



SATELLITE OPERATIONS

# Status of NOAA Satellite Operations & McIDAS at ESPC

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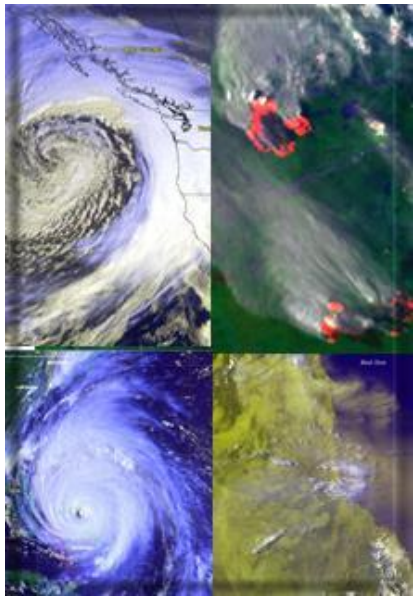
***NESDIS/Office of Satellite and Product Operations (OSPO)***

**2018 McIDAS Users' Group Meeting**
**May 22-23, 2018**
**Madison, WI**

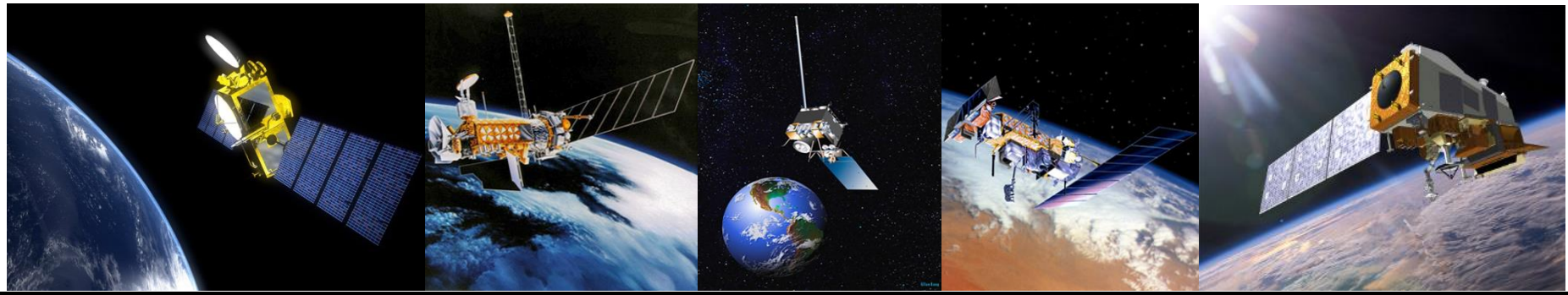
# Presentation Outline

- Overview of the Office of Satellite and Product Operations (OSPO)
- Status of Satellite Operations
- Status of McIDAS at ESPC
- Updates on Data Access and Distribution
- Q&A



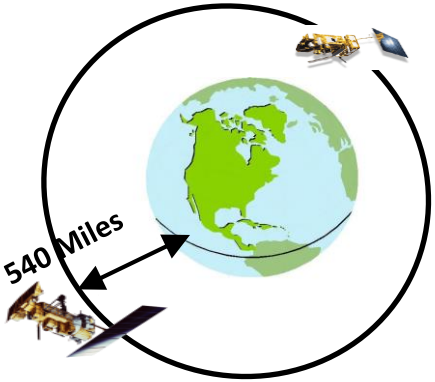
# NESDIS Office of Satellite and Product Operations (OSPO)

- Operates the Nation's 18 environmental satellites:
  - 5 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

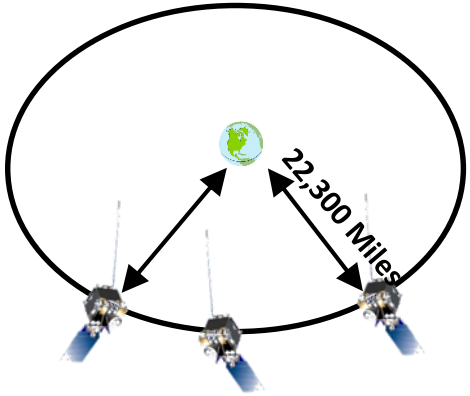
## Polar-orbiting Operational Environmental Satellites




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

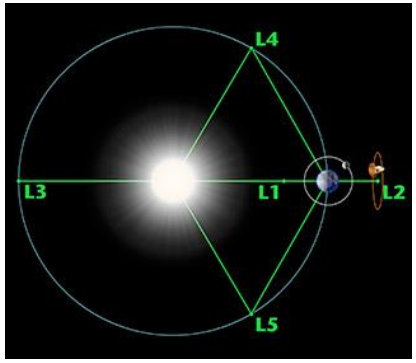
## Geostationary Operational Environmental Satellites




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

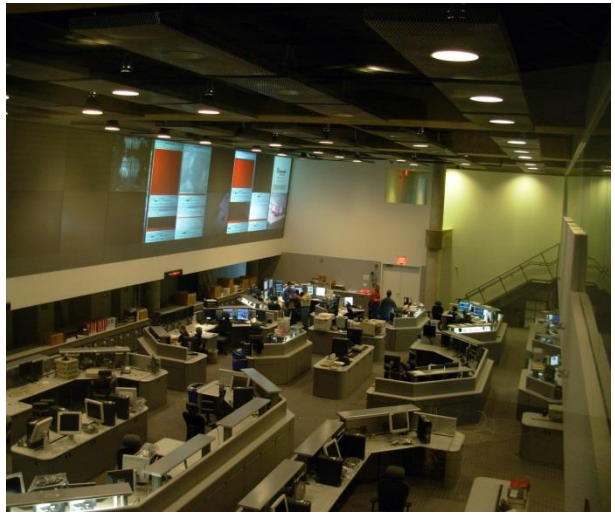



Continuous monitoring of the Sun

- 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**

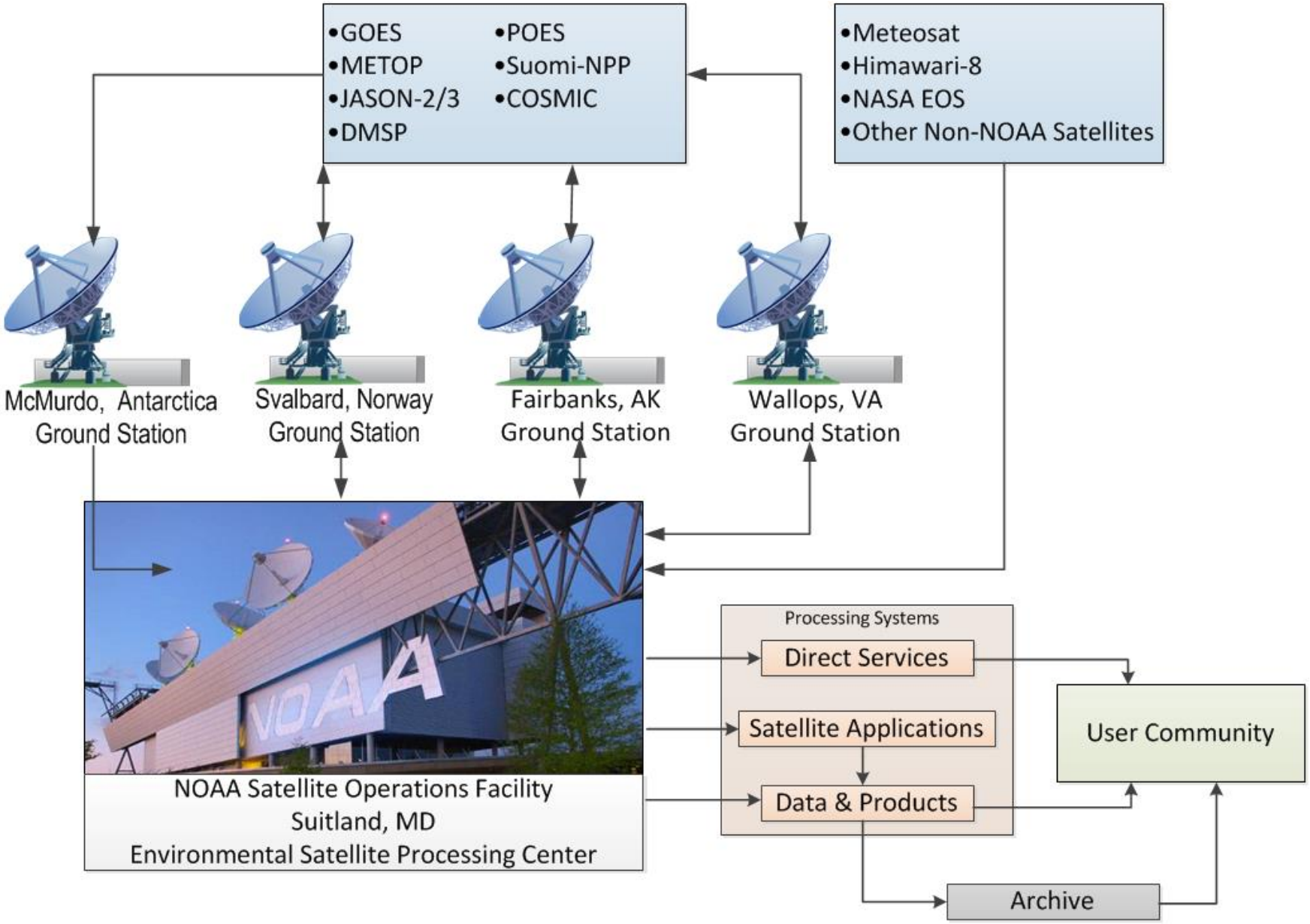

**Fairmont, WV***

**Wallops, VA**

**Fairbanks, AK**

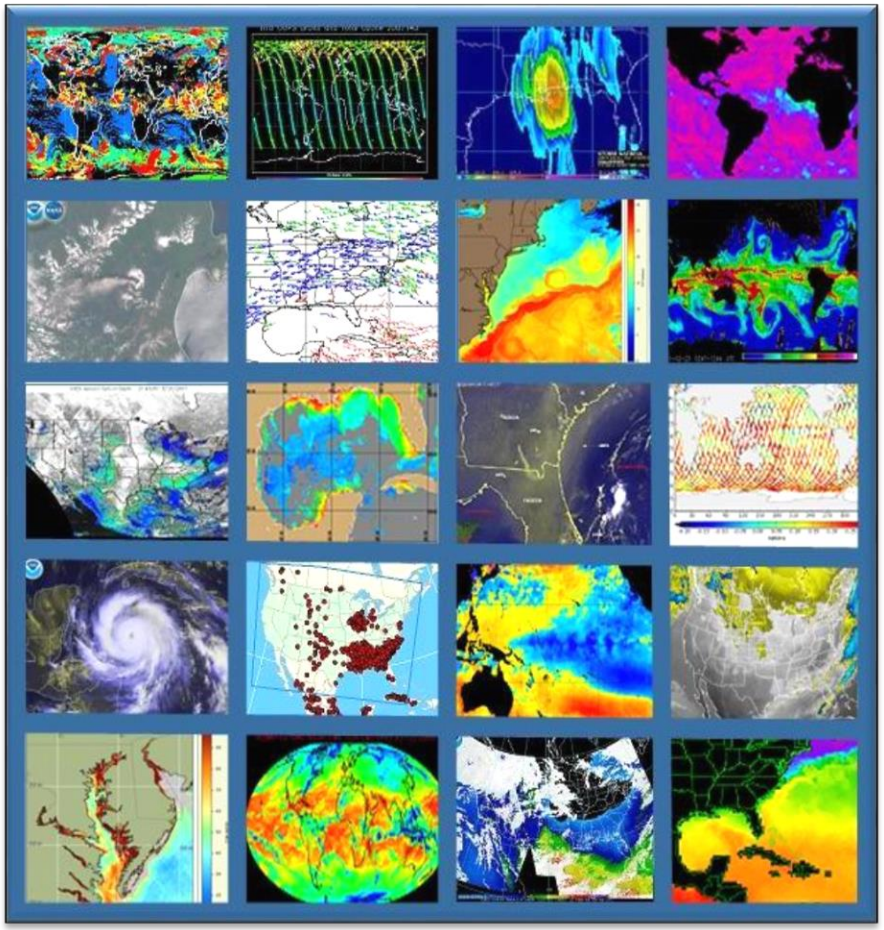
* GOES-R and JPSS (New) Backup Facility

# Nominal Satellite Data Flow



# 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

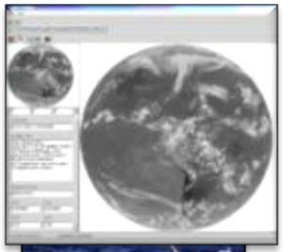


# Direct Service Operations

## Emergency Managers Weather Information Network (EMWIN):


- NOAA satellites relay critical information to users across the country.
  http://www.weather.gov/emwin/index.htm

## Low Resolution Image Transmission (LRIT):



- NOAA satellites are used to relay satellite and weather products to users in remote locations, that do not have landlines or internet connections.
  http://www.noaasis.noaa.gov/LRIT/

## 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 – March 2018

| *Payload Instrument* | GOES-13 (Storage) Launch: May 06 Activation: Apr 10 Legacy: Jan 18 | GOES-14 (Standby) Launch: Jun 09 Activation: | GOES-15 (West) Launch: Mar 10 Activation: Dec 11 |
|---|---|---|---|
| Imager | G | G | G |
| Sounder | R (4) | G | Y (3) |
| Energetic Particle Sensor (EPS) | G | G | G |
| Magnetometers | G | G | G |
| High Energy Proton and Alpha Detector (HEPAD) | G | G | G |
| X-Ray Sensor (XRS) | 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) Performance Status – March 2018

| *Payload Instrument* | GOES-16 (EAST) Launch: Nov 2016 Activation: Dec 2017 |
|---|---|
| Advanced Baseline Imager (ABI) | G |
| Space Environment I-Situ Suite (SEISS) | G |
| Solar Ultraviolet Imager (SUVI) | G |
| EUV and X-ray Irradiance Sensors (EXIS) | G |
| Magnetometer | Y |
| Geostationary Lighting Mapper (GLM) | G |
| ***Spacecraft Subsystems*** | |
| Command Data & Handling (CD&H) | G |
| Guidance Navigation Control (GNC) | G |
| Electrical Power Subsystem (EPS) | G |
| Propulsion | G |
| Mechanisms | G |
| Electrical Power | G |
| Thermal Control | G |
| Communications Payloads | G |

**Key**

**Operational**

**G**

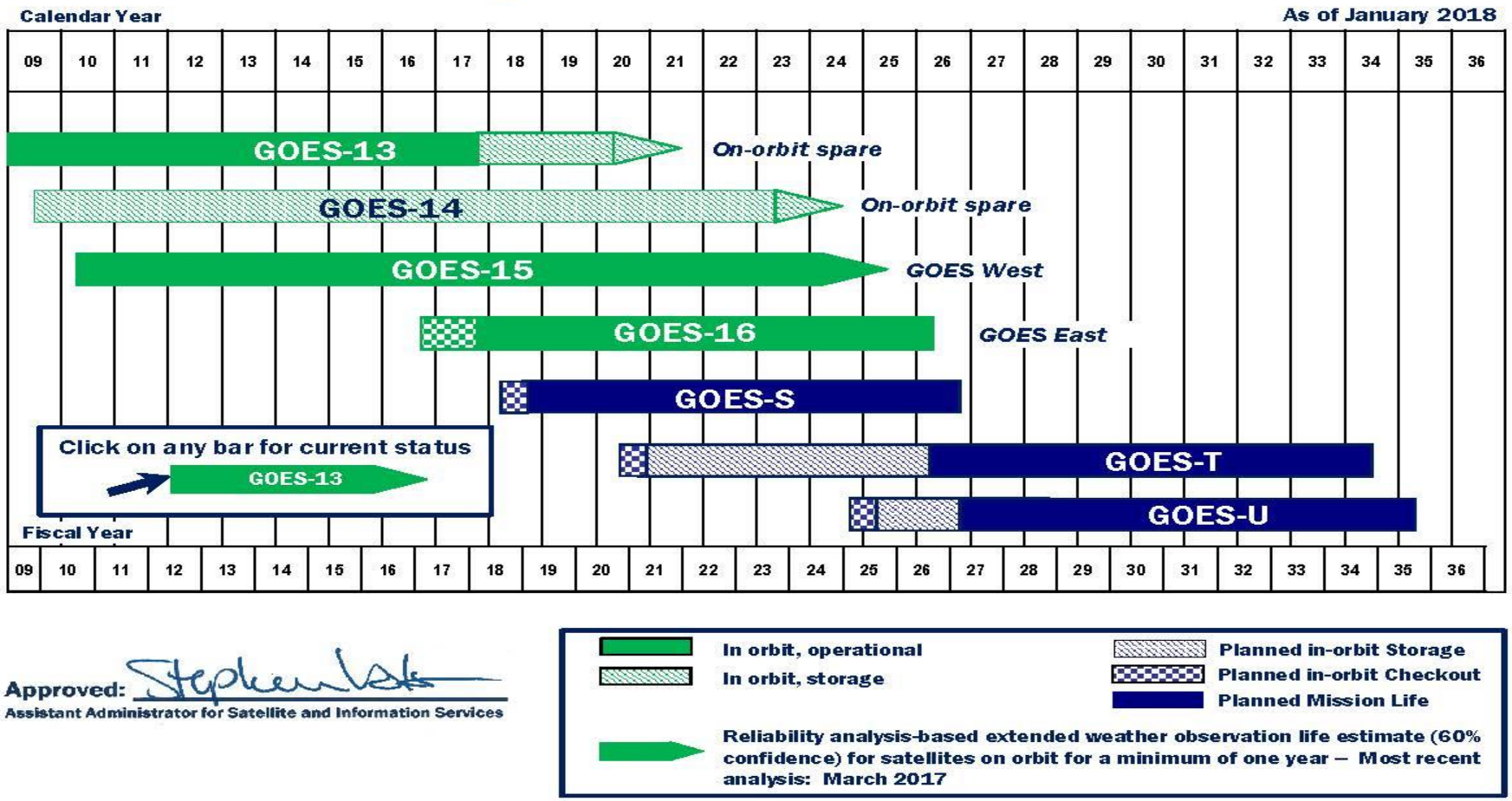
**Operational with limitations**

**Y**

**Non-operational**

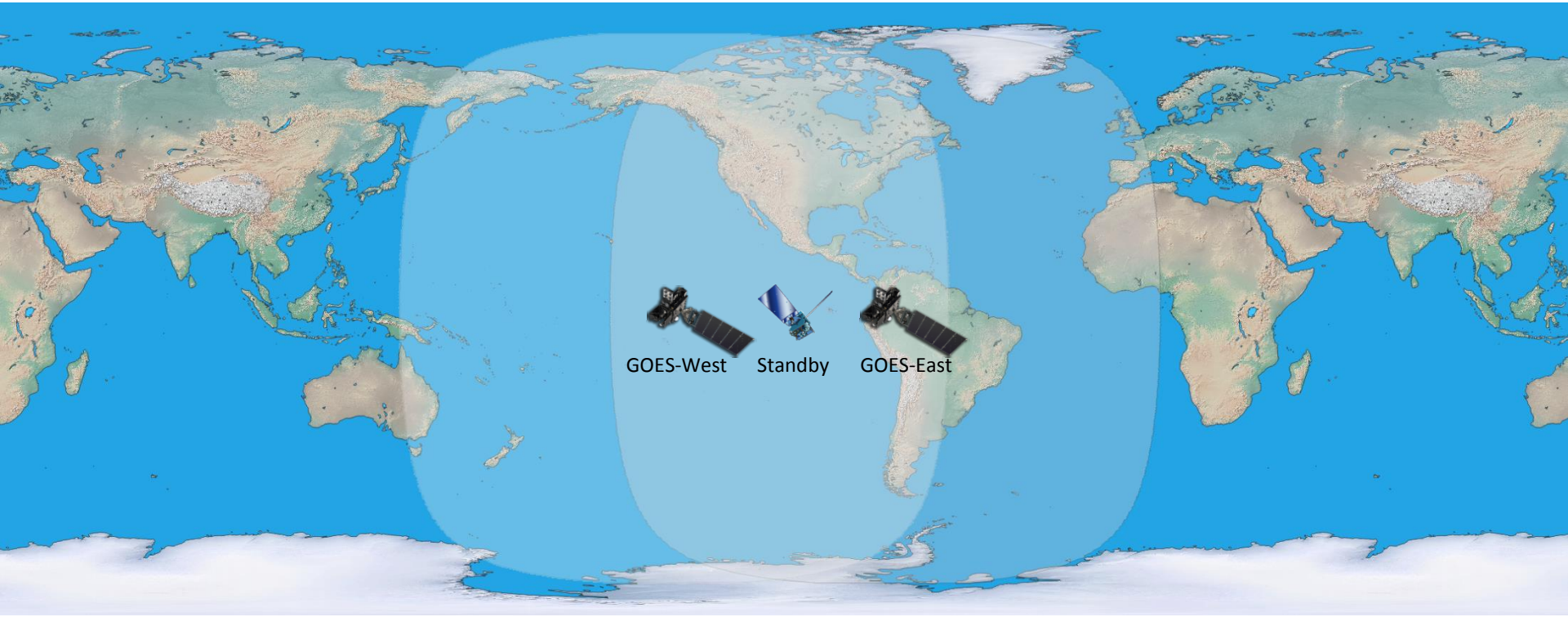
**R**

# GOES Flyout Schedule




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

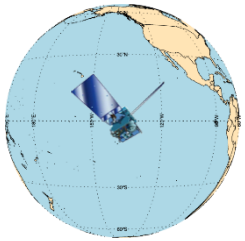
# GOES Constellation



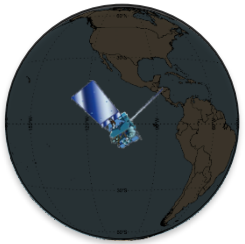
# GOES Constellation

## Current Constellation as of May 22, 2018

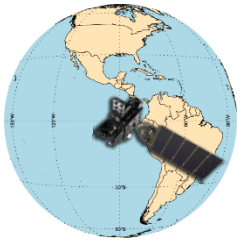
GOES-West
GOES-15
135° West



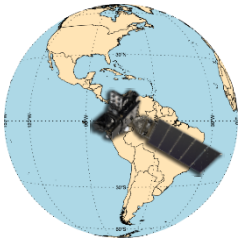
Standby
GOES-14
105° West



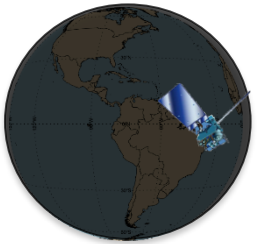
Checkout
GOES-17
89.5° West



GOES-East
GOES-16
75.2° West

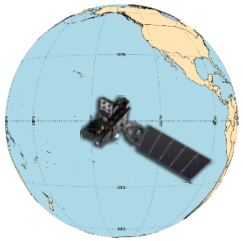


Storage
GOES-13
60° West



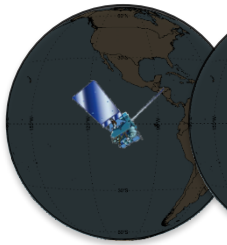
## Future Constellation Plans as of May 22, 2018

GOES-West
GOES-17
137° West

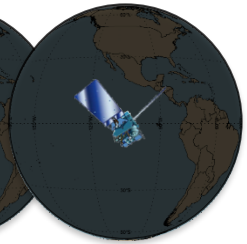


Drifting to 137° West in October, 2018; Operational at 137° West in Nov/Dec, 2018

Storage
GOES-15
105° West

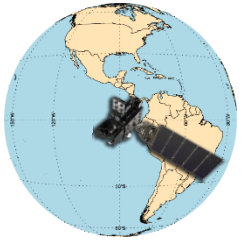


Standby
GOES-14
105° West



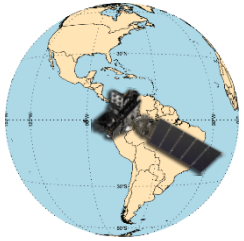
Drifting to 105° West for storage in Nov/Dec, 2018

Checkout
GOES-T/U
89.5° West

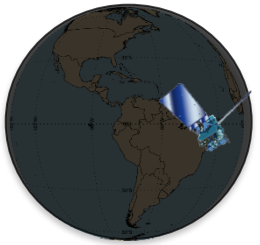


GOES-T Launching in June, 2020; GOES-U Launching in 2024

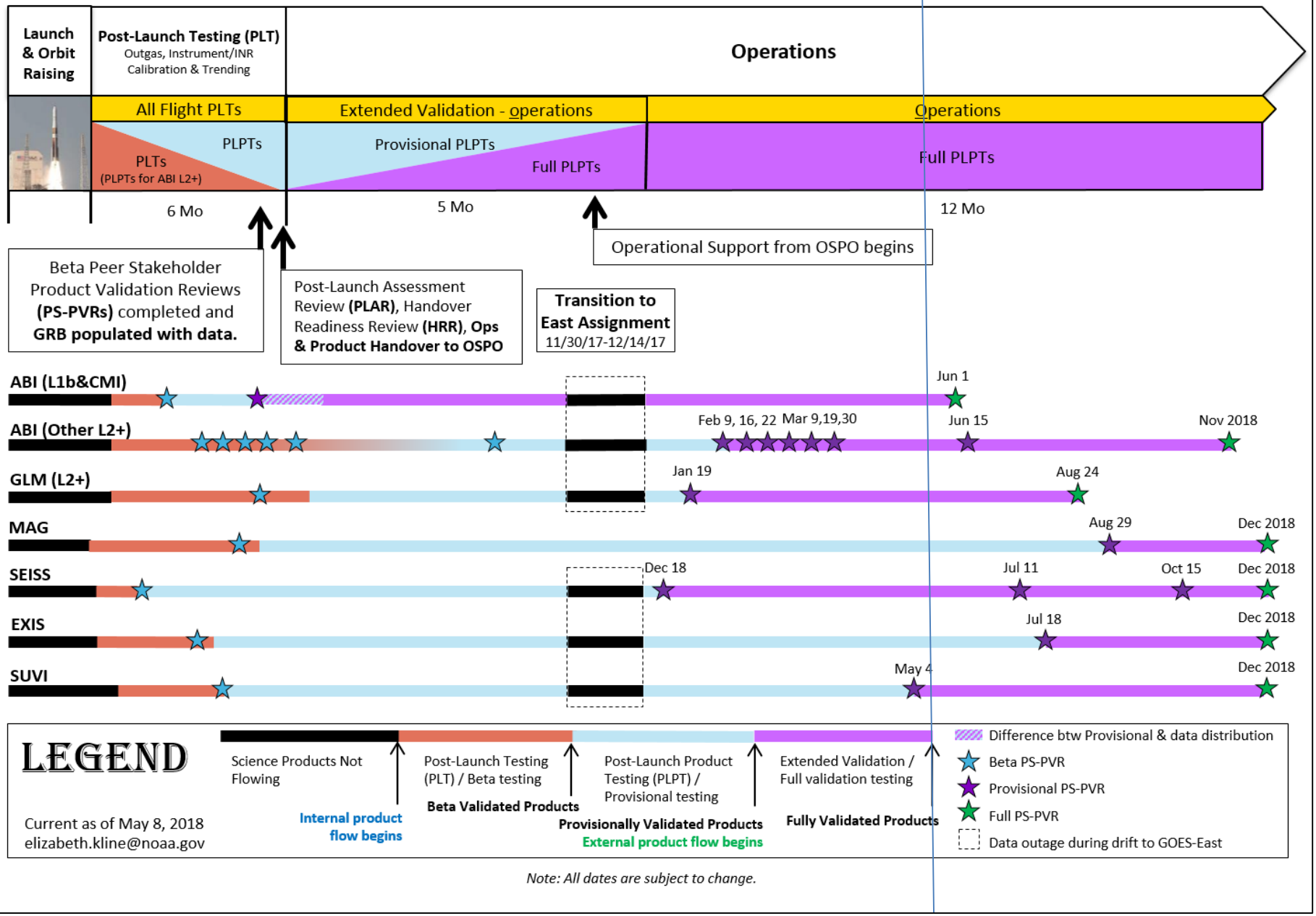
GOES-East
GOES-16
75.2° West



Storage
GOES-13
60° West



# 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 |

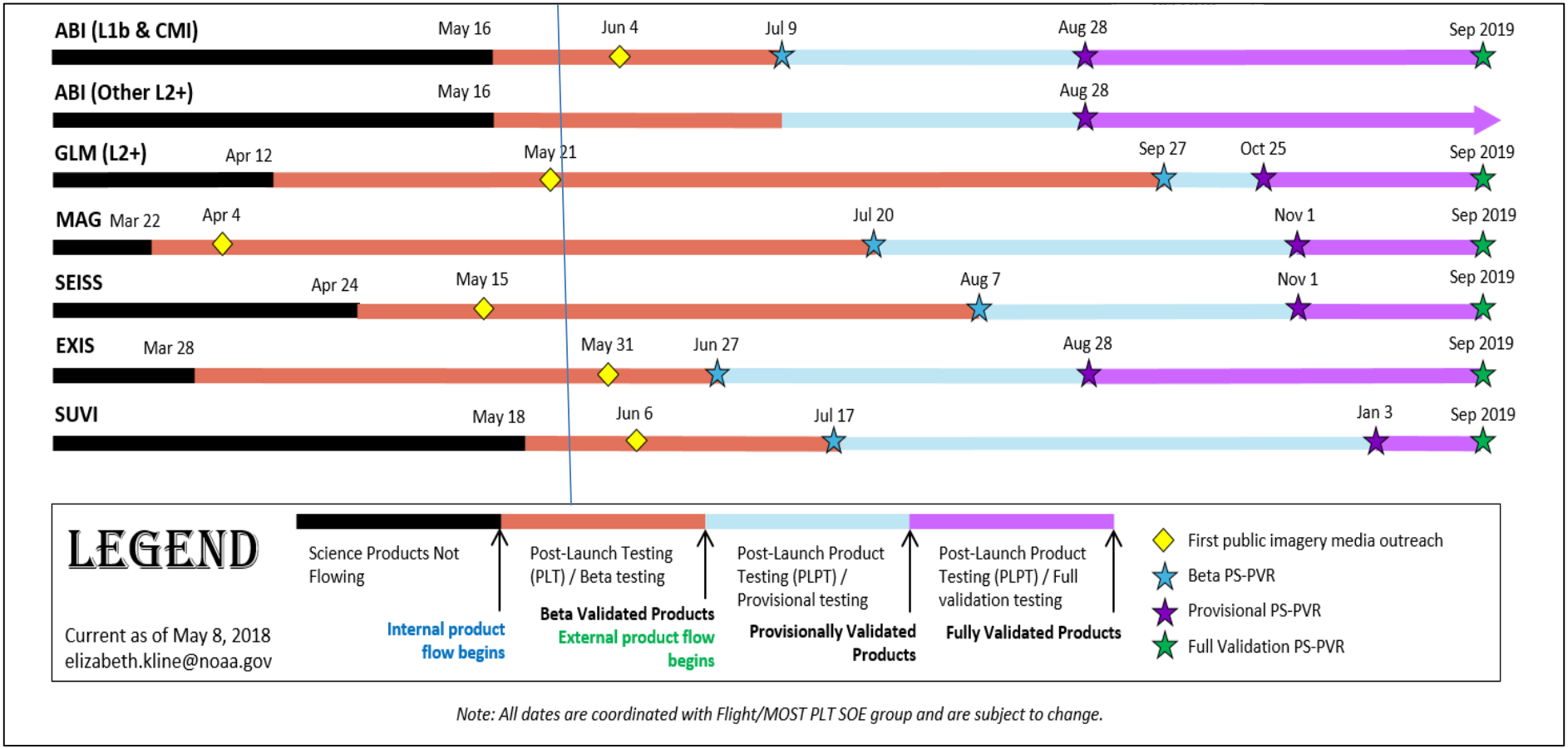
4/6/18

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

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

# GOES-17 First Public Images & Plots

- First public images/plots will be released after orbit raising and initial image navigation and radiometric assessment
- CWG POCs are established for creation of First Drafts of Public Image/Data Mock-Ups
- PRO Lead, Program Chief of Staff and NESDIS Communications facilitate and provide copy-edits for story-board layouts and captions



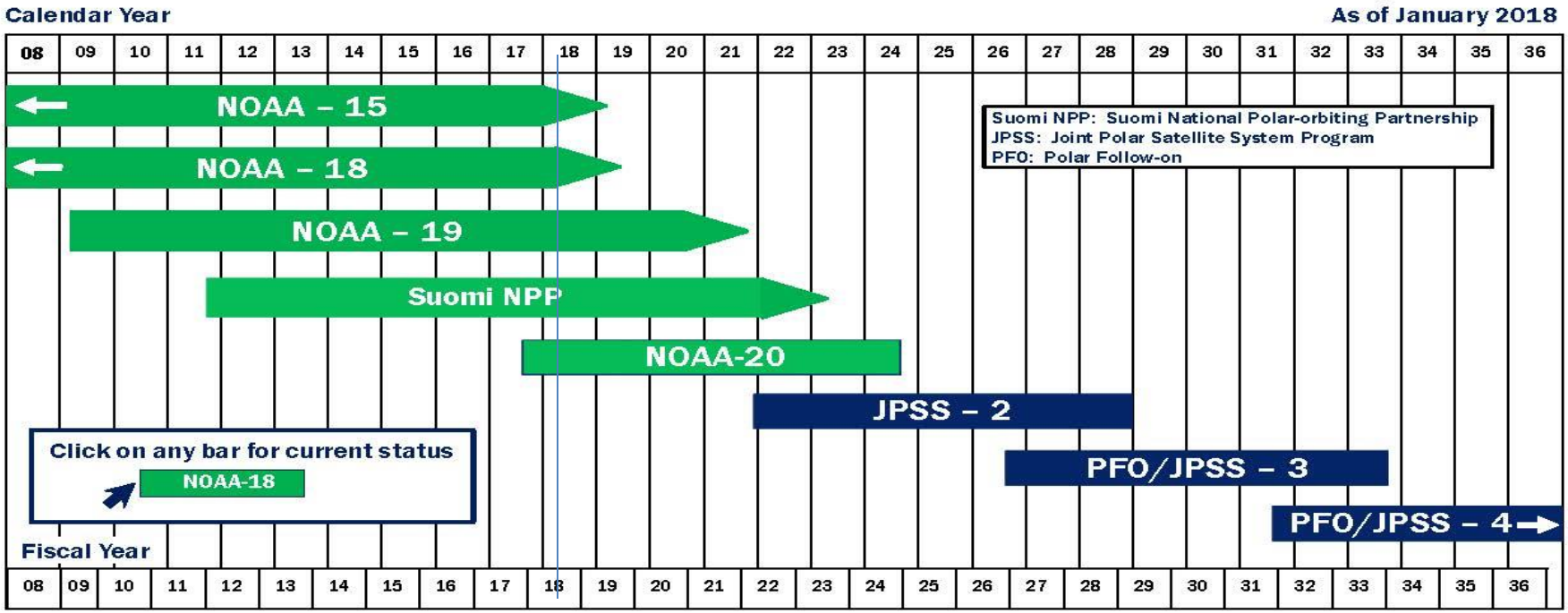

*Note: All dates are coordinated with Flight/MOST PLT SOE group and are subject to change.*

# GOES-West Transition Plan for Replacement of GOES-15 with GOES-17

| Date | GOES-17 | GOES-15 |
|---|---|---|
| Sep, 2018 | Post Launch Acceptance Review | |
| Sep, 2018 | Handover Readiness Review | |
| Oct, 2018 | Drift Start from 105 deg West (data stops) | |
| Oct, 2018 | | GVAR Re-Routed through GOES-14 |
| Nov, 2018 | Drift Stop at 137 deg West | |
| Nov, 2018 | Data Distribution Resumes | |
| Nov, 2018 | Operations Transition Readiness Review | |
| Nov/Dec, 2018 | Becomes GOES-West | |
| Nov/Dec, 2018 | | Data Distribution Disabled (some Space Wx may continue) |
| Dec, 2018 | | Data Re-Routing via GOES-14 Disabled |
| Dec, 2018 | | Instruments Placed in Safe Mode (some Space Wx may continue). Consider drift options. |

# POES Status

# LEO Flyout Schedule




Approved:
Assistant Administrator for Satellite and Information Services

In orbit and operating
Launched before Jan 2008
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
Planned Mission Life, from Planned Launch Date
Planned Mission Life Beyond 2036

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

# POES Status (Apr 2018)

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

| | |
|---|---|
| Operational | G |
| Spacecraft Issue but no User Impact | S/C |
| Operational with Limitation | Y |
| Non-Operational | R |
| Not Applicable | N/A |

| | METOP-B | NOAA-19 | S-NPP* | GOES-16 | GOES-15 |
|---|---|---|---|---|---|
| Launch Date | Sept 2012 | Feb 2009 | Oct 2011 | Nov 2016 | March 2010 |
| Operational Date | April 2013 | Jun 2009 | Sept 2013 (NDE) | Dec 2017 | December 2011 |
| Mission Data Category | Primary (AM) | Secondary (PM) | Primary (PM) | GOES-East | GOES-West |
| Product Areas | | | | | |
| Imagery | G | G | G | G | G |
| Radiances | G | G | G (CrIS/ATMS) | G | G |
| RadBud/Emissivity | G | G | G (Emissivity) | G | G |
| Soundings | G | G | G (CrIS/ATMS Moist and Temp Profiles) | G | G |
| Winds | G | G | G (VIIRS PW) | G | G |
| Sea Surface Temp | G | G | G (VIIRS SST) | G | G |
| Precipitation | G | G | G (MIRS RR+TPW) | G | G |
| Volcanic Ash | G | G | Future | G | G |
| Tropical Products | G | G | G(NTCP) | 6/15/2018 | G |
| Ozone | G | G | G (OMPS TC/Profile + CrIS Ozone) | N/A | N/A |
| Fire and Smoke | G | G | G(Active fires and AOT) | 3/30/2018 | G |
| Snow and Ice | G | G | G (Binary Snow Cover) | TBD | G |
| Vegetation | G | G | G (VIIRS Green Vegetation Fraction) | N/A | N/A |
| Broadcast Services | G | G | G | G | G |

# Suomi National Polar-orbiting Partnership (S-NPP) Performance Status – March 2018

| Spacecraft | S-NPP |
|---|---|
| Launch Date | Oct 28, 2011 |
| Mission Category | LTAN 1330 (PM) +/- 10 mins |

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

| Payload Instruments | Status |
|---|---|
| ATMS | G |
| CERES | G |
| CrIS | G |
| OMPS – Nadir | G |
| OMPS – Limb | G |
| VIIRS | G |

| Spacecraft Subsystem | Status |
|---|---|
| TLM, Command & Control | G |
| ADCS | G |
| EPS | G |
| Thermal Control | G |
| Communications | G |
| CDP | G |
| SCC | G |
| GPS | G |
| 1553 | G |
| 1394 | G |

## Additional Notes:

29-Mar-2018: All instruments operating normally and are meeting/exceeding their established performance specifications

**Additional instrument/system notes:**

- Extensive monitoring of the ATMS scan drive motor current loads and temperatures is ongoing.
- All data processing and distribution is being performed on Block JPSS 2.0 systems and on the new ground segment (NDE 2.0/PDA)

ATMS Instrument - Routine execution of twice an orbit ATMS scan drive motor reversal activities been ongoing since 18 Aug 2016 – this activity will continue indefinitely. These reversal activations are performed near high latitudes (70N, 70S, 75N, 75S, 80N, 80S) in order to provide for a more consistent placement of the reversal-induced data gaps.

**Note** - The purpose of the ATMS scan driver motor reversal is to extend the bearing life. During each reversal activity, expect up to a one minute ATMS data outage. ATMS data resumes normally after each scan drive motor reversal activity is completed.

# NOAA-20 (Joint Polar Satellite System-1) Performance Status – March 2018

| | |
|---|---|
| **Spacecraft** | NOAA-20/JPSS-1 |
| **Launch Date** | Nov 18, 2017 |
| **Mission Category** | Transitioning to Operational Orbit |

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

| Payload Instruments | Status |
|---|---|
| ATMS | On/Cal |
| CERES | On/Cal |
| CrIS | On/Cal |
| OMPS – Nadir | On/Cal |
| OMPS – Limb | On/Cal |
| VIIRS | On/Cal |

| Spacecraft Subsystem | Status |
|---|---|
| TLM, Command & Control | G |
| ADCS | G |
| EPS | G |
| Thermal Control | G |
| Communications | G |
| CDP | G |
| SCC | G |
| GPS | G |
| 1553 | G |
| SpaceWire | ON |

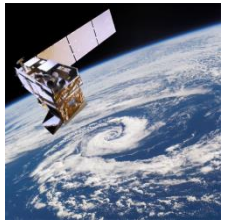
**Additional Notes:**

Spacecraft is nominal at this time

VIIRS: VIIRS Outgassing has improved the performance of the VIIRS instrument back to near-nominal levels. Engineering is monitoring instrument performance for 200 orbits (the initial time it took for the degradation to appear) before closing out anomaly.

# SNPP & NOAA-20 Concurrent Operations at OSPO

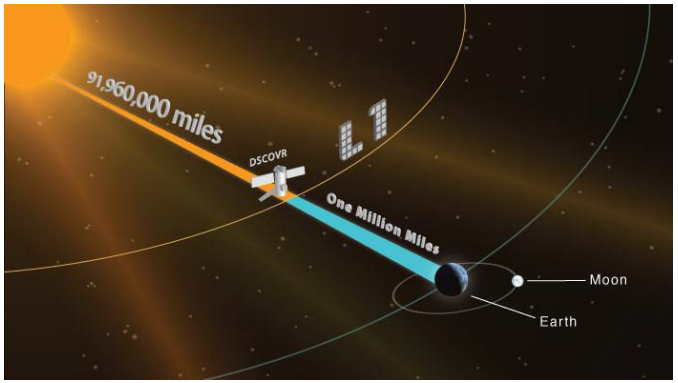
- The NOAA-20 mission profile is substantially similar to S-NPP as NOAA-20 leads S-NPP by ½ orbit (i.e. ~51 min.)
- With the launch of NOAA-20, NOAA will operate two satellites within the same environment.
- S-NPP northern contact  will often coincide with NOAA-20 southern contact.
- NOAA-20 SMD playback 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.




- Launched January 17, 2016
- February 12, 2016 - Began sending Operational Geophysical Data Records (OGDRs) to Ocean Prediction Center for evaluation.
- Full public release of Jason-3 products commenced this summer.
- Jason-2 transferred to interleaved orbit on October 13, 2016; transferred to separate orbit December 2017 to enhance coverage

# Space Weather Observations
# Deep Space Climate Observatory (DSCOVR)

- Launched 11 February 2015, at L1 on 8 June
- NOAA took command on October 28, 2015
- DSCOVR will work together with GOES-R to locate and measure size of solar flares;  provide earlier warning detection for geomagnetic storms.

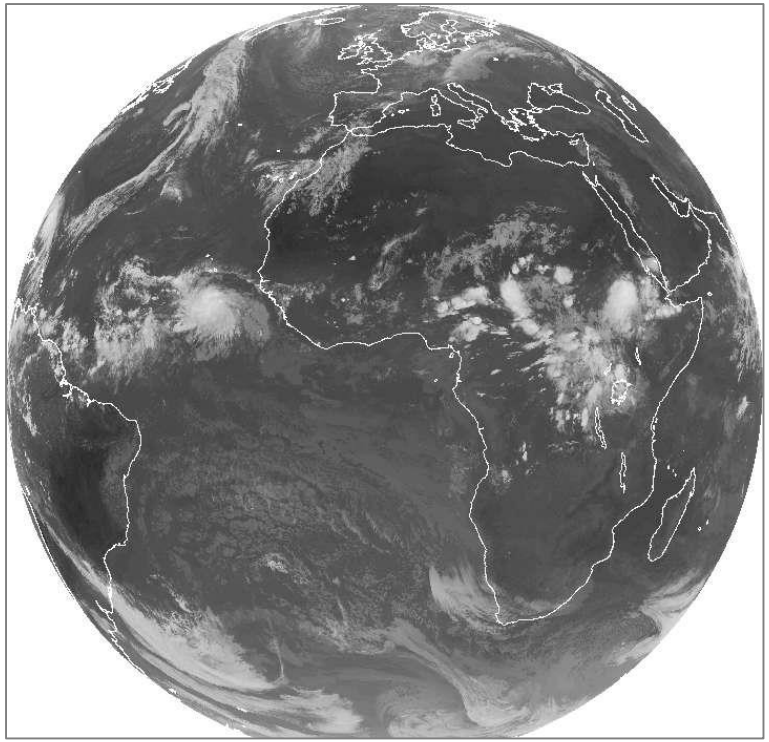


# Meteosat and Himawari

# 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 |
| Three-hourly Global Geostationary Mosaic | McIDAS Area, NetCDF4 |
| Arctic Composite Imagery | McIDAS Area |
| Geostationary Satellite (Web) Server | JPEG, GIF |

# Current MSG Constellation



| SATELLITE | LIFETIME | POSITION | SERVICES |
|---|---|---|---|
| **Meteosat-11** | 15/07/2015 – TBC | **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–TBC | **9.5° E** | Rapid Scan Service Real-time Imagery. |
| **Meteosat-8** | 28/08/2002 – Fuel lifetime is until 2020 | **41.5° E** | Full IODC service |

# Current Issue/Risk for MSG

- OSPO receives Meteosat data several ways
  - DOMSAT has been our primary link, BUT…
    - Routes through Wallops Island facility (remote from OSPO)
    - Expensive
    - Low capacity (cannot handle 2 meteosats simultaneously)
    - Has EOL components that could fail at any time and not be replaced
    - Circuit infrastructure being phased out NLT Dec 2018

# Current Issue/Risk for MSG

- OSPO receives Meteosat data several ways
  - JEUNO is the newer network architecture
    - Higher capacity (5 Gb/sec vs 1)
    - Delivers to PDA at NSOF
    - Able to deliver both met-11 and met-8
    - Downside – extra processing steps (PDA initiates pull, security scans, PDA distribution) create 2-6 minute latencies, compared to DOMSAT

# Current Issue/Risk for MSG

- OSPO receives Meteosat data several ways
  - Via NOAA/STAR
    - Maintains ftp server receiving data from EUMETCAST broadcast service
    - Used by OSPO as backup data source to DOMSAT (now) and PDA (future)
    - Not operational – STAR support only 8x5

# Himawari Update

- NESDIS/STAR, College Park, is pulling full resolution Himawari (8/9) AHI level 1b data from the HimawariCloud server
  - NOAA has *one* account for data access to the JMA server. On a best effort basis, full res H-8 AHI data are further distributed from STAR's server to:
    - NWS NCEP (includes AMVs and radiances in BUFR to EMC/JCSDA)
    - DoD
    - SSEC/CIMSS
    - NSOF/ESPC
- NSOF/ESPC is making H-8 imagery and derived level 2 products in McIDAS available from GEODIST7
    - Sub-sampled H-8 data reflecting the H-8 specifications of the five channels having a spatial resolution of 4 km in the IR, and 1 km in the Visible are being used to produce imagery and derived level 2 products (product listing next slide)

# Additional Updates

- Expected transfer of HimawariCloud data distribution from PDA did not happen
- Still rely on STAR, only supported 8x5
- Imagery backup (for SAB visual use) from SSEC/HCAST data
- Products/external users have no backup source
  - Attempt underway to extend HCAST distribution

# McIDAS at ESPC

# McIDAS Data Delivery Summary


GEODIST –

Geostationary satellite data is ingested on a SSEC Data Ingestor (SDI), converted to McIDAS format and placed on a server.

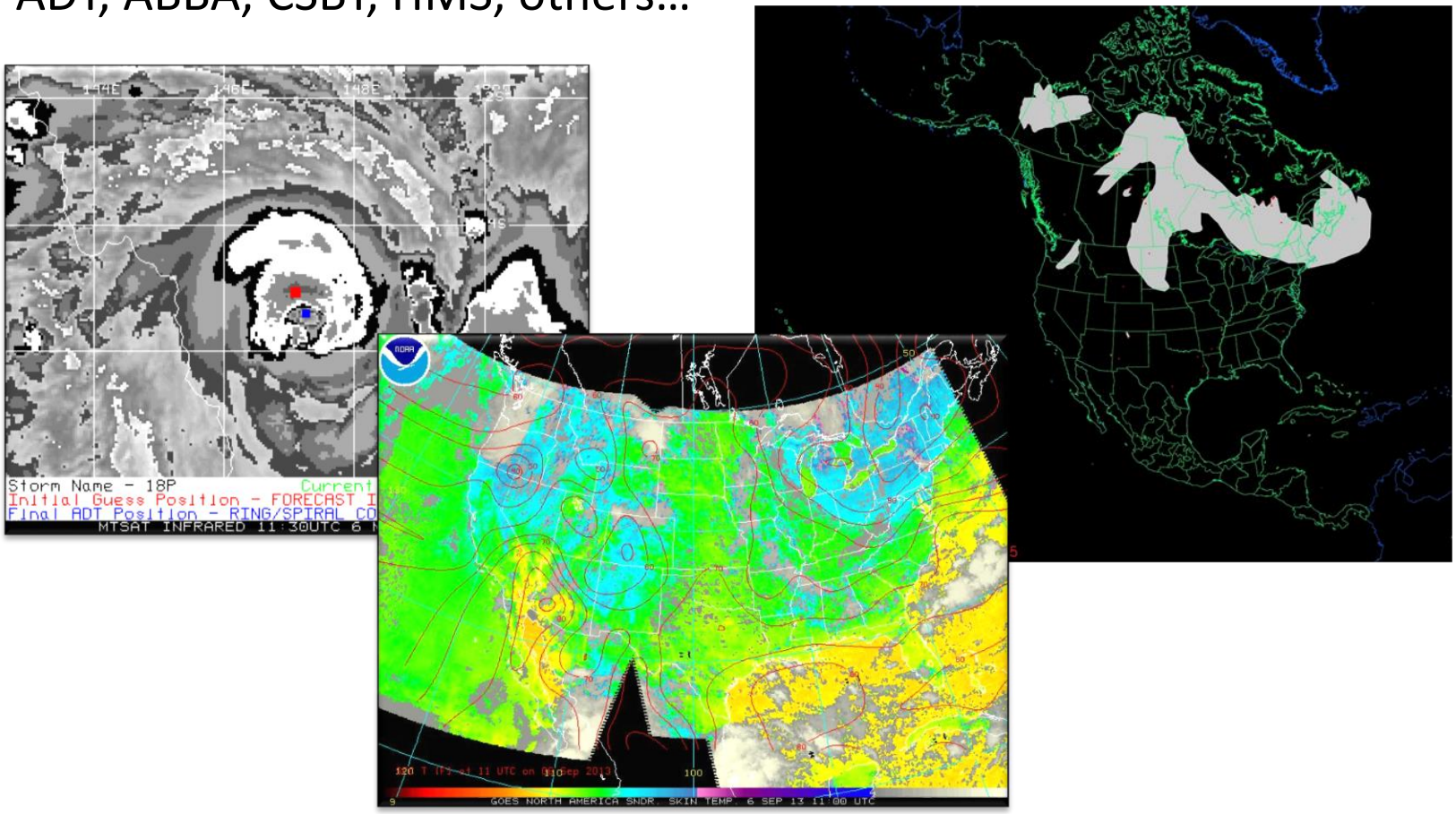
In addition, some foreign geostationary data, polar data, model data and derived products are converted into McIDAS.

This data is served via McIDAS ADDE:

| Data | NSOF Server | ADDE Name | |
|---|---|---|---|
| Derived Products | GEODIST1e | DPD | |
| ~~GOES-E~~ | ~~GEODIST2e~~ | ~~GER~~ | ***PDA/NCDF Only*** |
| GOES-W | GEODIST3e | GWR | |
| Polar | GEODIST4e | PLR | |
| Model data | GEODIST5 | MOD | |
| Global Mosaic 5 Sat. Comp. | GEODIST6 | MOS | |
| MSG/MIO | GEODIST6e | MSG / MIO | |
| Himawari | GEODIST7e | HIM | |
| Select requested data | SATEPSANONE | PUB | ***(not operational)*** |
| Surface/Ship Buoy/RAOBs | FOS2 | FOS (Family of Services) | |

# McIDAS & ESPC Applications

- Over 50 applications in ESPC use McIDAS, McIDAS libraries, input & serve McIDAS AREA Files, MD point files, GRID (McIDAS GRID Format), and Text via ADDE
- ADT, ABBA, CSBT, HMS, others…

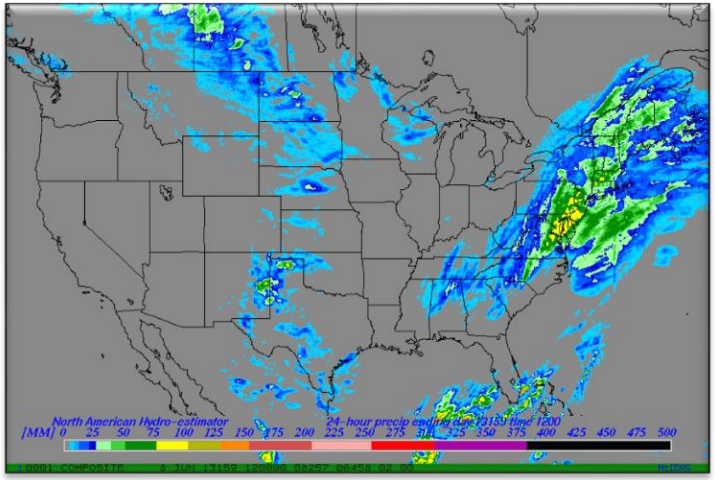


# McIDAS Systems at ESPC

- Over 20 SDIs at NSOF and Wallops OBF
  - Several are dedicated...
  - GOES-West, -14, Remappers
  - GOES Ingest and NOAAPORT Interface (GINI)

- Over 20 Workstations in SAB
  - -X for realtime analysis, product generation, and QA/QC
  - RHEL 7 Linux on Intel x86_64
  - Many “home grown” programs in Fortran, .PGM, BATCH

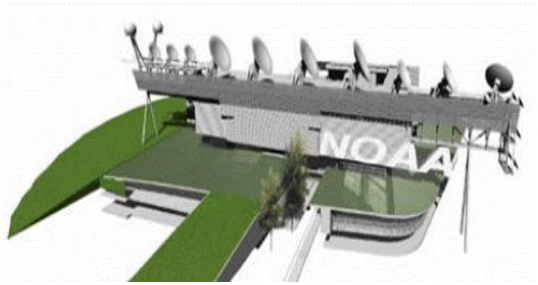
- Advantage - The ADDE protocol allows for many users accessing single systems with one port (112)



Global Hydro-Estimator 1 Day Total

- ESPC Product Generation/Distribution
  - IBM P6 & P7 Series with Linux Partitions, GEO Boxes
  - Many other Linux systems (gp*)
  - GINI running on Linux

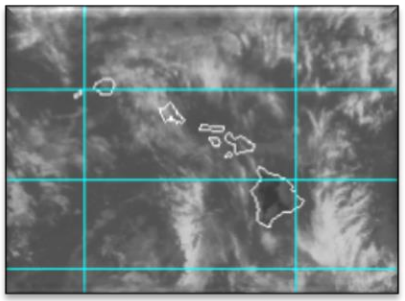
# McIDAS at ESPC

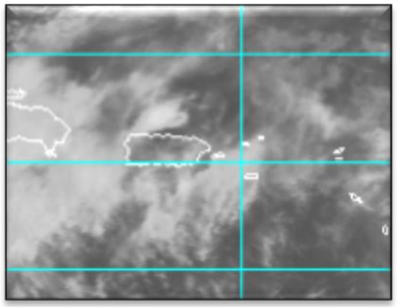



- ESPC has a standing, annual contract with SSEC for McIDAS Support and ongoing development
- ESPC representatives on the McIDAS Advisory Committee (MAC)
  - Jason Taylor and Clay Davenport
  - Kathryn Mozer (Alternate)

# SAB Use of McIDAS

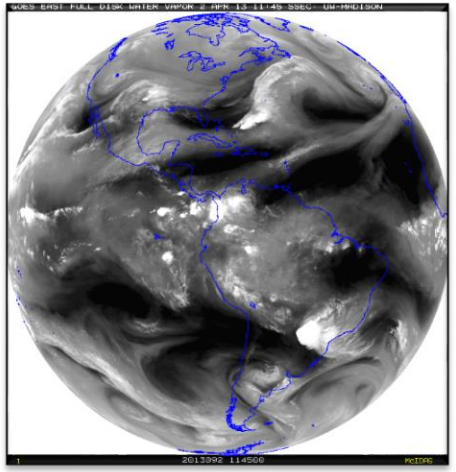
- SAB is 24x7 operation of 5 disaster mitigation desks (Heavy Precipitation, Volcanic Ash, Fire/Smoke/Dust, Marine Pollution, Tropical Cyclones) All desk use Mc-X in some capacity, except Marine which is ArcGIS
- McIDAS-X Usage: ~10 operational Linux systems with 24 GB RAM each and multiple monitor visualization setup
- A persistent daemon (image loop refresh) "SPIDER" uses ADDE protocol to display ~100 imagery loops
- Use Fnc keys to switch loops and pan entire globe through SPIDER loaded frames (e.g. NW Pacific IR, Shift+F1 - NW Pacific Vis, F2 - Central US IR) and still use command line (grudgingly)
- Lots of batch commands and everything is scripted by business work flow
- Uses McIDAS AREA files for web site as do NWS offices across country, namely NHC, AWC, NWS Western Region

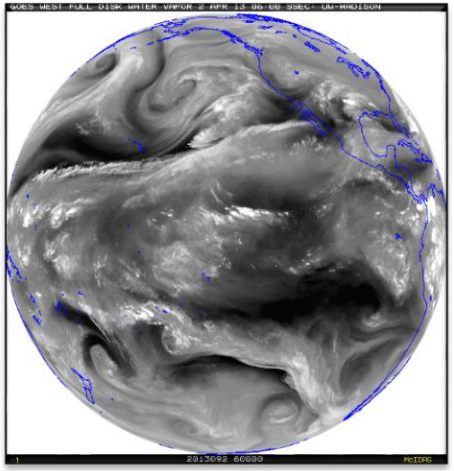




# McIDAS Advantages in SAB

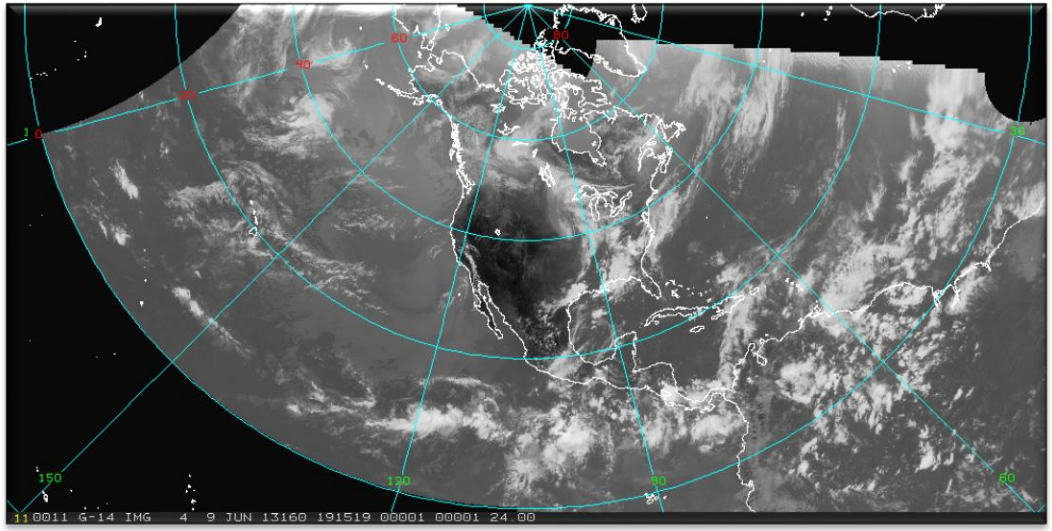
- Institutional knowledge - SAB Analysts have great familiarity with McIDAS
- Ability to have near-global coverage at multiple domain scales and resolution (~1800 frames) of quickly and routinely loaded (SPIDER) imagery at the tap of a button (TU Hotkeys) to perform interrogation, manipulation and value-added analysis when every second counts for time sensitive and rapidly evolving natural and man-made hazards, such as volcanic eruptions, flash flooding, fires, etc.
  - This cannot be done presently with NAWIPS or HMS. In fact, depending on the area of concern up to 20 minutes is lost waiting for imagery to show up on these other systems vs McIDAS
  - HOWEVER, since the NWS is the primary user of many SAB products (e.g. volcanic ash and heavy precipitation), there are benefits for SAB to conduct PG on NAWIPS like, quick overlays and seamless in-tool distribution. Fire uses HMS for analysis.



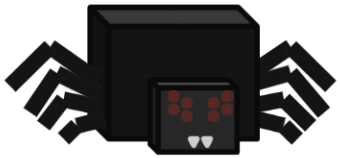


# McIDAS Challenges in SAB

- Maintaining efficient access to servers for operations (SPIDER is in-house stop-gap measure).
- Additional customer requirements for advanced data formats (GIS, KMZ)… writing own local code for NPP VIIRS, Windsat, others to convert them to AREA files as there are no local servers
- Learning Curve with commands
- Color Tables – 8 bit (default) – challenge with GOES-R series




North Hemi Composite - IR



# SPider

## **S**atellite **P**roduct **I**nformation **D**istribution **E**nvi**R**onment

Expands on concepts of Core Mcidas commands concepts

ADDE, DATALOC, DSSERVE, PT/GRD/IMGLIST, PT/GRD/IMGDISP, PT/GRD/IMGCOPY, SKL, etc.

Consists of two programs: Spider Server (SPS) and Spider Client (SPC)

Benefits:

-- Automatic loading without duplication of images
-- Reduces task loading of server/workstations
  - Numerous pings to server but fewer downloads
-- Run from command line environment (typically SKL) on all platforms
  - Leads to distribution system effectiveness
-- Timely, based on user needed requirements (set to any refresh rate)
-- Upgrades for Goes-R series have improved monitoring capability and broken the 10K file limit

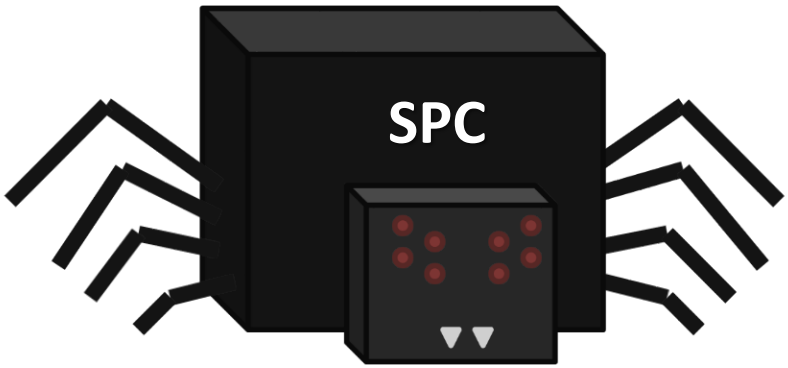
# Two Types of SPider

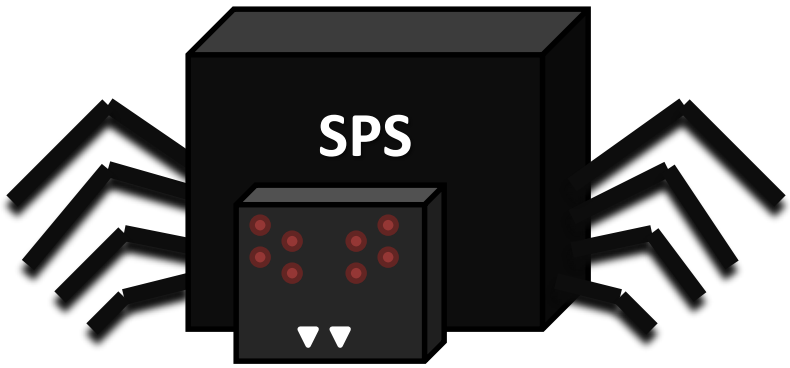
## • Spider Client (SPC)

- User
  - Resides on Workstation
  - Keeps Request File of user defined loop(s) specifications and polls it against the Server Availability File
  - Pulls “area” files from server and loads it into predetermined frame

## • Spider Server (SPS)

- Host
  - Resides on Server
  - Integrated into “Area generator” that creates products on the server
  - Keeps and up to date Availability List of these products

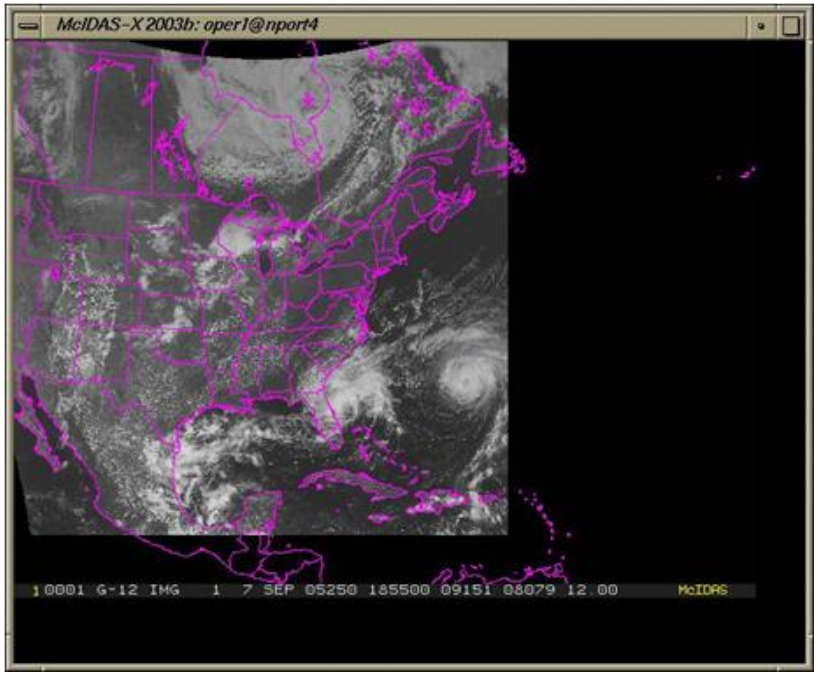


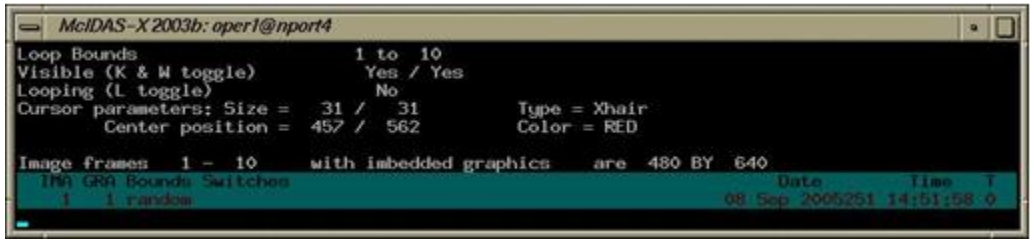



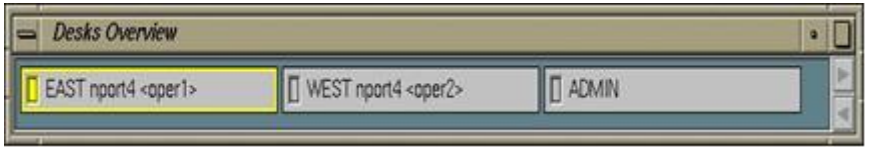
# Other Ad hoc McIDAS Usage at ESPC

- Heavy usage of the local GINI server in McIDAS format for validation checks (image previews) for conversion of GOES-15 data to NWS AWIPS
- Great reliance on GINIs during GOES anomalies to confirm the output images quickly and efficiently (Generated mock AWIPS files to confirm changes to use GOES-14).
- Deliver GOES-16 data to select legacy applications
  - Spoofs GOES-13 AREA file appearance with IMGREMAP
  - No or minimal changes required in legacy code to process
  - Usable by older (pre-GOES-R) McIDAS versions
- Imagery on OSPO web page generated by McIDAS-X client-side software.
- OSPO web servers are currently being upgraded with 2018.1 McIDAS-X

# AWIPS Composite Using McIDAS

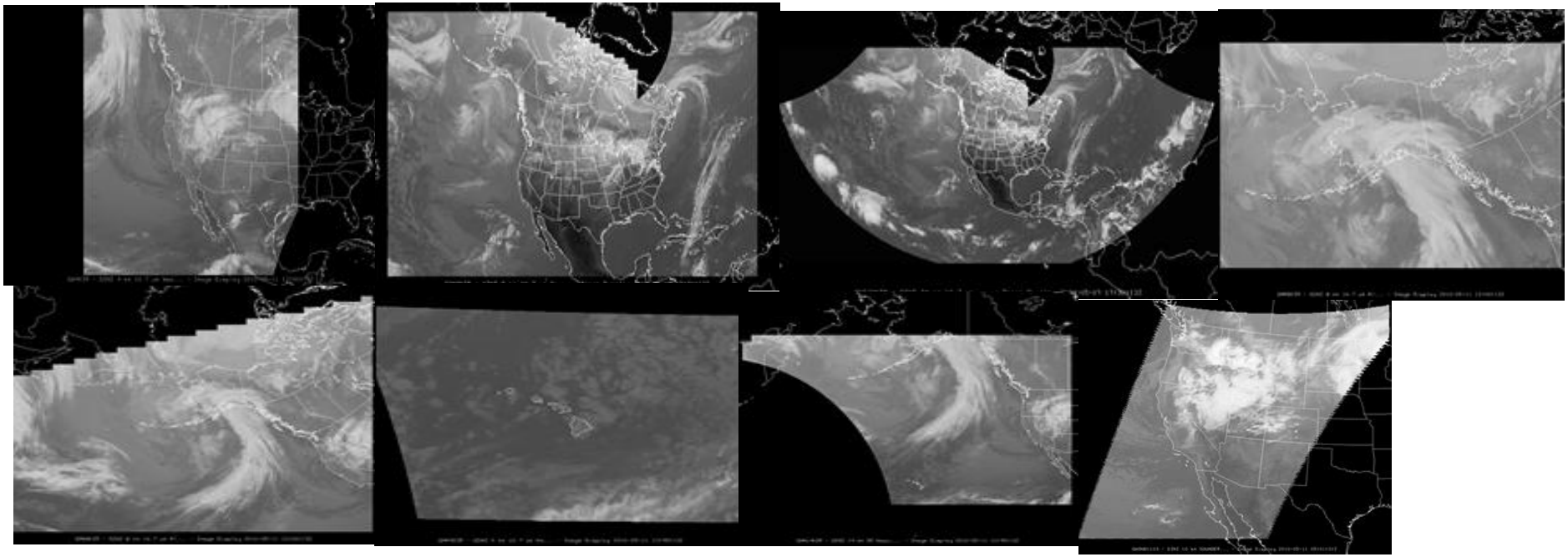


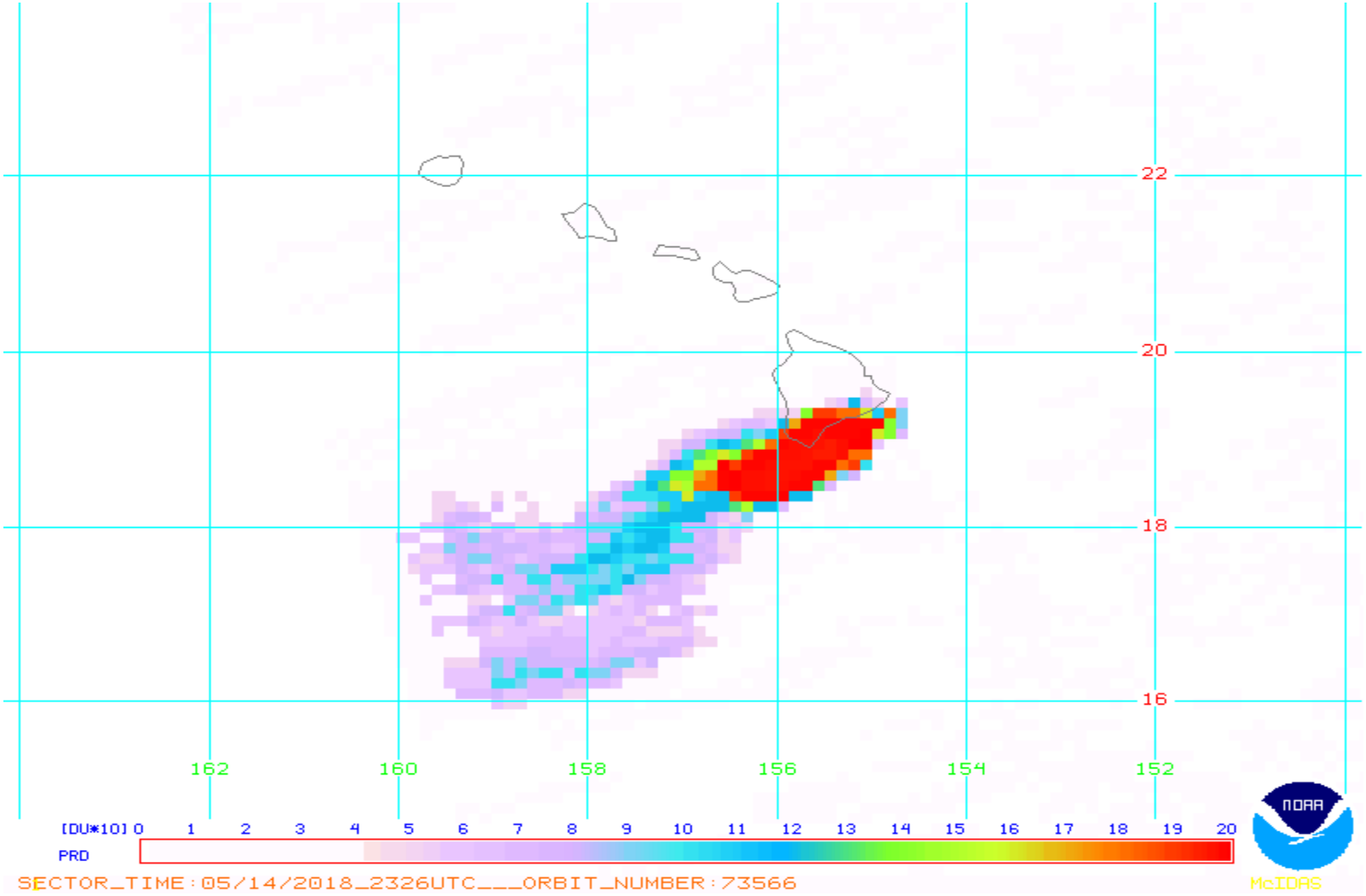
# AWIPS WEST Products

**Conus, Super National, North Hemisphere, Alaska Regional, Alaska National, Hawaii Regional, Hawaii National, Conus Sounder**

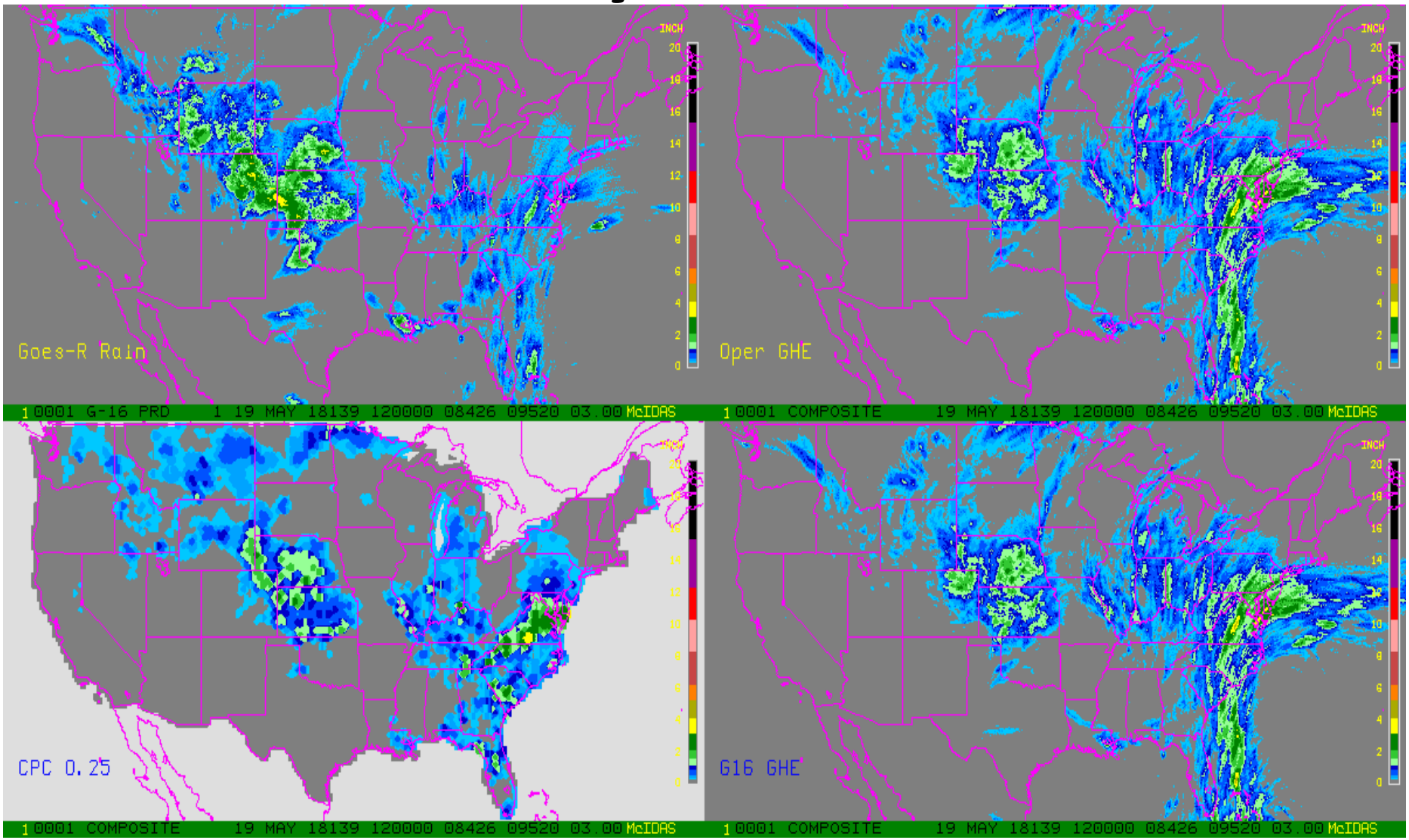


- OSPO uses its local GINI server to convert GOES-15 data to NWS AWIPS.
- The AWIPS Products are generated from McIDAS AREA files; MCIDAS headers are exchanged with AWIPS header/trailers to make it an AWIPS product.

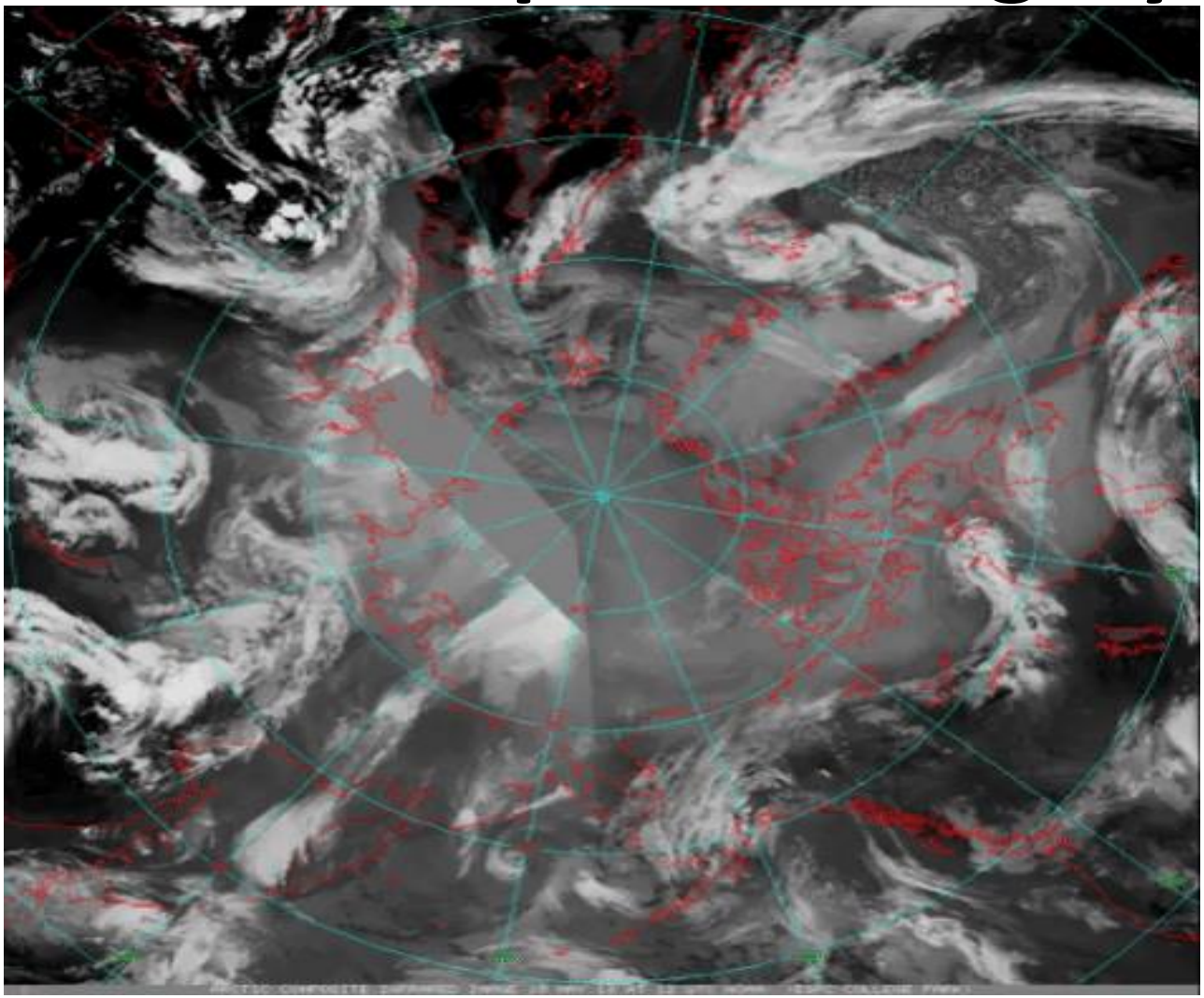
# SO2 Plume /OMI (Aqua)



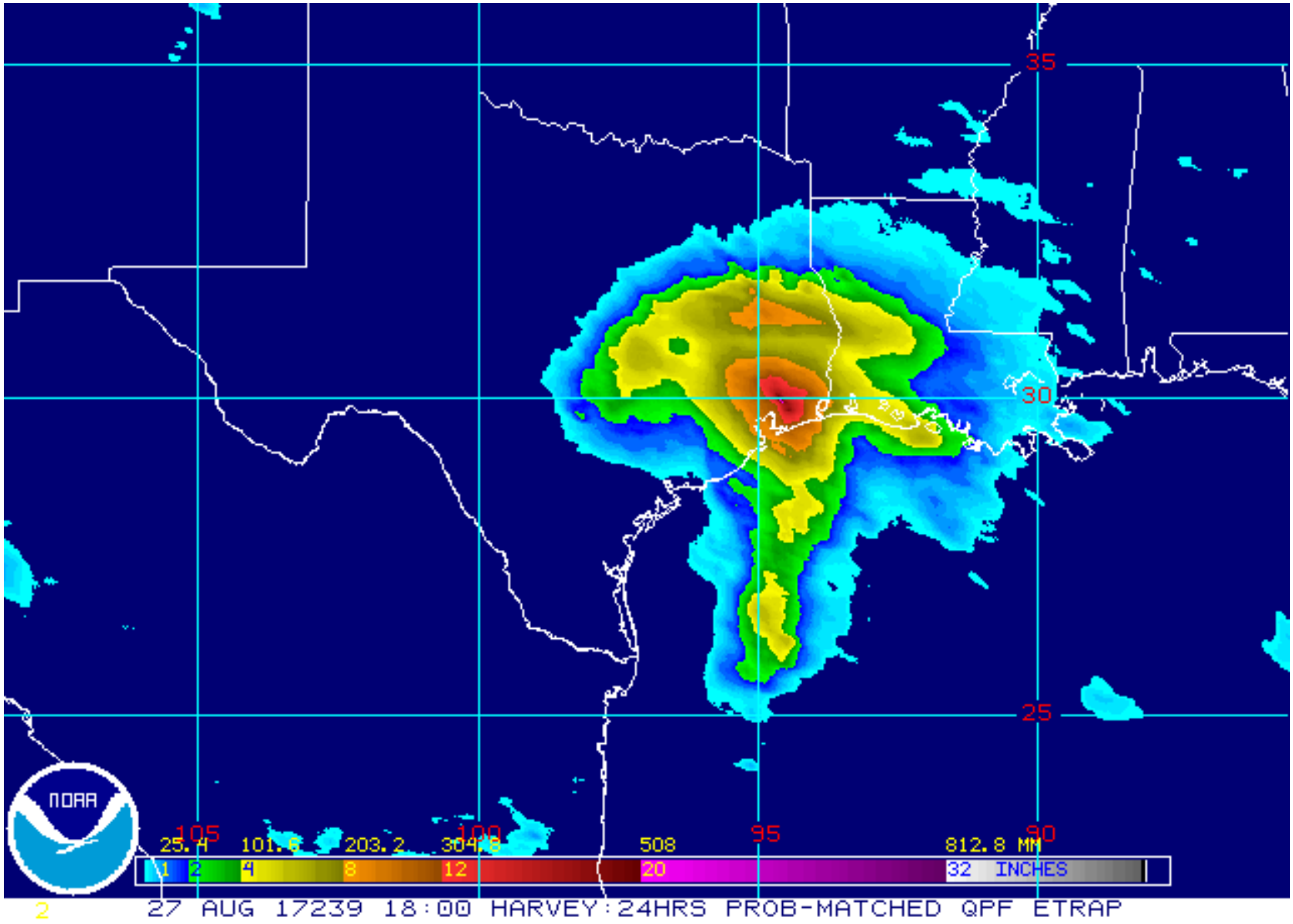
# Global HydroEstimator



# Arctic Composite Imagery



# E-TRaP


35
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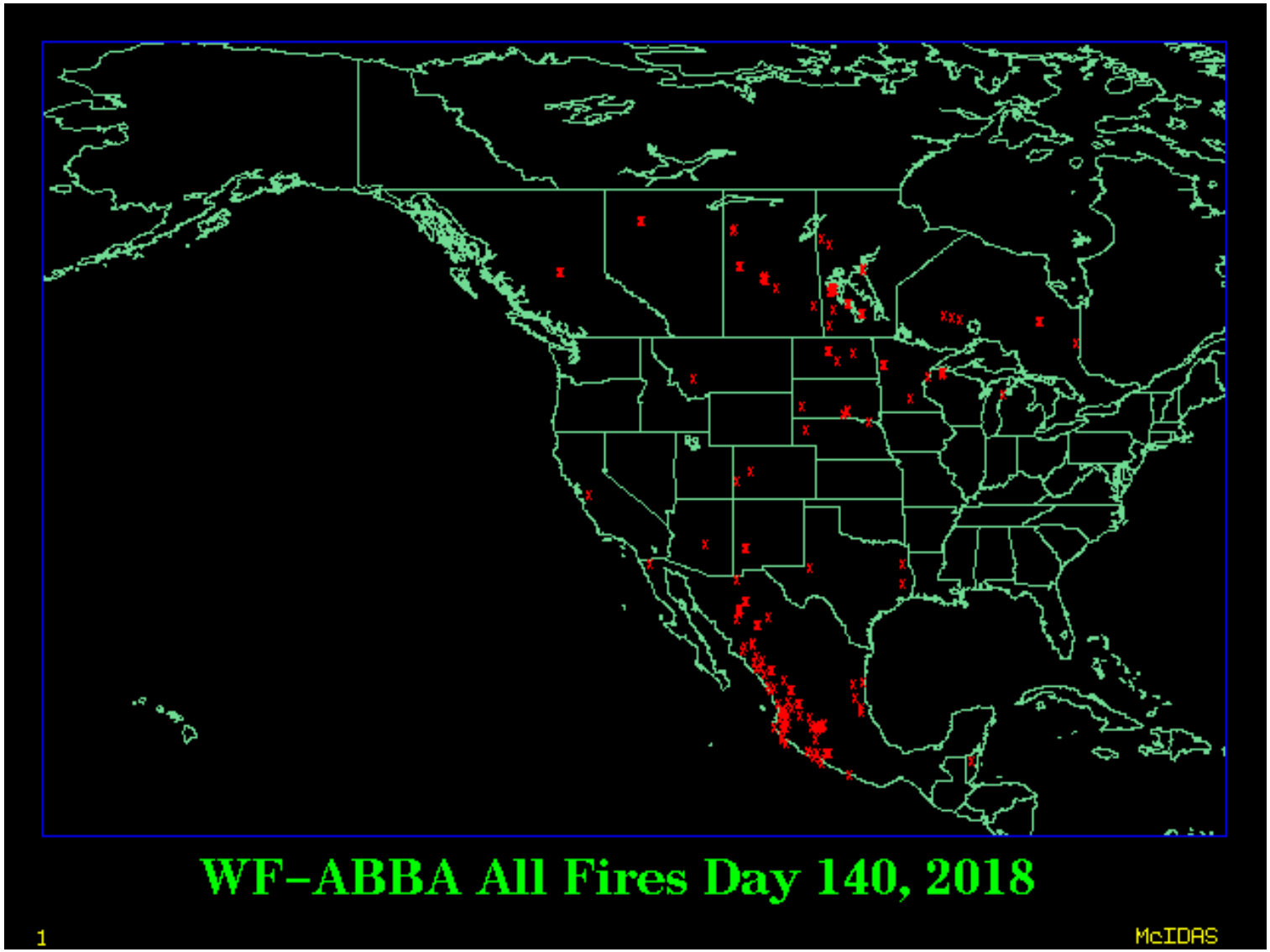
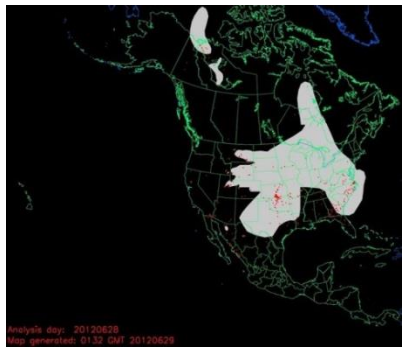
32 INCHES
NOAA
27 AUG 17239 18:00 HARVEY:24HRS PROB-MATCHED QPF ETRAP

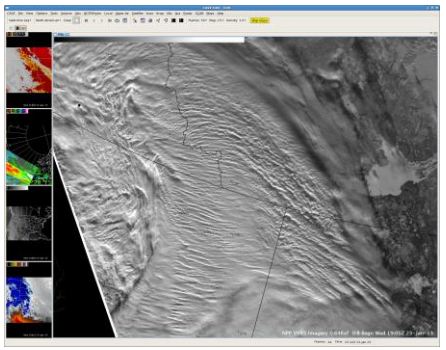
# Fire Products



# SAB Use of McIDAS for GOES-16/17

- Dedicated servers to ingest GOES-R series data – hold seven days
- Redundant data feeds from GRB antenna (NCEP, College Park, via LDM) and by PDA (local curl scripts)
- Soft links between old AREA*nnnn* names and netcdf files allow Spider to continue its distribution role
- Numeric limit extended to 10K per directory, from 10K total
- Setting up to have most RGB components pre-generated





# Data Distribution Update: Near real-time data access Product Distribution & Access (PDA)

# Data Access Services

- Current Access Services (in addition to Direct Broadcast)
  - Data Distribution Service (DDS) – (s)FTP push/pull from secure accounts – SERVICE ENDING IN JUNE*
  - Product Distribution and Access (PDA) – Operational*
  - NWS Telecommunications Gateway
  - GINI (GOES Ingest and NOAAPORT Interface) / NOAAPORT for Advanced Weather Interactive Processing System (AWIPS) display
  - GEODIST – GOES, POES, and Derived Products; McIDAS *
  - Shared Processing DAPE Gateway – for military partners *
  - MODIS server – subset of products made by NASA *
  - Websites - http://www.ospo.noaa.gov/

**** Require Data Access Request (Government)***

- Archival
  - NCEI archive data products using CLASS

# ESPC Notifications, Status, and Contacts

| | |
|---|---|
| 24/7 Help Desk | ESPCOperations@noaa.gov |
| ESPC Messages | http://www.ssd.noaa.gov/PS/SATS/messages.html |
| WMO GTS Bulletins | Urgent: http://www.weather.gov/view/validProds.php?prod=ADM&node=KNES Routine: http://www.weather.gov/view/validProds.php?prod=ADA&node=KNES |
| User Services | SPSD.UserServices@noaa.gov |
| Data Access | NESDIS.Data.Access@noaa.gov |
| Webmaster | SSDWebmaster@noaa.gov |
| Facebook | www.facebook.com/NOAANESDIS |
| Twitter | www.twitter.com/noaasatellites |
| Satellite Ops Status | http://noaasis.noaa.gov/NOAASIS/ml/status.html |
| Press releases | http://www.nesdis.noaa.gov/news_archives/ |
| Web | www.ospo.noaa.gov |

# Thank you!

Questions?