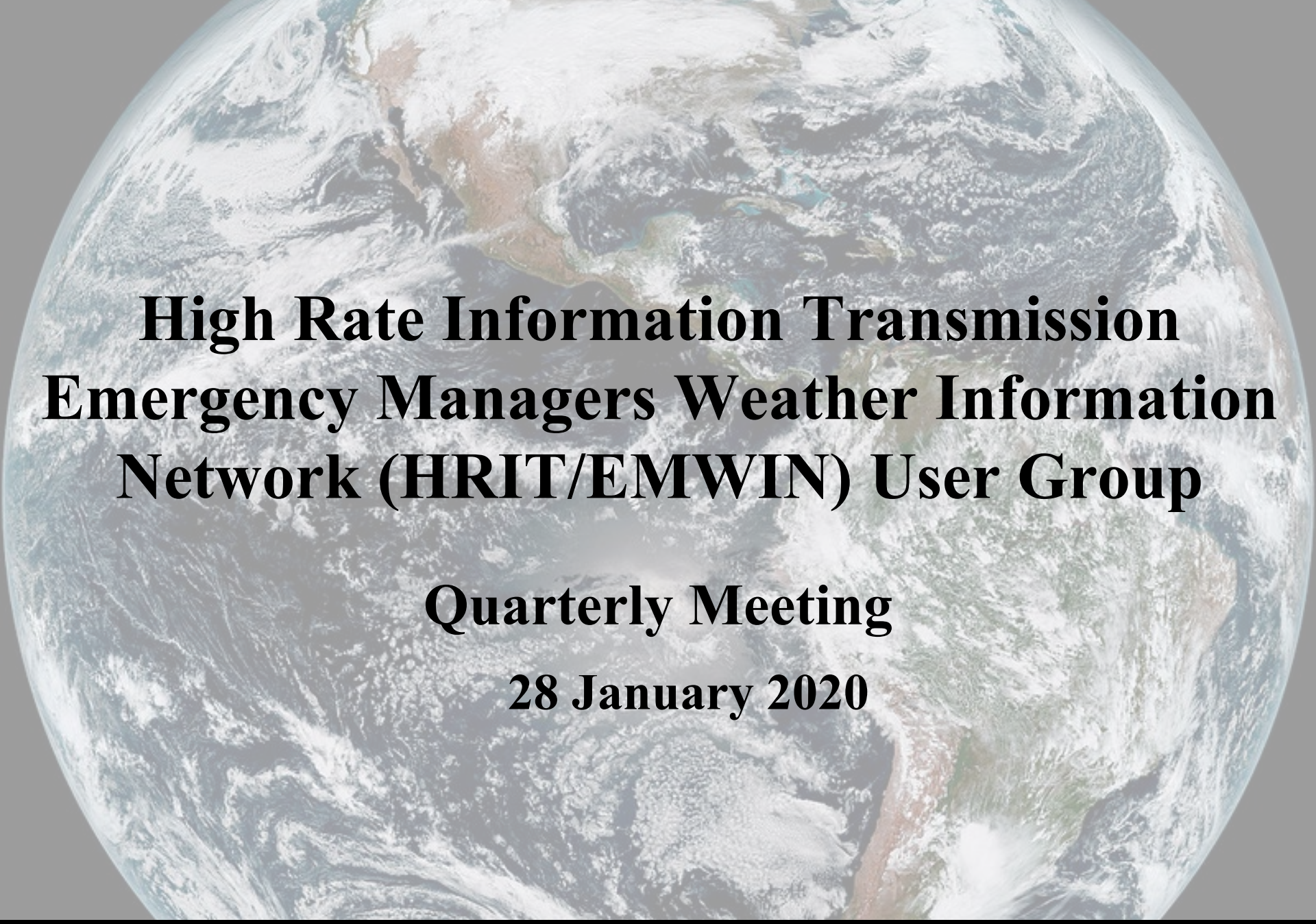


High Rate Information Transmission Emergency Managers Weather Information Network (HRIT/EMWIN) User Group

Quarterly Meeting

28 January 2020

Agenda Items & Schedule

- 3:00 pm (EST) – Roll Call/ Introduction to User Group---------Seth Clevenstine – 5 mins
- GOES Constellation Broadcast Status----------Seth Clevenstine – 2 mins
- GOES East Past Quarterly Stats----------Seth Clevenstine – 5 mins
- GOES West Past Quarterly Stats----------Seth Clevenstine – 5 mins
- GOES 17 ABI Status----------Seth Clevenstine – 3 mins
- Product Change Details----------Seth Clevenstine – 5 mins
- Upcoming PDA Release 3.5 Content----------Seth Clevenstine – 5 mins
- HRIT/EMWIN Event Schedule----------Seth Clevenstine – 5 mins
- EMWIN Updates----------Bob Gillespie – 5 mins
- Open Discussion Items----------Open – 15 mins
- Action items and summary----------Paul Seymour – 5 mins
- Total – 60 mins

HRIT/EMWIN User Group

-GOES Constellation Broadcast Status

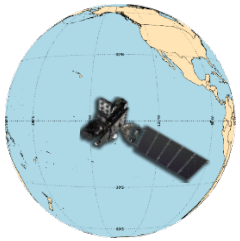
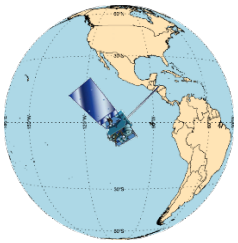
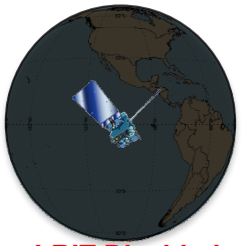
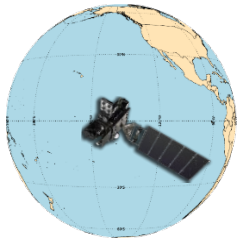
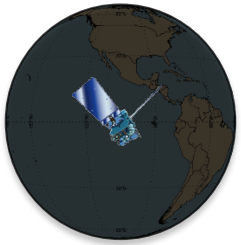
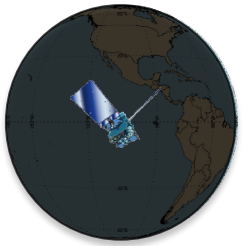
-GOES East Status and Past Quarterly Stats

-GOES West Status and Past Quarterly Stats

-GOES-17 ABI Seasonal Dependence Update

Seth Clevenstine

Present - Future GOES Constellation

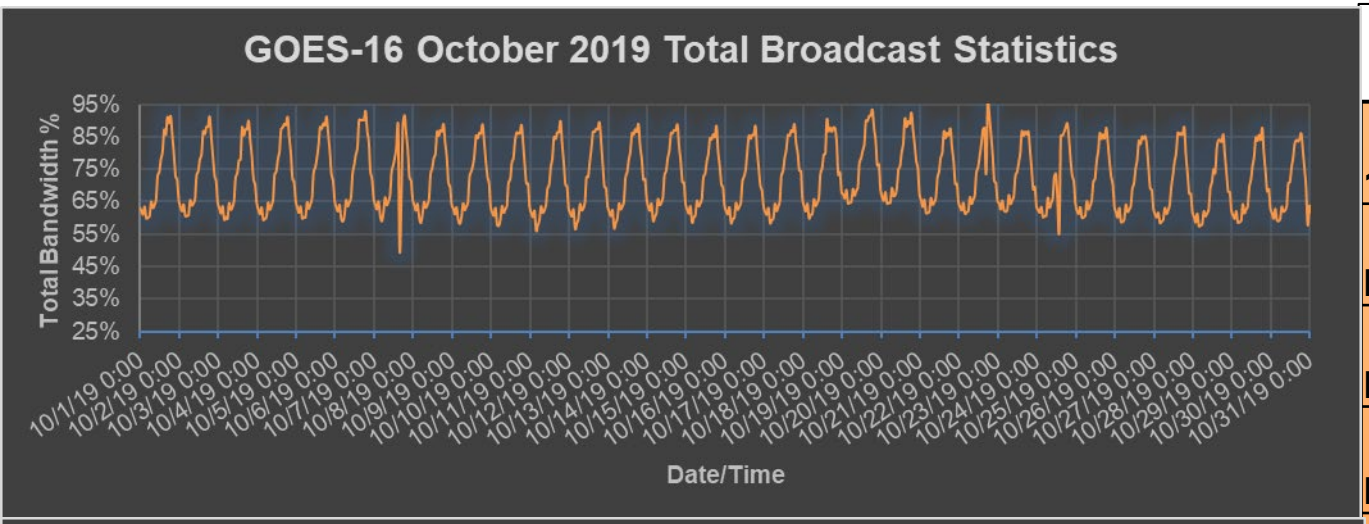
	GOES-West	Tandem GOES-West	Standby	GOES-East
Current – Jan 31, 2020	GOES-17 137.2° West  HRIT/EMWIN Active	GOES-15 128° West  LRIT Disabled EMWIN Disabled *Dec 2, 2019*	GOES-14 105° West  LRIT Disabled EMWIN Disabled *Dec 2, 2019*	GOES-16 75.2° West  HRIT/EMWIN Active
Plan for Mar 2nd 2020	GOES-West GOES-17 137.2° West  HRIT/EMWIN Active	Storage GOES-15 128° West  LRIT Disabled EMWIN Disabled	Standby GOES-14 105° West  LRIT Disabled EMWIN Disabled	GOES-East GOES-16 75.2° West  HRIT/EMWIN Active

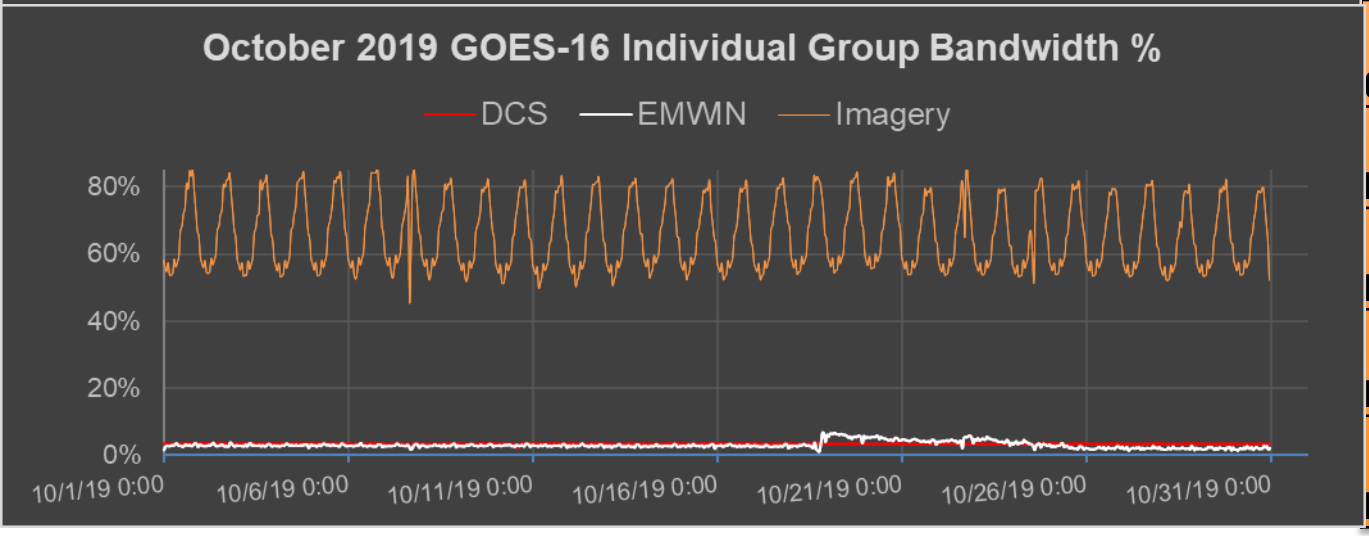
GOES-T (GOES-18) scheduled for launch on or before FY2022, on-orbit storage after post-launch checkout

GOES-16 HRIT Product Status

VCID #	Product Name	Period -Min	Format	Resolution	Product Availability
0	Admin Text	60	Text Messages	N/A	Active and available
1	Mesoscale Imagery	15	HRIT/LRIT	0.5km Band 2, 2km for bands 7 and 13	Both mesoscale regions active and available
2	CMI Band 2	30	HRIT/LRIT	2 km	Active and available
7	CMI Band 7	30	HRIT/LRIT	2 km	Active and available
8	CMI Band 8	30	HRIT/LRIT	2 km	Active and available
9	CMI Band 9	30	HRIT/LRIT	2 km	Active and available
13	CMI Band 13	30	HRIT/LRIT	2 km	Active and available
14	CMI Band 14	30	HRIT/LRIT	2 km	Active and available
15	CMI Band 15	30	HRIT/LRIT	2 km	Active and available
17	G17 CMI Band 13	60	HRIT/LRIT	4 km	Active and available
20	EMWIN - Priority	Variable	Text	N/A	Active and available
21	EMWIN - Graphics	Variable	Graphic (e.g. GIF, JPEG)	N/A	Active and available
22	EMWIN - Other	Variable	Text and Graphic	N/A	Active and available
23	NWS Products	Variable	Graphic	N/A	Planned for removal 2/3/2020
24	NHC Maritime Graphics Products	Variable	Graphic (e.g. GIF, JPEG)	N/A	Active and available
25	GOES-16 Level II Products	60 - 240	HRIT/LRIT	2-10 km	Adding Cloud Height product on 2/5/2020
30	DCS Admin	Continuous	Text	N/A	Active and available
32	DCS Data New Format	Continuous	Formatted Text	N/A	Active and available

October 2019 GOES East HRIT Statistics

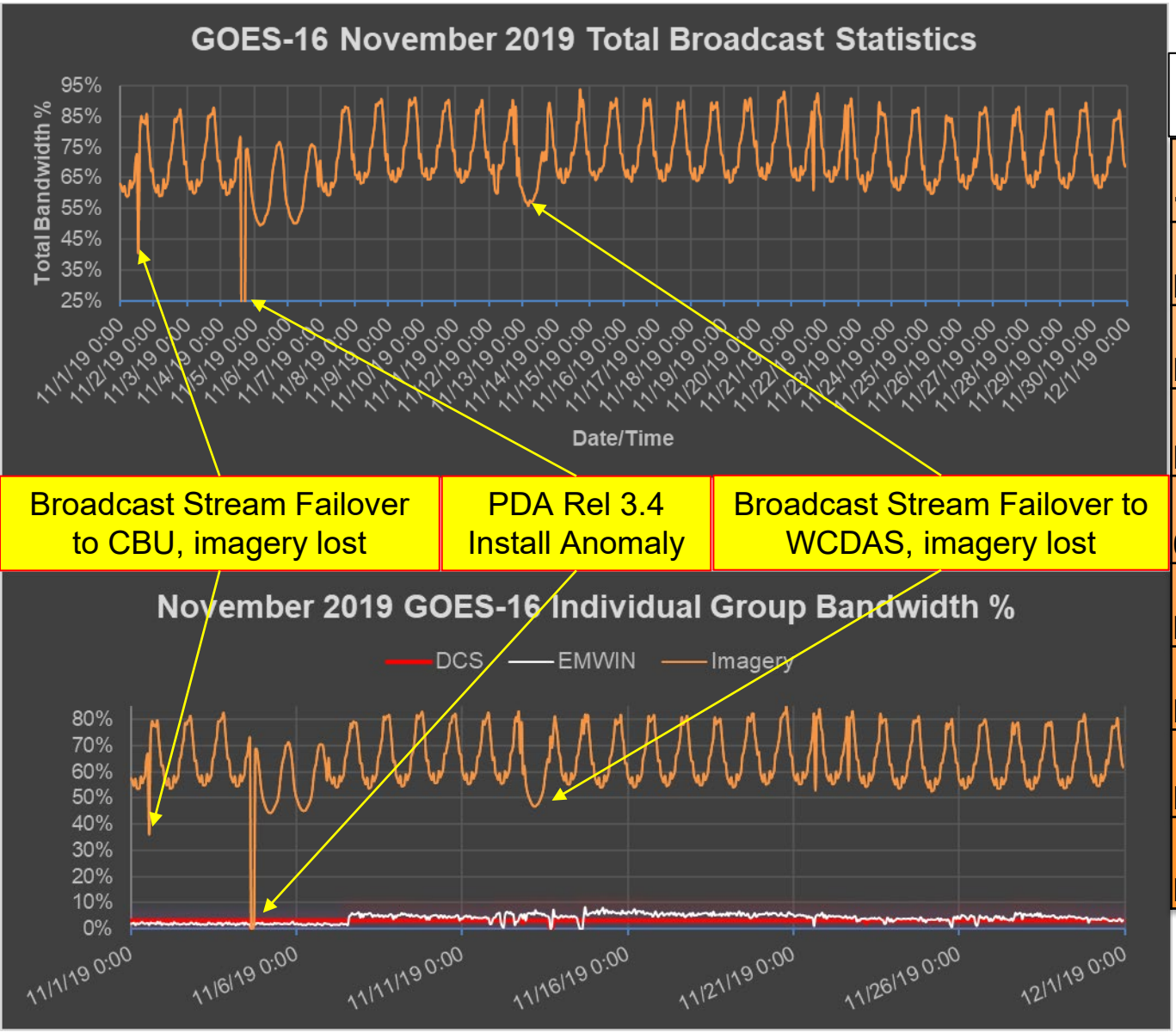




Monthly Averages

19Z Daytime Peak %	89.2%
Imagery Group	82.4%
DCS	3.42%
EMWIN	3.42%
04Z Night time Lull %	59.5%
Imagery Group	53.3%
DCS	3.33%
EMWIN	3.07%
Daily Total Data Size	49.8 Gb

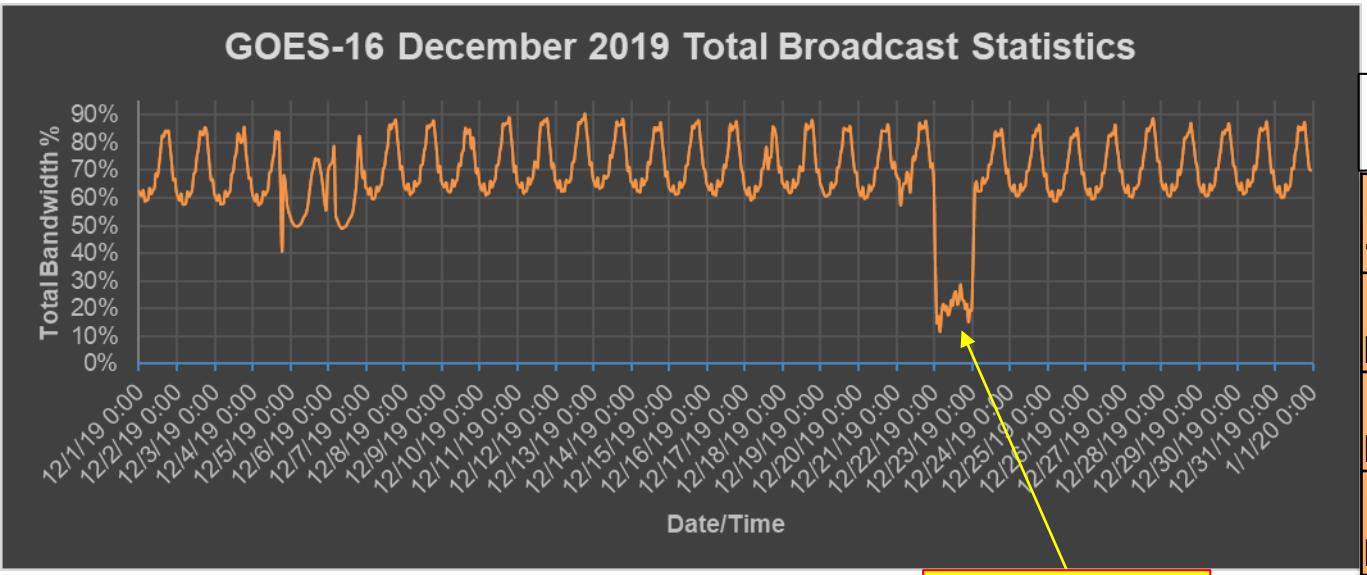
November 2019 GOES East HRIT Statistics



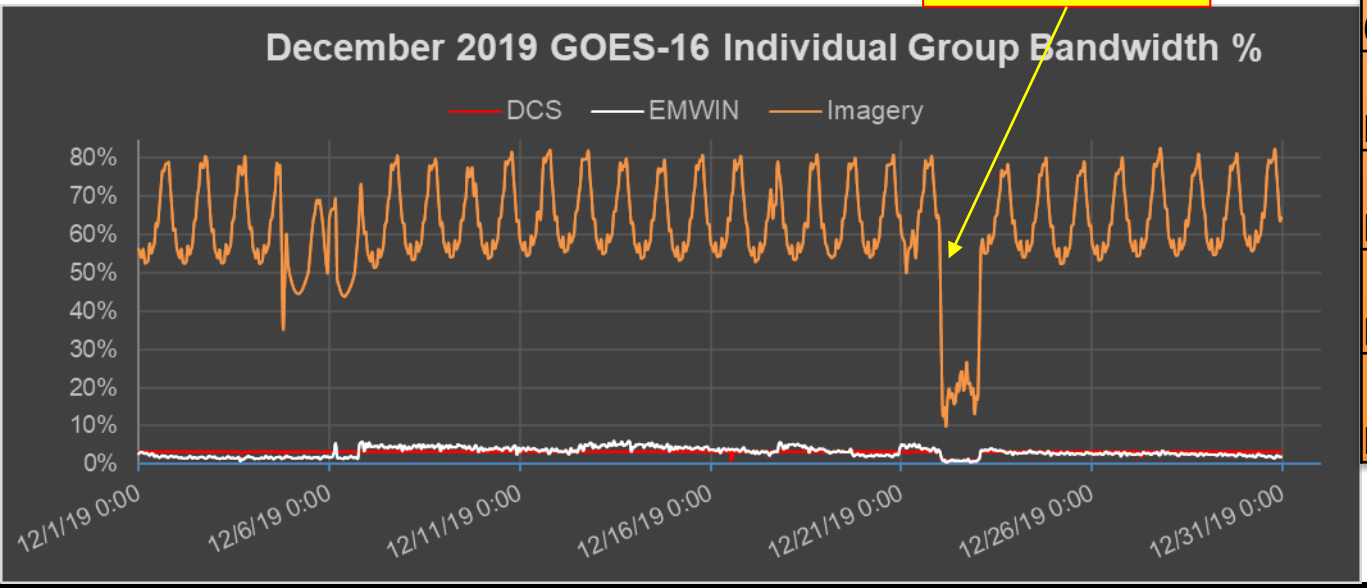
Monthly Averages

19Z Daytime Peak %	87.7%
Imagery Group	80.2%
DCS	3.33%
EMWIN	4.22%
04Z Night time Lull %	61.4%
Imagery Group	53.7%
DCS	3.32%
EMWIN	4.39%
Daily Total Data Size	49.6 Gb

December 2019 GOES East HRIT Statistics



PDA Anomaly



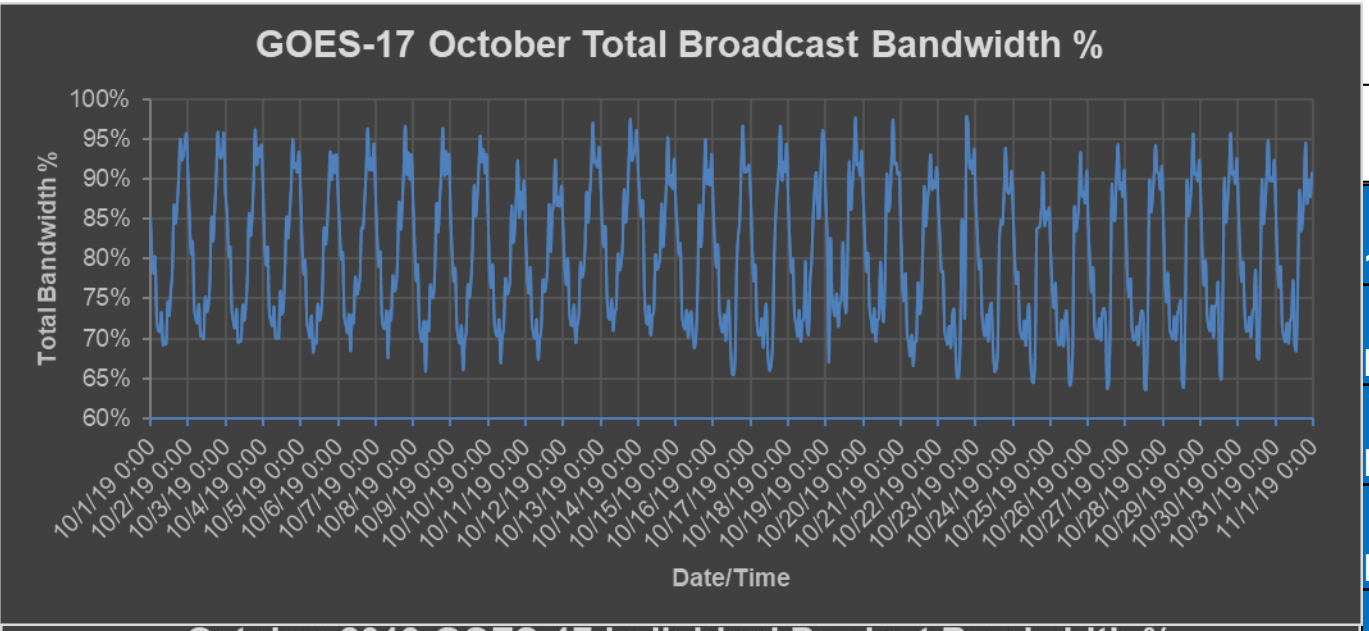
Monthly Averages

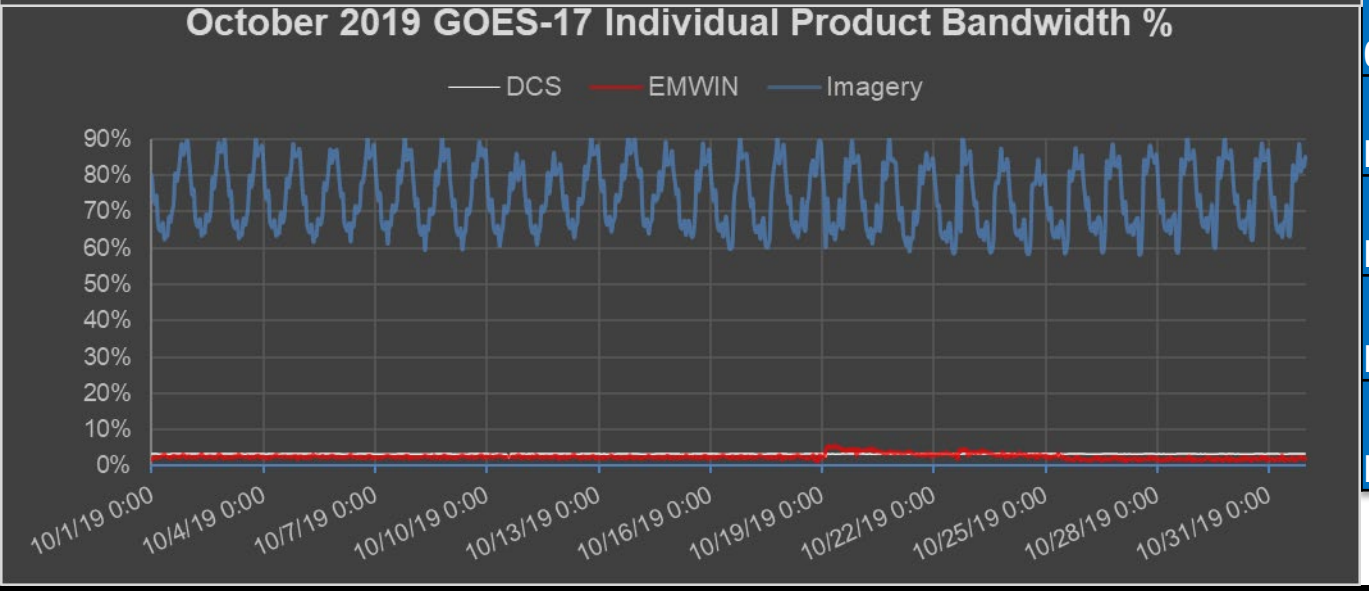
19Z Daytime Peak %	82.4%
Imagery Group	79.9%
DCS	3.26%
EMWIN	3.16%
05Z Night time Lull %	59.1%
Imagery Group	52.5%
DCS	3.22%
EMWIN	3.11%
Daily Total Data Size	47.6 Gb

GOES-17 HRIT Product Status

VCID #	Product Name	Period -Min	Format	Resolution	Product Availability
0	Admin Text	60	Text Messages	N/A	Active and available
1	Mesoscale Imagery	15	HRIT/LRIT	0.5km Band 2, 2km for bands 7 and 13	Both mesoscale regions active and available
2	CMI Band 2	30	HRIT/LRIT	2 km	Active and available
5	GOES-15 WV Imagery	30 - 180	LRIT	4 km	Available until March 2nd, 2020
6	GOES-15 IR Imagery	30 - 180	LRIT	4 km	Available until March 2nd, 2020
7	CMI Band 7	30	HRIT/LRIT	2 km	Active and available
8	CMI Band 8	30	HRIT/LRIT	2 km	Active and available
9	CMI Band 9	30	HRIT/LRIT	2 km	Active and available
13	CMI Band 13	30	HRIT/LRIT	2 km	Active and available
14	CMI Band 14	30	HRIT/LRIT	2 km	Active and available
15	CMI Band 15	30	HRIT/LRIT	2 km	Active and available
16	G16 CMI Band 13	60	HRIT/LRIT	4 km	Active and available
20	EMWIN - Priority	Variable	Text	N/A	Active and available
21	EMWIN - Graphics	Variable	Graphic (e.g. GIF, JPEG)	N/A	Active and available
22	EMWIN - Other	Variable	Text and Graphic	N/A	Active and available
23	NWS Products	Variable	Graphic	N/A	Planned for removal 2/3/2020
24	NHC Maritime Graphics Products	Variable	Graphic (e.g. GIF, JPEG)	N/A	Active and available
25	GOES-R/S Level II Products	Variable	HRIT/LRIT	2-10 km	Adding Cloud Height product on 3/2/2020
30	DCS Admin	Continuous	Text	N/A	Active and available
32	DCS Data New Format	Continuous	Formatted Text	N/A	Active and available
60	Himawari-8	60	LRIT	4 km	Active and available

October 2019 GOES West HRIT Statistics

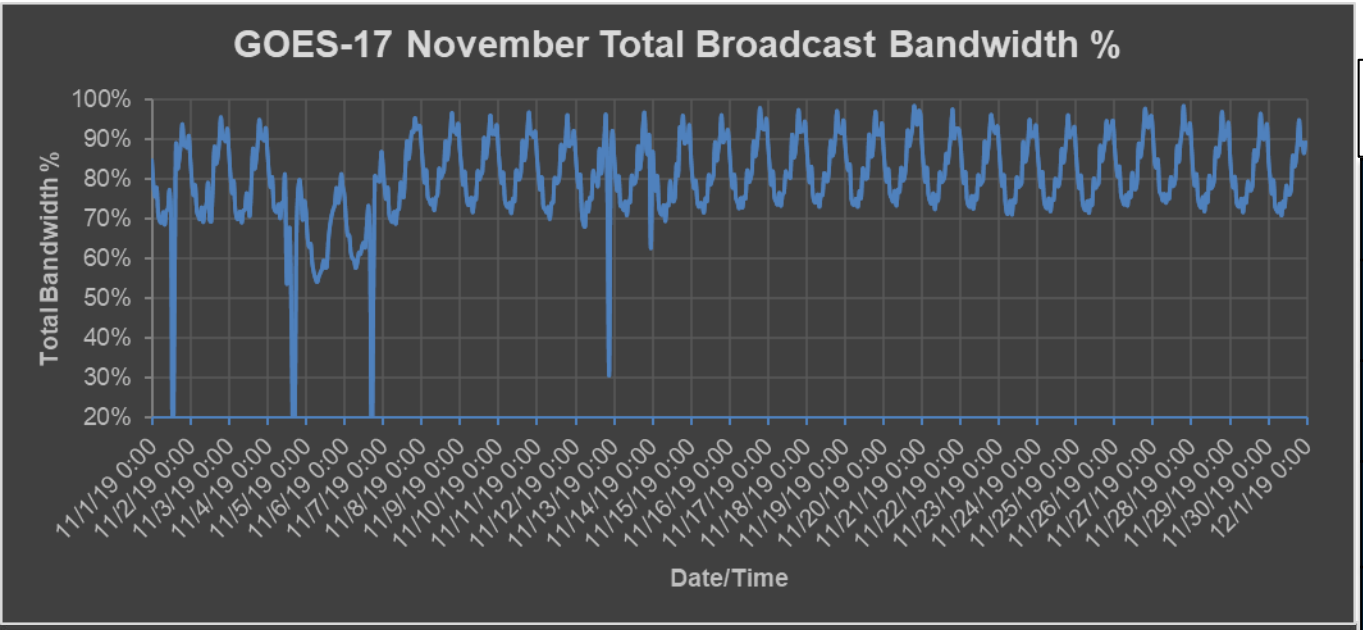


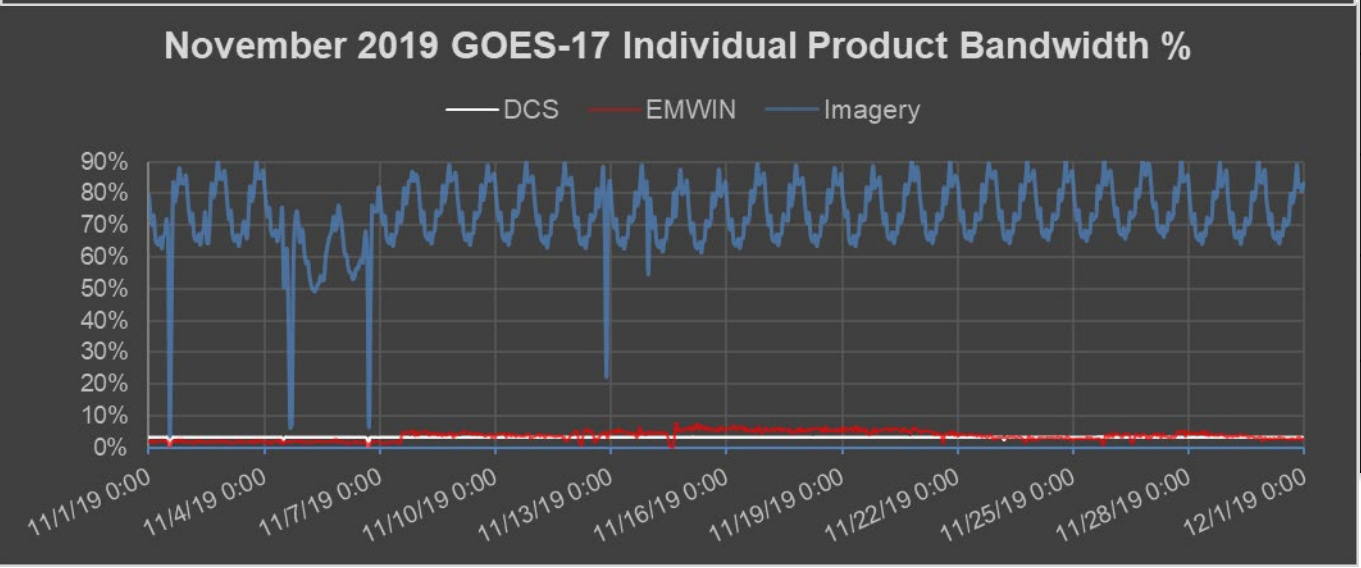


Monthly Averages

19Z Daytime Peak %	94.8%
Imagery Group	88.7%
DCS	3.34%
EMWIN	2.81%
08Z Night time Lull %	70.5%
Imagery Group	63.0%
DCS	3.31%
EMWIN	4.14%
Daily Total Data Size	55.5 Gb

November 2019 GOES West HRIT Statistics

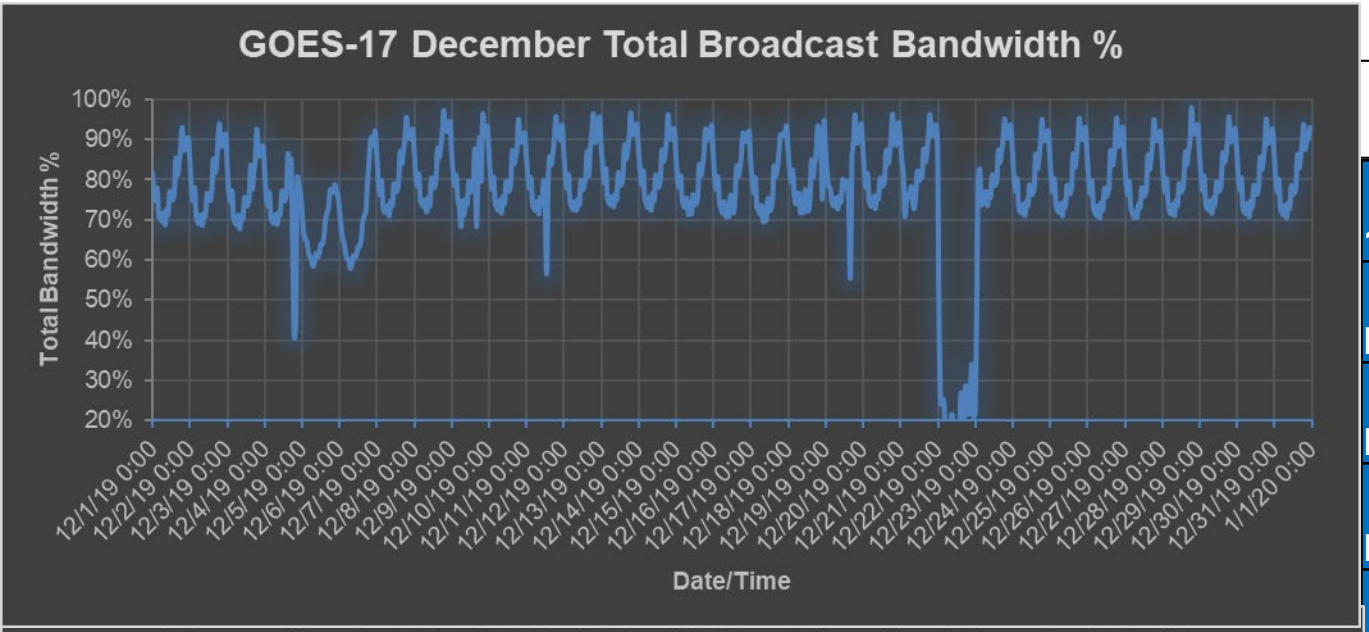


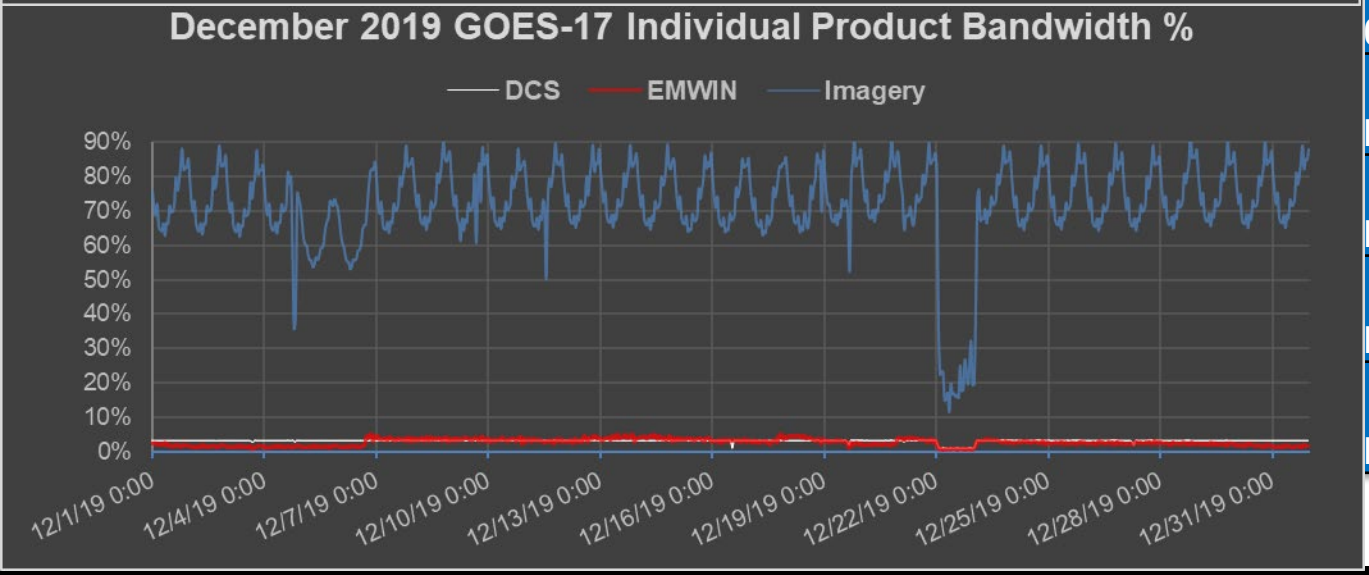


Monthly Averages

23Z Daytime Peak %	94.7%
Imagery Group	86.9%
DCS	3.29%
EMWIN	4.50%
08Z Night time Lull %	67.3%
Imagery Group	59.3%
DCS	3.25%
EMWIN	4.66%
Daily Total Data Size	56.3 Gb

December 2019 GOES West HRIT Statistics

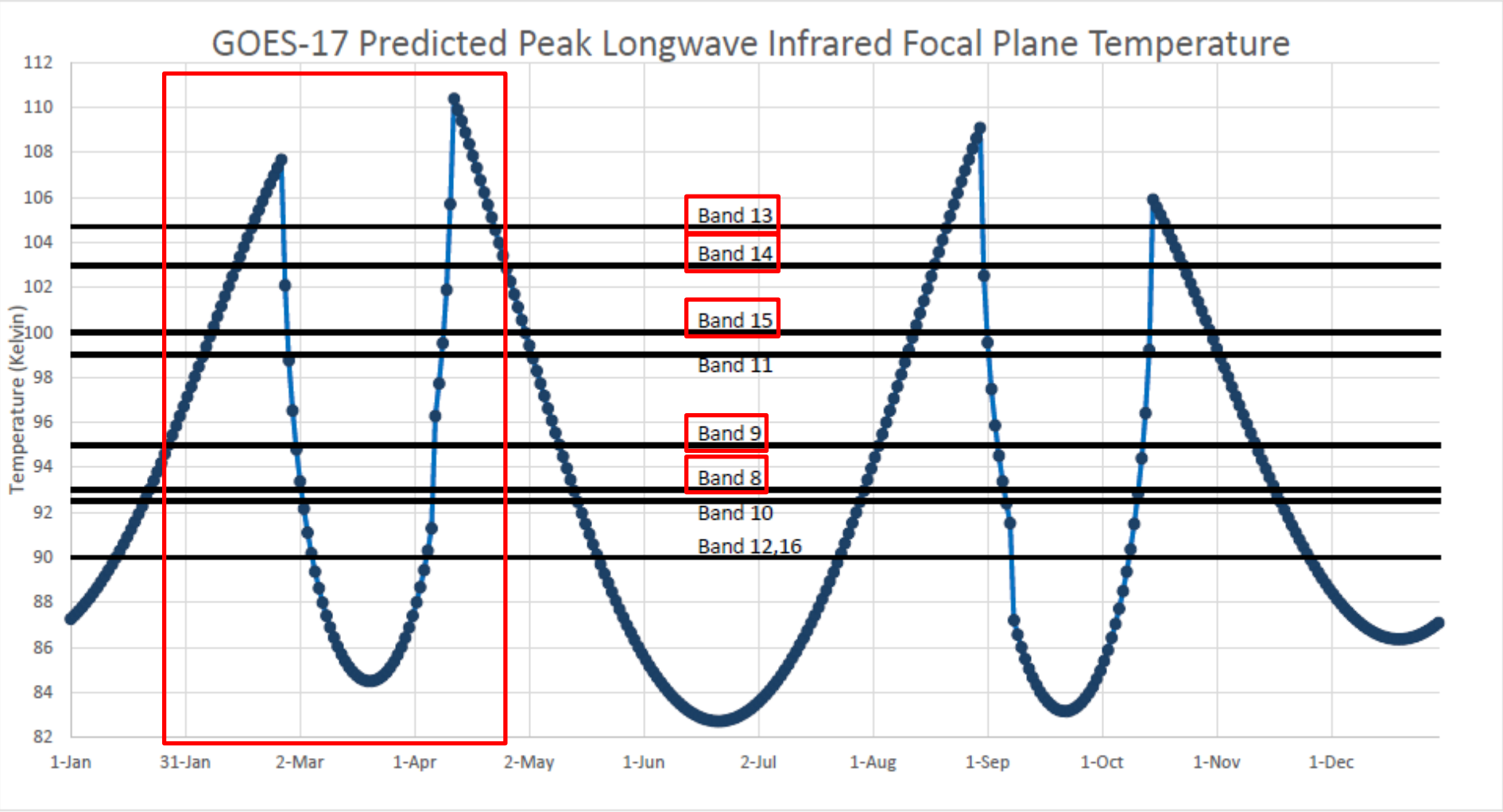




Monthly Averages

19Z Daytime Peak %	89.6%
Imagery Group	83.7%
DCS	3.26%
EMWIN	2.64%
08Z Night time Lull %	68.6%
Imagery Group	62.3%
DCS	3.23%
EMWIN	3.11%
Daily Total Data Size	54.0 Gb

GOES-17 ABI Seasonal Dependence



This plot shows daily maximum temperature of the ABI focal plane module. These maximums occur at night. The higher the temperature, the more saturated imagery becomes. Where the temperature rises to approach a black line for each band, marginal saturation may be observed in imagery. Where the temperature curve exceeds a black line for each band, the imagery may begin to saturate so much that it becomes unusable.

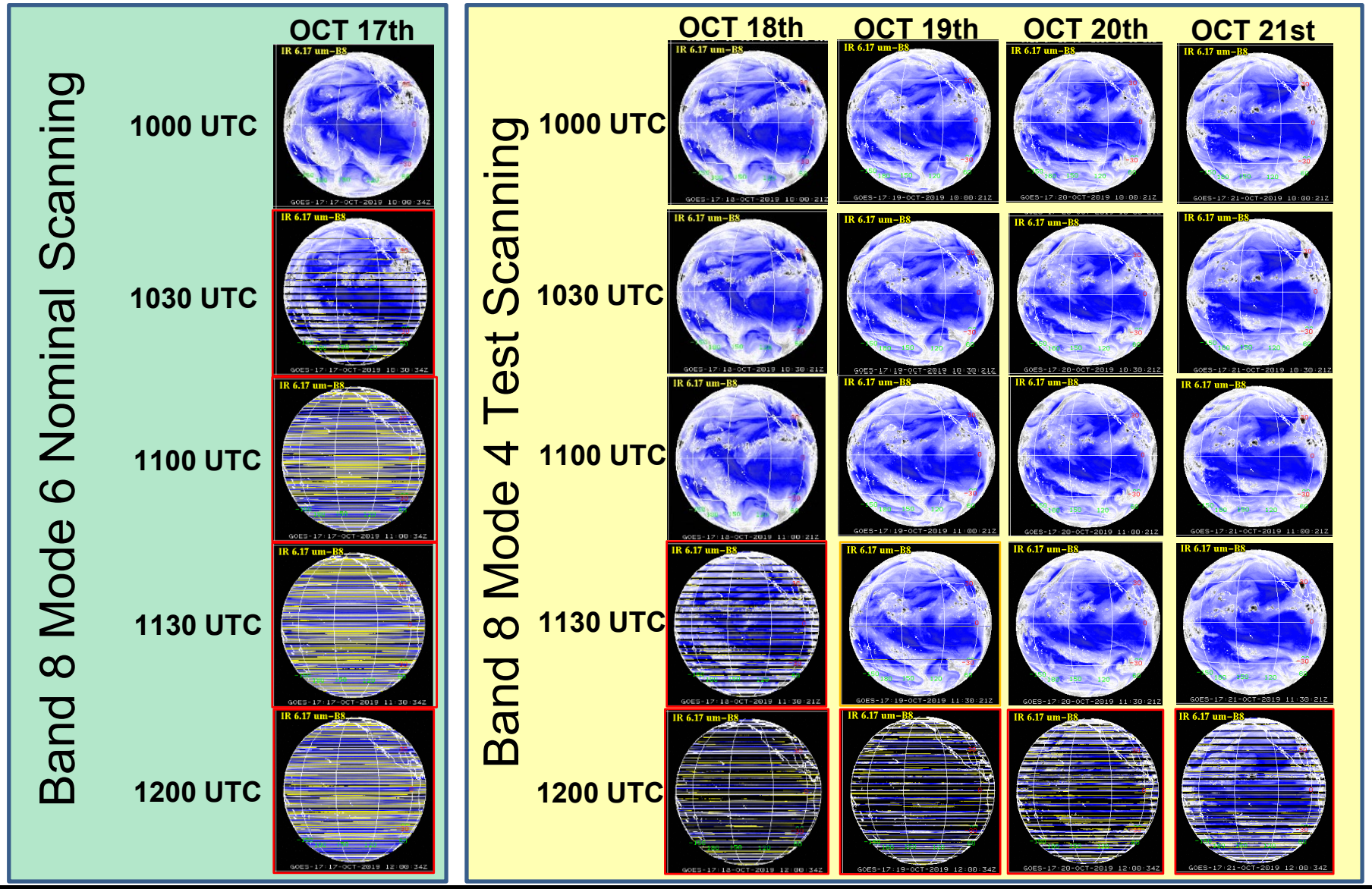
2020 GOES-17 ABI Seasonal Dependence

1 January - 26 February	Channel saturation begins starting with bands in this order: 12, 16, 10, 8, 9, 11, 15, 14, 13 from marginal to unusable by the end of the time period.	Saturation can occur between approximately 1000-1730 UTC. Peak saturation occurs at the end of the time period at approximately 1300 UTC.
26 February - 19 March	Channel saturation improves starting with bands in this order: 13, 14, 15, 11, 9, 8, 10, 16, 12 from unusable to marginal by the end of the time period.	Saturation can occur between approximately 1000-1730 UTC. Peak saturation occurs at the beginning of the time period at approximately 1300 UTC.
19 March	Spring Equinox	
19 March - 12 April	Channel saturation begins starting with bands in this order: 12, 16, 10, 8, 9, 11, 15, 14, 13 from marginal to unusable by the end of the time period.	Saturation can occur between approximately 1030-1630 UTC. Peak saturation occurs at the end of the time period at approximately 1300 UTC.
12 April - 20 June	Channel saturation improves starting with bands in this order: 13, 14, 15, 11, 9, 8, 10, 16, 12 from unusable to marginal by the end of the time period.	Saturation can occur between approximately 1030-1630 UTC. Peak saturation occurs at the beginning of the time period at approximately 1300 UTC.
20 June	Summer Solstice	
20 June - 30 August	Channel saturation begins starting with bands in this order: 12, 16, 10, 8, 9, 11, 15, 14, 13 from marginal to unusable by the end of the time period.	Saturation can occur between approximately 1000-1730 UTC. Peak saturation occurs at the end of the time period at approximately 1300 UTC.
30 August - 22 September	Channel saturation improves starting with bands in this order: 13, 14, 15, 11, 9, 8, 10, 16, 12 from unusable to marginal by the end of the time period.	Saturation can occur between approximately 1000-1730 UTC. Peak saturation occurs at the beginning of the time period at approximately 1300 UTC.
22 September	Fall Equinox	
22 September - 15 October	Channel saturation begins starting with bands in this order: 12, 16, 10, 8, 9, 11, 15, 14, 13 from marginal to unusable by the end of the time period.	Saturation can occur between approximately 1030-1630 UTC. Peak saturation occurs at the end of the time period at approximately 1300 UTC.
15 October - 19 December	Channel saturation improves starting with bands in this order: 13, 14, 15, 11, 9, 8, 10, 16, 12 from unusable to marginal by the end of the time period.	Saturation can occur between approximately 1030-1630 UTC. Peak saturation occurs at the beginning of the time period at approximately 1300 UTC.

Recent GOES-17 ABI Testing

- Testing on Oct 18th -21st was conducted to investigate whether modifying the GOES-17 (GOES-West) ABI scan pattern during periods of high thermal loading would decrease the number of saturated images currently resulting due to the loop heat pipe anomaly.
- Initial results looked promising with less degradation (next slide)
- Follow-up tests were planned in December 2019, but were cancelled for a later time
- No update to when/if more additional testing will be done or if a modified schedule will become operational

GOES-17 ABI Testing Visual Results



2020 GOES-17 ABI Seasonal Dependence

For more information about GOES-17's ABI performance, upcoming events and the schedule, please visit the GOES-R website for more details (link below).

https://www.goes-r.gov/users/GOES-17-ABI-Performance.html

HRIT/EMWIN User Group

-Product Changes

Seth Clevenstine

Virtual Channel #23

- VCID 23 is the NHC forecasts discussions
  - –Total of 45 different products
    - •Completely dependent on active weather for distribution
- These discussions are also available on VCID 20 per the EMWIN product baseline
  - –Now that EMWIN is operational, these redundant products can be removed.
- On February 3rd, this virtual channel and subscriptions will be removed.

Level 2+ Product Availability

Listing of Products Currently Available to HRIT

Aerosol Detection (Including Smoke and Dust)
Aerosol Optical Depth (AOD)
Cloud Top Height
Cloud Top Pressure
Fire/Hot Spot Characterization
Cloud Top Temperature
Rainfall Rate / QPE
Land Surface Temperature (Skin)
Sea Surface Temperature (Skin)
Total Precipitable Water
Derived Stability Indices (CAPE and LI)

~~Clear Sky Masks~~
~~Downward Shortwave Radiation: Surface~~
~~Reflected Shortwave Radiation~~
~~Volcanic Ash: Detection and Height~~
~~Cloud Optical Depth~~
~~Cloud Particle Size Distribution~~
~~Cloud Top Phase~~
~~Legacy Vertical Moisture Profile~~
~~Legacy Vertical Temperature Profile~~
~~Hurricane Intensity Estimation~~
~~Snow Cover~~

-Will look to add Cloud Top Height (available once an hour) during the week of February 3rd for GOES-16. Will schedule the time-trigger to occur around the top of the hour. GOES-17's addition will not happen until after March 2nd.

-Will test a layer and usability after Release 3.5.

HRIT/EMWIN User Group

-Noted Broadcast Issues
-PDA Release 3.5
-HRIT/EMWIN Event Schedule

Seth Clevenstine

Noted Broadcast Issues – PDA Rel 3.4

HRIT/EMWIN Intermittent File Latency

– Problem

- Observed intermittent latency spikes in DCS and EMWIN data, mean latency for EMWIN/DCS is ~19-20 seconds. Latency "spikes" **account for ~2%** of the overall data.

– Previous Solution

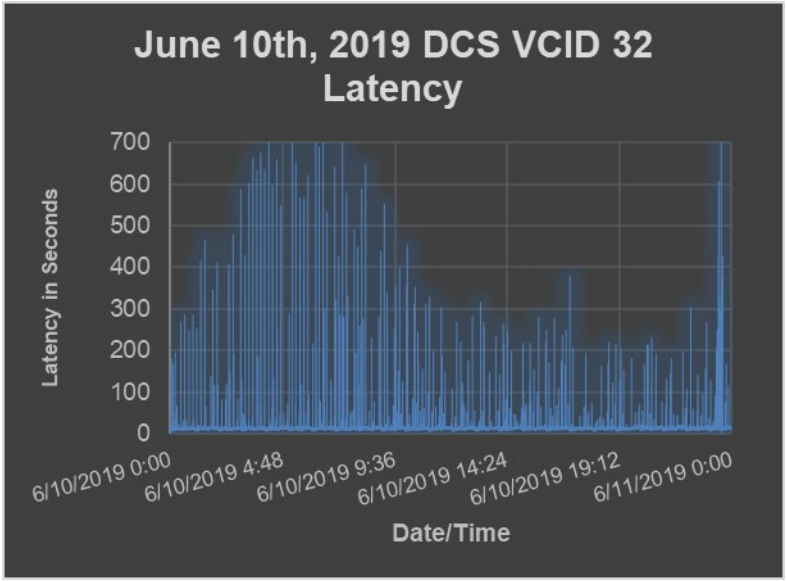
- Dictates HRIT products within PDA as the highest priority

– New Solution

- While prioritization gives HRIT data "ahead of the line" privileges in the processing chain, the root cause of the spikes has been determined to be an outdated Java version that affects an internal service within PDA that creates the "VM slowness."

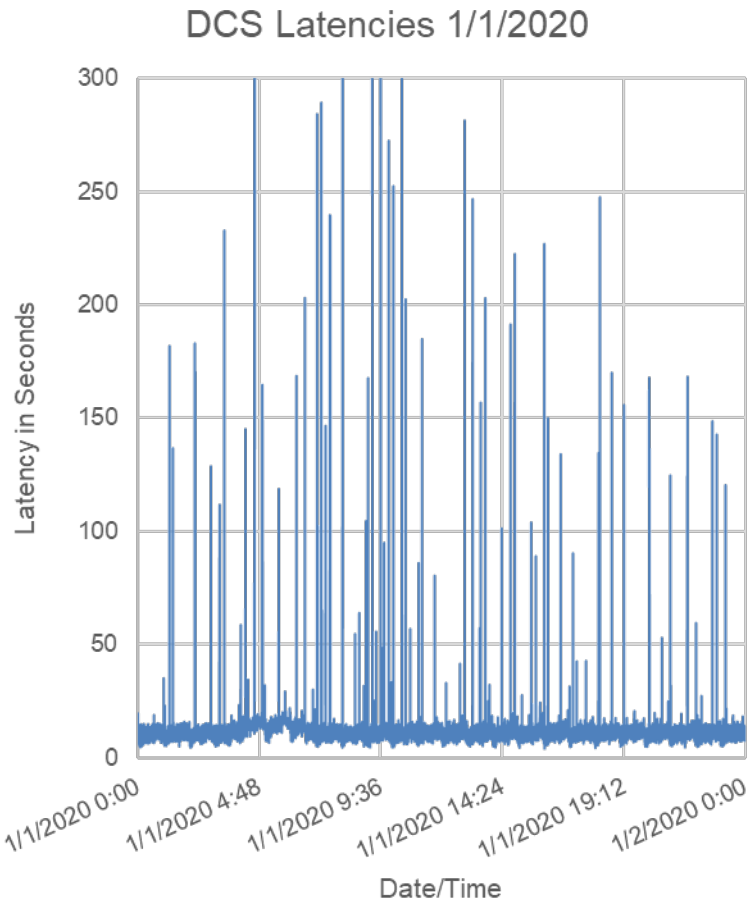
– Implementation Date

- November 7th, 2019



June 10th VCID 32 DCS Descriptive Stats	
Mean	**18.13175**
Median	13.534
Mode	12.567
Standard Deviation	39.45649
Minimum	6.153
Maximum	**816.08**
Count	16879
File Count 30-60 seconds	180
File Count 60-120 seconds	94
File Count 120-300 seconds	136
File Count >300 seconds	88
% Count > 30 Seconds	**2.95%**

Noted Broadcast Issues – PDA Rel 3.4 Results



End-to-End DCS Latency Stats 1/1/2020	
Mean	**11.61247**
Median	10.948
Mode	11.384
Standard Deviation	11.10522
Minimum	4.465
Maximum	**363.007**
Count	16587
Count >30	25
Count >60	15
Count>120	41
Count>300	5
Total Latent	**0.52%**

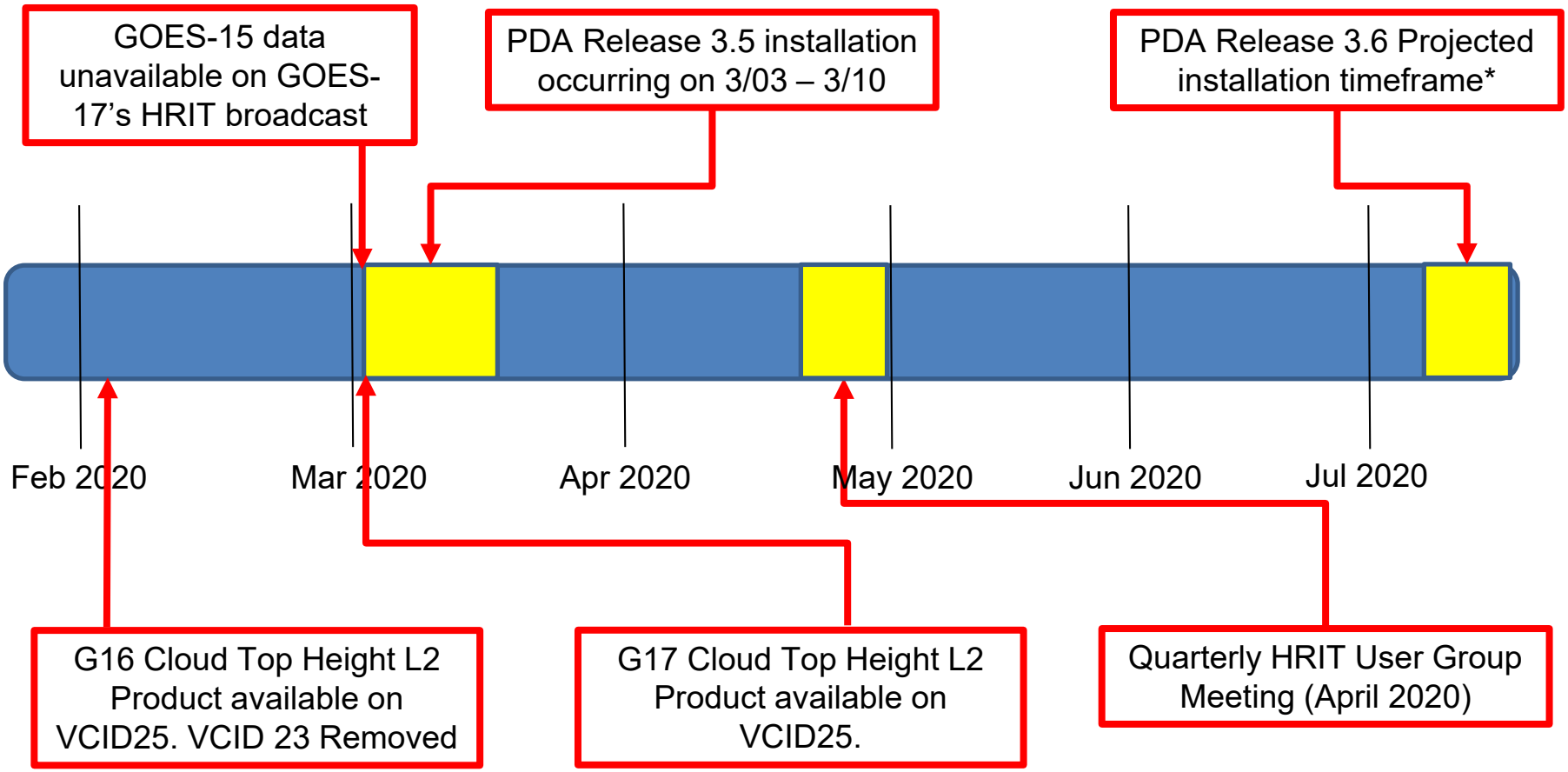
PDA DCS Latency Stats 1/1/2020	
Mean	6.224271
Median	5.501
Mode	5.13
Standard Deviation	10.91652
Minimum	2.882
Maximum	352.972
Count	16587
Count >30	16
Count >60	17
Count>120	39
Count>300	4
Total Latent	0.46%

After PDA Release 3.4 was installed, DCS latencies have dropped significantly. There are still spikes that affect 0.52% of the data.

PDA Rel 3.5

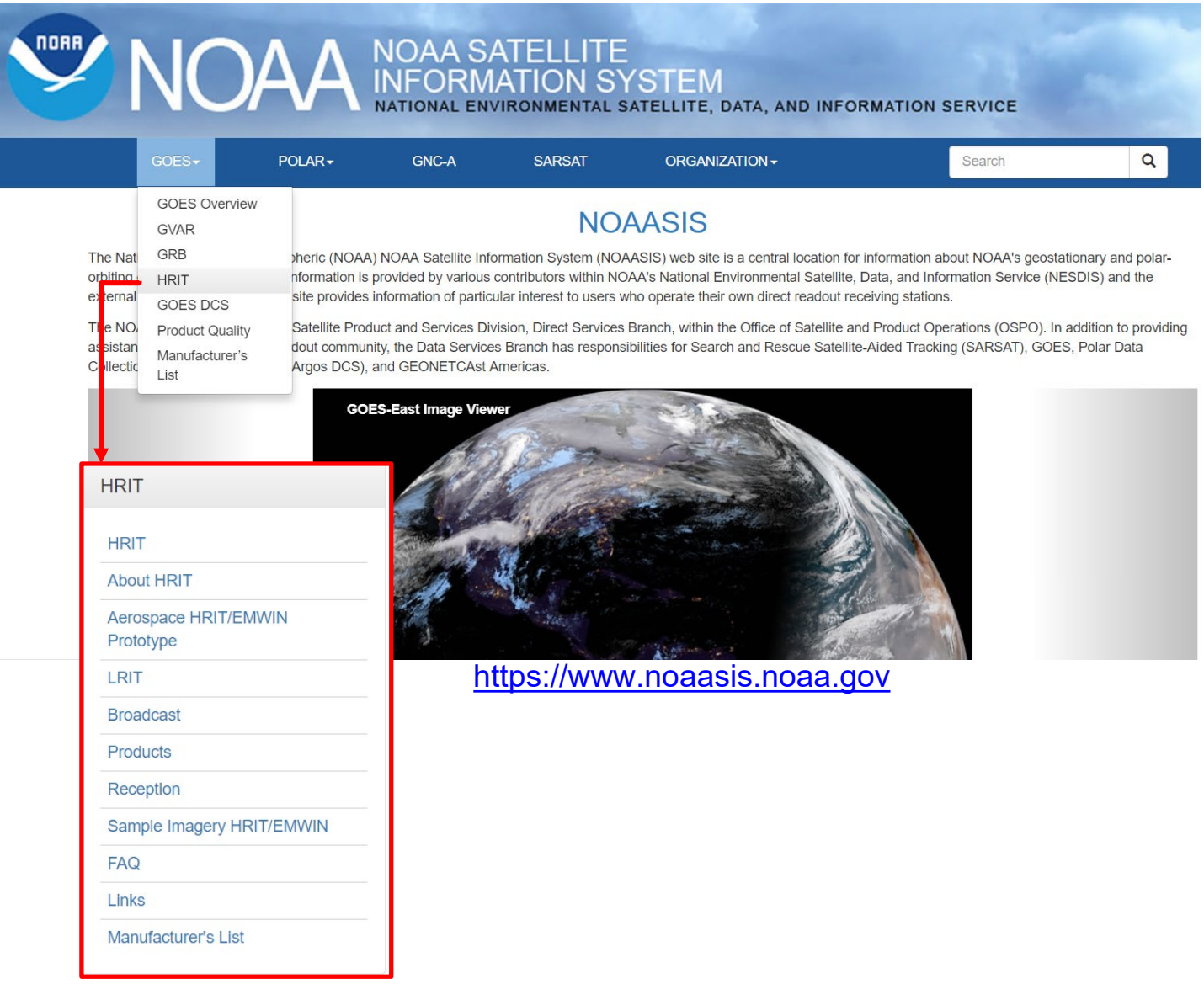
- Reducing the number of shared pathways of PDA and HRIT products (including segregating HRIT tailoring).
  - Reduces latency from PDA backlogs (JPSS passes)
- Projected to fix the Segment ID incremental issue and missing segments on the Legacy GOES-NOP imagery
- Broadcast subscriptions not fulfilled for the same product with multiple layers
  - Ex: Fire/Hot Spot Characterization
- Small High Priority files are not prioritized in anomalous conditions.
  - Ex: Only DCS/EMWIN files during PDA backlog events

HRIT/EMWIN User Group Event Timeline



Dates are subject to change, these are just projections from the current ongoing development work taking place in January 2020

NOAASIS Website



https://www.noaasis.noaa.gov

- The HRIT section includes information on the broadcast, products, reception, sample imagery, frequently asked questions and links to other affiliated organizations with NOAA (both internal and external)
- Any issues or comments for inclusion, feedback is welcome!

ESPC Notifications, Status, and Contacts

Subscribe to ESPC for notifications. This is the primary way for you to receive notifications and information on GOES status and schedules!

24/7 Help Desk	ESPCOperations@noaa.gov
ESPC Messages	http://www.ssd.noaa.gov/PS/SATS/messages.html
User Services	SPSD.UserServices@noaa.gov
Data Access	NESDIS.Data.Access@noaa.gov
Facebook	www.facebook.com/NOAANESDIS
Twitter	www.twitter.com/noaasatellites
Press releases	http://www.nesdis.noaa.gov/news_archives/
NOAASIS Website	https://www.noaasis.noaa.gov
GOES Status	http://www.ospo.noaa.gov/Operations/GOES/status.html
GOES User Information and Documents	http://www.ospo.noaa.gov/Operations/GOES/documents.html
POES Schedules	http://www.ospo.noaa.gov/Operations/GOES/schedules.html

HRIT/EMWIN Broadcast Contact Information

Seth Clevenstine

HRIT/EMWIN Program Manager

Direct Services Branch

Satellite Products and Services Division

Office of Satellite and Product Operations

NOAA NESDIS

NOAA Satellite Operations Facility (NSOF) Suitland, MD

Cubicle #1653

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Tel: 301-817-4558

HRIT/EMWIN User Group

Next meeting will be April 2020

Thanks for your participation!

HRIT/EMWIN User Group

Open Discussion

Seth Clevenstine