environmental satellites:
  - 4 Geostationary (GOES) by NOAA
  - 2 Joint Polar Satellite Systems by NOAA + NASA (NOAA-20, Suomi-NPP)
  - 3 Polar-Orbiting (POES) by NOAA
  - 5 Defense Meteorological Satellite program (DMSP) operated by NOAA
  - 2 OSTM Jason-2 & Jason-3 (Ocean Surface Topography Mission) - Joint NOAA, NASA, CNES, EUMETSAT effort
  - 1 DSCOVR (Deep Space Climate Observatory) by NOAA



Three Observation Vantage Points

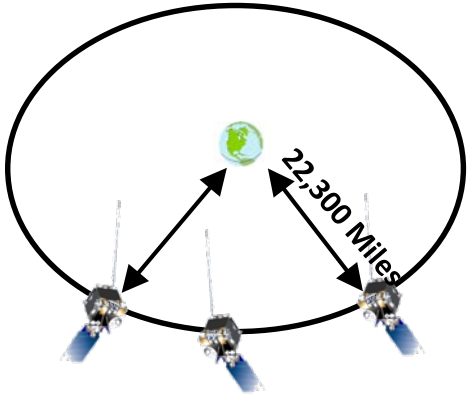
Polar-orbiting Operational Environmental Satellites



Each satellite covers the Earth twice per day

- Pole-to-pole orbit is 101 minutes and views each location at the same time of day; capability for ½ orbit dumps with JPSS-1
- Global coverage every 12 hours with one satellite
- EUMETSAT - mid-morning orbit
- NOAA - early afternoon orbit

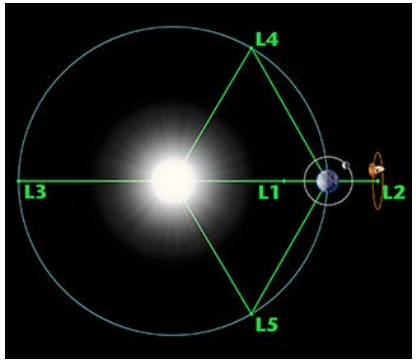
Geostationary Operational Environmental Satellites



Continuous monitoring of the Americas

- Coverage over the same geographic location
- Constant monitoring for nowcast purposes and for forecast applications (NWP, etc.)

Deep Space at Lagrange 1 Point

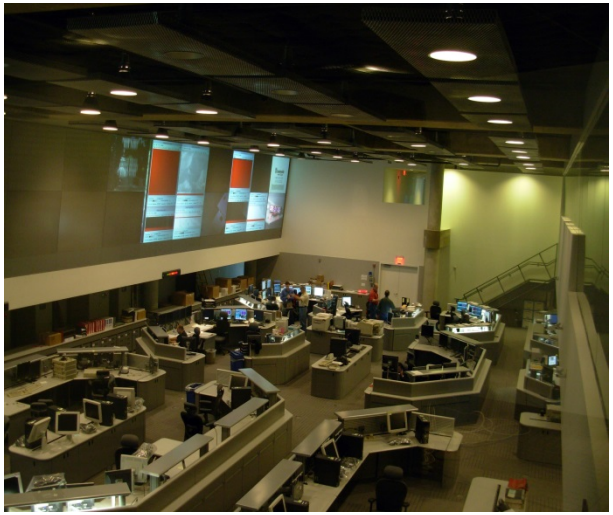


Continuous monitoring of the Sun

- Uninterrupted view of the sun
- Information is used for solar winds monitoring for Space Weather warnings

OSPO's Key Roles

- Ground System Command & Control, Ingest, Generation, and Distribution
- Pre-Launch and Post-Launch Testing
- Operational Testing, Validation, and Verification
- User Readiness for Broadcast Services and Product Delivery
- Long-Term Continuity of Products and Services



OSPO Operational Facilities

Suitland, MD

Over 500 staff supporting or operating the satellites, receptors, and processing systems

College Park, MD

Fairmont, WV*

Wallops, VA

Fairbanks, AK

* GOES-R and JPSS (New) Backup Facility

Nominal Satellite Data Flow

- GOES NOP (14 + 15)
- GOES-R (16 +17)
- METOP
- Jason- 2/3
- DMSP
- POES
- NPP/NOAA-20
- COSMIC

- Meteosat
- Himawari-8
- NASA EOS
- Other Non-NOAA Satellites

McMurdo, Antarctica Ground Station

Svalbard, Norway Ground Station

Fairbanks, AK Ground Station

Wallops, VA Ground Station

NOAA Satellite Operations Facility
Suitland, MD
Environmental Satellite Processing Center

Processing Systems

Direct Services

Satellite Applications

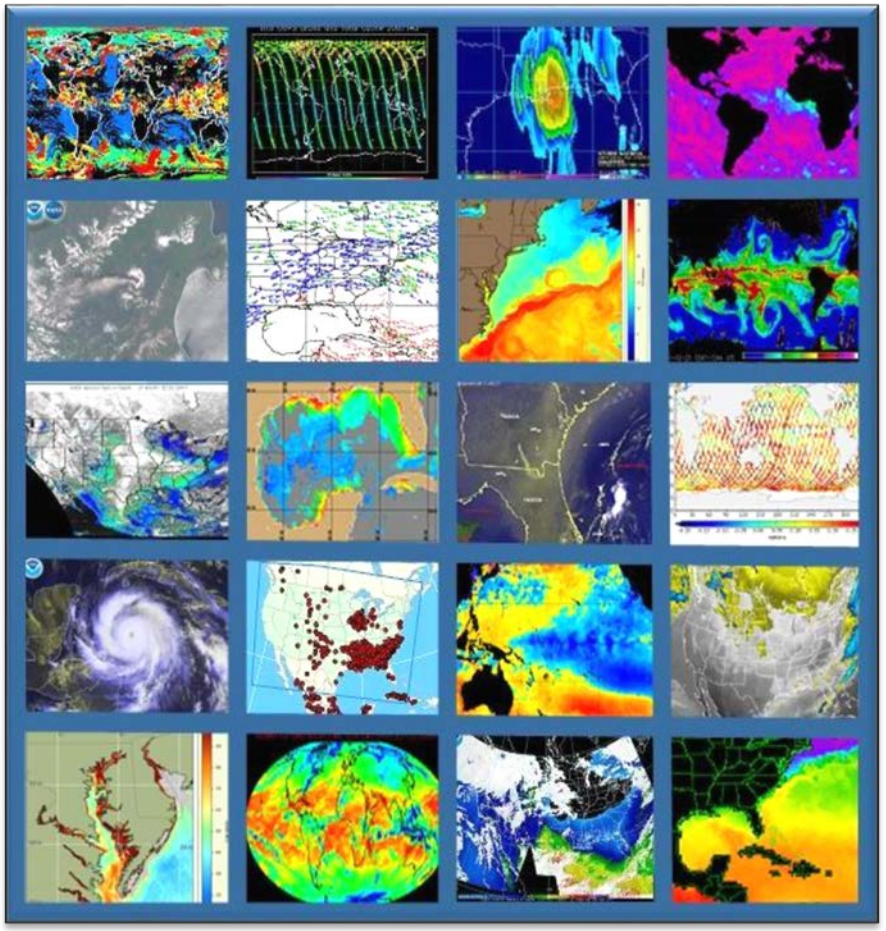
Data & Products

User Community

Archive

OSPO's Satellite Products and Services Division

- Provides 24x7 interpretive analyses of satellite data
  - Atmospheric temp/moisture
  - Hurricane intensity & position
  - Volcanic Ash
  - Fire and Smoke
  - Oil Spills
  - Significant Precipitation (20x7)
- Manages automated environmental products
- Collaborates with partners to support transition of research products into operations



Direct Service Operations

Emergency Managers Weather Information Network (EMWIN):

- NOAA satellites relay critical information to users across the country.

GOES Rebroadcast (GRB):

- The GRB provides the primary GOES-16 and GOES-17 relay of full resolution, calibrated, near-real-time direct broadcast Level 1b data from each instrument and Level 2 data from the Geostationary Lightning Mapper (GLM). https://www.noaasis.noaa.gov/GOES/GRB/grb.html

Data Collection:

- NOAA satellites are used to collect and relay scientific data from around the globe.
  http://www.noaasis.noaa.gov/DCS/ http://www.noaasis.noaa.gov/ARGOS/

Search and Rescue Satellite Aid Tracking (SARSAT):

- NOAA satellites are used to relay distress alerts from aviators, mariners and land-based users (http://www.sarsat.noaa.gov/

Geonetcast Americas:

- Data from NOAA for diverse societal benefits - agriculture, energy, health, climate, weather, disaster mitigation, biodiversity, water resources, and ecosystems.
  http://www.geonetcastamericas.noaa.gov/index.html

GEO Status

Geostationary Operational Environmental Satellite (GOES-NOP) Performance Status – July 2019

Payload Instrument	**GOES-13 (Storage) Launch: May 06 Activation: Apr 10**	**GOES-14 (Backup) Launch: Jun 09 Activation:**	**GOES-15 (West Backup) Launch: Mar 10 Activation: Dec 11**
Imager	G	G	G
Sounder	R (4)	G	Y (3)
Magnetosphere Proton and Electron Detectors (MAGPD/MAGED)	G	G	Y (5)
Magnetometers	G	G	G
Energetic Proton, Electron, and Alpha Detectors (EPEAD/HEPAD)	G	G	G
X-Ray/EUV Sensors (XRS/EUV)	Y (1)	G	G
Solar X-Ray Imager (SXI)	Y (2)	G	G
Spacecraft Subsystems			
Telemetry, Command & Control	G	G	G
Attitude and Orbit Control	G	G	G
Fuel for Inclination Control	G	G	G
Propulsion	G	G	G
Mechanisms	G	G	G
Electrical Power	G	G	G
Thermal Control	G	G	G
Communications Payloads	G	G	G

Key

Operational

G

Operational with limitations

Y

Non-operational

R

Geostationary Operational Environmental Satellite (GOES-16 and 17) Performance Status – July 2019

Payload Instrument	**GOES-16 (East) Launch: Nov 16 Activation: Dec 17**	**GOES-17 (West) Launch: Mar 18 Activation: Feb 19**
Advanced Baseline Imager (ABI)	**G**	**Y(2)**
Space Environment I-Situ Suite (SEISS)	**G**	**G**
Solar Ultraviolet Imager (SUVI)	**G**	**G**
EUV and X-ray Irradiance Sensors (EXIS)	**G**	**G**
Magnetometer	**Y(1)**	**G**
Geostationary Lighting Mapper (GLM)	**G**	**G**
Spacecraft Subsystems		
Command Data & Handling (CD&H)	**G**	**G**
Guidance Navigation Control (GNC)	**G**	**G**
Electrical Power Subsystem (EPS)	**G**	**G**
Propulsion	**G**	**G**
Mechanisms	**G**	**G**
Electrical Power	**G**	**G**
Thermal Control	**G**	**G**
Communications Payloads	**G**	**G**

Key

Operational

G

Operational with limitations

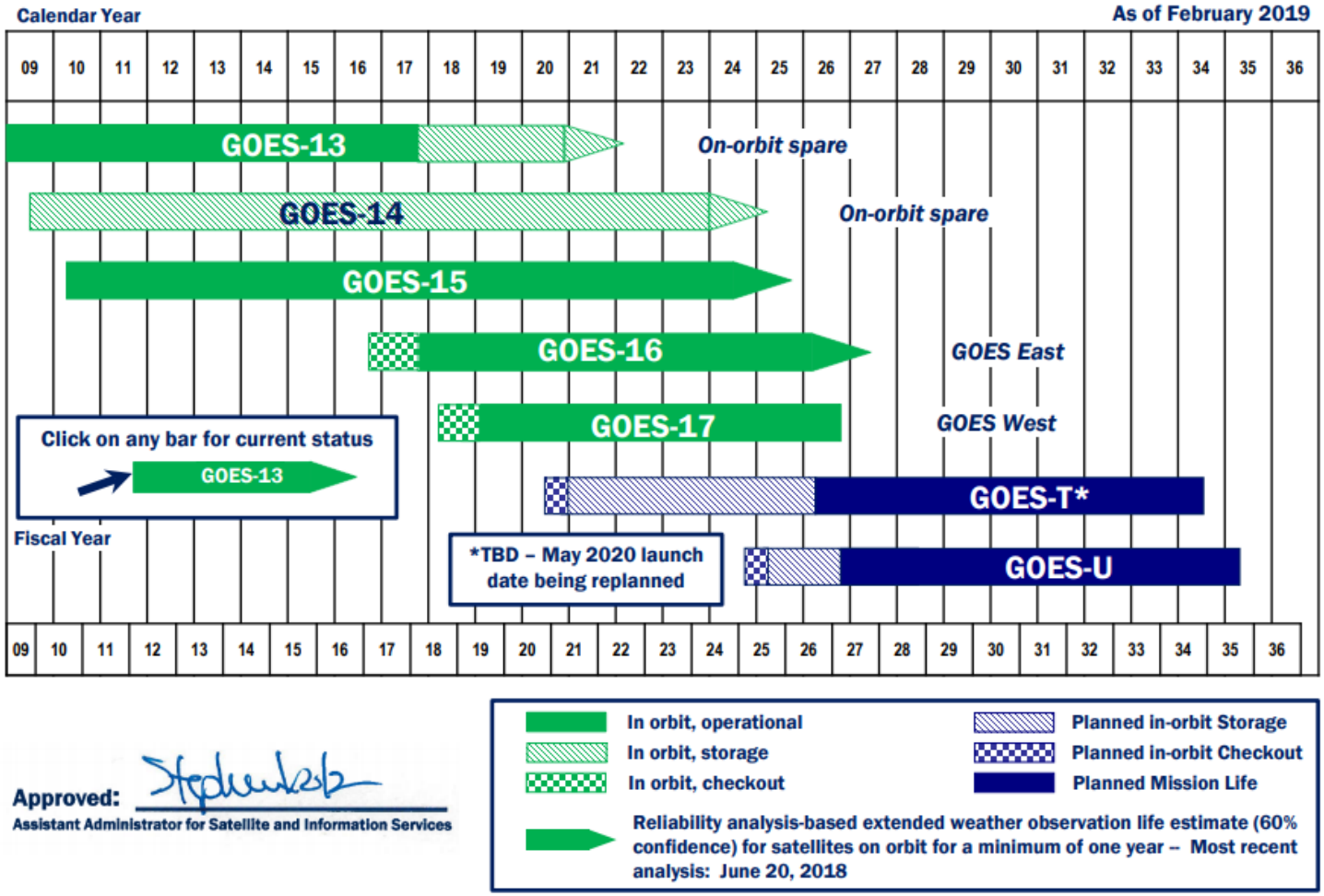
Y

Non-operational

R

GOES Flyout Schedule

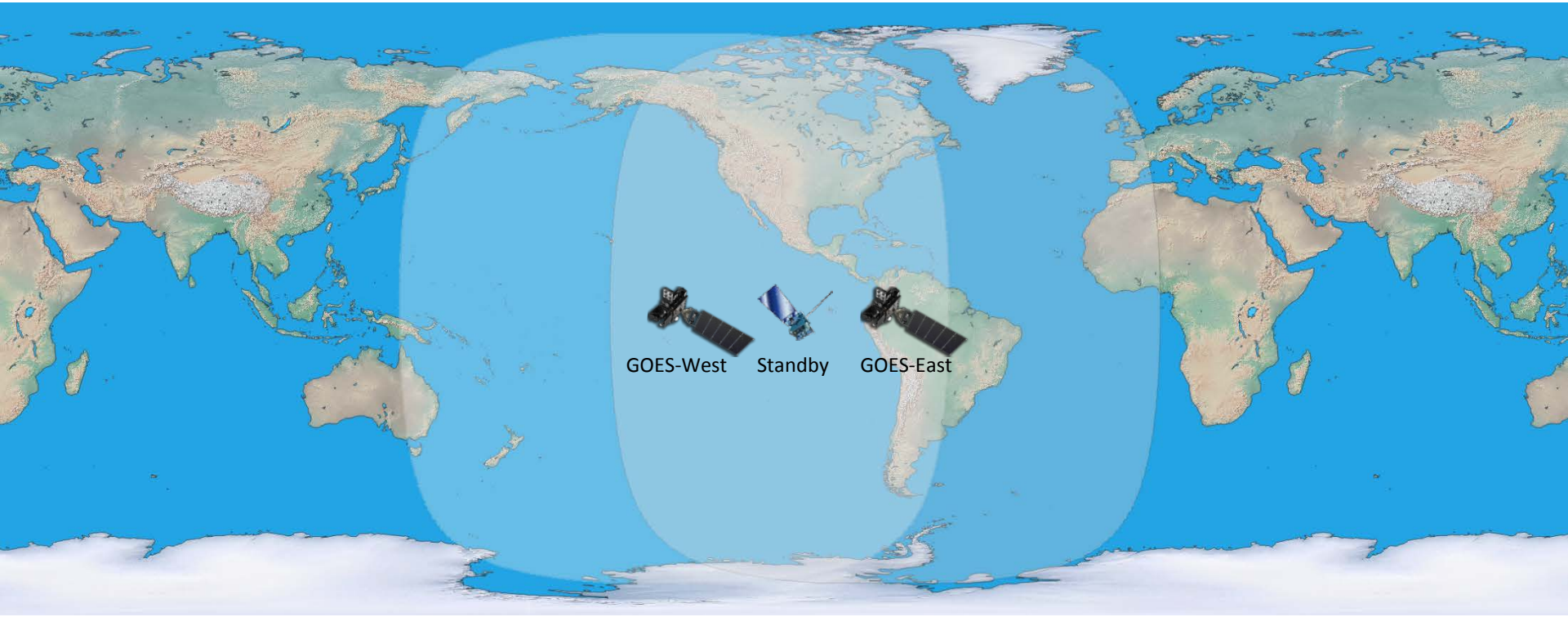
NOAA Geostationary Satellite Programs
Continuity of Weather Observations



Approved:
Assistant Administrator for Satellite and Information Services

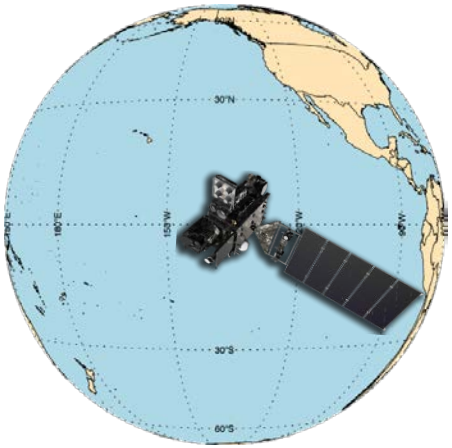
http://www.nesdis.noaa.gov/FlyoutSchedules.html http://www.goes-r.gov

GOES Constellation

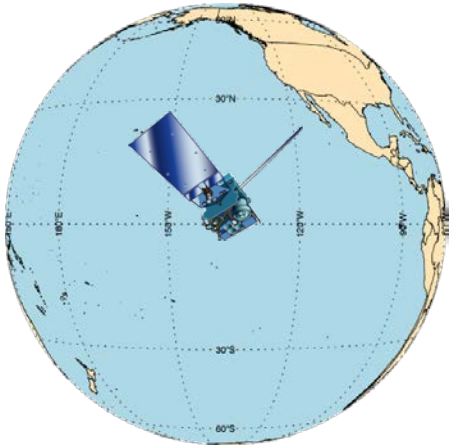


GOES Constellation

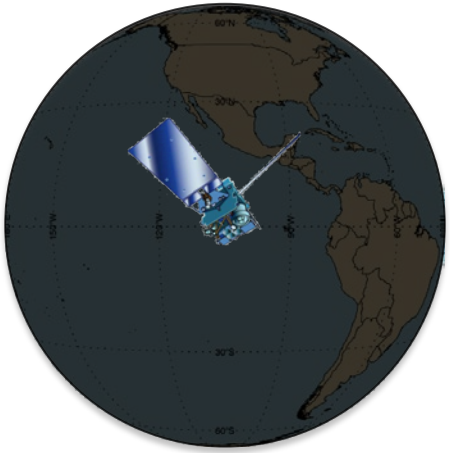
GOES-West
GOES-17
137.2° West



Supplemental Ops until Dec, 2019
GOES-15
128° West



Standby
GOES-14
105° West



GOES-East
GOES-16
75.2° West

- Currently, supplemental operations are enabled for GOES-15 products and services and GOES-14 EMWIN and MDL services (excludes SXI and XRS/EUV)
  - These are mitigations for the GOES-17 operations promotion, meant to lessen risk associated with ABI LHP (loop heat pipe) anomaly and space weather products operations status

- Effective in Dec, 2019, GOES-15 and GOES-14 will return to their respective storage and standby roles
  - Conversations are underway between NWS and NESDIS regarding a request to extend GOES-14/15 supplemental operations due to Space Wx, EMWIN, and ABI hot period concerns

GOES- R Series Data Access

Acronym	System Name
GRB	GOES Rebroadcast
HRIT/ EMWIN	High Rate Information Transmission/ Emergency Managers Weather Information Network
PDA	Product Distribution and Access
CLASS	Comprehensive Large Array-data Stewardship System
GNC-A	GEONETCast Americas
Websites	Websites on the Internet
BDP	Big Data Project
SBN/NOAAPort	NWS Satellite Broadcast Network

GOES-16 Update

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	12/6/18	2021
Aerosol Optical Depth (AOD)	5/24/17	9/14/18	2021
Clear Sky Mask	4/19/17	2/16/18	2021
Cloud Optical Depth	6/8/17	2/22/18	2021
Cloud Particle Size Distribution	6/8/17	12/14/18	2021
Cloud Top Height	5/16/17	2/16/18	2021
Cloud Top Phase	5/16/17	2/22/18	2021
Cloud Top Pressure	5/16/17	2/16/18	2021
Cloud Top Temperature	5/16/17	2/16/18	2021
Derived Motion Winds	6/8/17	2/9/18	2021
Derived Stability Indices	5/16/17	2/22/18	2021

ABI L2+ Products	Beta	Prov	Full
Downward S/W Radiation: Surface	6/23/17	10/23/18	2021
Fire/Hot Spot Characterization	5/24/17	3/30/18	2021
Hurricane Intensity Estimation	9/25/17	N/A	N/A
Land Surface Temperature	5/24/17	3/19/18	2021
Legacy Vertical Moisture Profile	5/16/17	2/22/18	2021
Legacy Vertical Temperature Profile	5/16/17	2/22/18	2021
Rainfall Rate/QPE	9/13/17	3/30/18	2021
Reflected S/W Radiation: TOA	6/23/17	10/23/18	2021
Sea Surface Temperature	6/14/17	3/9/18	2021
Snow Cover	N/A	2/13/20	2021
Total Precipitable Water	5/16/17	2/22/18	2021
Volcanic Ash: Detection and Height	9/13/17	7/20/18	N/A

7/7/19

Validation Maturity Levels: Not Validated | Beta Maturity | Provisional Maturity | Full Maturity

* Snow Cover has a waiver. It is dependent upon a non-baseline Albedo Product which is in development.

GOES-16 L1b Science Product Validation Status

ABI L1b Product	Beta	Provisional	Full
Radiances	2/28/17	6/1/17	6/1/18
GLM L2 Product			
Lightning: Events, Groups, Flashes	7/5/17	1/19/18	11/1/18
SEISS L1b Products			
Energetic Heavy Ions	2/10/17	7/11/18	2/13/20
Magnetospheric e^-/p^+: Low Energy	2/10/17	3/29/19	5/1/20
Magnetospheric e^-/p^+: High Energy	2/10/17	12/18/17	2/13/20
Solar & Galactic Protons	2/10/17	7/11/18	2/13/20
EXIS L1b Products			
Solar Flux: EUV	3/23/17	9/25/19	5/3/21
Solar Flux: X-ray Irradiance	3/23/17	8/15/18	2/13/20
SUVI L1b Product			
Solar EUV Imagery	4/19/17	5/4/18	2/13/20
MAG L1b Product			
Geomagnetic Field	5/25/17	8/29/18	2/13/20

6/27/19

Validation Maturity Levels: Not Validated | Beta Maturity | Provisional Maturity | Full Maturity

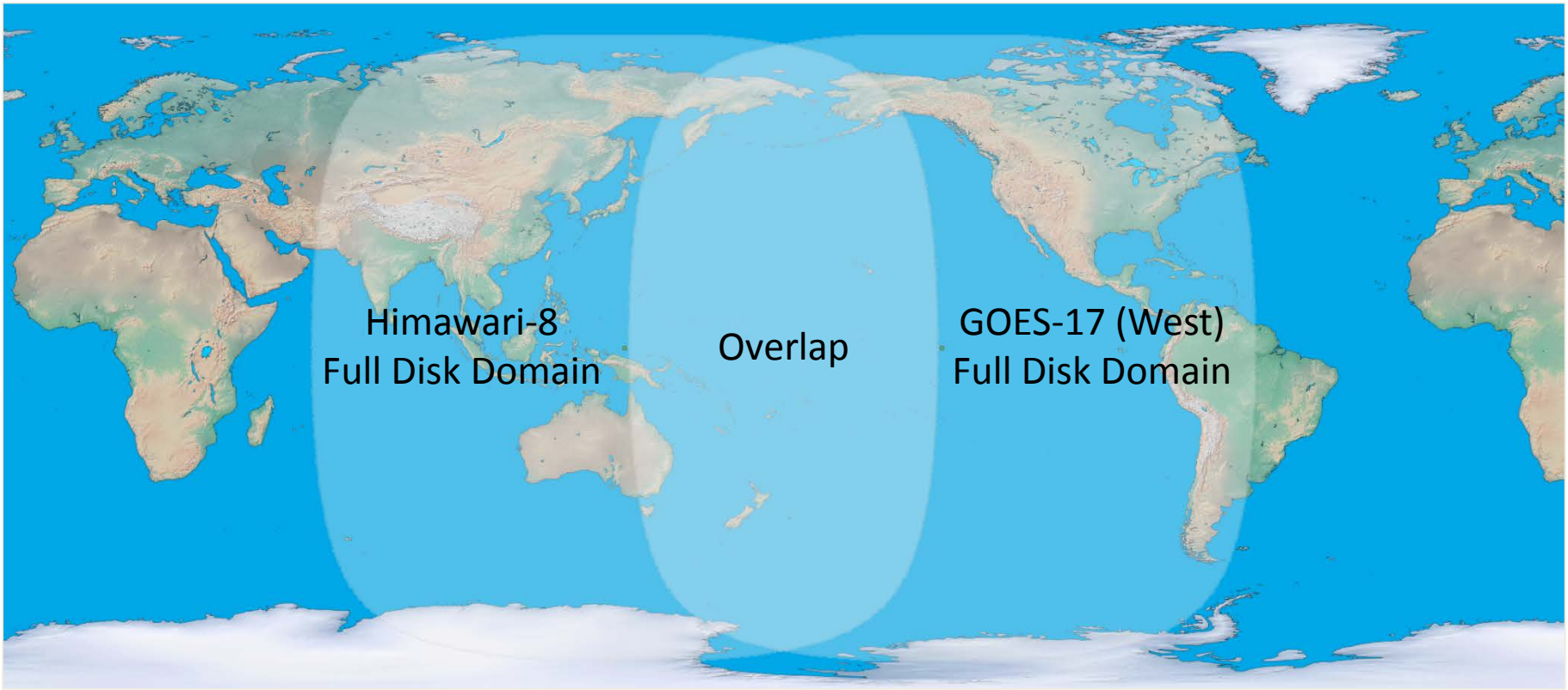
GOES-17 Update

GOES-17 ABI Timeline

(Optimizations & Mitigations appear in blue italics)

2018 Mar 1	Launch
2018 Apr 13	Optical port cover opened
2018 Apr 29	Thermal anomaly discovered
2018 May	Thermal system troubleshooting & recovery
2018 Jun	***Began working optimization strategy in parallel to troubleshooting & recovery***
2018 Jul 30	ABI post-launch tests began
2018 Aug	***Increased measurement frequency of onboard blackbody***
2018 Oct	***Operations procedure at handover includes yaw flip***
2018 Oct 24	GOES-17 began drift from -89.5 to -137.2 degrees
2018 Nov 15	GOES-17 resumed data distribution after drift
2019 Feb 12	GOES-17 transitioned to operations as NOAA's GOES West
2019 Apr 8	***GOES-17 Temperature Data Quality Flags promoted to operations for users to track temp of focal plane module***
2019 Jun	***Mitigate with pseudo-operations for Himawari-8 data to NWS***
2019 Jul	***Implement predictive calibration in operational data***
2020	***Mitigate with operationalized Himawari-8 generation in cloud***

GOES-17 Mitigation using Overlap with Himawari-8



2019 Jun: Mitigate with pseudo-operations for Himawari-8 data to NWS
Sept 2021: Mitigate with operationalized Himawari-8 product generation in NESDIS cloud

GOES-17 L2+ Science Product Validation Status

ABI L2+ Products	Beta	Prov (cool period)	Delta (warm period mits. revisit)	Full
Cloud and Moisture Imagery (CMI) and Sectorized CMI (KPP)	8/27/18	11/28/18	N/A	2/12/20
Aerosol Detection (Smoke & Dust)	8/27/18	6/27/19	10/22/20	2021
Aerosol Optical Depth (AOD)	8/27/18	6/27/19	10/22/20	2021
Clear Sky Mask	8/27/18	5/6/19	4/23/20	2021
Cloud Optical Depth	8/27/18	9/24/19	10/22/20	2021
Cloud Particle Size Distribution	8/27/18	9/24/19	10/22/20	2021
Cloud Top Height	8/27/18	5/6/19	4/23/20	2021
Cloud Top Phase	8/27/18	5/6/19	4/23/20	2021
Cloud Top Pressure	8/27/18	5/6/19	4/23/20	2021
Cloud Top Temperature	8/27/18	5/6/19	4/23/20	2021
Derived Motion Winds	8/27/18	5/16/19	6/25/20	2021

ABI L2+ Products	Beta	Prov (cool period)	Delta (warm period mits. revisit)	Full
Derived Stability Indices	8/27/18	5/16/19	5/7/20	2021
Downward S/W Radiation: Surface	8/27/18	6/27/19	11/5/20	2021
Fire/Hot Spot Characterization	8/27/18	7/25/19	7/16/20	2021
Land Surface Temperature	8/27/18	6/13/19	7/16/20	2021
Legacy Vertical Moisture Profile	8/27/18	5/16/19	5/7/20	2021
Legacy Vertical Temperature Profile	8/27/18	5/16/19	5/7/20	2021
Rainfall Rate/QPE	8/27/18	5/16/19	5/7/20	2021
Reflected S/W Radiation: TOA	8/27/18	6/27/19	11/5/20	2021
Sea Surface Temperature	8/27/18	7/25/19	11/19/20	2021
Snow Cover	N/A	2/13/20	N/A	2021
Total Precipitable Water	8/27/18	5/16/19	5/7/20	2021
Volcanic Ash: Detection and Height	8/27/18	N/A	N/A	N/A

Validation Maturity Levels: Not Validated | Beta Maturity | Provisional Maturity | Full Maturity

8/8/19

* Snow Cover has a waiver. It is dependent upon a non-baseline Albedo Product which is in development.

GOES-17 L1b Science Product Validation Status

ABI L1b Product	Beta	Provisional	Full
Radiances	8/27/18	11/28/18	2/12/20
GLM L2 Product			
Lightning: Events, Groups, Flashes	10/2/18	12/20/18	11/21/19
SEISS L1b Products			
Energetic Heavy Ions	8/10/18	5/21/19	2/13/20
Magnetospheric e^-/p^+: Low Energy	8/10/18	9/20/19	7/17/20
Magnetospheric e^-/p^+: High Energy	8/10/18	12/18/18	2/13/20
Solar & Galactic Protons	8/10/18	2/27/19	2/13/20
EXIS L1b Products			
Solar Flux: EUV	6/27/18	9/25/19	5/3/21
Solar Flux: X-ray Irradiance	6/27/18	4/24/19	4/29/20
SUVI L1b Product			
Solar EUV Imagery	8/21/18	5/14/19	5/14/20
MAG L1b Product			
Geomagnetic Field	8/8/18	3/14/19	3/12/20

8/8/19

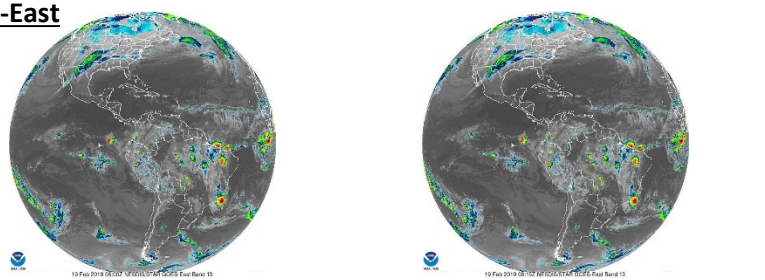
Validation Maturity Levels: Not Validated | Beta Maturity | Provisional Maturity | Full Maturity

GOES-16/17 ABI Mode 6

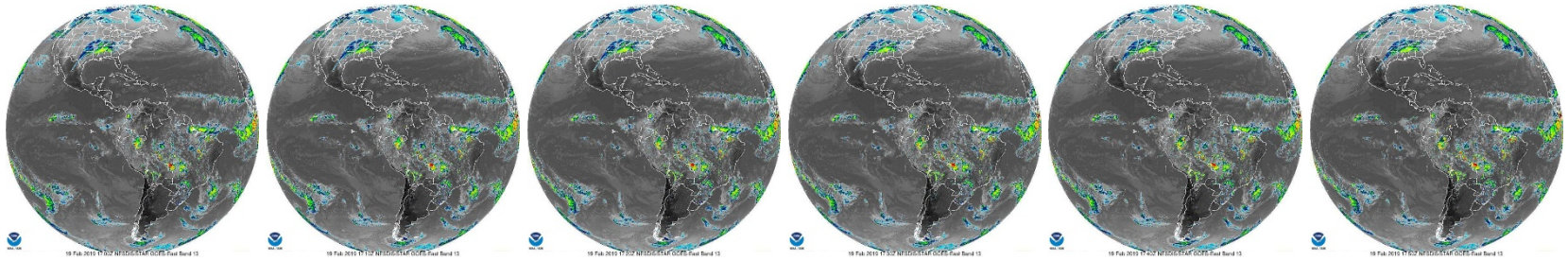
Effective April 2, 2019 | 50% more Full Disk Imagery

GOES-East

Mode 3
15-minute
Full Disk
2/19/19 0600-0645 UTC

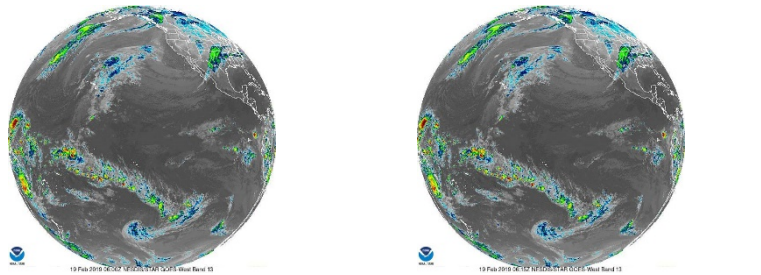


Mode 6
10-minute
Full Disk
2/19/19 0600-0645 UTC

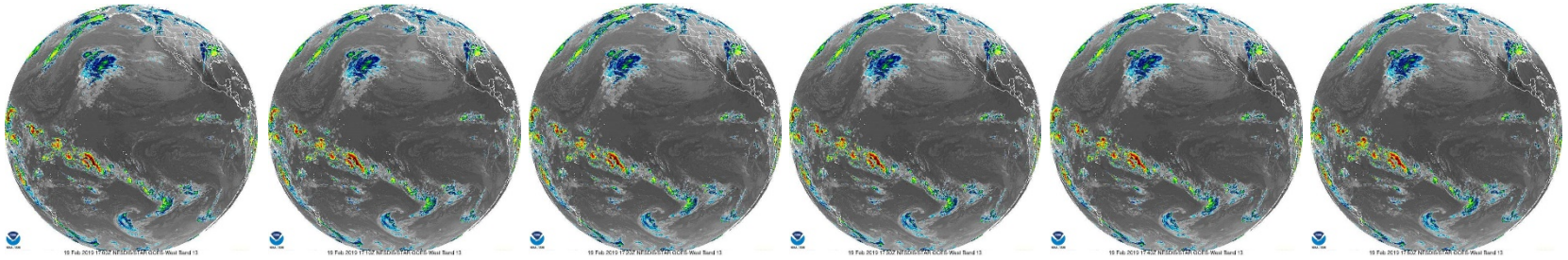


GOES-West

Mode 3
15-minute
Full Disk
2/19/19 0600-0645 UTC



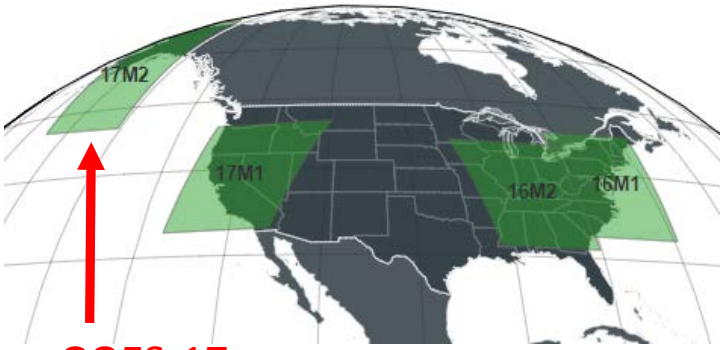
Mode 6
10-minute
Full Disk
2/19/19 0600-0645 UTC



New Location for GOES-17 Default Meso-2 Domain Sector

Effective March 5, 2019, the default center-point changed to coordinates chosen by Alaska Region (56N, 150W)

Prior GOES-17
Meso-2 location



New GOES-17
Meso-2 location

Rationale

- Alaska only receives 15-minute GOES-17 imagery routinely as they are outside of 5 minute PACUS domain
- CONUS NWS Regions felt the area covered by the prior default Meso-2 was sufficiently covered by 5-minute CONUS GOES-16 imagery, plus slight overlap from GOES-16 default Meso-2
- Hawaii Region was covered by 5-minute PACUS imagery

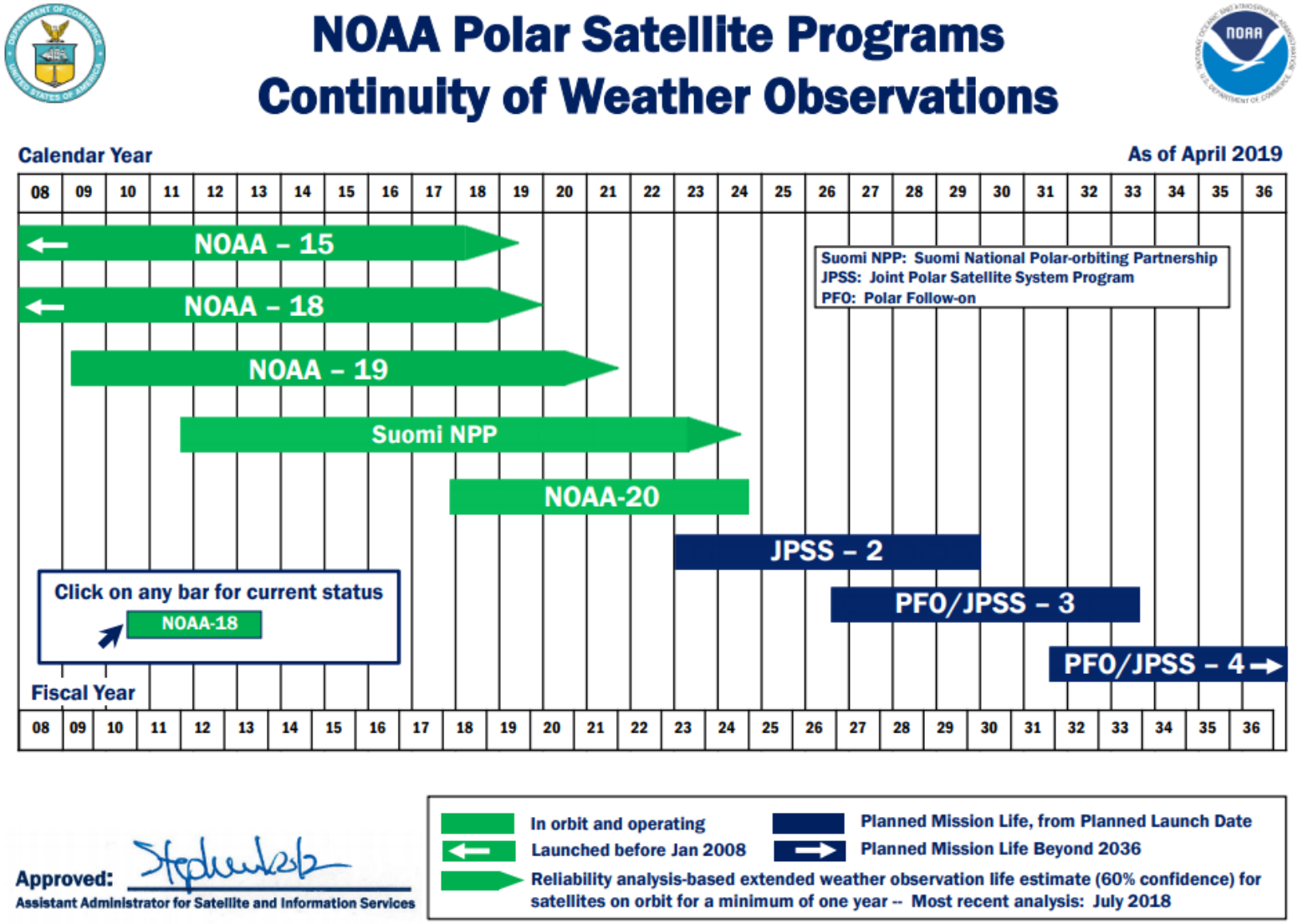
Documentation of Product Status

A comprehensive listing of data quality assessments for GOES-16/17 ABI L2 products:

https://www.noaasis.noaa.gov/GOES/product_quality.html

POES Status

LEO Flyout Schedule



http://www.nesdis.noaa.gov/FlyoutSchedules.html

http://www.jpss.noaa.gov

POES Status (Aug 2019)

http://www.ospo.noaa.gov/Operations/POES/status.html

Spacecraft Subsystems	METOP-A	METOP-B	METOP-C	NOAA-19	NOAA-18	NOAA-15
Launch Date	Oct 2006	Sept 2012	Nov 2018	Feb 2009	May 2005	May 1998
Operational Date	May 2007	April 2013	April 2019	Jun 2009	Aug 2005	Dec 1998
Mission Data Category	Secondary (AM)	Primary (AM)	Operational (AM)	Prime Services Mission (PM)	Secondary (PM)	Secondary (AM)
Payload Instruments						
AVHRR	G	G	G	G	G	Y(19)
HIRS	Y(40)	P(32)	N/A	O (31)	R (3,43)	Y (5)
AMSU-A1	O (30)	Y(36)	P (44)	G	P (33)	Y(20)
AMSU-A2	G	G	G	G	G	
AMSU-B	N/A		N/A	N/A	N/A	R (11)
MHS	G	G	P(45)	Y (6)	R(42)	N/A
SEM	Y(38)	G	G	Y(39)	Y(37)	G
SBUV	N/A		N/A	S/C (9)	R(27)	N/A
Spacecraft Subsystems						
Telemetry, Command & Control	G	G	G	G	G	G
ADACS	G	G	G	G	Y (41)	O (10)
EPS	G	G	G	G	G	G
Thermal Control	G	G	G	G	G	Y(21)
Communications	Y (1)	G	G	G	G	Y(22)
APT/LRPT	R (2)	R (2)	R (2)	G	G	G
DCS	N/A	N/A	N/A	N/A	G	G
ADCS	G	O(29)	G	Y(34)	N/A	N/A
SAR: SARR & SARP	G	Y(35)	N/A	G	G	Y(23)

Operational	G
Spacecraft Issue but No User Impact	S/C
Investigating Performance Issue which will Impact Users	P
Operational with Limitation	Y
Operational with Degradation	O
Non-Operational	R
Not Applicable	

Suomi National Polar-orbiting Partnership (S-NPP) and NOAA-20 Performance Status – August 2019

Spacecraft	Suomi-NPP
Launch Date	Oct 28, 2011
Mission Category	LTAN 1325 (PM) *Operational (secondary)*

Spacecraft	NOAA-20
Launch Date	Nov 18, 2017
Mission Category	LTAN 1325 (PM) *Primary Satellite in PM orbit*

S-NPP	
Payload - Instruments	**Status**
ATMS	G
CERES	G
CrIS	G
OMPS – Nadir	G
OMPS – Limb	G
VIIRS	G

NOAA-20	
Payload - Instruments	**Status**
ATMS	G
CERES	G
CrIS	G
OMPS – Nadir	G
VIIRS	G

S-NPP Notes:

24-Aug-2019: All instruments operating normally

- Extensive monitoring of the S-NPP ATMS scan drive motor current loads and temperatures is ongoing.
- Spacecraft and sub-systems are power positive and operating nominally.

NOAA-20 (JPSS-1) Notes:

24-Aug-2019: All instruments operating normally and are meeting/exceeding their established performance specifications.

Operational (or capable of)

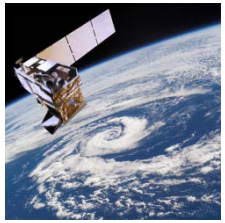
Operational with degraded performance

Operational with limitations (or in standby)

Not functional

SNPP & NOAA-20 Concurrent Operations at OSPO

- The NOAA-20 mission profile is substantially similar to S-NPP as NOAA-20 leads S-NPP by ½ orbit (i.e. ~51 min.)
- With the launch of NOAA-20, NOAA will operate two satellites within the same environment.
- S-NPP northern contact will often coincide with NOAA-20 southern contact.
- NOAA-20 SMD playback data latency significantly improved vs. S-NPP(140 to 80 min.)
- The Community Satellite Processing Package (CSPP) supports direct readout users in making the transition from POES to SNPP and subsequently to JPSS.



Deep Space Climate Observatory (DSCOVR)
Performance Status – Aug 2019 (in Safe-Hold)

Spacecraft	DSCOVR
Launch Date	Feb 11, 2015
Activation	June 2015

Payload Instruments	Status
EPIC	
PlasMag	
NISTAR	
Faraday Cup	
ESA	
Magnetometer	
PHA	

- Operational (or capable of)
- Operational with limitations (or in standby)
- Operational with degraded performance
- Not functional
- Functional but turned off
- No status reported

Spacecraft Subsystem	Status
Telemetry, Command & Control	O (1)
Guidance, Navigation and Control	O (1)
Attitude Control System	Y (1)
Propulsion	G
Mechanisms	G
Electrical Power	G
Thermal Control	G
Communications Payloads	G
Flight Software	G
1394	G

(1) DSCOVR will remain in Safe-Hold until delivery and upload of Star Tracker Flight Software planned Feb 14, 2020.

Jason-2 Status

- No Safe Holds.

97.32% data capture within 3 hours, requirement 75% within 3 hours (May 27 – Sep 1, 2019)

- **May 29:** New TM-NRTs connected to operational (old) NJGS.
- **June 17:** Began Site Acceptance Testing of new NJGS.
- **July 12:** The first proactive gyro swap was performed. Until the end of September, Jason-2 will be running on gyros 2 and 3, letting gyro 1 rest for a while.
- **July 15:** Cabling between ESPC and SOCC for the NJGS Refresh completed.
- **July 31:** Jason-2 station-keeping maneuver over land
- **Aug 13:** Began receiving yellow alarms, potentially due to PCE (Power Conditioning Equipment) section failure (investigations are currently on-going).
- **Sept 4:** Meeting with Law on Space Operations (LOS) bureau was held at CNES.
- **Sept 11:** Exceptional Joint Steering Group held to discuss Jason-2 end-of-life.

Jason-3 Status

- Spacecraft nominal. No Safe Holds.
- 98.38% data capture within 3 hours, requirement 75% within 3 hours (May 27 – Sep 1, 2019)

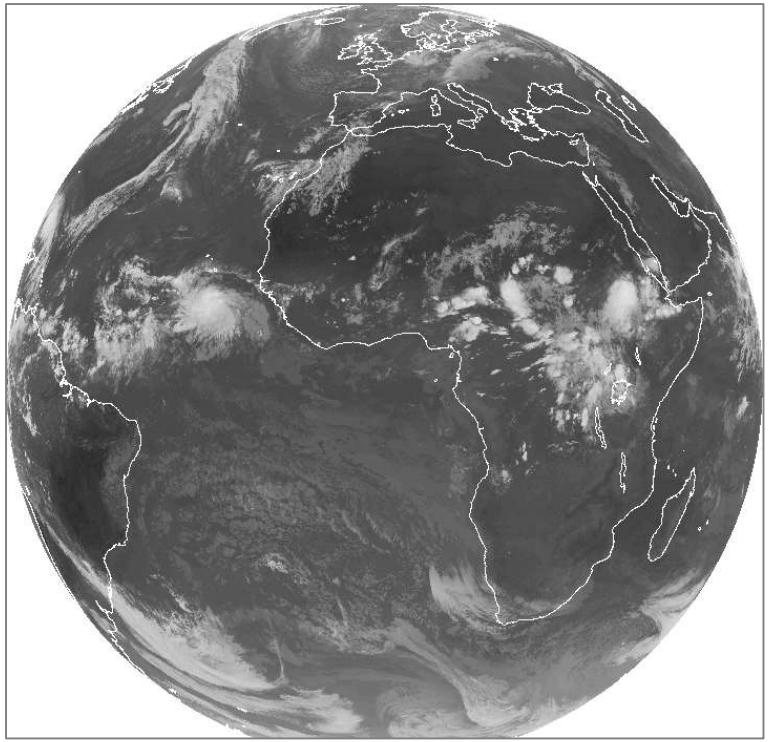
- **May 29:** New TM-NRTs connected to operational (old) NJGS.
- **June 16:** Jason-3 braking maneuver performed. One OGDR impacted.
- **June 17:** Began Site Acceptance Testing of new NJGS.
- **July 15:** Cabling between ESPC and SOCC for the NJGS Refresh completed.
- **August 6:** Jason-3 station-keeping maneuver over land. No impact.

Meteosat and Himawari

Specific Products Generated at NESDIS/ESPC from Himawari or Meteosat Data

NESDIS H-8 Product	Data Format(s)
Visible and IR Imagery	McIDAS Area
Tropical Cyclone Formation Probability	McIDAS Area
Wildfire Automated Biomass Burning Algorithm	McIDAS Area
Global Hydro-Estimator Satellite Rainfall Estimates	McIDAS Area, GRIB2, NetCDF4, PNG
Advanced Dvorak Technique	McIDAS Area
Volcano Multi-Spectral Imagery	McIDAS Area
Volcano Principle Component Imagery	McIDAS Area
Snow Cover, Ice Cover, Snow Depth, and Ice Concentration	McIDAS Area, GRIB2, ASCII
One-hourly NH Composite for AWIPS	AWIPS/GINI
Global Mosaic of Geostationary Satellite Imagery (GMGSI)	McIDAS Area, NetCDF4
Arctic Composite Imagery	McIDAS Area

Current MSG Constellation



SATELLITE	LIFETIME	POSITION	SERVICES
Meteosat-11	15/07/2015 2024	**0°**	0º SEVIRI Image Data. Real-time Imagery.
Meteosat-9	22/12/2005–Fuel lifetime is until 2024	**3.5° E**	Rapid Scan Service gap filling spacecraft and back-up to prime Met-11 spacecraft
Meteosat-10	05/07/2012–2024	**9.5° E**	Rapid Scan Service Real-time Imagery.
Meteosat-8	28/08/2002 – Fuel lifetime is until 2022	**41.5° E**	Full IODC service

Primary Imaging Operations

Current Networks Used for MSG Data Access

- OSPO receives Meteosat data several ways
  - JEUNO link between EUMETSAT and NOAA/NESDIS
    - Higher capacity (5 Gb/sec vs 1)
    - Delivers to PDA at NSOF
    - Able to deliver both Met-11 and Met-8 data
    - Caveat – extra processing steps (PDA initiates pull, security scans, PDA distribution) create 2-6 minute latencies compared to previous DOMSAT network

Current Networks Used for MSG Data Access

- OSPO's Meteosat Data Access Back-up
  - NOAA/STAR
    - Maintains ftp server receiving data from EUMETCAST broadcast service
    - Used by OSPO as backup data source to primary operational JEUNO network
    - STAR support 8x5, best effort

Change in EUMETSAT MSG Data Policy Effective January 2019

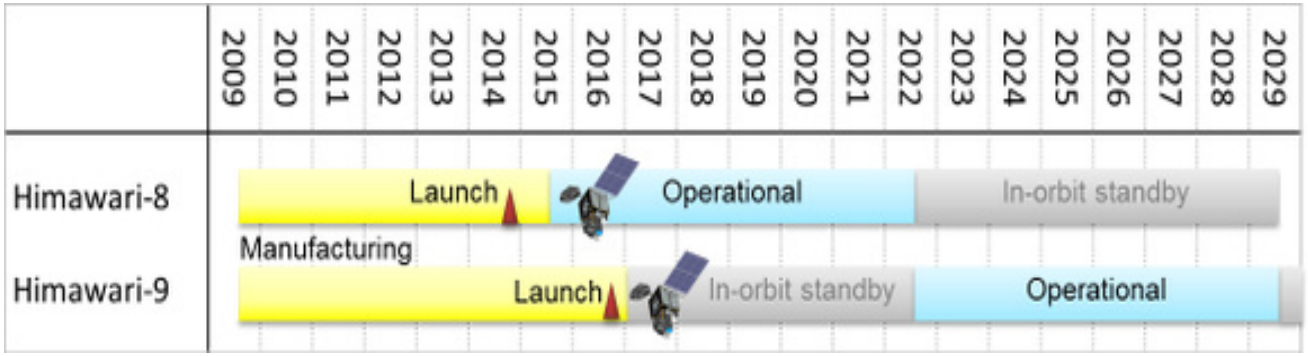
- EUMETSAT shall make its *Hourly* Meteosat [HRIT] Data, all Derived Products and Advance Image Products available to all users world-wide on a free and unrestricted basis as "Essential" Data and Products in accordance with WMO Resolution 40

Future Meteosat Third Generation (MTG) Satellites

- MTG-I1 (imager mission)
  - Projected launch date Q3/CY2021, operational by October 2022
  - 16 channel imager and lightning mapper
    - Temporal and spatial resolutions similar to GOES-R series
- MTG-S1 (sounder mission)
  - Projected launch date Q3/CY2023
  - Two Spectral bands: MWIR (4.44–6.25 µm) and LWIR (8.26–14.70 µm)
  - Spatial resolution of 4 km x 4 km at nadir

Himawari-8/9 Constellation

- Himawari-8 is operational at 140E
- Himawari-9 is in standby at 140.7E
  - Slated for prime 140E operations in 2022
  - Himawari-9 end of life around 2030



NOAA's Himawari-8 Operational Plans Himawari Tiger Team

- Phase 1 Short Term (1-2 months)
  - NESDIS provides Himawari Level 2 products via the Center for Satellite Applications and Research (STAR) ftp server with 24/7 monitoring capability provided by the Office of Satellite Products and Operations (OSPO) and 24/7 troubleshooting capability provided by STAR.
    - Current Himawari L2 products available from STAR
      - Cloud Products: Cloud Mask, Cloud Phase, and Cloud Height
      - Derived motion winds
    - L1b data also available in native HSD format from STAR via JMA's HimawariCloud service

Himawari-8 Operational Plans
Himawari Tiger Team

- Phase 2 (2020-2021)
  - NESDIS will move L2 PG to cloud service - products will flow from NESDIS cloud to PDA and from PDA to customers
  - Distribution of level 1b HSD data also from PDA
  - Himawari L2 products planned for generation and distribution:
    - Cloud and Moisture Imagery
    - Rainfall Rate
    - Sea Surface Temperature
    - Cloud Products
      - Cloud Top Height, Clear Sky Mask, Cloud Top Phase
- Initial demonstration of capability ~ March 2020
- Full operational capability ~ September 2021

Thank you!

Questions?