

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

Quarterly Meeting

06 December 2018

Agenda Items & Schedule

- 3:00 pm (EST) – Roll Call/ Introduction to User Group-----Seth Clevenstine – 5 mins
- GOES East/West Status-----Seth Clevenstine – 5 mins
- GOES West Pre/Post Transition Plans-----Seth Clevenstine – 5 mins
- GOES LRIT Broadcast Deactivation-----Seth Clevenstine – 5 mins
- GOES-16 & 17 HRIT Stream Changes-----Seth Clevenstine – 5 mins
- GOES East HRIT Stats Quarterly Stats-----Seth Clevenstine – 5 mins
- Observed Broadcast Updates/Issues-----Seth Clevenstine – 10 mins
- DCS File Format Change-----Brett Betsill – 5 mins
- EMWIN update-----Bob Gillespie – 5 mins
- Open Discussion Items-----Open – 20 mins
- Action items and summary-----Paul Seymour – 5 mins
- Total – 75 mins

Purpose of the User Group

- Form a User Community for HRIT/EMWIN
- Provide the latest news on the HRIT/EMWIN broadcast
- Provide the latest status on the GOES-17 Schedule
- Information Exchange on Broadcast Content
- Updates on User / Manufacturer Readiness
- Other Topics As They Arise

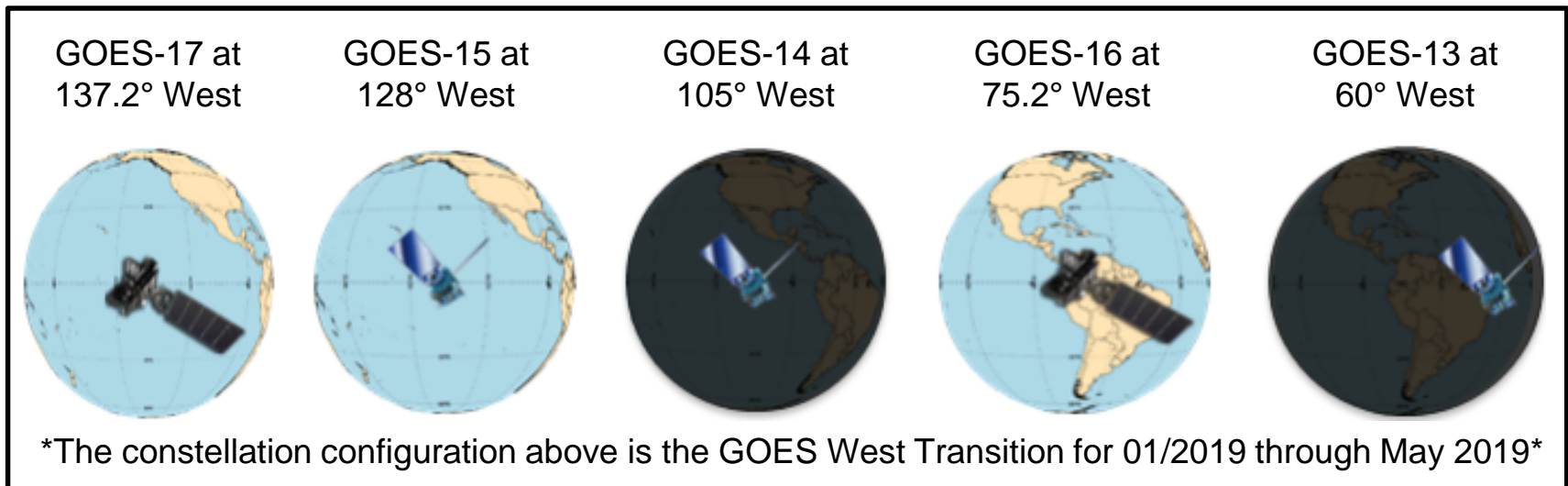
HRIT/EMWIN User Group

- GOES East/West Operational Status**
- GOES LRIT Broadcast Deactivation**
- GOES East HRIT Stats Quarterly Stats**

Seth Clevensine

Current Status of GOES-15 and GOES-16

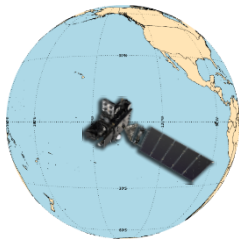
- GOES-16 is GOES-East at 75.2° West as of 12/18/2017
 - HRIT/EMWIN is operational on GOES-East
 - A 1692.7 MHz EMWIN broadcast is active on GOES-14 at 105° West for GOES East users and GOES-15 West users until May 2019
 - LRIT & EMWIN broadcasts are still operational on GOES-15 (West)



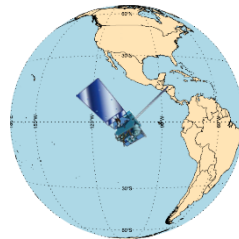
Present - Future GOES Constellation

Preparing for GOES-West Ops

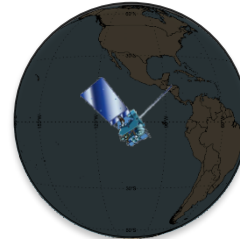
GOES-17
137.2° West



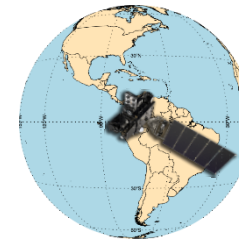
GOES-West
GOES-15
128° West



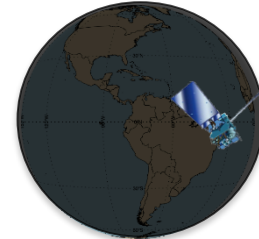
Standby
GOES-14
105° West



GOES-East
GOES-16
75.2° West

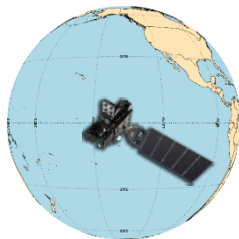


Storage
GOES-13
60° West

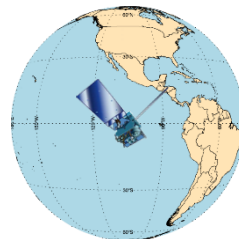


Current as of
Dec 06, 2018

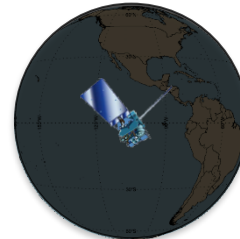
GOES-West
GOES-17
137.2° West



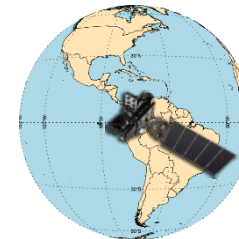
Tandem GOES-West
GOES-15
128° West



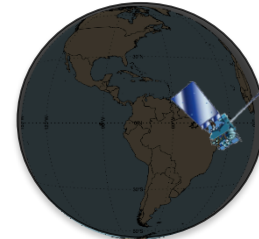
Standby
GOES-14
105° West



GOES-East
GOES-16
75.2° West

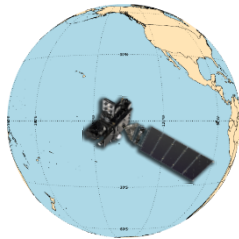


Storage
GOES-13
60° West

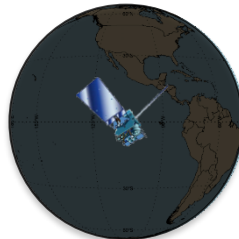


Plan for
Jan 2019

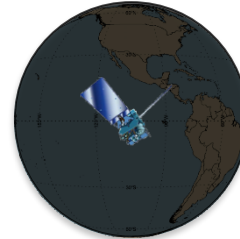
GOES-West
GOES-17
137.2° West



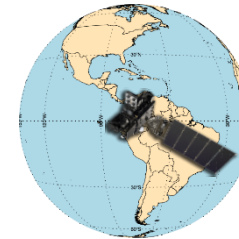
Storage
GOES-15
128° West



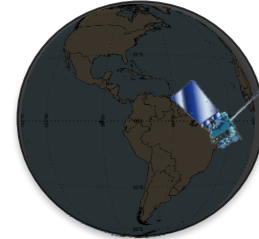
Standby
GOES-14
105° West



GOES-East
GOES-16
75.2° West



Storage
GOES-13
60° West



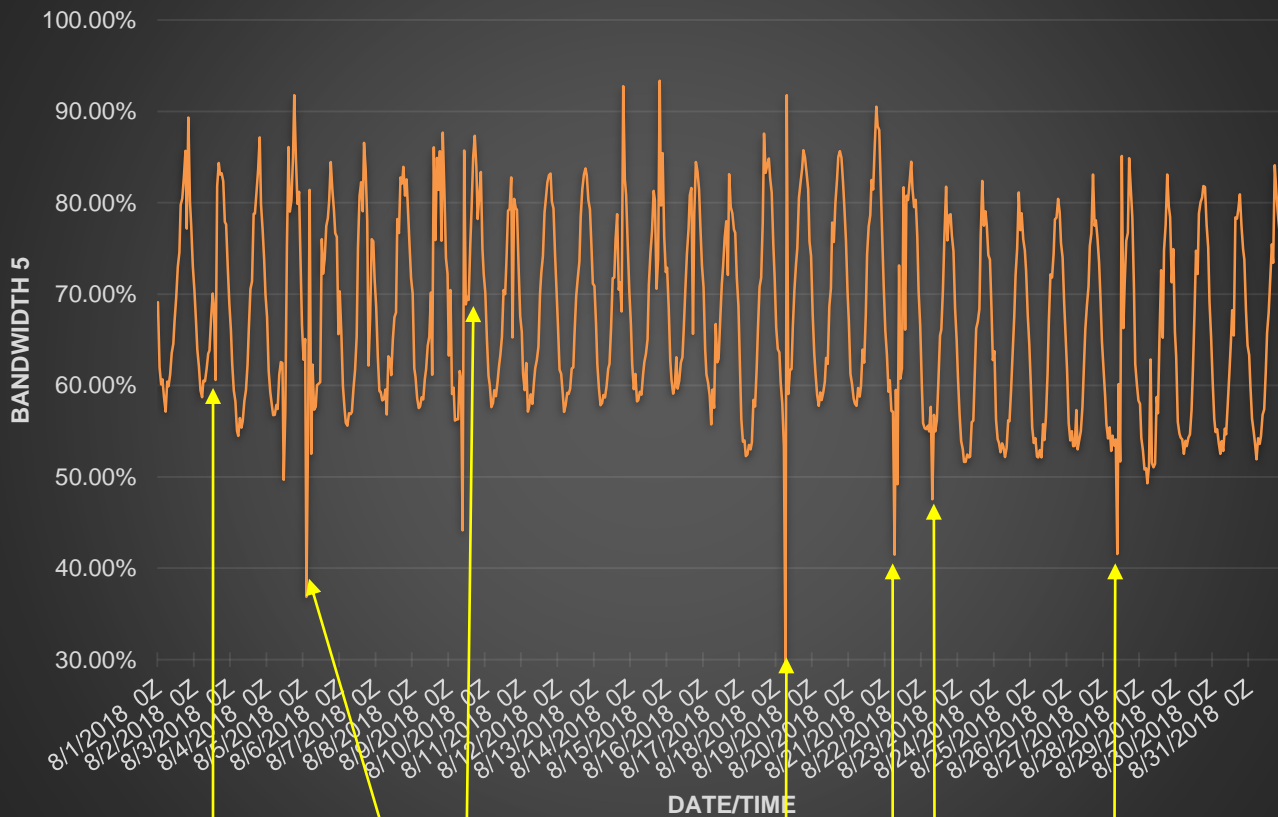
Plan for
May, 2019

GOES-15 LRIT Broadcast (Post Transition)

- GOES-15's LRIT broadcast will be disabled shortly after the GOES-17 official GOES West operational announcement is made. It is expected to occur at some point in January 2019.
- Reasons why this is occurring:
 - Operational Risks involved running two parallel systems with three satellites
 - Not enough feedback for operational necessity from stakeholders to outweigh the risks.
- The GOES-15 LRIT Transponder will be activated and available in the need of a contingency occurs during collocation period.
- GOES-15 IR images will still be available on GOES-17's HRIT broadcast until May 2019.
 - Both Northern/Southern Hemisphere IR1 & Water Vapor images available on VCID 6

August 2018 GOES East HRIT Statistics

August 2018 Total Broadcast Bandwidth %



Monthly Averages

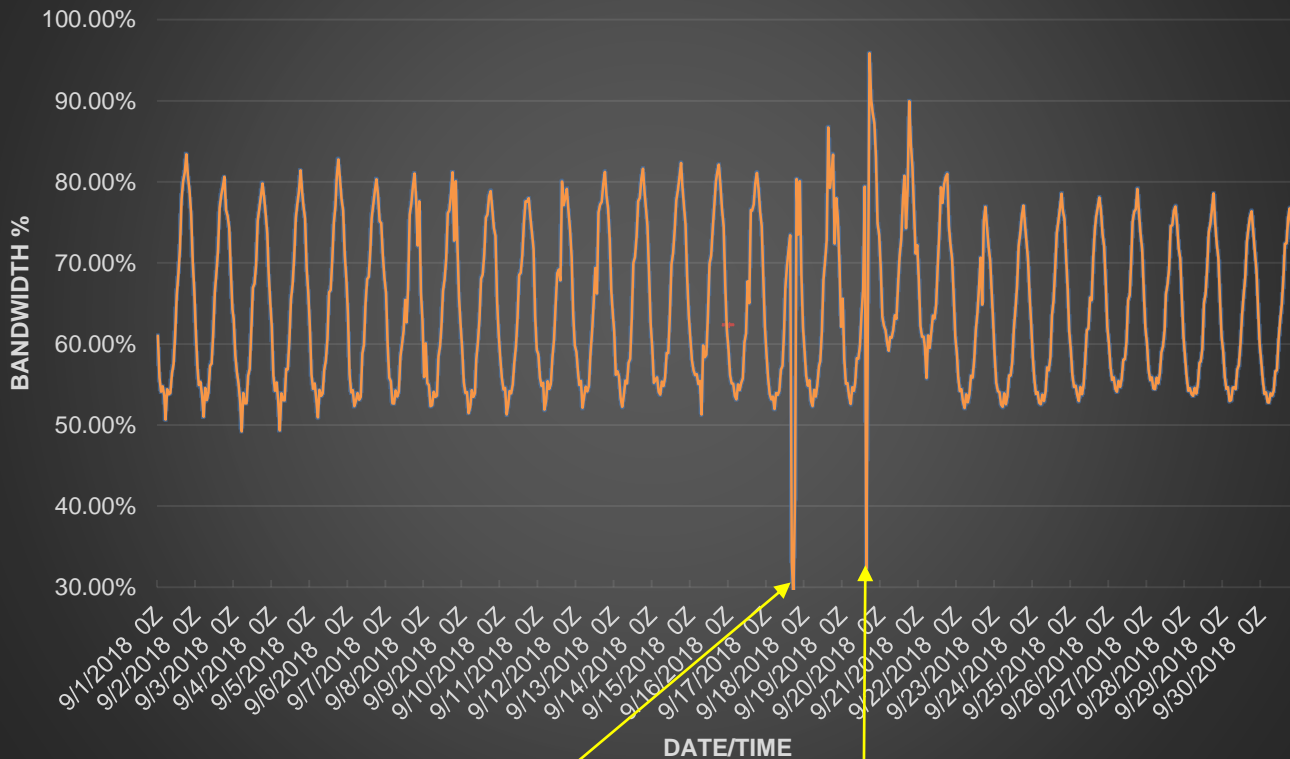
18Z Daytime Peak %	81.4%
Imagery Group	74.9%
DCS	3.89%
EMWIN	2.81%
04Z Night time Lull %	55.4%
Imagery Group	48.7%
DCS	3.89%
EMWIN	2.69%
Daily Total Data Size	46.8 Gb

PDA Release 3.1

PDA Database Anomalies

September 2018 GOES East HRIT Statistics

September 2018 Total Broadcast Bandwidth %



PDA Anomaly

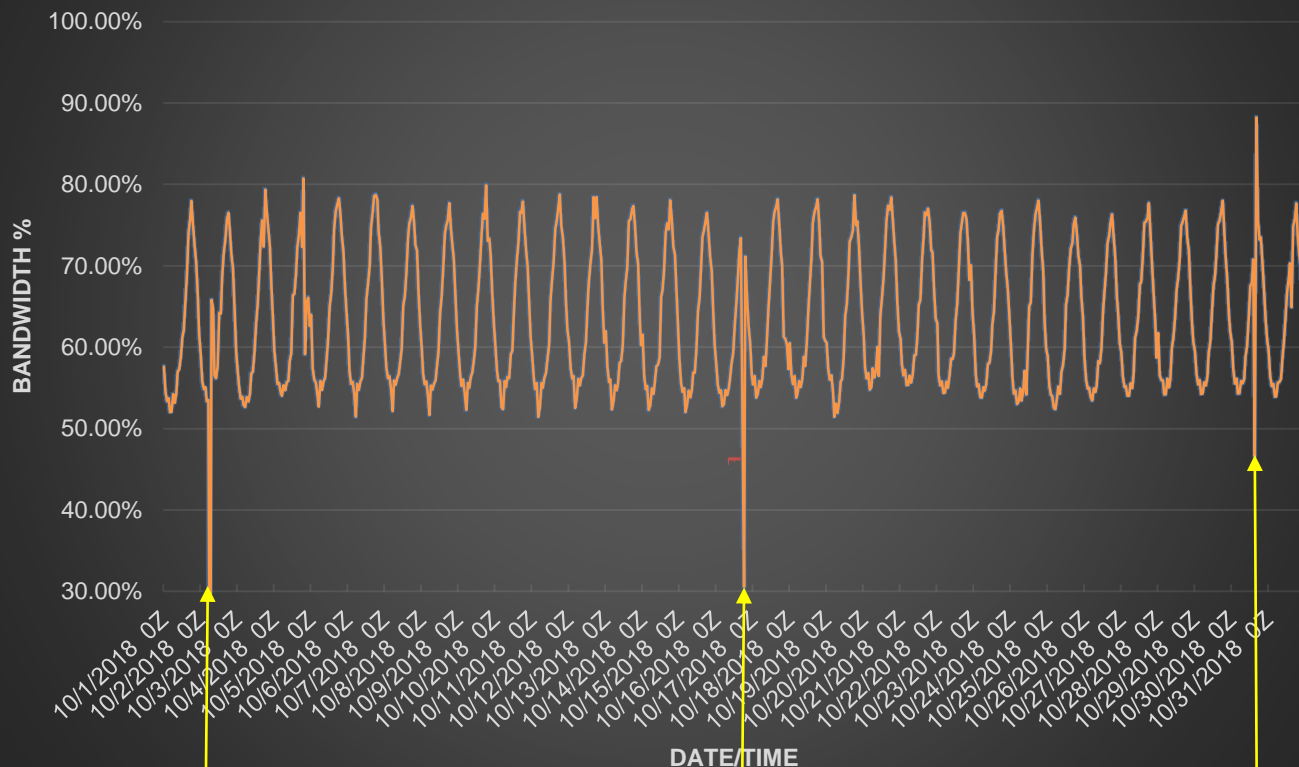
Broadcast Failover

Monthly Averages

18Z Daytime Peak %	79.3%
Imagery Group	74.9%
DCS	3.91%
EMWIN	0.45%
04Z Night time Lull %	52.8%
Imagery Group	48.6%
DCS	3.92%
EMWIN	0.33%
Daily Total Data Size	44.5 Gb

October 2018 GOES East HRIT Statistics

October 2018 Total Broadcast Bandwidth %



PDA H-8 Anomaly

DCS Outage/PDA Database Maintenance

Missing Segments in IR bands Ground Anomaly

Monthly Averages

18Z Daytime Peak %	79.3%
Imagery Group	74.9%
DCS	3.91%
EMWIN	0.02%
05Z Night time Lull %	53.3%
Imagery Group	49.6%
DCS	3.62%
EMWIN	0.02%
Daily Total Data Size	43.8 Gb

HRIT/EMWIN User Group

-GOES-17 ABI Thermal Status

-GOES-16 & 17 HRIT Stream Changes

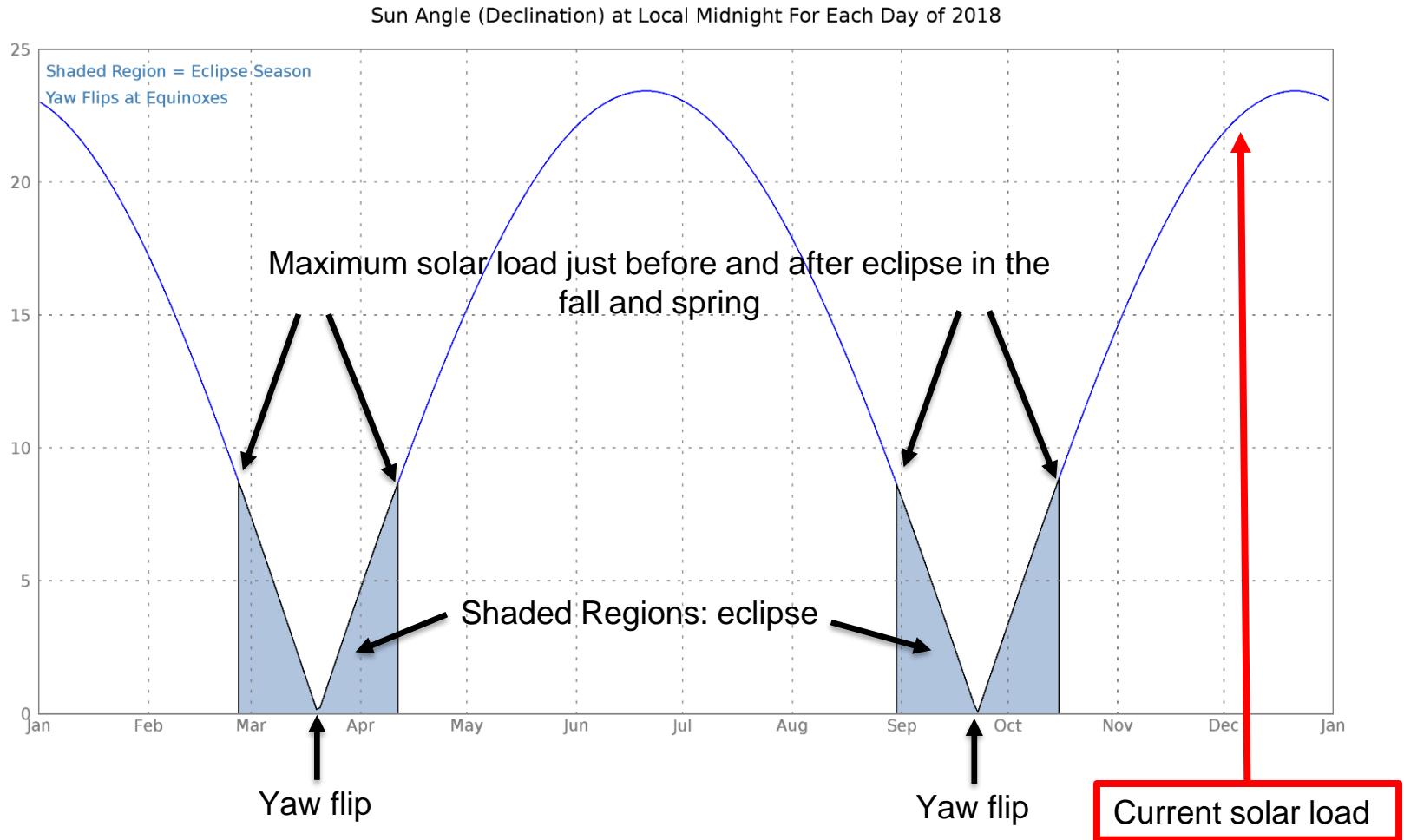
-GOES-17 PLT CBU Imagery Results

Seth Clevensine

GOES-17 ABI Thermal Performance

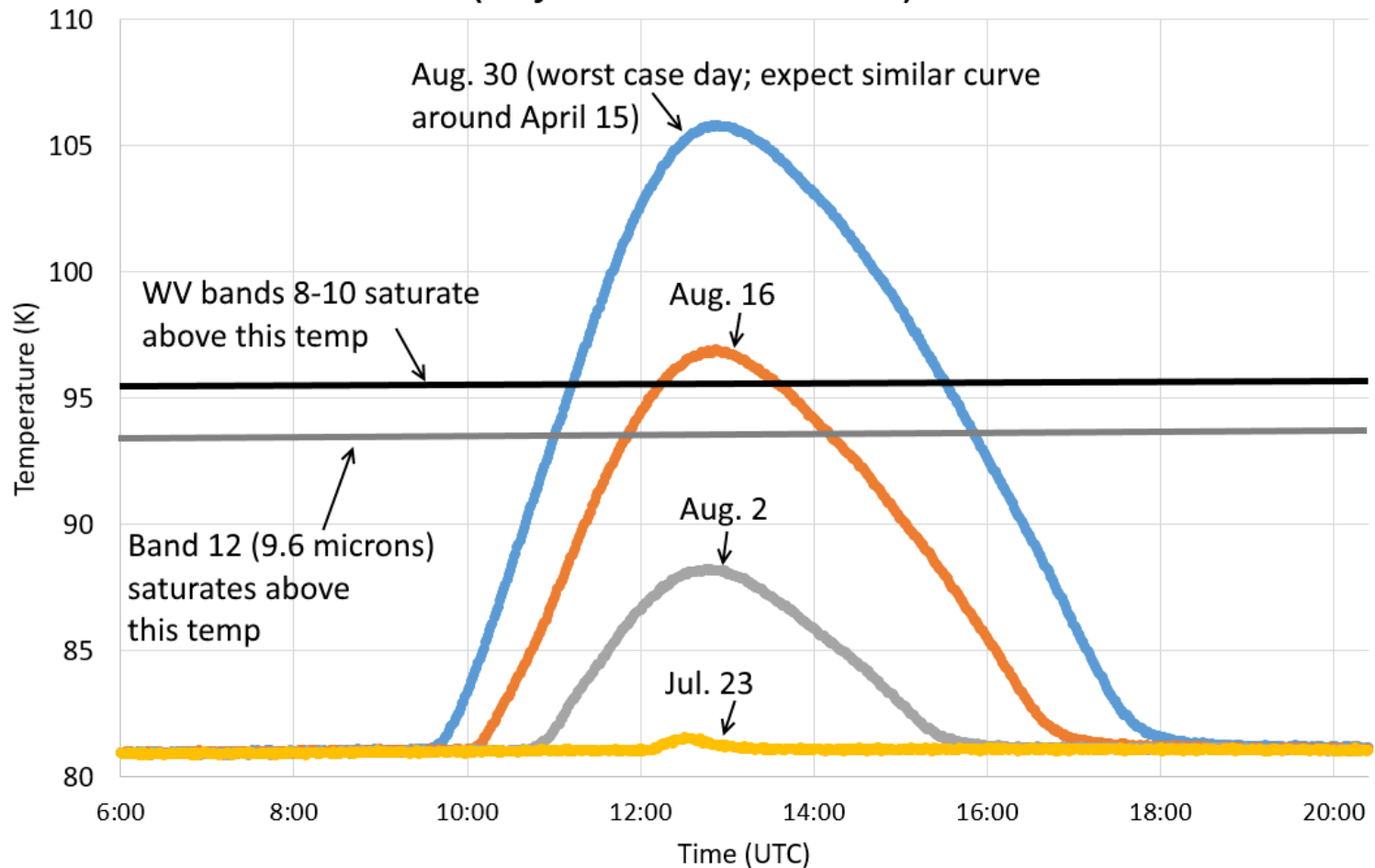
- Loop Heat Pipes on GOES-17 ABI on G-17 ABI not functioning properly
 - Loop Heat Pipes are not transferring expected thermal load to radiator
 - Results in loss of data from 7 infrared channels at warmest orbital conditions (before and after the vernal and autumnal equinoxes)
 - Under worst case conditions, local emission and dark current noise cause the longer wavelength channels to saturate and become unusable for 3-6 hours overnight depending on channel
- Optimization techniques successful in recovering >97% of planned ABI data
 - Operating IR detectors and cryocooler at higher set points
 - Reducing detector integration time and optimizing gain/bias settings
 - Performing semi-annual yaw flip to reduce solar load
- GOES-17 will go into operations as NOAA's GOES West at some point in January 2019 at 137.2 degrees west longitude
 - Delay caused by a ABI memory software error observed on November 25th, 2018.
 - Not apart of the ABI thermal issue mentioned above
 - Plans to upload/patch the ABI instrument to fix the memory errors in early January 2019
 - NESDIS will update/email end users on the official GOES West operational date when available
 - <https://www.goes-r.gov/users/transitionToOperations17.html>

GOES-17 ABI Seasonal Dependence

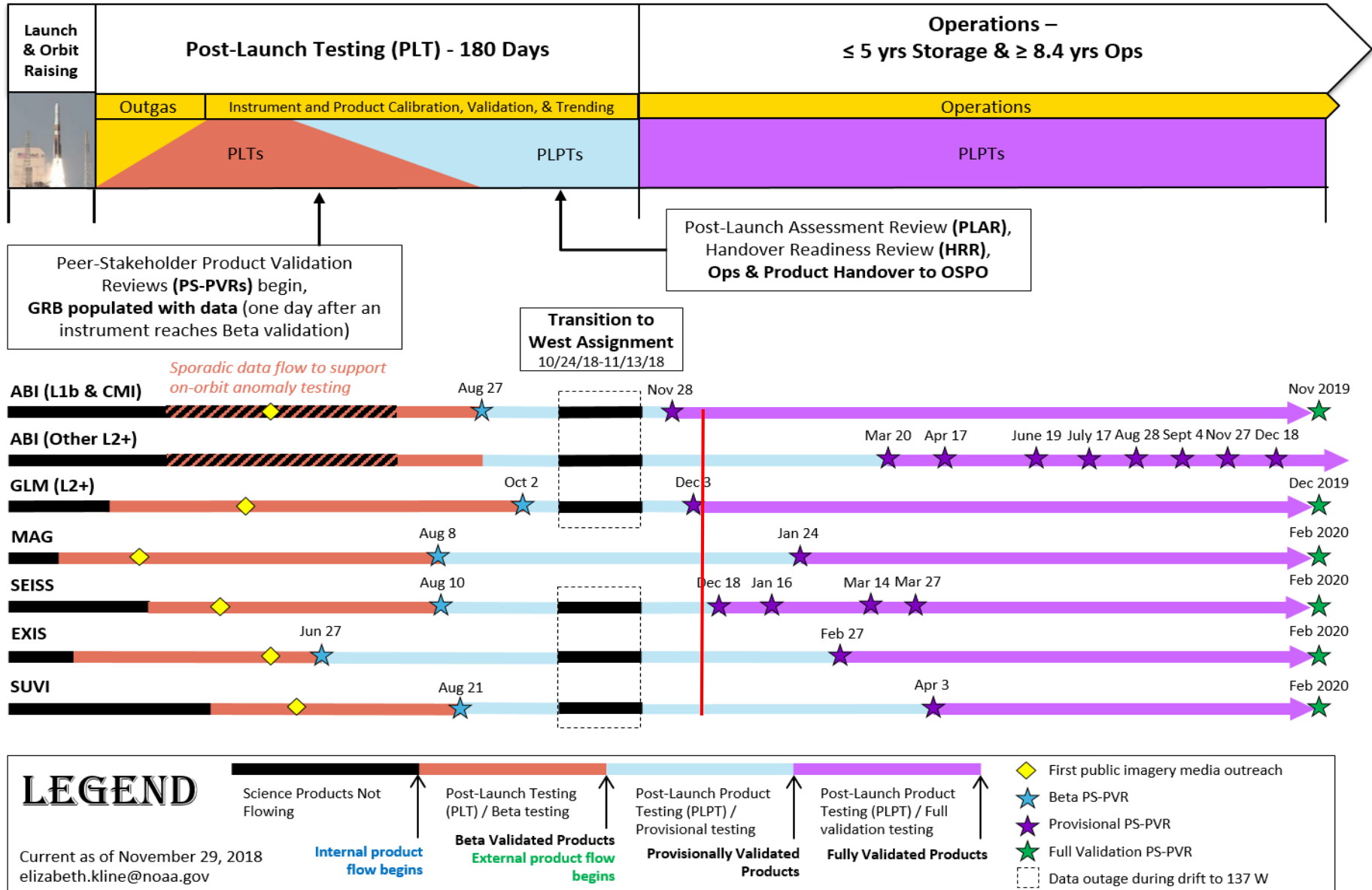


GOES-17 ABI Worst Case

Longwave IR Detector Temperature Diurnal Trace
(adjusted to 137.2 W)



GOES-17 Post-Launch Science Product Validation Schedule



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

GOES-16 HRIT Product Listing

VCID #	Product Name	Period - Min	Format	Resolution	Source	Operational Readiness Status
0	Admin Text	60	Text Messages	N/A	NSOF and CBU PDA	Configured in G16 Broadcast Stream
1	G17 Mesoscale 1 Km box (Bands 2, 7, 13)	15	HRIT/LRIT	0.5km Band 2, 2 km for bands 7 and 13	GOES-R Ground Segment	Configured in G16 Broadcast Stream
2	G16 CMI Band 2	30	HRIT/LRIT	2 km	GOES-R Ground Segment	Configured in G16 Broadcast Stream
6	GOES-15 Imagery	30	LRIT	4 km	GOES-NOP Ground AFEP	Removed from G16 Broadcast Stream
7	G16 CMI Band 7	30	HRIT/LRIT	2 km	GOES-R Ground Segment	Configured in G16 Broadcast Stream
8	G16 CMI Band 8	30	HRIT/LRIT	2 km	GOES-R Ground Segment	Configured in G16 Broadcast Stream
9	G16 CMI Band 9	30	HRIT/LRIT	2 km	GOES-R Ground Segment	Configured in G16 Broadcast Stream
13	G16 CMI Band 13	30	HRIT/LRIT	2 km	GOES-R Ground Segment	Configured in G16 Broadcast Stream
14	G16 CMI Band 14	30	HRIT/LRIT	2 km	GOES-R Ground Segment	Configured in G16 Broadcast Stream
15	G16 CMI Band 15	30	HRIT/LRIT	2 km	GOES-R Ground Segment	Configured in G16 Broadcast Stream
16	G17 CMI Band 13	60	HRIT/LRIT	4 km	GOES-R Ground Segment	Recently Added in G16 Broadcast Stream
20	EMWIN - Priority	Variable	Text	N/A	Enterprise EMWIN System	Configured in G16 Broadcast Stream, Non-operational
21	EMWIN - Graphics	Variable	Graphic (e.g. GIF, JPEG)	N/A	Enterprise EMWIN System	Configured in G16 Broadcast Stream, Non-operational
22	EMWIN - Other	Variable	Text and Graphic	N/A	Enterprise EMWIN System	Configured in G16 Broadcast Stream, Non-operational
23	NWS Products	60	Graphic	N/A	NWSTG	Configured in G16 Broadcast Stream
24	NHC Maritime Graphics Products	60	Graphic (e.g. GIF, JPEG)	N/A	TAFB NHC	Pacific Maritime NHC Products Removed from G16 Broadcast Stream, NHC Atlantic/Carribbean/Gulf still available
30	DCS Admin	Continuous	Text	N/A	NSOF/WCDAS DCS DADDS	Configured in G16 Broadcast Stream
31	DCS Data Old Format	Continuous	Formatted Text	N/A	NSOF/WCDAS DCS DADDS	Configured in G16 Broadcast Stream
32	DCS Data New Format	Continuous	Formatted Text	N/A	NSOF/WCDAS DCS DADDS	Configured in G16 Broadcast Stream, Non-operational
60	Himawari-8	60	LRIT	4 km	Japanese Meteorological Agency	Removed from G16 Broadcast Stream

GOES-17 HRIT Product Listing

VCID #	Product Name	Period - Min	Format	Resolution	Source	Operational Readiness Status
0	Admin Text	60	Text Messages	N/A	NSOF and CBU PDA	Configured in G17 Broadcast Stream
1	G17 Mesoscale 1 Km box (Bands 2, 7, 13)	15	HRIT/LRIT	0.5km Band 2, 2 km for bands 7 and 13	GOES-R Ground Segment	Configured in G17 Broadcast Stream
2	G17 CMI Band 2	30	HRIT/LRIT	2 km	GOES-R Ground Segment	Configured in G17 Broadcast Stream
6	GOES-15 Imagery	30	LRIT	4 km	GOES-NOP Ground AFEP	Configured in G17 Broadcast Stream available until May 2019
7	G17 CMI Band 7	30	HRIT/LRIT	2 km	GOES-R Ground Segment	Configured in G17 Broadcast Stream
8	G17 CMI Band 8	30	HRIT/LRIT	2 km	GOES-R Ground Segment	Configured in G17 Broadcast Stream
9	G17 CMI Band 9	30	HRIT/LRIT	2 km	GOES-R Ground Segment	Configured in G17 Broadcast Stream
13	G17 CMI Band 13	30	HRIT/LRIT	2 km	GOES-R Ground Segment	Configured in G17 Broadcast Stream
14	G17 CMI Band 14	30	HRIT/LRIT	2 km	GOES-R Ground Segment	Configured in G17 Broadcast Stream
15	G17 CMI Band 15	30	HRIT/LRIT	2 km	GOES-R Ground Segment	Configured in G17 Broadcast Stream
16	G16 CMI Band 13	60	HRIT/LRIT	4 km	GOES-R Ground Segment	Configured in G17 Broadcast Stream
20	EMWIN - Priority	Variable	Text	N/A	Enterprise EMWIN System	Configured in G17 Broadcast Stream, Non-operational
21	EMWIN - Graphics	Variable	Graphic (e.g. GIF, JPEG)	N/A	Enterprise EMWIN System	Configured in G17 Broadcast Stream, Non-operational
22	EMWIN - Other	Variable	Text and Graphic	N/A	Enterprise EMWIN System	Configured in G17 Broadcast Stream, Non-operational
23	NWS Products	60	Graphic	N/A	NWSTG	Configured in G17 Broadcast Stream
24	NHC Maritime Graphics Products	60	Graphic (e.g. GIF, JPEG)	N/A	TAFB NHC	Configured in G17 Broadcast Stream for Pacific Maritime NHC products only
30	DCS Admin	Continuous	Text	N/A	NSOF/WCDAS DCS DADDS	Configured in G17 Broadcast Stream
31	DCS Data Old Format	Continuous	Formatted Text	N/A	NSOF/WCDAS DCS DADDS	Configured in G17 Broadcast Stream
32	DCS Data New Format	Continuous	Formatted Text	N/A	NSOF/WCDAS DCS DADDS	Configured in G17 Broadcast Stream, Non-operational
60	Himawari-8	60	LRIT	4 km	Japanese Meteorological Agency	Configured in G17 Broadcast Stream

Broadcast Update – CBU Imagery Inclusion

GOES-R imagery provided to CBU's PDA

–Problem

- CBU PDA was never set up to ingest GOES-R series data from any of the acquisition sites
- HRIT/EMWIN has 3 of the 6 total broadcast stream services from CBU's PDA
- With 2 operational satellites, comes the need for at least 4 operational streams (a primary and backup for each satellite) that has a full product listing available for each satellite broadcast

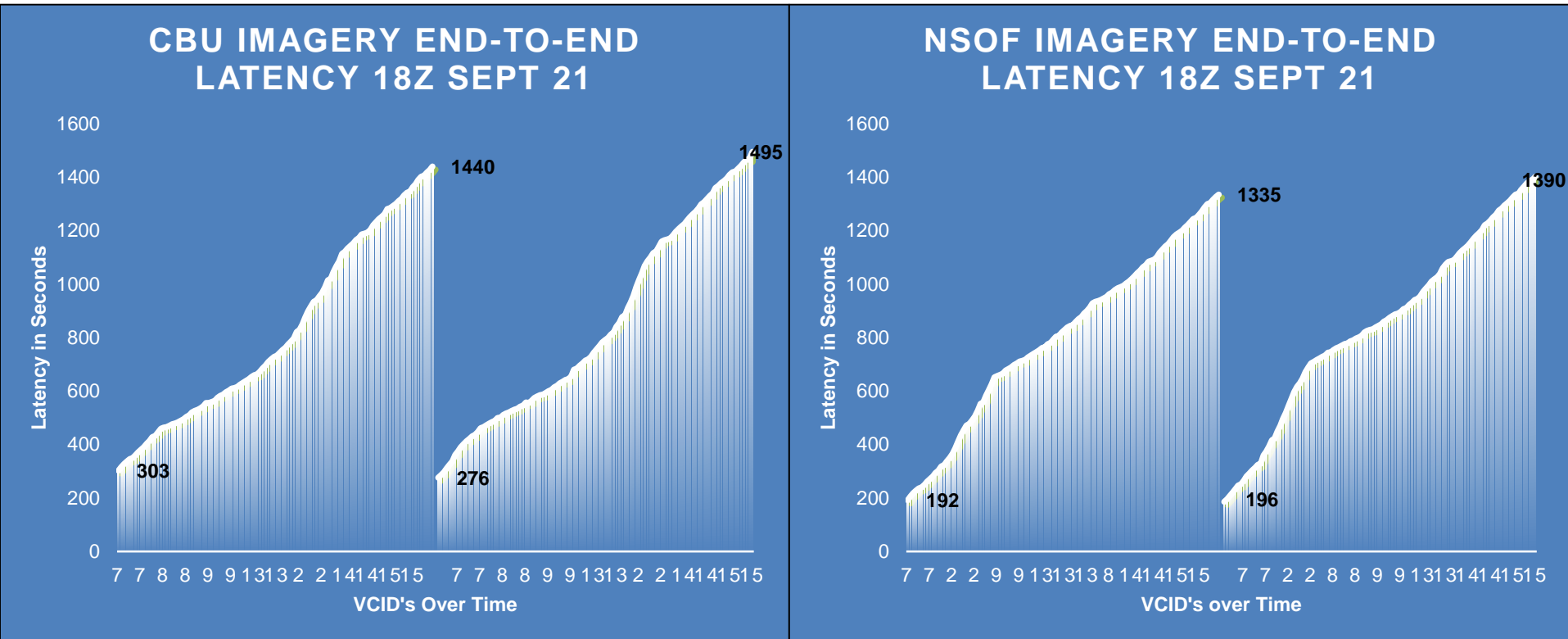
–Resolution

- An automatic script pulling data directly from GOES-R Ground segment at NSOF, FTP's the data to be ingested at CBU. Would induce extra latencies for imagery for CBU PDA data streams.
 - NSOF PDA anomalies would not impact performance unless the VM that the script resides in is impacted

–Status

- Script was completed in August 2018, verification testing during GOES-17 PLT starting September 21st.

Broadcast Update – CBU Imagery Latencies



- Latency start times are from the end scan time from the ABI instrument
- Imagery files being pushed from NSOF to CBU's PDA creates 100 seconds more latency of imagery files
- In the event the NSOF PDA's source of imagery files is down, there will be no imagery files on the three CBU HRIT broadcast streams.

Broadcast Update – Mode 6 Testing

Mode 6 - GOES-R FD imagery provided every 10 vs 15 minutes

–Problem

- HRIT/EMWIN never tested mode 6 full disks imagery before on GOES-16

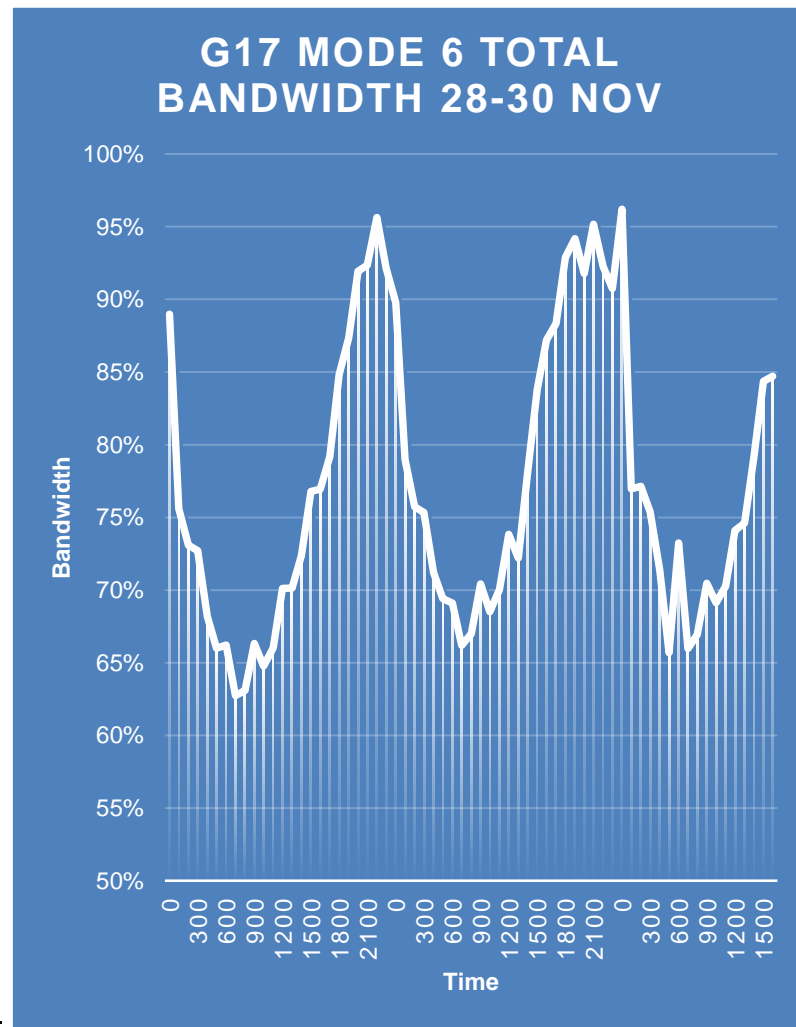
–Resolution

- Add additional mode 4 & 6 subscriptions in both the NSOF and CBU GOES-16/17 operational streams
- Test increasing the frequency of distribution of primary bands 2, 7 and 13 to 20 minutes vs 30 (bands 8, 9, 14 and 15 remained at 30)

–Status

- The 3 day test proves HRIT can sustain this

Broadcast stream configuration **WITH EXCEPTIONS**



Broadcast Update – Mode 6 Testing

Nominal Full Disk Imagery Receipt

	00Z	01Z	02Z	03Z	04Z	05Z	06Z	07Z	08Z	09Z	10Z	11Z	12Z	13Z	14Z	15Z	16Z	17Z	18Z	19Z	20Z	21Z	22Z	23Z
11/27/2018																								
11/28/2018																								
11/29/2018																								
11/30/2018																								

➤ Mesoscale Imagery wasn't received at CBU until 11/29 @ 19Z, which 288 files were never broadcasted. After a modification, only 28 images were omitted

➤ GOES-15 IR FD images were omitted on 11/27 @ 18Z and 21Z. Also on 11/29 @ 21Z.

➤ Himawari-8 IR/WV/VIS FD images was lost on 11/29 @ 19Z for unknown reasons.

➤ Mode 6 has not been approved for use and is not expected in the next two months unless NWS requests

➤ More analysis is needed to finalize broadcast stream configuration

VCID #	AVG Latency in Broadcast Queue (seconds)	Files Omitted	FD Affected
VCID 1	440.49	316	N/A
VCID 2	427.58	0	0
VCID 6	549.25	10	3
VCID 7	110.41	0	0
VCID 8	186.30	0	0
VCID 9	276.85	0	0
VCID 13	296.43	0	0
VCID 14	428.87	0	0
VCID 15	568.91	0	0
VCID 60	441.46	15	3



HRIT/EMWIN User Group

PDA Release 3.2

-Product Duplication

**-Operational Monitoring and Anomaly
Notification**

-Image Navigation Issue

Seth Clevensine

Broadcast Issues – PDA Rel 3.2

•Product Duplications - Concluded

–Problem

- Still experiencing duplicated datasets, though frequency is greatly reduced since database management update was incorporated into OPS in early summer

–Solution

- Fix is currently being tested/reviewed in PDA Integration and Testing environment
- Timeline TBD when it could be introduced to OPS due to other ongoing anomalous investigations

•Operational Change Requests - Concluded

- Majority of HRIT changes on Release 3.2 regard operational changes
- Several regard better monitoring of the broadcast streams and FEP anomaly notification
- Higher priority PDA software fixes took priority over several HRIT change requests

Broadcast Issues – PDA Rel 3.2

Image Navigation Issue – In Progress

•Background

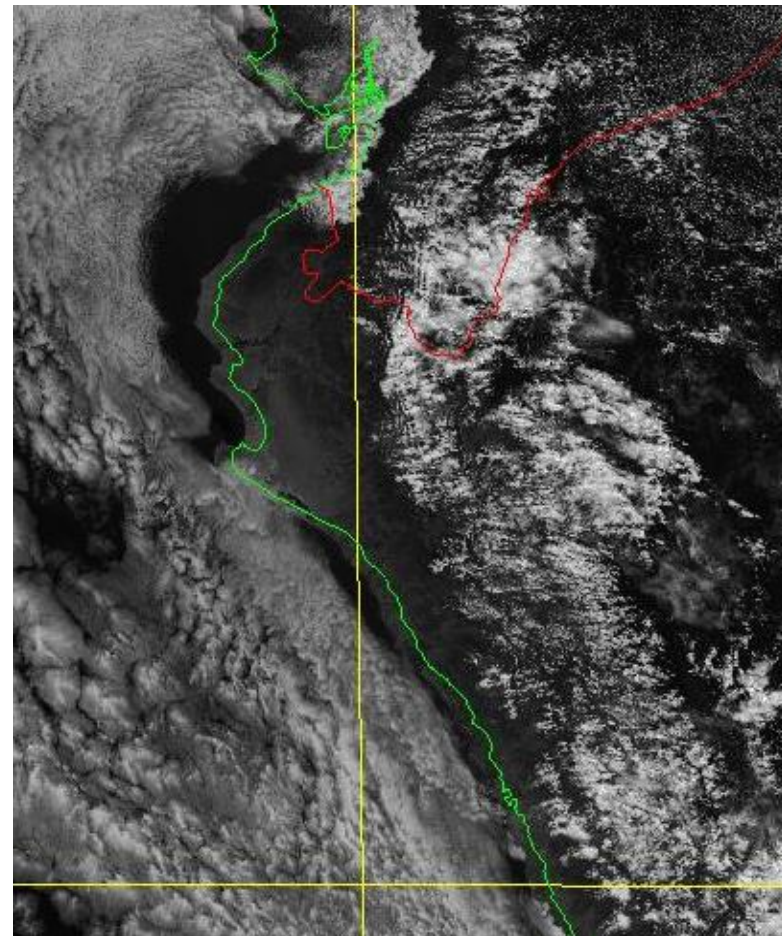
- Noted by Dartcom in April 2018 to affect the outer boundaries in imagery, previously noted in G16 PLT.
- Worsened by GOES-R Ground segments longitude offset from 75.0° to 75.2° W in August 2018.

• Investigation

- GOES-R PUG vs LRIT/HRIT file specification use different lat/long to pixel location equations.

•Fix

- NESDIS to fix the 0.2° offset issue ASAP, the latest for the complete fix would be Release 3.3. This is a high priority with NESDIS. Subsequent changes to LRIT/HRIT file specification possible to correct lat/long to pixel equation. Much more work/outreach to be performed. **Any end user feedback would be greatly appreciated!**



HRIT/EMWIN User Group

PDA Release 3.3

- Fast Track HRIT Data in PDA**
- Broadcast both Mesoscale Regions**
- Level II Product Conversion**

Seth Clevens

Broadcast Issues – PDA Rel 3.3

HRIT/EMWIN File Latency - **Concluded**

–Problem

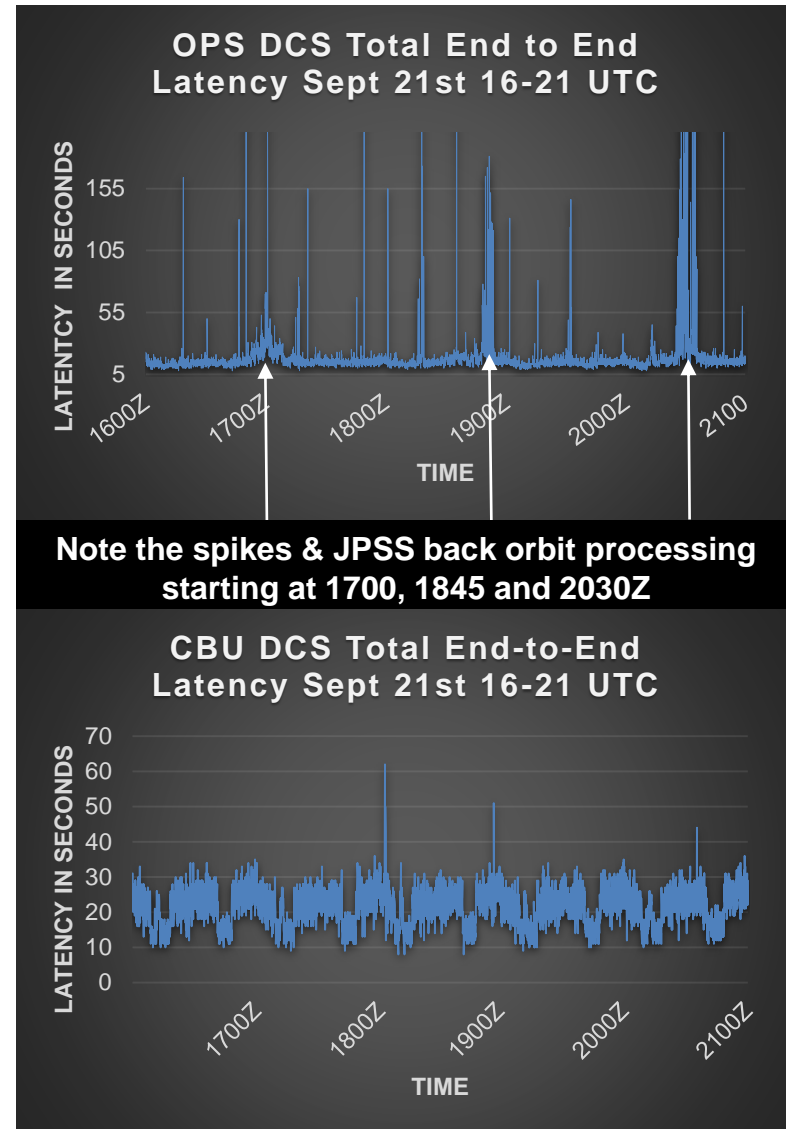
- Observed intermittent latency spikes in DCS data
- Affects other products as well

–Solution

- Separate HRIT/EMWIN “tailoring” from other PDA products to reduce high intermittent observed latency values
- This change will reduce, but not fix the JPSS back orbit processing latency impacts seen in NSOF PDA broadcast streams

–Implementation Date

- Was to be included in PDA Release 3.2, but could not be verified in time for integration and testing with build schedule.
 - Latency script being built to verify the work performed fixes the issue of intermittent spikes



Broadcast Issues – PDA Rel 3.3

Known Time Triggered Meso Subscription Issues - [Concluded](#)

•Problem

–Affects one Mesoscale Imagery sector each 15 minutes from distributing

- Workaround was implemented on 5/8/2018 and seemed to work initially
- Maintenance conducted later on in the month reverted the change back
- Currently only Mesoscale sector 1 is uploaded for each band offering

•Solution

–Currently the patch to fix this problem is fixed/concluded and awaiting a PDA Release

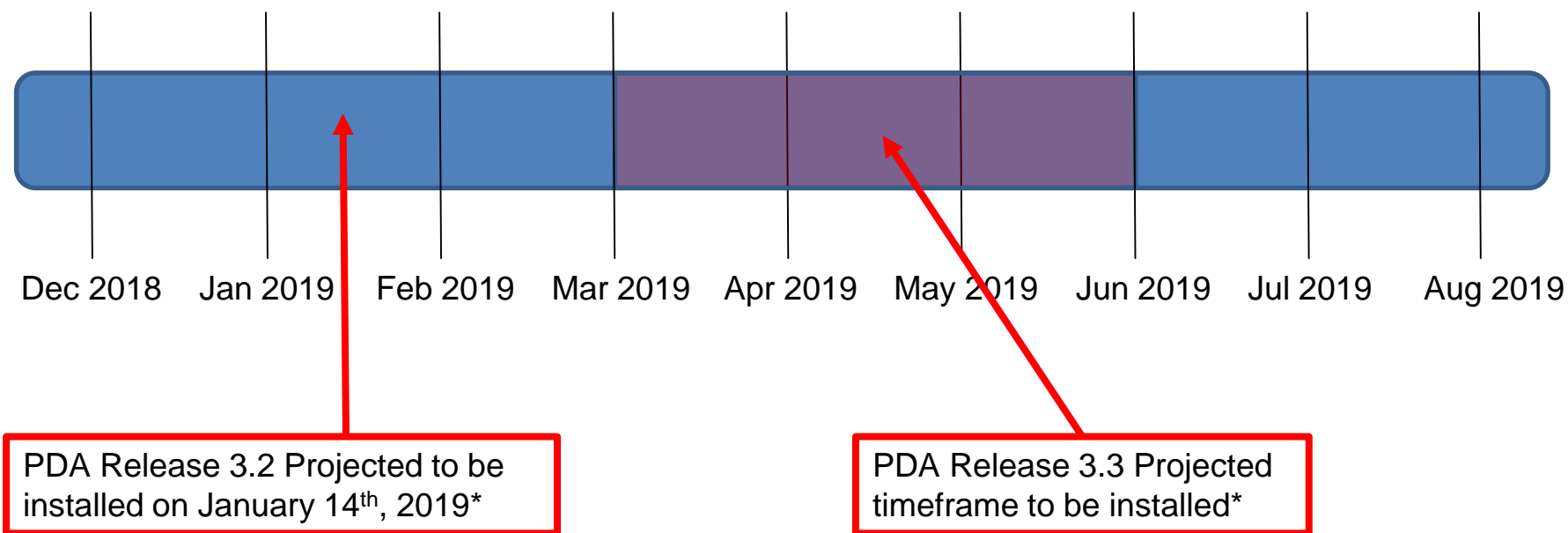
–Expected to be deployed to OPS during PDA Release 3.3

Broadcast Issues – PDA Rel 3.3

GOES-R Series Level II Product Inclusion – In Progress

- Problem – Currently only the GOES-R series CMI data is broadcasted
 - Need for the PDA system to “tailor” other Level II products
 - Need for the HRIT Broadcast to allocate bandwidth for inclusion of Level II products
- Solution
 - Cloud Top Height, Derived Stability Indices (CAPE and Lifted only), Land Surface Temp, Rainfall Rate QPE, Sea Surface Temp and Total Precipitable Water have been finalized for inclusion.
 - Configure the broadcast to push files during the “off-imagery” times and “peak” bandwidth times of the day (ie: 16-20z for GOES East and 19-23z for GOES West).
 - Expected to be delivered to PDA Release 3.3, though possible to delay
 - Still awaiting GLM solution from the NWS for NESDIS usage. Not expected in FY2019.

HRIT/EMWIN User Group PDA Release Projected Timeline



Dates are subject to change, these are just projections from the current ongoing development work taking place in Dec 2018

HRIT/EMWIN User Group

New DCS File Format Change on HRIT

Brett Betsill
Microcom Design, Inc.



New HRIT DCS File Format - Background

- **Original LRIT/HRIT File Format from 2003-2005.**
- **New format proposed in September 2017.**
- **New format accepted and approved in March 2018.**
- **Implementation begin in September 2018, with testing performed in October and November.**
- **Dual streams will become active on December 10TH:**
 - **Legacy format files on Virtual Channel 31.**
 - **New format files on Virtual Channel 32.**
- **New HRIT DCS file format:**
 - **Reduced message header size (41 versus 70 bytes)**
 - **Improved DCS message quality statistics.**
 - **Format specification document will be posted on DADDS website.**



New HRIT DCS File Format - Transition

- **Both streams will be transmitted for six months:**
 - Allow time for manufactures to make and test updates.
 - Allow time for users to deploy updates.
- **File type detection:**
 - On segregated virtual channels during dual streams.
 - Legacy files have filename of pM-YYDDDHHMMSS-Q.dcs
 - YYDDDHHMMSS is the file date/time in UTC Julian format.
 - Q is an ASCII letter (A to Z) used in the event two files are generated at the same time.
 - New files have filename of pH-YYDDDHHMMSS-Q.dcs
 - H designates the new HRIT file format.
 - Both will use current HRIT Header DCS file type of 130 (0x82).
 - Internal Type field in legacy and new file formats.
- **Utilization requirements:**
 - Presently DCS accounts for ~4% of the HRIT transmission bandwidth.
 - Transmitting dual streams doubles DCS utilization to 8%.

New HRIT DCS File Format – Microcom DigiRIT



- **Once new file format stream becomes active:**
 - Microcom will make necessary updates to its DigiRIT receiver.
 - Expect updates to be implemented and tested by early January.

- **Once updates are ready:**
 - Microcom will contact DigiRIT user via email.
 - Microcom will post notice on our website www.MicrocomEnviro.com

- **DigiRIT Update:**
 - Will be able to be applied by user onsite.
 - Will be low cost (< \$500).
 - Can be performed by Microcom by returning unit for modest additional fee and return shipping.

HRIT/EMWIN User Group - 12/06/2018

EMWIN Update

Emergency Managers Weather Information Network (EMWIN)

EMWIN Program Manger:	Bob Gillespie	robert.gillespie@noaa.gov	(301) 427-9693
Chief Dissemination Systems:	Craig Hodan	craig.hodan@noaa.gov	(301) 427-9678
EMWIN Support eMail Contact:		nws.emwin.support@noaa.gov	

NWS HRIT/EMWIN Deployment Status:

1. NWS Data Center Build Out - COMPLETE

College Park, MD

Boulder, CO

2. Network Infrastructure and NESDIS PDA Interface – COMPLETE

NSOF, Suitland, MD

CBU, Fairmont, WV

3. EMWIN Processing Software : IN PROGRESS

- software rework to correct deficiencies is in progress

- planned operational date: May 2019

4. NWS/NESDIS 24x7 Operational Support Services – READY

... to start with 30-day Software Acceptance Test (March 2019); and available thereafter.

EMWIN Broadcast / GOES Satellite Constellation

1. GOES-East (GOES-16) @ 75.2° W

- a) HRIT/EMWIN Transmitter active (since Dec 2017)
- b) EMWIN sub-channels (20,21,22) for testing only – NWS will announce “operational use”.

2. GOES-14 @ 105° W

- a) EMWIN Transmitter active (available through May 2019).

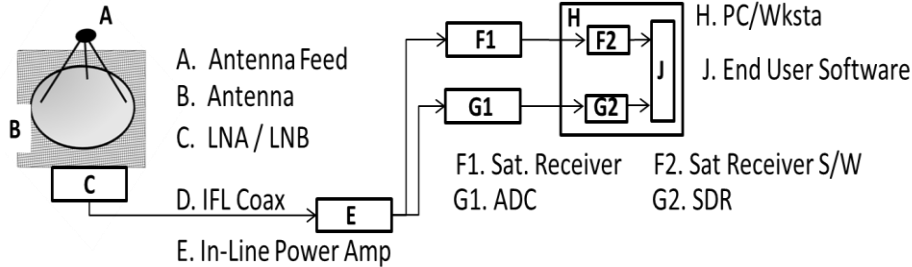
3. GOES-West (GOES-15) @ 135° W

- a) EMWIN Transmitter active (available through May 2019).
- b) LRIT Transmitter active (available until January 2019).

4. GOES-17 @ 137.2° W

- a) HRIT/EMWIN Transmitter active (November 2018) – with content.
- b) EMWIN sub-channels (20,21,22) for testing only – NWS will announce “operational use”.

HRIT/EMWIN User Configuration Info



- NOAA is looking for end user feedback on the many different configurations that's being used for current HRIT/EMWIN broadcast receipt.
- Strictly voluntarily to help support other users
- Configurations will be posted on EMWIN and NOAASIS webpages for public view
 - Personal identifiable information will not be obtained, just the configuration information.

<u>A. Antenna Feed:</u> Mfg – Model – P/N –	<u>F1. Satellite Receiver:</u> Mfg – Model – P/N –
<u>B. Antenna:</u> Mfg – Model – P/N –	<u>F2. Satellite Receiver Software:</u> Mfg – Name – Release –
<u>C. LNA / LNB:</u> Mfg – Model – P/N –	<u>G1. SDR Analog/Digital Converter:</u> Mfg – Model – P/N –
<u>D. IFL Coax Cable:</u> Mfg – Item No – Length –	<u>G2. Software Defined Radio:</u> Mfg – Name – Release –
<u>E. In-Line Power Amp:</u> Mfg – Model – P/N –	<u>H. PC/Workstation</u> Mfg – Model – P/N – O/S Mfg – O/S Name – O/S Release –

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/
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

Email: seth.clevenstine@noaa.gov

Tel: 301-817-4558

NWS EMWIN Product Contact Information

Robert Gillespie

EMWIN Program Manager

National Weather Service Office of Dissemination

NOAA NWS

1325 East West Highway

Silver Spring, MD 20910

Email: Robert.Gillespie@noaa.gov

Tel: 301-427-9693

HRIT/EMWIN User Group

Next meeting will be March 2019

Thanks for your participation!

HRIT/EMWIN User Group

Open Discussion

Seth Clevens

HRIT/EMWIN User Group

Wrap-Up/Summary

Paul Seymour

HRIT/EMWIN User Group

Back-up Slides

EMWIN Update

EMWIN Sub-Channels:

1. Channel 20 - “Priority”

- a) Text (.txt / .zip)
- b) EMWIN priority 1 & 2 text products, including Warnings and Alerts

2. Channel 21 – “Graphics”

- a) Binary (.gif .png .jpg / .zip)
- b) http://www.nws.noaa.gov/emwin/EMWIN_Image_and_Text_Data_Capture_Catalog_v1.3_r180817.pdf

3. Channel 22 – “Other”

- a) Text (.txt / .zip)
- b) EMWIN priority 3 and 4 text products, Observations, Forecasts and Climate

HRIT/EMWIN Virtual Channel ID	Group	Product Name
0	Imagery	Admin Text Messages
1	Imagery	Mesoscale 1km (ch. 2, 7, 13)
2	Imagery	Band 2 - Red
3	Imagery	GOES-13 IR
6	Imagery	GOES-15 IR
7	Imagery	Band 7 - Shortwave Window
8	Imagery	Band 8
9	Imagery	Band 9 - Mid-Level Trop
13	Imagery	band 13
14	Imagery	Band 14 - IR
15	Imagery	Band 15
20	EMWIN	Priority
21	EMWIN	Graphics
22	EMWIN	Other
23	Imagery	NWS Products
24	Imagery	NHC Graphics Products
25	Imagery	GOES-R JPG Products
26	Imagery	International Graphics Products
30	DCS	DCS Admin
31	DCS	DCS Data
60	Imagery	Himawari

EMWIN Product Characteristics on HRIT/EMWIN

Broadcast:

1. Product sources:

- a) US NOAA Weather Wire Service (NWS) – subset
- b) RTH/GISC Washington GTS Switch (International Products)
- c) Internet/Web (Hurricane, Radar, Satellite Images)

2. File format

- a) Full contiguous file
- b) Longer file names

ref: http://www.nws.noaa.gov/emwin/EMWIN_GOES-R_filename_convention.pdf

3. Additional information available on NWS EMWIN Web Page:

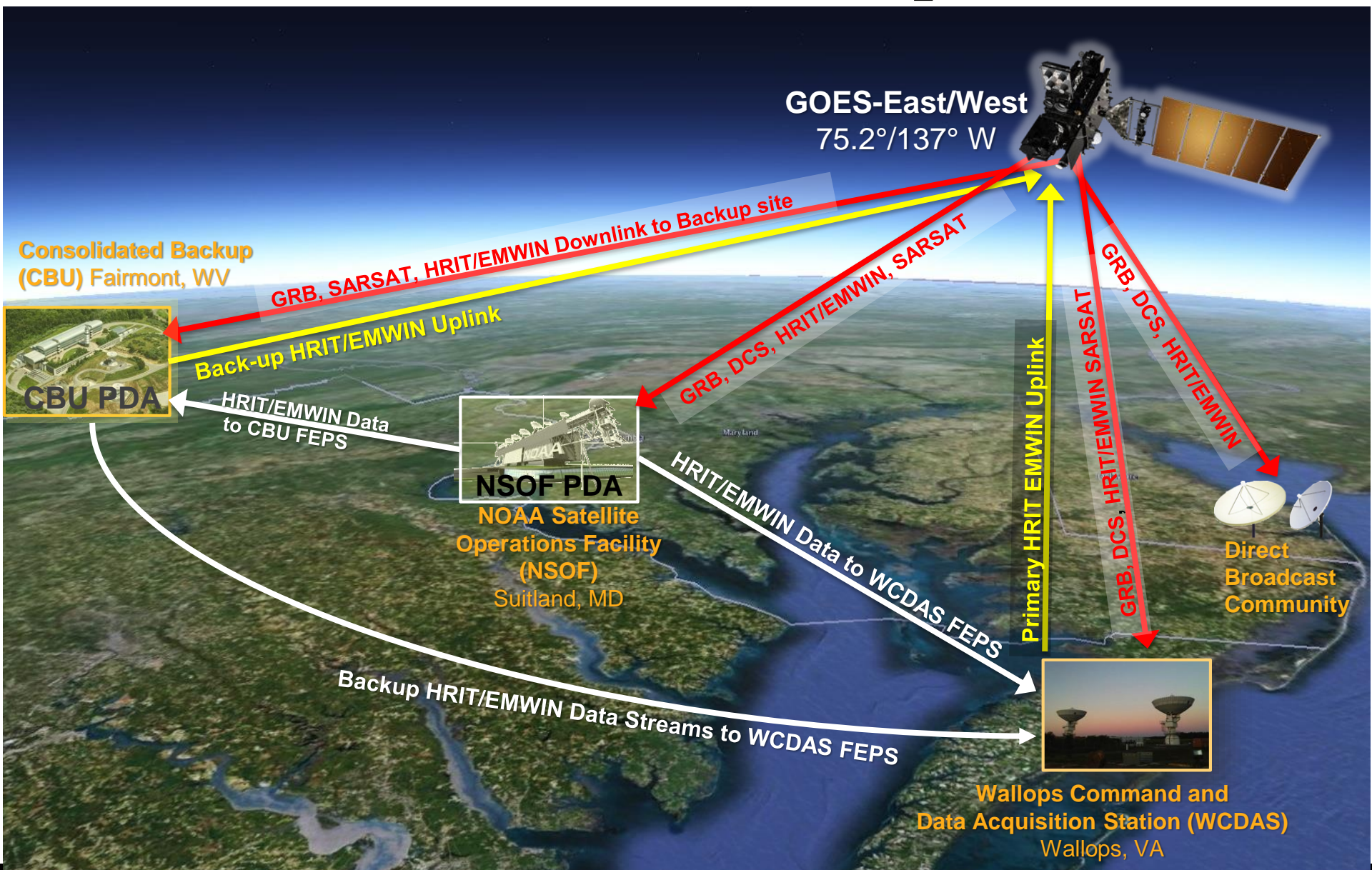
<http://www.nws.noaa.gov/emwin/index.html#issues>

GOES-17 ABI Cryocooler Affected Channels

Band	Channel	Function	Estimated Unsaturated Signal Cold Season (Solstice)	Estimated Unsaturated Signal Warm Season (Pre-Eclipse)
1	0.47 μm	Blue	24 hr	24 hr
2	0.64 μm	Red	24 hr	24 hr
3	0.86 μm	Veggie	24 hr	24 hr
4	1.38 μm	Cirrus	24 hr	24 hr
5	1.61 μm	Snow/Ice	24 hr	24 hr
6	2.25 μm	Cloud Particle Size	24 hr	24 hr
7	3.90 μm	Shortwave Window	24 hr	24 hr
8	6.18 μm	Upper-Level Water Vapor	24 hr	18 - 20 hr
9	6.95 μm	Mid-Level Water Vapor	24 hr	18 - 20 hr
10	7.34 μm	Lower-Level Water Vapor	24 hr	18 - 20 hr
11	8.50 μm	Cloud-Top Phase	24 hr	21 hr
12	9.61 μm	Ozone	24 hr	18 - 20 hr
13	10.35 μm	Clean IR Longwave Window	24 hr	21 hr
14	11.20 μm	IR Longwave Window	24 hr	22 hr
15	12.30 μm	Dirty Longwave Window	24 hr	21 hr
16	13.30 μm	CO ₂ Longwave Infrared	24 hr	18 - 20 hr

NOTE: **Preliminary estimate** of channel availability at best/worst season; subject to change.

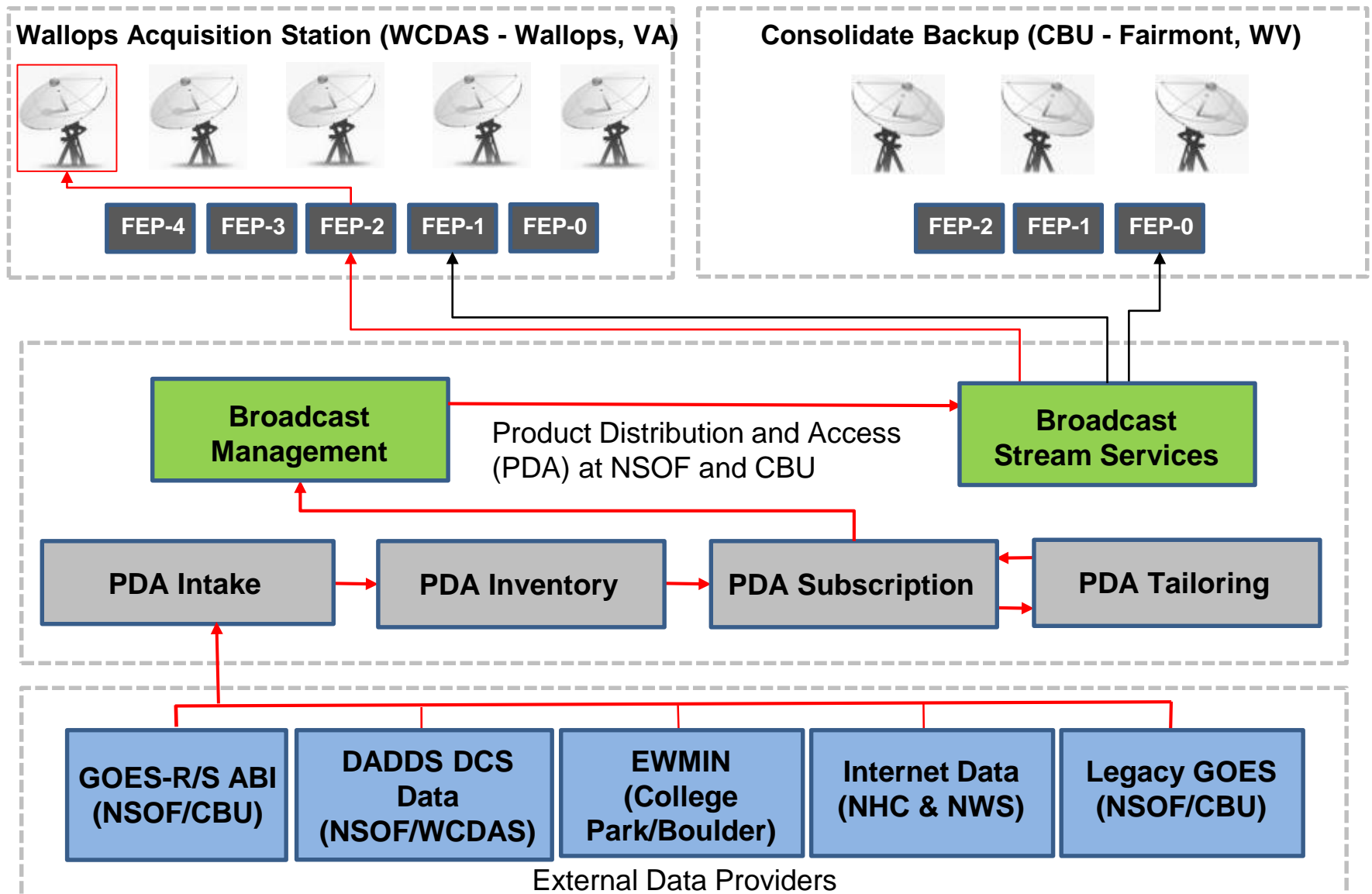
GOES HRIT/EMWIN Operations



Production and Uplink Systems

Characteristic	HRIT/EMWIN System Configuration
Input Streams All Go Through the Product Dissemination & Access (PDA) Systems	<ol style="list-style-type: none"> 1. Imagery – PDA NSOF, Suitland, MD or CBU Fairmont, WV 2. EMWIN – NWS “Gateway” College Park, MD or Boulder, CO 3. DCS – DADDS NSOF, Suitland, MD or DADDS Wallops, VA 4. NHC Products – Acquired over the internet at this time
PDA / HRIT-EMWIN Broadcast Stream Production	<p><u>Primary</u> – Satellite Operations Facility (NSOF) in Suitland, MD</p> <p><u>Backup</u> – Consolidated Backup Facility (CBU) in Fairmont, WV</p> <ul style="list-style-type: none"> • Both can feed uplink antenna systems at Wallops, WV and the CBU
Uplink Antenna Systems	<p><u>Primary</u> – Command & Data Acquisition Station (WCDAS) Wallops Island, VA</p> <p><u>Backup</u> – Consolidated Backup Facility (CBU) in Fairmont, WV</p> <ul style="list-style-type: none"> • Both can uplink HRIT/EMWIN to GOES-R Series Satellites
Downlink and Data Monitoring	<ul style="list-style-type: none"> • Front End Processors (FEPS) linked to GOES-R antennas at WCDAS/CBU have both transmit and receive capability. Received files are relayed back to PDA’s for transmit-receipt & checksum validation • Anomaly warning messages are generated to help desk & operators • VSAT stations are online at the NSOF for troubleshooting
User Input on Broadcast Quality	<p><u>Input from users/manufacturers in the field is highly desired</u></p>

PDA to HRIT to Acquisition Site Data Flow



Receive System Components - General

Component	HRIT/EMWIN Broadcast Specifications	Additional Information
Platform	Operational East and West GOES-R Series Satellites	<ul style="list-style-type: none"> • GOES-16 at 75.2 West • GOES-17 at 137.0 West <ul style="list-style-type: none"> ○ Launched March 1, 2018 ○ Predicted Operational West Fall 2018
Broadcast	Operating Frequency Range	L-band
	Center Frequency	1694.1 MHz
	Data Rate	400 Kbps
	Symbol Rate	927 ksps
	Modulation - BPSK	<ul style="list-style-type: none"> • Convolutional rate $\frac{1}{2}$ code with constraint length 7 concatenated with Reed Solomon (255,223) with Interleave = 4 • Square Root Raised Cosine filtering using an Alpha factor of 0.3 • The resulting “Necessary Bandwidth” for this signal will be 1.205 MHz
	Polarization - Linear	Vertical Offset
Antenna System	VSAT	<ul style="list-style-type: none"> • At 5 degree elevation, the minimum antenna is 1.2 meter. • At 10 degrees or more elevation the minimum size is 1.0 meter
Low-Noise Block-Down Converter	L-band	Example: <ul style="list-style-type: none"> • Input 1691 MHz • Output 137.5 Mhz
Satellite Receiver	L-band	<ul style="list-style-type: none"> • BPSK 1691MHz to 137.5MHz
Software	N/A	<ul style="list-style-type: none"> • De-encapsulates HRIT/LRIT files • Visualization and Manipulation of Files • Optional Applications (examples) <ul style="list-style-type: none"> ○ EMWIN visualization application ○ GOES-DCS database software or application

GOES-16 Imagery Schedule

GOES-East ABI Flex Mode (Routine) Schedule - Abridged

MESO 1 and MESO 2 frames will each be imaged once every minute at the following times:

MESO 1 - XX:XX:24.4 - 5.6 sec dur

MESO 2 - XX:XX:54.4 - 5.6 sec dur

Full Disk on HRIT/EMWIN every 30 min in 7 ABI bands. The table below shows a 15 minute schedule with HRIT product pulls in bold. XX = Hour.

 TIME (UTC) SCAN SECTOR DURATION (MM:SS)

XX:00:24	MESO 1	5.6 sec
XX:00:35	Full Disk	10:37
XX:00:54	MESO 2	5.6 sec
XX:01:24	MESO 1	5.6 sec
XX:01:54	MESO 2	5.6 sec
XX:02:16	CONUS	02:37
XX:02:24	MESO 1	5.6 sec
XX:02:54	MESO 2	5.6 sec
XX:03:24	MESO 1	5.6 sec
XX:03:54	MESO 2	5.6 sec
XX:04:24	MESO 1	5.6 sec
XX:04:54	MESO 2	5.6 sec

XX:05:24	MESO 1	5.6 sec
XX:05:54	MESO 2	5.6 sec
XX:06:24	MESO 1	5.6 sec
XX:06:54	MESO 2	5.6 sec
XX:07:16	CONUS	02:37
XX:07:24	MESO 1	5.6 sec
XX:07:54	MESO 2	5.6 sec
XX:08:24	MESO 1	5.6 sec
XX:08:54	MESO 2	5.6 sec
XX:09:24	MESO 1	5.6 sec
XX:09:54	MESO 2	5.6 sec
XX:10:24	MESO 1	5.6 sec
XX:10:54	MESO 2	5.6 sec
XX:11:24	MESO 1	5.6 sec
XX:11:54	MESO 2	5.6 sec
XX:12:16	CONUS	02:37
XX:12:24	MESO 1	5.6 sec
XX:12:54	MESO 2	5.6 sec
XX:13:24	MESO 1	5.6 sec
XX:13:54	MESO 2	5.6 sec
XX:14:24	MESO 1	5.6 sec
XX:14:54	MESO 2	5.6 sec
XX:15:24	MESO 1	5.6 sec
XX:15:35	Full Disk	10:37
XX:15:54	MESO 2	5.6 sec

EMWIN Update

HRIT/EMWIN Full Service Receiving Station Manufacturers:

1. **Dartcom Systems Ltd.**, Powdermills, Postbridge, Yelverton, Devon, UK. , POC: David Wright, dave@dartcom.co.uk, +44 1822 88025
http://www.nws.noaa.gov/emwin/pdf/HRIT-EMWIN_Configuration_Documentation_Form_r180214-1320%20Dartcom%20Systems%20Ltd.pdf

HRIT/EMWIN Compatible Receiver Manufacturers:

1. **Global Imaging, Inc.**, 3228 N. Twin Oaks Valley Road Unit A, San Marcos, CA 92069, POC: Steven Borders sborders@globalimaging.com Ph: (858) 481-5750
2. **Global – LG (Dartcom USA sales)**, 426 Jolina Way, Encinitas, CA 92024, POC - Michael Guberek michael.guberek@global-lg.com Ph: (619) 301- 0421
3. **Microcom Design, Inc.**, 10948 Beaver Dam Road, Hunt Valley, MD, USA 21030, POC - Brett Betsill, Perry West, bbetsill@microcomdesign.com pwest@microcomdesign.com Tel: (410) 771-1070
4. **Quorum Communications, Inc.**, 3807 Carbon Rd. Irving, TX 75038-3415, POC - Allan Bundens, allan.b@qcom.com Ph: (800) 982-9614

Pacific Region HRIT/EMWIN Receiving Station Development & Configuration Activity

This listing does not imply any particular product or service endorsement or recommendation by the NWS. Customers should consult the vendors to determine product suitability for the customers' specific need and environment.