GOES-R Overview

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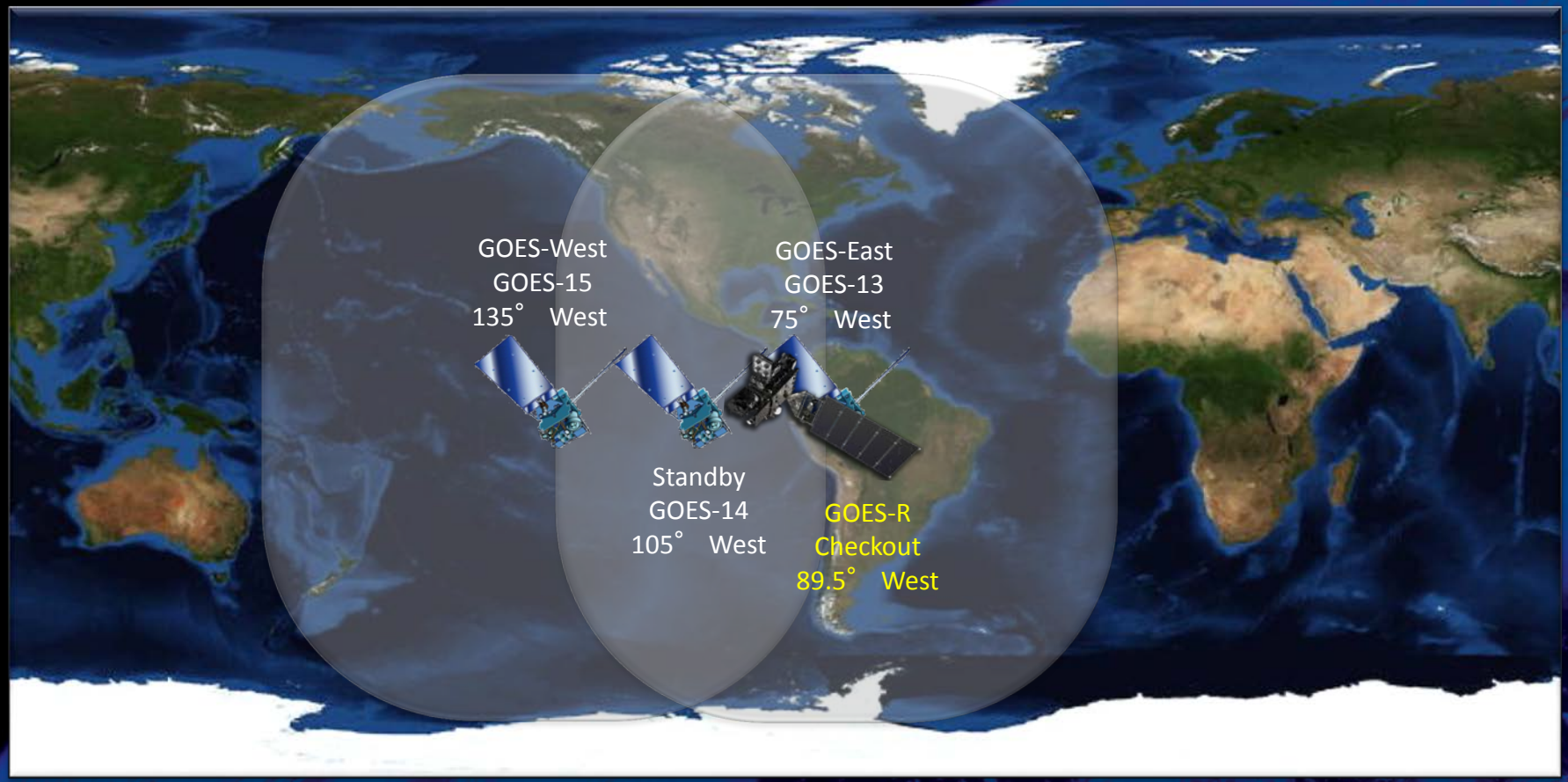
GOES-R Data Operations Manager

COPC Meeting
October 25-26, 2016

Presentation Outline

- Current GOES Constellation
- GOES-R Capabilities
- GOES-R ABI Modes
- GOES-R Nominal and Non-Nominal Operational Modes
- GOES-R Product Release Schedule

GOES Constellation



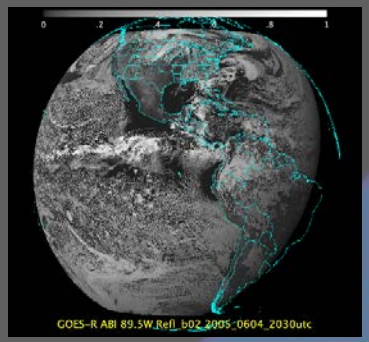
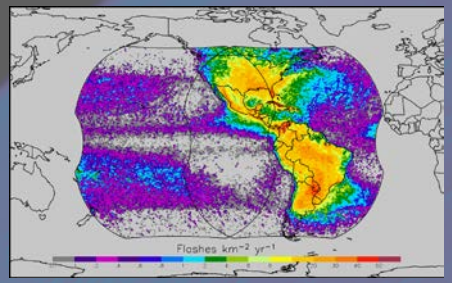
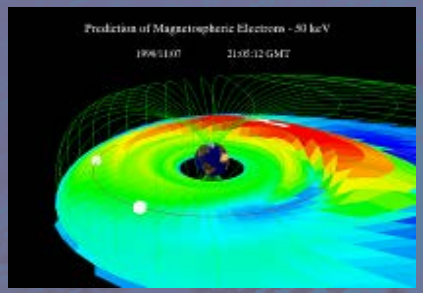
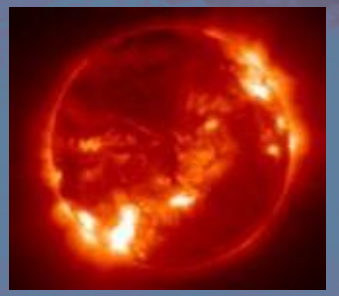
- Primary source of data for short term forecasting, especially of severe weather such as tropical storms
- Continuity of Operations since 1974

GOES-R Series

- GOES R, S, T, U
- GOES-R launch
  - Most recent update: GOES-R made it through Hurricane Matthew unscathed, but the GVAN rail car which houses the Atlas GSE was tipped on its side. It needs to be checked out and repaired if necessary. Unofficially, GOES-R launch may incur a delay due to this issue.
  - Launching from: Cape Canaveral Air Force Station, Florida
  - Vehicle: United Launch Alliance Atlas V (AV-541)
  - Pad: Launch Complex 41
  - First public images ~Jan. 2017
  - First imagery released for public use ~Feb. 2017
  - Assume position at East/West ~Nov. 2017
- GOES-S launch Feb. 2018
- GOES-T launch 2019
- GOES-U launch 2024

GOES-R Capabilities

The GOES-R series will provide significant improvements in the detection and observations of meteorological phenomena that directly impact public safety, protection of property, and our Nation's economic health and prosperity.

ABI	GLM	SEISS and MAG	EXIS and SUVI
			
Visible & IR Imagery	*Lightning Mapping*	*Space Weather Monitoring*	*Solar Imaging*

Assembled GOES-R Spacecraft

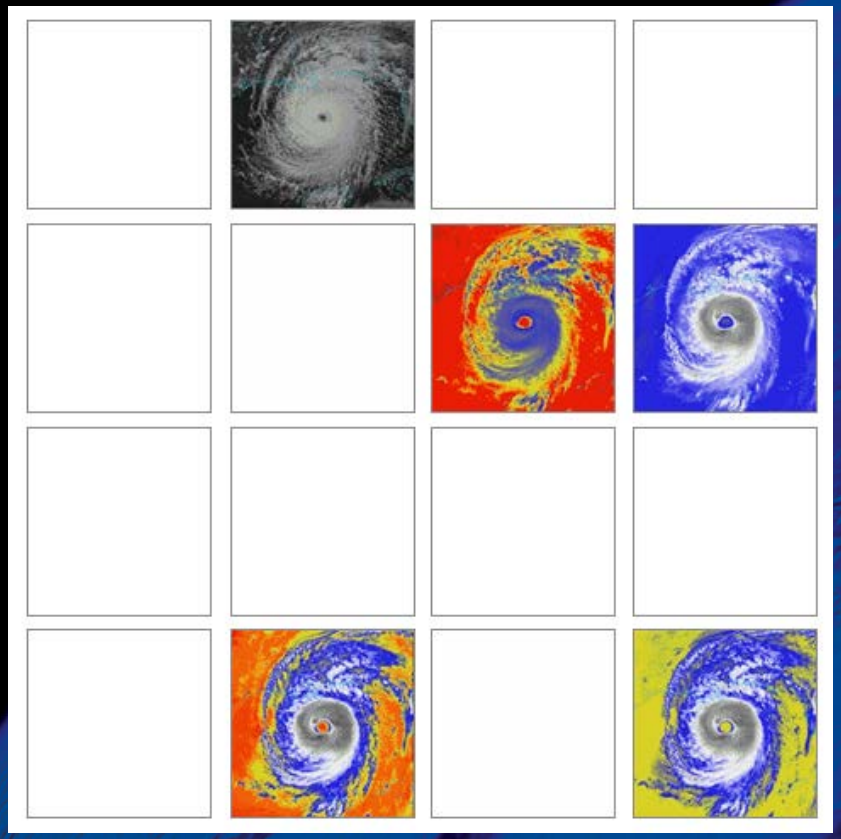
Trip to Florida

Advanced Baseline Imager (ABI)

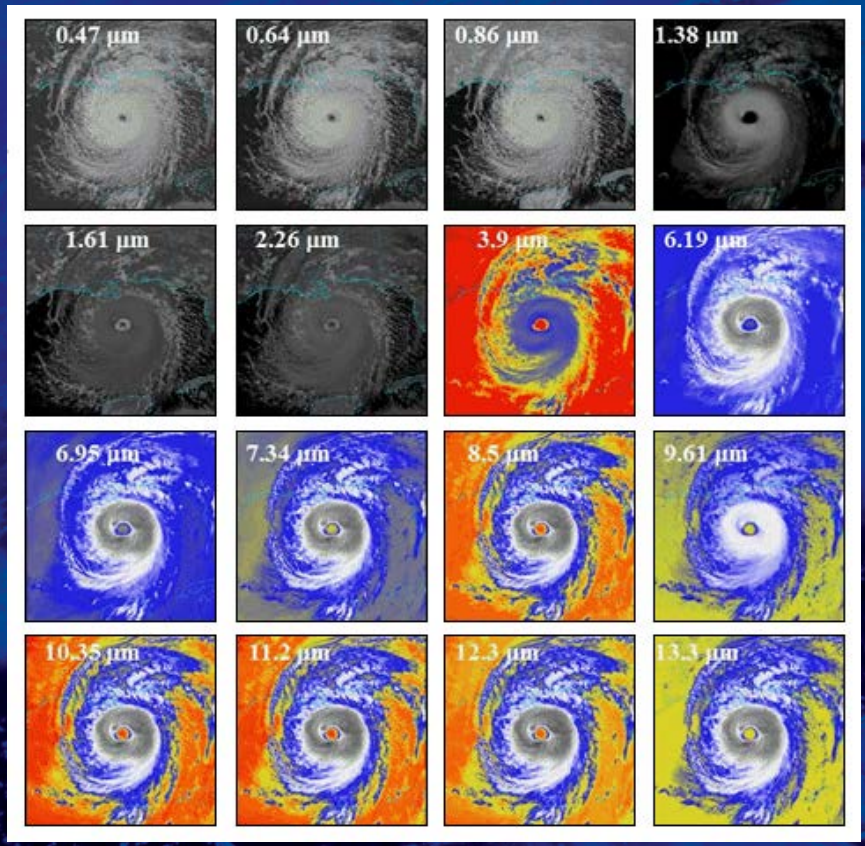
- Primary instrument in GOES-R series
- 16 channel imager

Three Times More Spectral Information

GOES-13/14/15 Spectral Bands



GOES-R Spectral Bands



Four Times More Spatial Resolution

Spatially:	**GOES-R**	**Current**
0.64 um VIS:	0.5 km	1 km
other VIS/NIR:	1 km	n/a
IR:	2 km	4 km

GOES

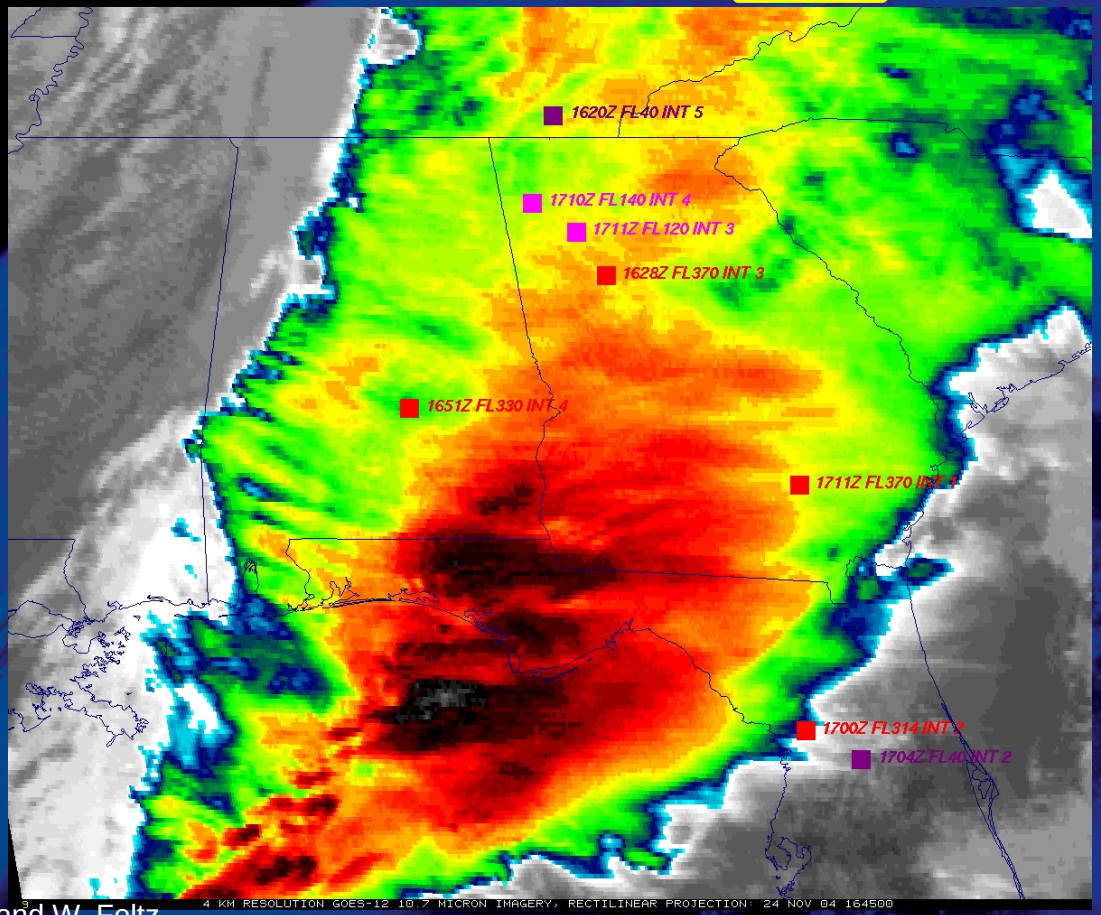


Figure courtesy of K. Bedka and W. Feltz

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"ABI" from MODIS

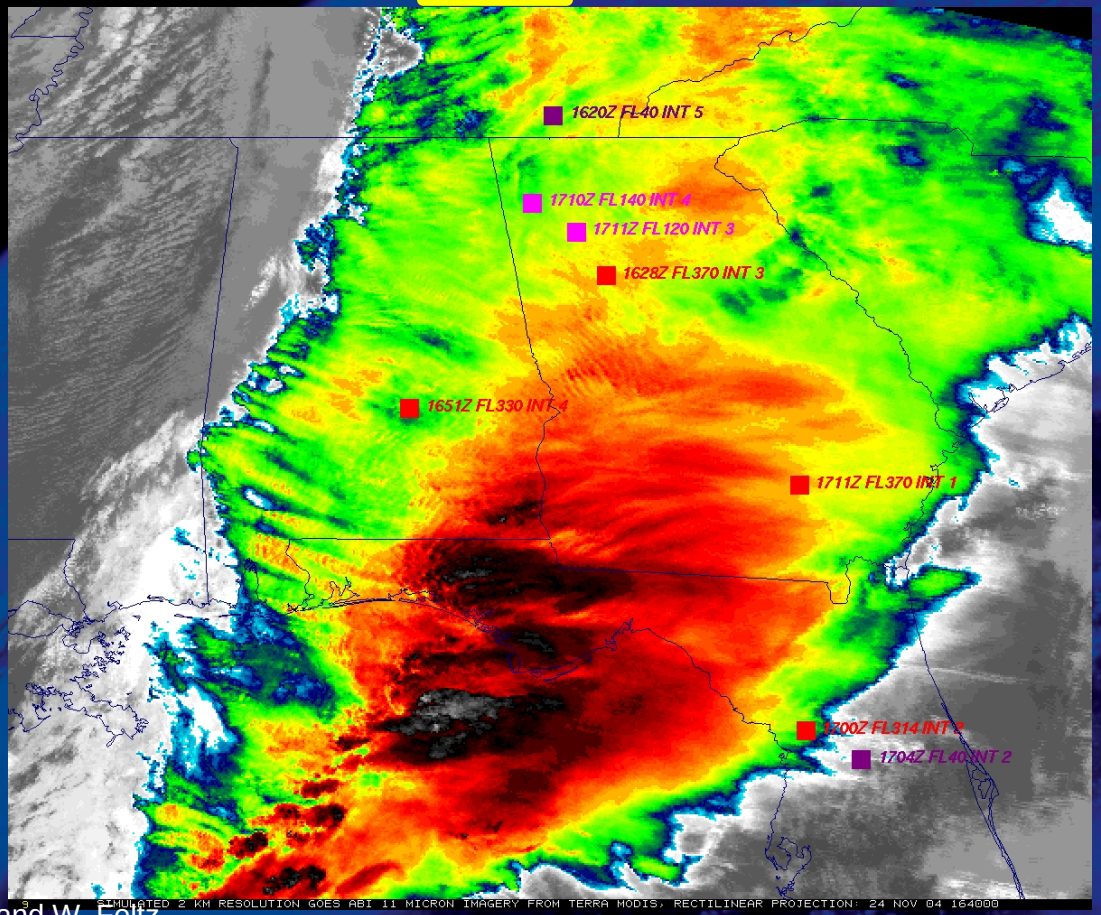
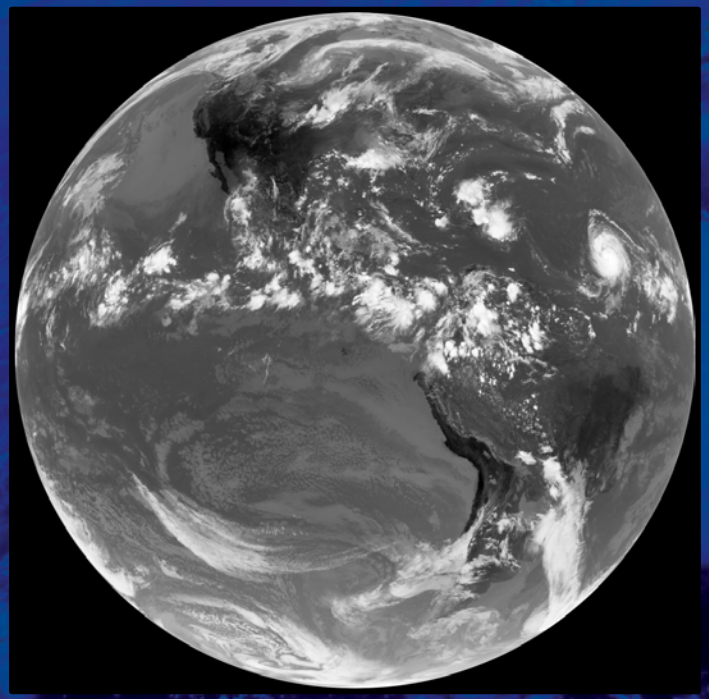


Figure courtesy of K. Bedka and W. Feltz

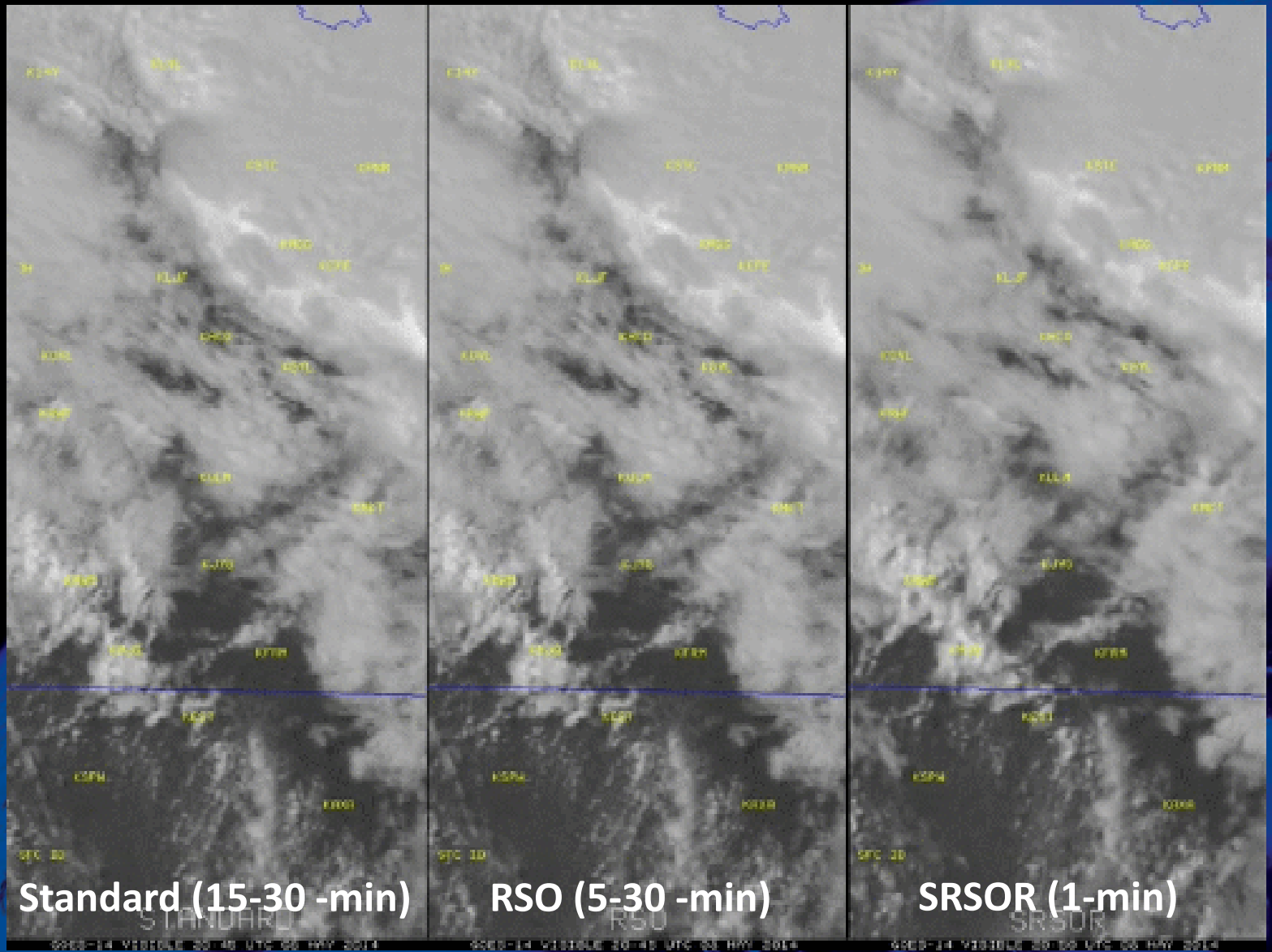
Five Times Faster Coverage

Current GOES
5 minute Capability



GOES-R
5 minute Capability

ABI: Temporal



Figures courtesy of NOAA

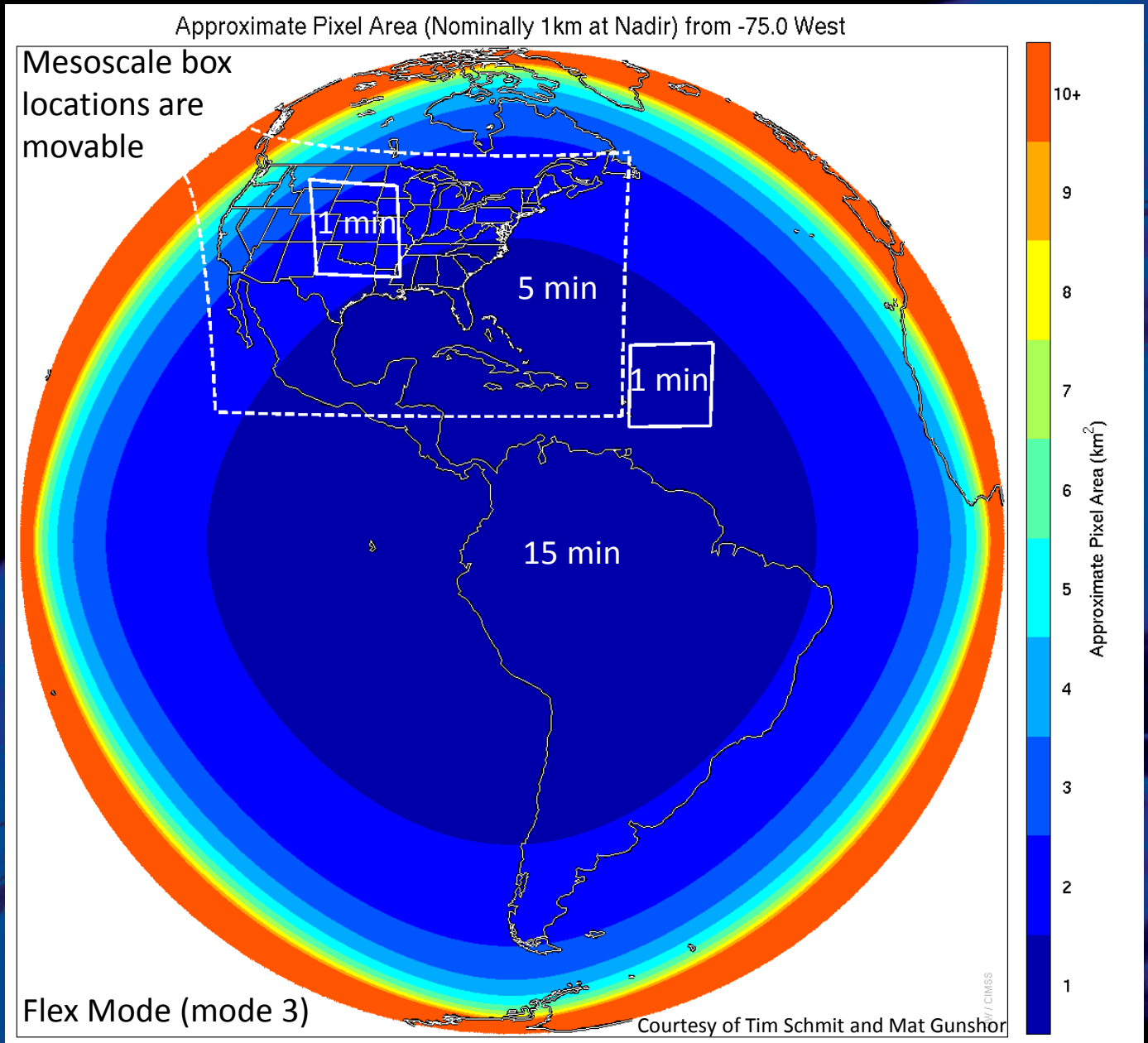
Flexibility of the ABI

Two Primary Modes of Operation:

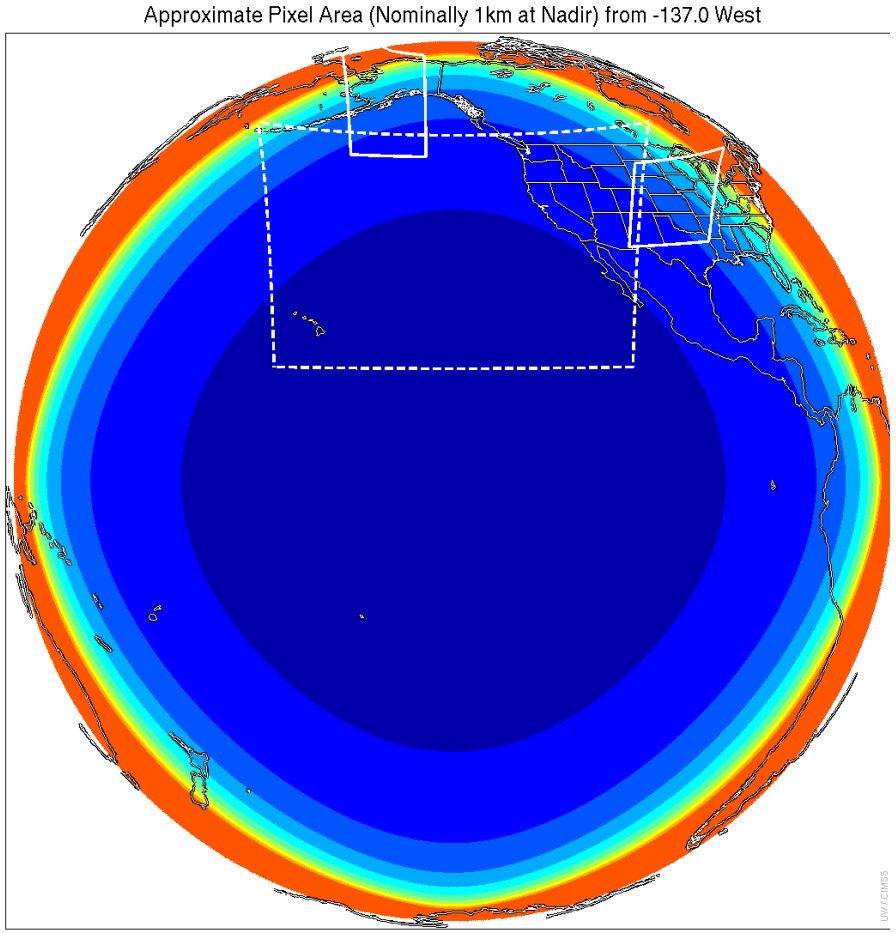
- **Mode 3: Flex Mode (Default Mode per NWS)**
  - Full Disk (FD) domain every 15 mins
  - Contiguous US (CONUS) domain every 5 mins
  - 2 Mesoscale domains every 1 minute

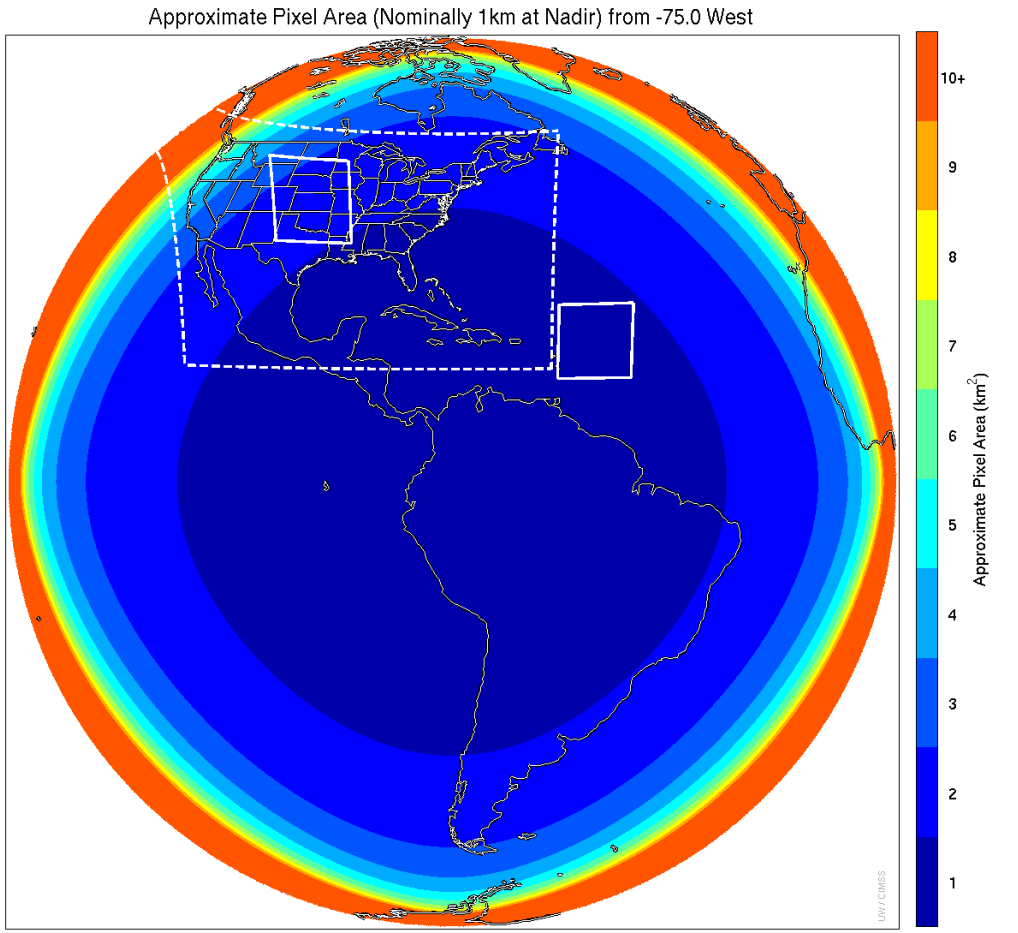
    or
  - 1 Mesoscale domain every 30 seconds
- **Mode 4: Continuous Full Disk (FD) Mode**
  - Full Disk domain every 5 mins
- Mesoscale and mode domain changes are handled by the NCEP/Senior Duty Meteorologist (SDM) - They receive requests for mode and mesoscale location changes from NWS, NCEP, and/or NESDIS requesting entities (like DoD).

Flex Mode Scanning



With 2 ABIs (GOES E & W) = 4 Mesoscale Domain Sectors (MDS)





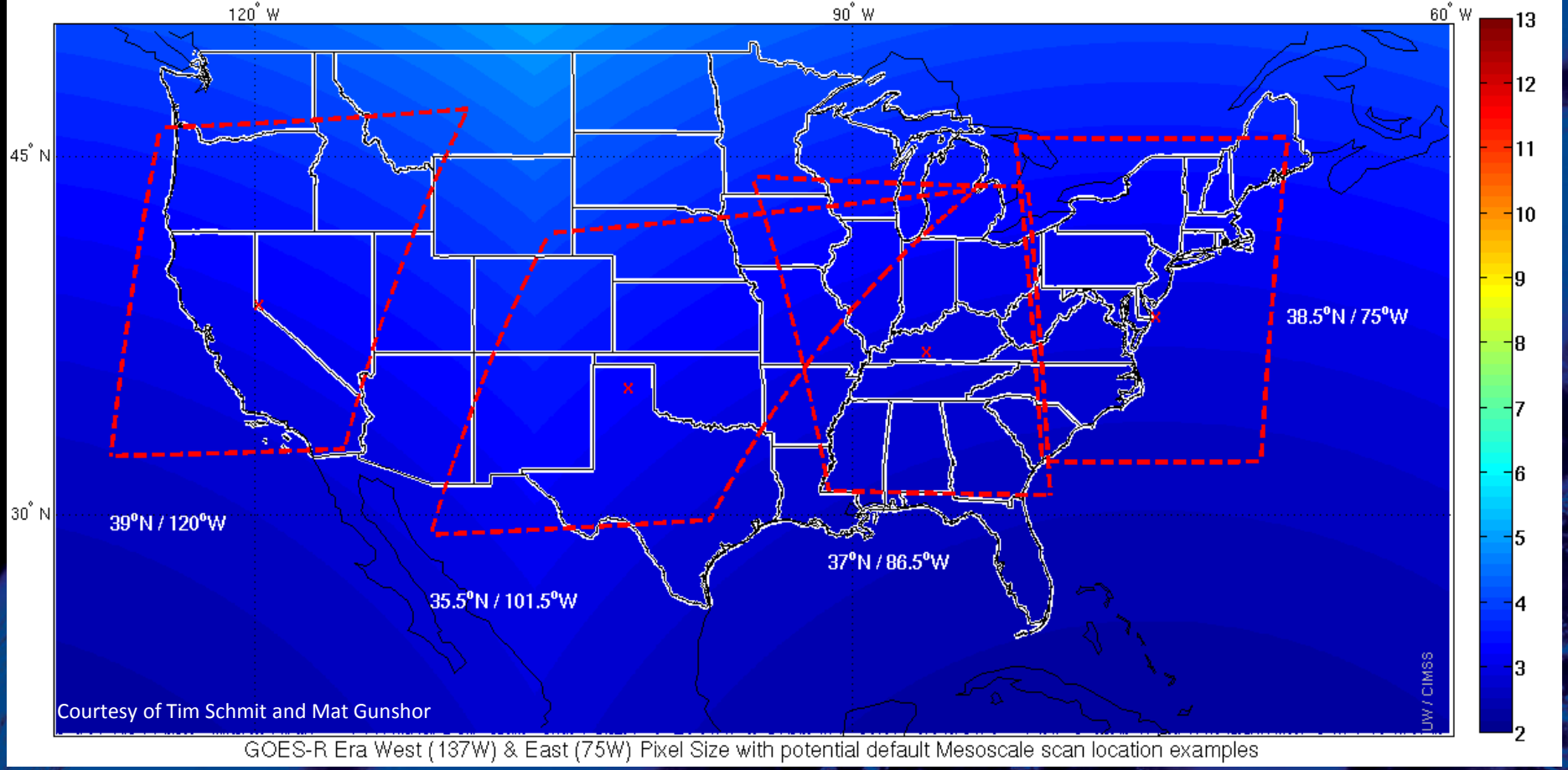
GOES-16 as GOES West

GOES-16 as GOES East

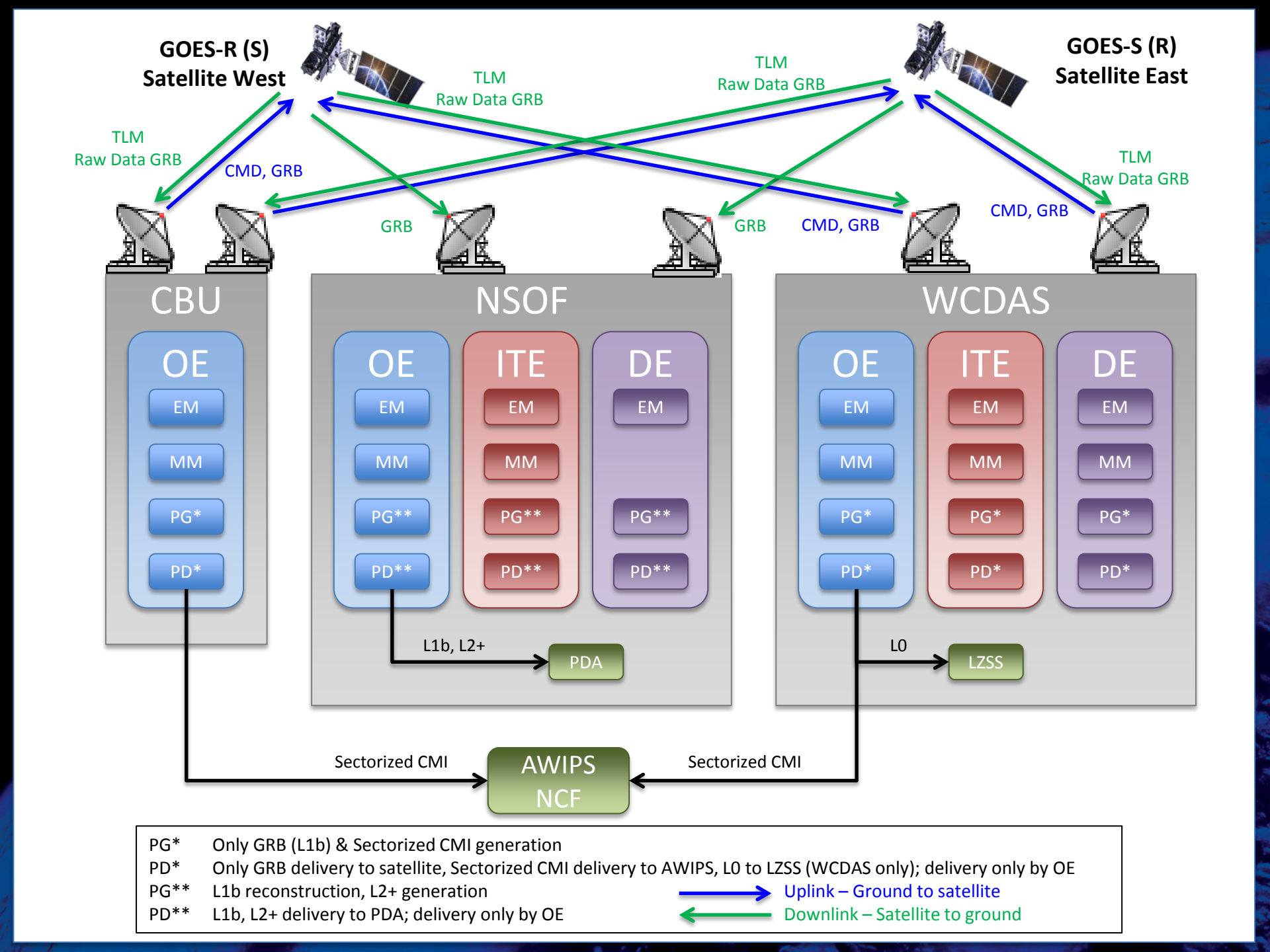
Courtesy of Tim Schmit and Mat Gunshor

Flex Mode Mesoscale Domain
Default Positions

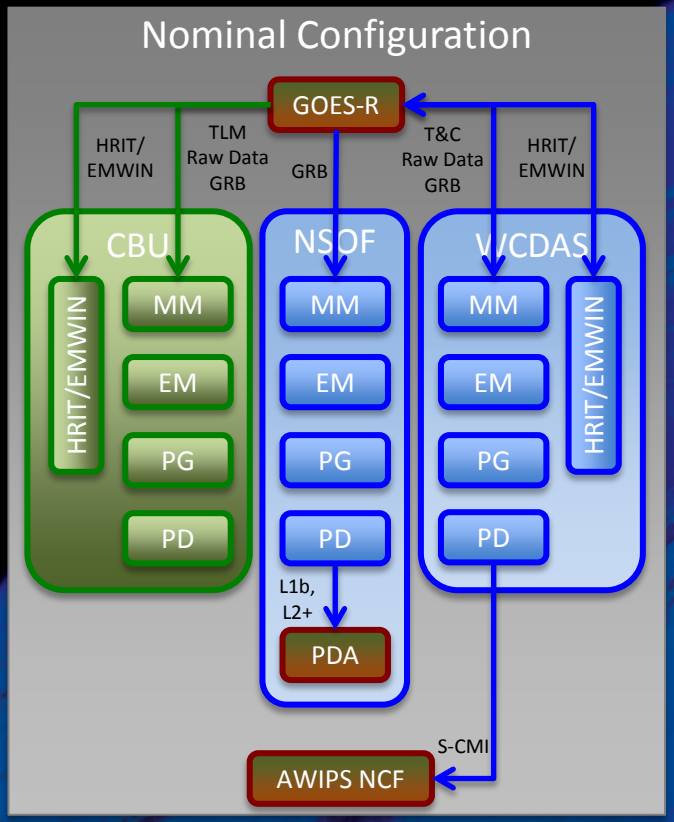
- Commercial airline route corridors shown for both GOES-E and GOES-W
- These will be default Mesoscale Domain Sector (MDS) locations if there are no other requests



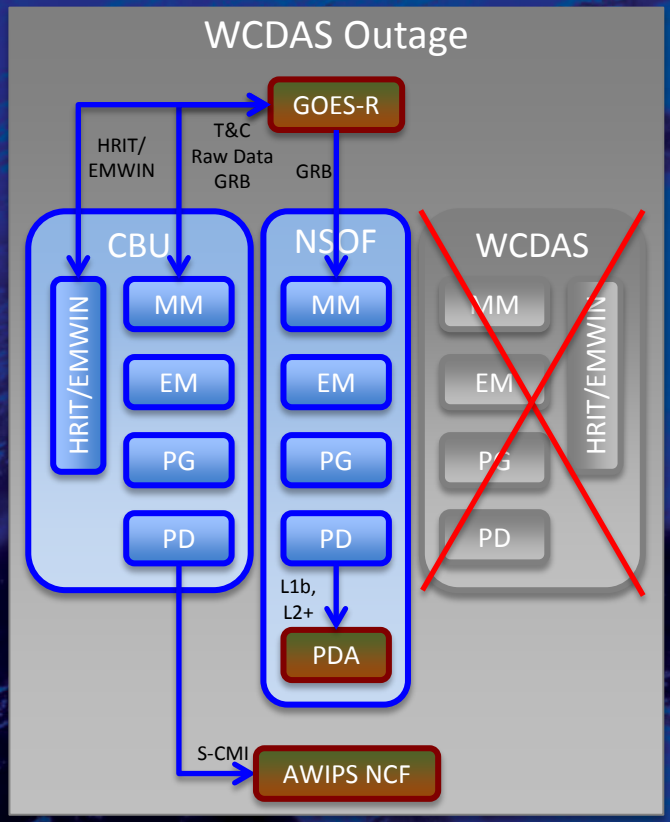
GOES-R Era West (137W) & East (75W) Pixel Size with potential default Mesoscale scan location examples


GOES-R (S)
Satellite West
GOES-S (R)
Satellite East
TLM
Raw Data GRB
CMD, GRB
GRB
CBU
NSOF
WCDAS
OE
ITE
DE
EM
MM
PG*
PD*
PG**
PD**
L1b, L2+
PDA
L0
LZSS
Sectorized CMI
AWIPS
NCF
PG* Only GRB (L1b) & Sectorized CMI generation
PD* Only GRB delivery to satellite, Sectorized CMI delivery to AWIPS, L0 to LZSS (WCDAS only); delivery only by OE
PG** L1b reconstruction, L2+ generation
PD** L1b, L2+ delivery to PDA; delivery only by OE
Uplink – Ground to satellite
Downlink – Satellite to ground

Nominal Data Flow

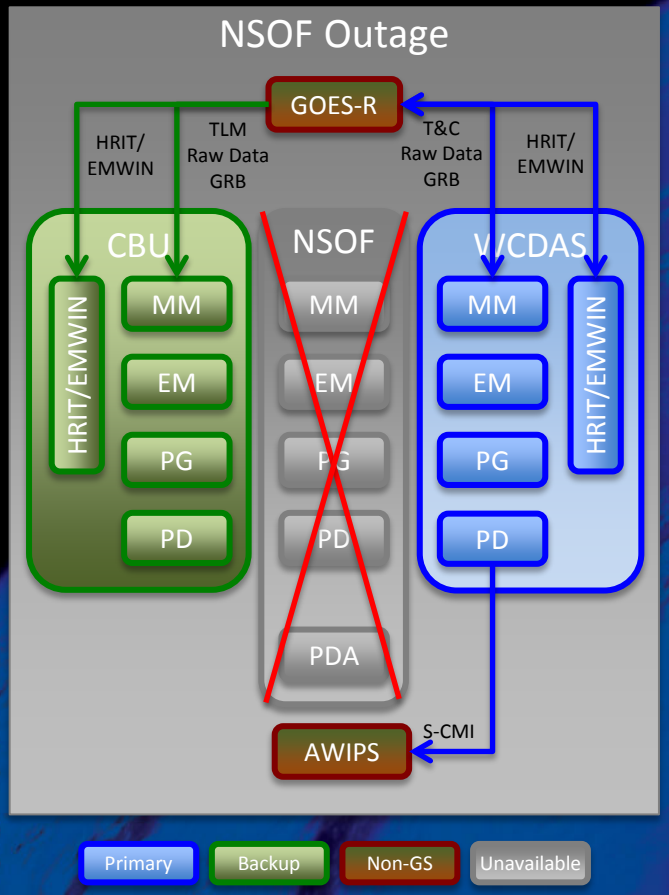


COOP Data Flow (WCDAS Outage)

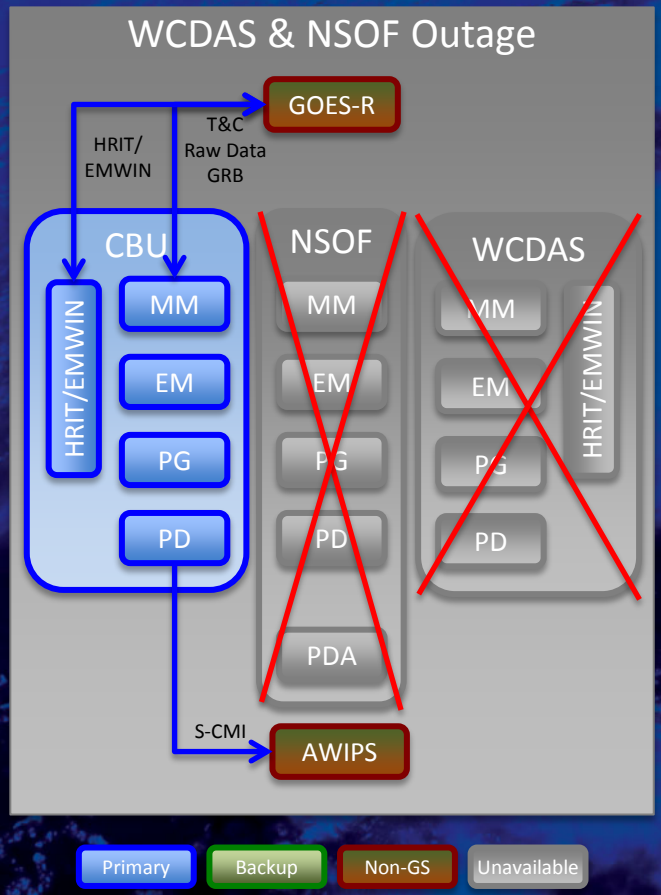


GRB & AWIPS delivery remains in tact for COOP scenarios

COOP Data Flow (NSOF Outage)

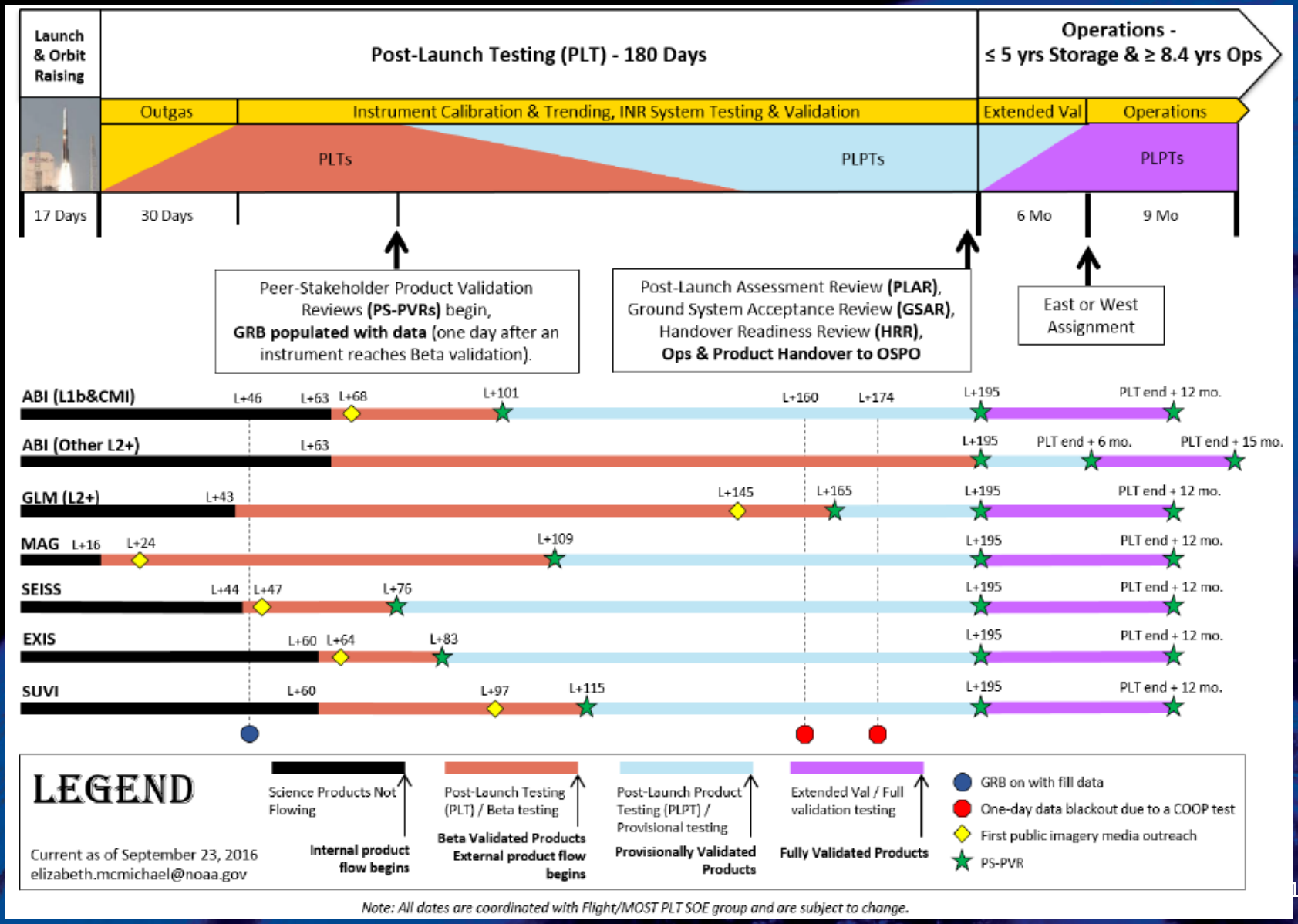


COOP Data Flow (WCDAS and NSOF Outages)

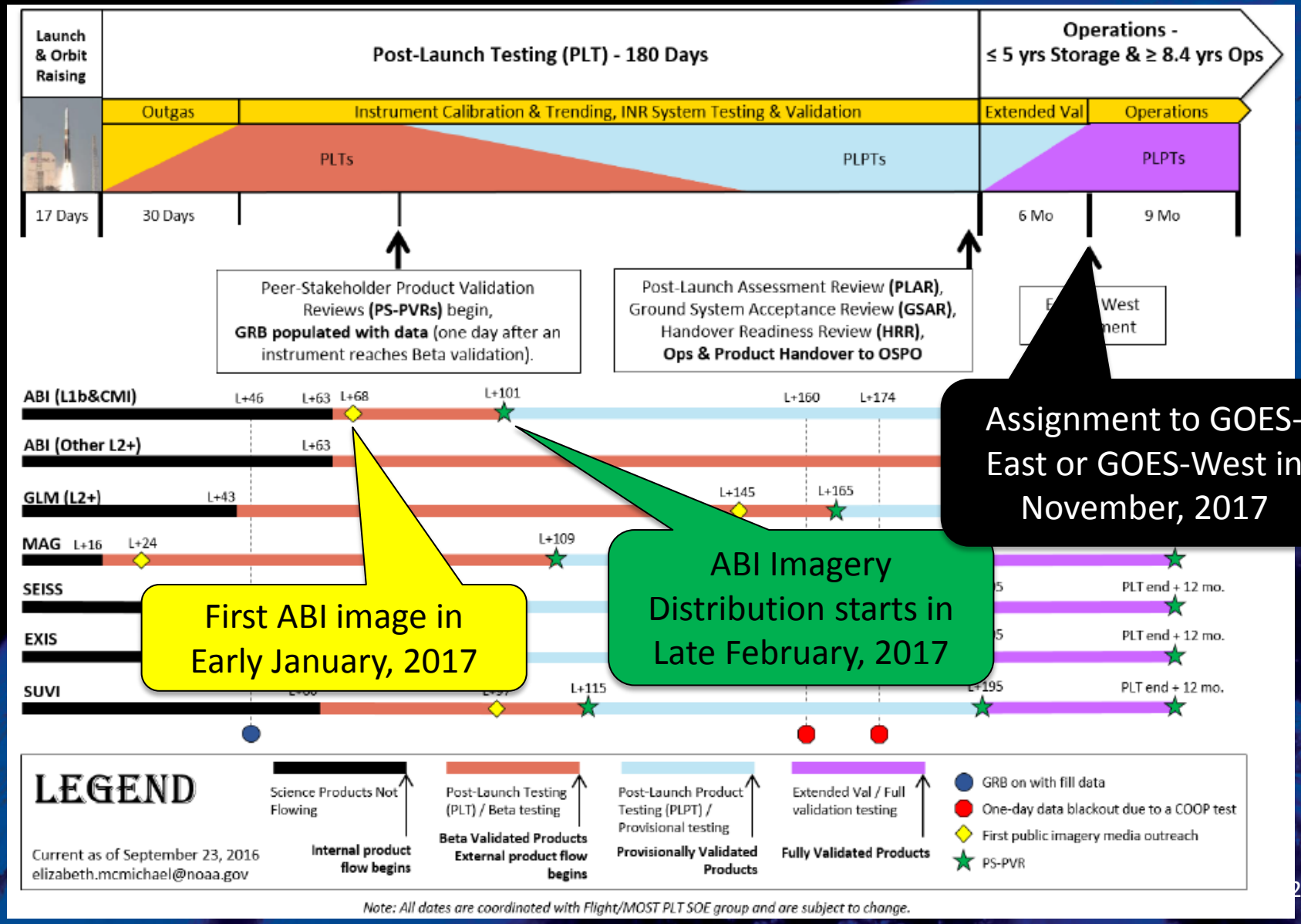


GRB & AWIPS delivery remains in tact for COOP scenarios

Detailed Data Release Strategy



Detailed Data Release Strategy



GOES-R

GEOSTATIONARY OPERATIONAL ENVIRONMENTAL SATELLITE R-SERIES

The next generation of geostationary environmental satellites

For more information visit www.goes-r.gov

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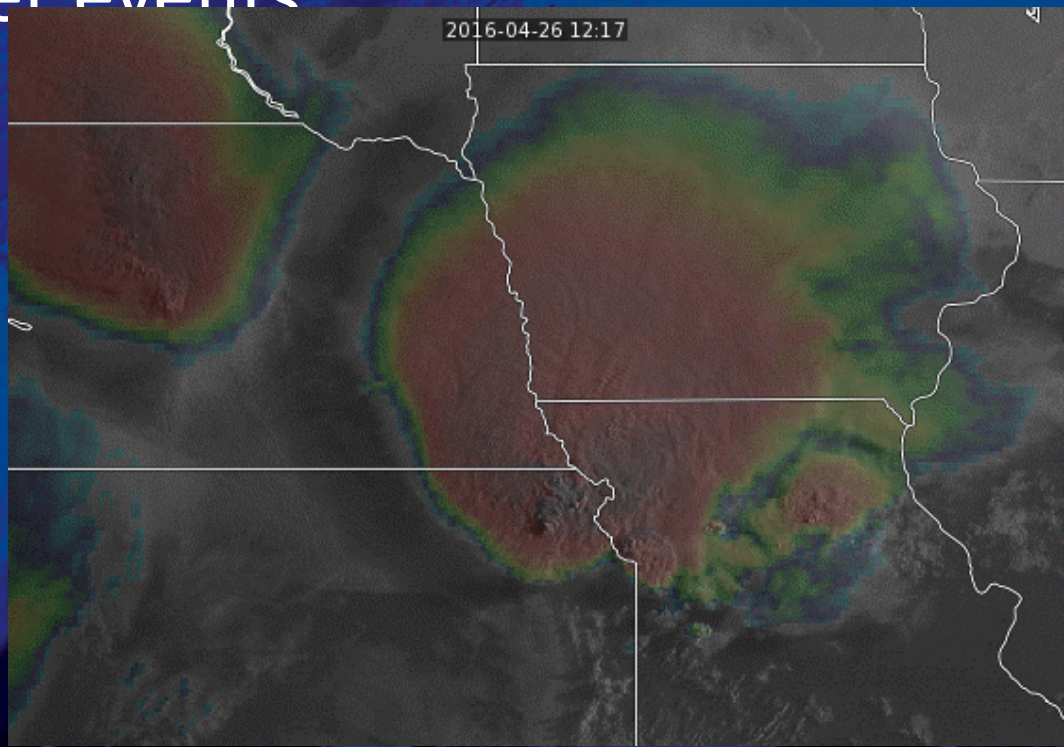
Why 1-Minute Scans?

Numerous ~1-minute "super rapid scan" periods of evaluation (from GOES-14) have shown great benefit to analyzing and diagnosing high-impact weather events

- *Convective Initiation*
- *Convection Evolution*
- *Fire Elements*
- *Fog/Stratus Evolution*
- *Volcanic Ash Dispersion*
- *Many others…*



Priorities for ABI Mesoscale/Mode Change Requests

1. SPC High or Moderate Risk
2. Volcanic ash eruption and plume directly over or approaching the US or US Territories
3. SPC Enhanced Risk
4. Major Hurricane (CAT 3-5) forecast to make landfall to US or US Territories Day 1 or 2
5. Event or circumstance with national importance requiring elevated DSS (e.g… Super Bowl, Olympics, large hazmat event, etc…)
6. Solar Diffuser Scans (will have a window but *must* occur during that window)
7. Lunar calibration scan (1 MDS, 2x/month, less than 2 minutes)
8. SPC Extreme Fire Weather criteria
9. Hurricane (CAT 1-2) forecast to make landfall to US or US Territories Day 1 or 2
10. SPC Marginal or Slight Risk or Severe Thunderstorm or Tornado Warnings
11. SPC Critical Fire Weather or OCONUS Fire Weather Watch with at least one active wildfire occurring
12. WPC High or Moderate Risk of Excessive Rainfall or WFO issuance of Flash Flood Watch
13. LIFR Conditions (widespread) at Large and/or Medium FAA Hub Airports
14. Winter Storm Warning criteria (including blizzard and ice storm warning criteria)
15. Tropical Storm forecast to make landfall to US or US Territories Days 1-4
16. Two or more Tropical Storms (or Hurricanes) outside of the CONUS domain invoking a switch to Mode 4
17. Volcanic ash plume not directly over or approaching the US or US Territories
18. Two or more volcanic eruptions outside of the CONUS domain invoking a switch to Mode 4
19. Blowing dust or sand conditions with ¼ mile or less visibility
20. ABI calibration/validation activities (N/S scans)
21. LIFR or worse conditions (widespread) over small FAA Hub Airports
22. Winter Weather A
23. SPC General Thun
24. Other NWS requ
25. DoD requests
26. SAB responsibility interests for non-US/non-Canadian high impact conditions
27. SAB responsibility interests for two or more non-US/non-Canadian high impact conditions invoking a switch to Mode 4
28. Canadian Operational Need (requested from Canada per MoU)
29. Operations request from non-US/Canadian interests
30. US research interests (non-operational, and coordinated through the research community)
31. Canadian research interests per MoU
32. Non-US/Canadian research interests (non-operational, and coordinated through the SPSD User Services Coordinators)

Submit to SAB for 24x7 Support:
(301) 683-1400
sabsupervisor@noaa.gov
For 8x5 Planning contact User Services:
Spsd.UserServices@noaa.gov

GOES-R Data Access

Acronym	System Name	Description
GRB	GOES Rebroadcast	One channel of the space data relay service of GOES-R for Level 1b data products (ABI L1b, Space Weather L1b, and GLM L2). These data are available to all users with GRB receivers in view of a GOES-R series satellite at the East or West operational longitudes.
AWIPS	Advanced Weather Interactive Processing System	Interactive computer system that integrates meteorological and hydrological data, enabling forecasters to prepare forecasts and issue warnings. GOES-R will provide selected products through AWIPS. Sectorized Cloud and Moisture Imagery will be delivered via NOAAPORT/SBN (Satellite Broadcast Network).
HRIT/ EMWIN	High Rate Information Transmission/ Emergency Managers Weather Information Network	EMWIN is a direct service that provides users with weather forecasts, warnings, graphics and other information directly from the NWS in near real-time. The HRIT service is a new high data rate (400 Kbps) version of today's LRIT (Low Rate Information Transmission), broadcasting GOES-R satellite imagery and selected products to remotely-located user terminals.
PDA	Product Distribution and Access	The Environmental Satellite Processing and Distribution System (ESPDS) is responsible for receiving and storing real-time environmental satellite data and products and making them available to authorized users (ABI L1b and L2+, Space Weather L1b, and GLM L2). PDA will provide real-time distribution and access services for GOES-R users.
CLASS	Comprehensive Large Array-data Stewardship System	Web-based data archive and distribution system for NOAA's environmental data. CLASS will provide retrospective data access and distribution services of GOES-R data to all users.

www.goes-r.gov