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

## Quarterly Meeting

## 12 May 2020

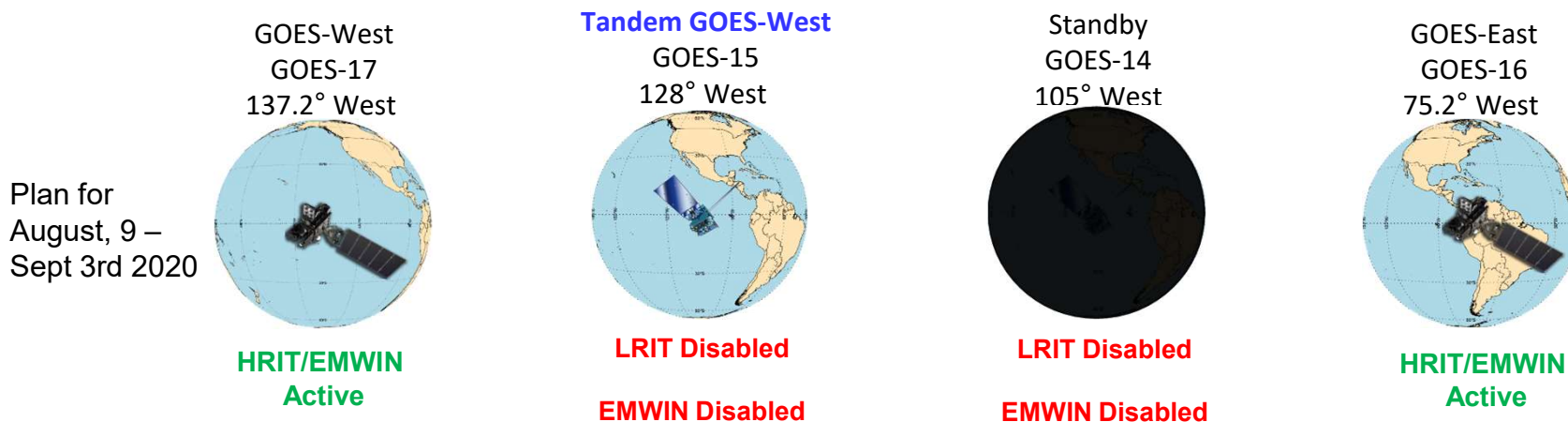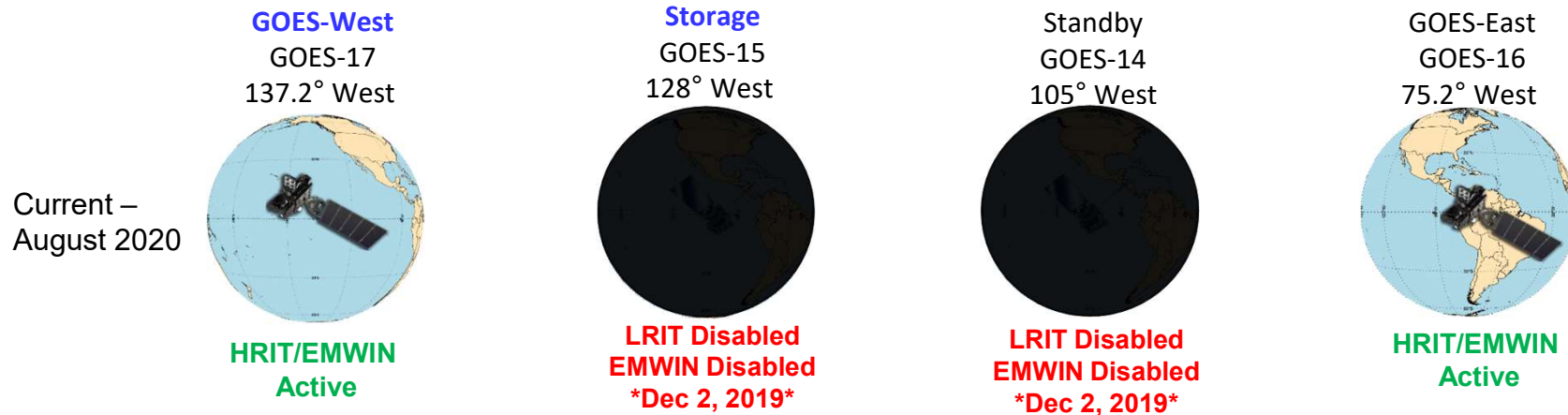# Agenda Items & Schedule

- 3:00 pm (EST) – Roll Call/ Introduction to User Group--------Seth Clevenstine – 2 mins

- GOES Constellation Broadcast Status----------------------------Seth Clevenstine – 5 mins

- GOES 17 ABI Status and Mode Change-------------------------Seth Clevenstine – 3 mins

- PDA Release Change Content and Event Schedule---------------Seth Clevenstine – 5 mins

- EMWIN Updates----------------------------------------------------------Bob Gillespie – 5 mins

- RFIMS Overview--------------------------------------------------Pouyan Amirshahi– 10 mins

- HRIT/EMWIN RANET Project------------------------------------------Bob Bubon – 10 mins

- EMWIN Updates---------------------------------------------------------Bob Gillespie – 5 mins

- Open Discussion Items----------------------------------------------------Open – 15 mins

- Action items and summary------------------------------------------Paul Seymour – 5 mins

- Total — 65 mins

# Present - Future GOES Constellation

**Current – August 2020**

| GOES-West GOES-17 137.2° West | Storage GOES-15 128° West | Standby GOES-14 105° West | GOES-East GOES-16 75.2° West |
|---|---|---|---|
| HRIT/EMWIN Active | LRIT Disabled EMWIN Disabled *Dec 2, 2019* | LRIT Disabled EMWIN Disabled *Dec 2, 2019* | HRIT/EMWIN Active |

**Plan for August, 9 – Sept 3rd 2020**

| 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 |
|---|---|---|---|
| HRIT/EMWIN Active | LRIT Disabled EMWIN Disabled | LRIT Disabled EMWIN Disabled | HRIT/EMWIN Active |

*GOES-15 tandem operations for GVAR only*
*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 | Removed on 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 |

# February 2020 GOES East HRIT Statistics



**GOES-16 February 2020 Total Broadcast Statistics**



**GOES-16 February 2020 Individual Group Bandwidth %**
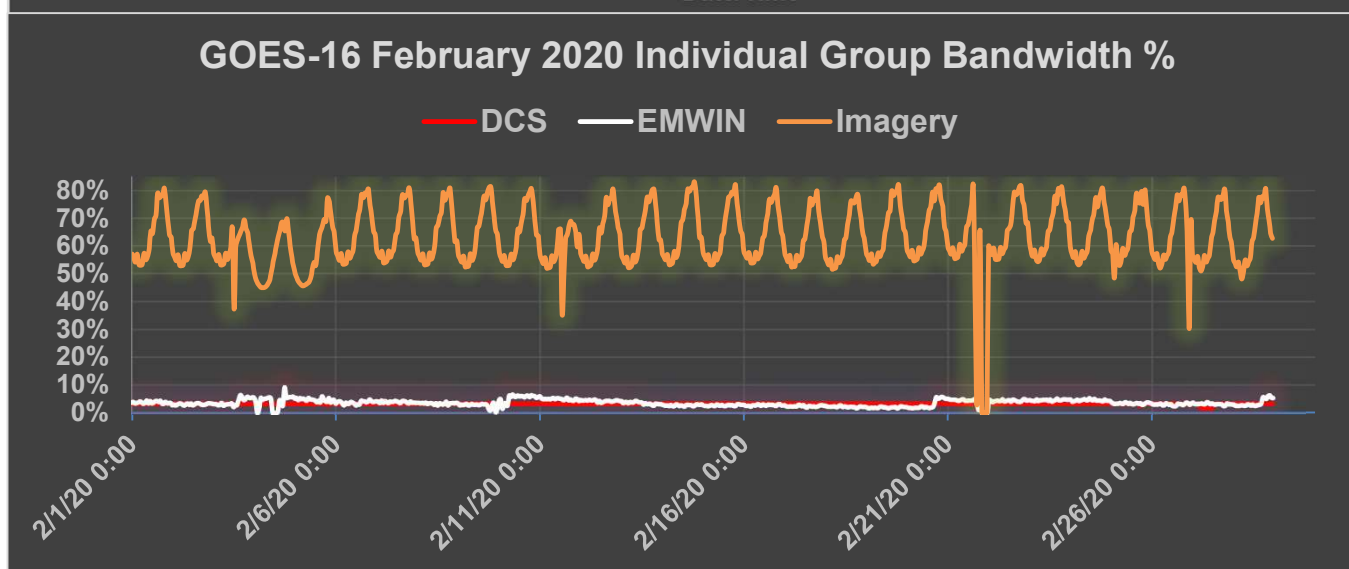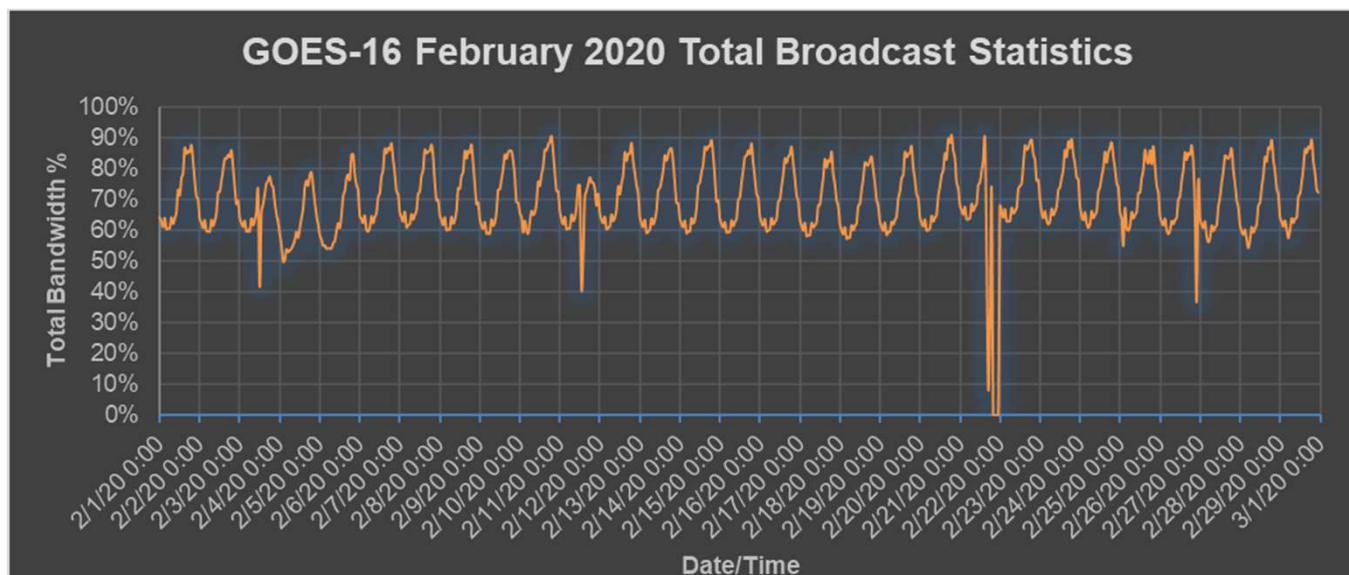
| Monthly Averages | |
|---|---|
| **19Z Daytime Peak %** | **85.8%** |
| **Imagery Group** | **78.8%** |
| **DCS** | **3.32%** |
| **EMWIN** | **3.64%** |
| **04Z Night time Lull %** | **59.3%** |
| **Imagery Group** | **54.4%** |
| **DCS** | **3.25%** |
| **EMWIN** | **3.63%** |
| **Daily Total Data Size** | **46.6 Gb** |

# March 2020 GOES East HRIT Statistics
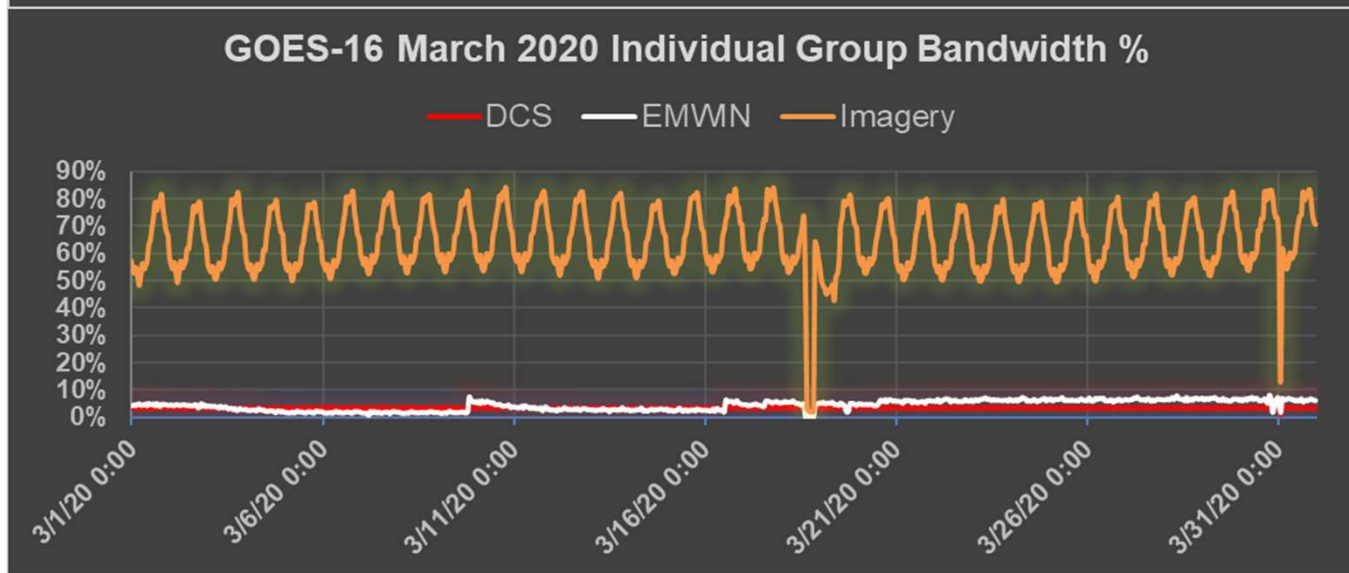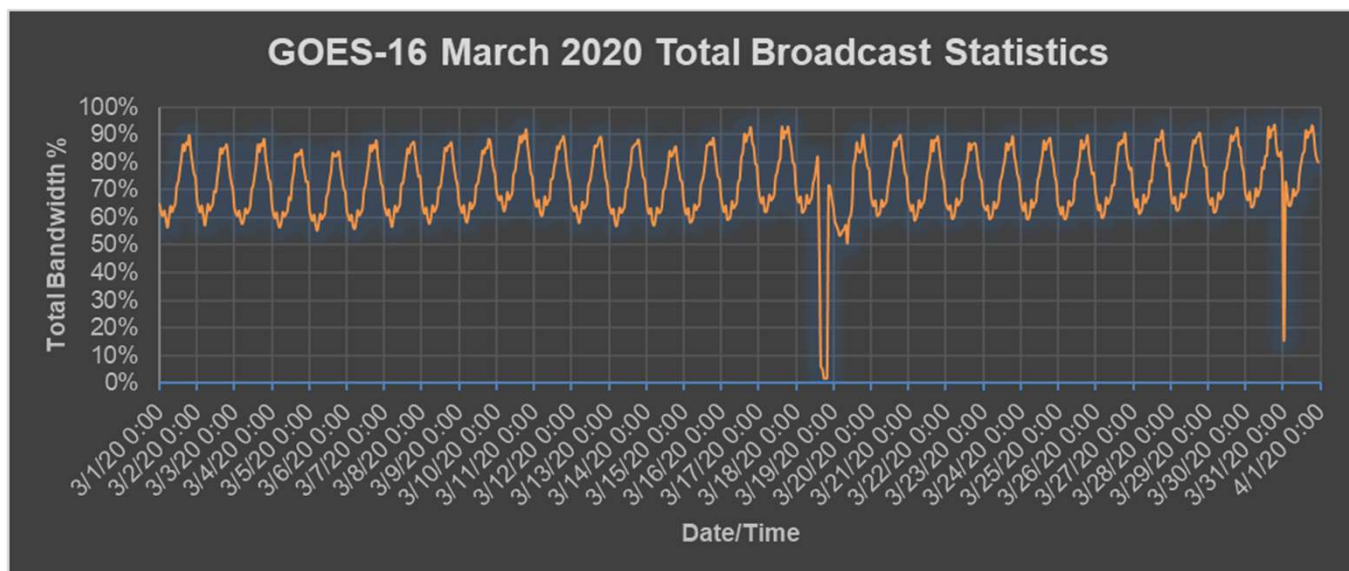


| Monthly Averages | |
|---|---|
| 19Z Daytime Peak % | 86.2% |
| Imagery Group | 78.7% |
| DCS | 3.25% |
| EMWIN | 4.24% |
| 04Z Night time Lull % | 59.2% |
| Imagery Group | 51.4% |
| DCS | 3.36% |
| EMWIN | 4.45% |
| Daily Total Data Size | 49.8 Gb |

# April 2020 GOES East HRIT Statistics



## Monthly Averages

| | |
|---|---|
| **19Z Daytime Peak %** | 91.7% |
| **Imagery Group** | 82.1% |
| **DCS** | 3.38% |
| **EMWIN** | 6.28% |
| **05Z Night time Lull %** | 62.9% |
| **Imagery Group** | 53.5% |
| **DCS** | 3.35% |
| **EMWIN** | 6.06% |
| **Daily Total Data Size** | 50.8 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 | Unavailable until August 2020 |
| 6 | GOES-15 IR Imagery | 30 - 180 | LRIT | 4 km | Unavailable until August 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 | Removed on 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 |

# February 2020 GOES West HRIT Statistics
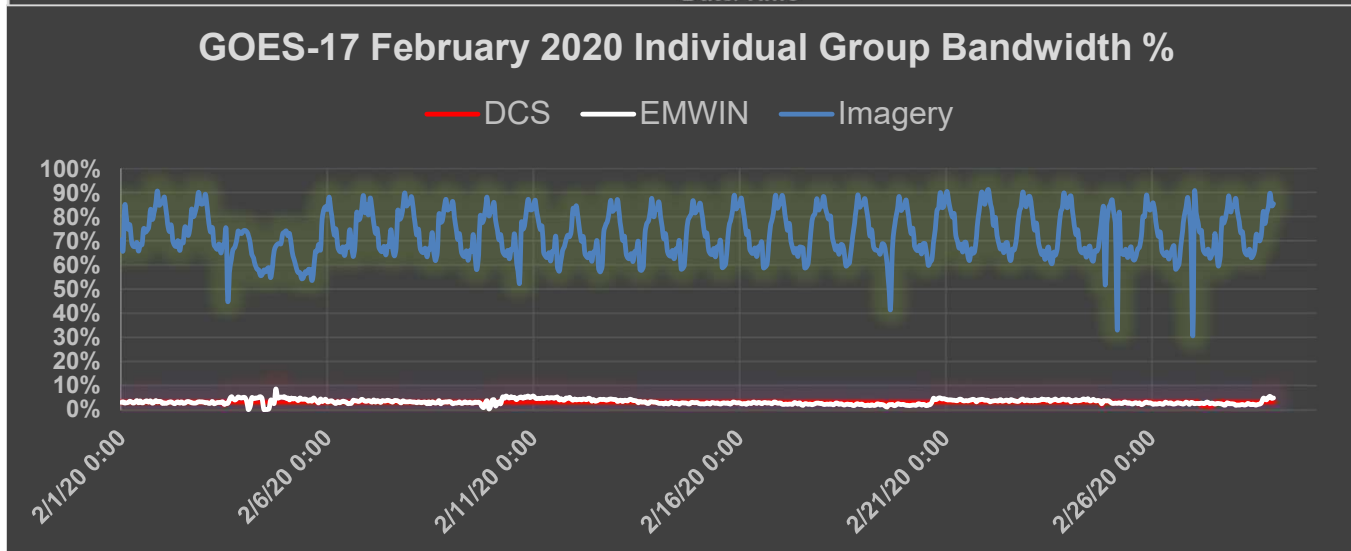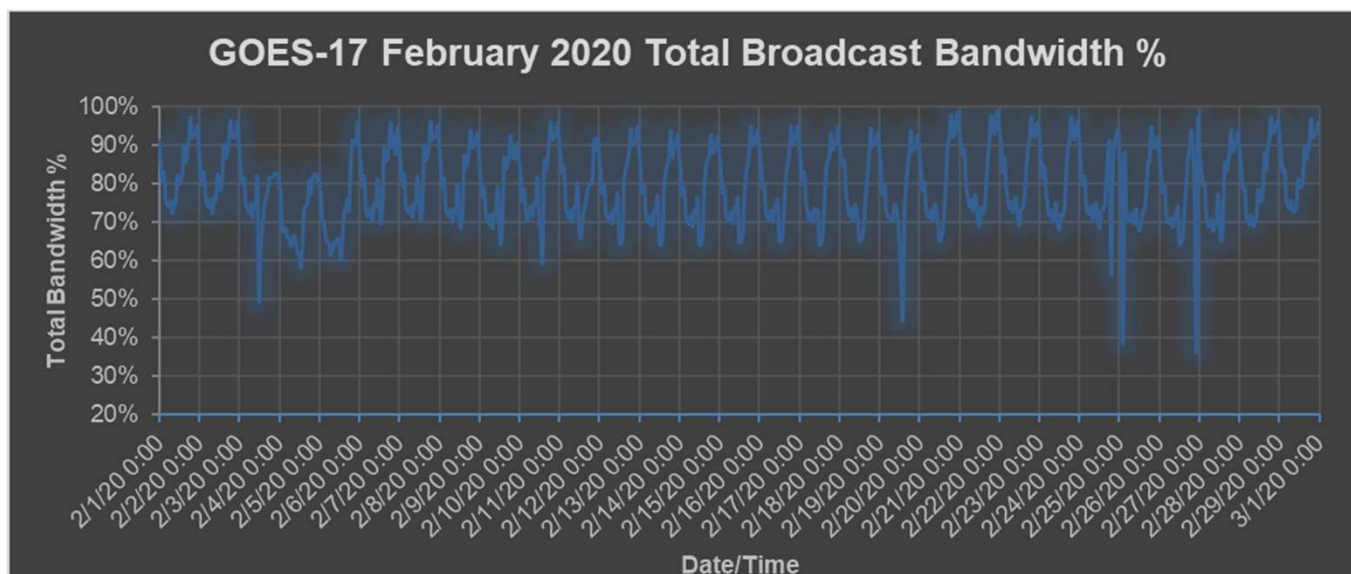


| Monthly Averages | |
|---|---|
| **19Z Daytime Peak %** | **93.7%** |
| **Imagery Group** | **86.9%** |
| **DCS** | **3.33%** |
| **EMWIN** | **3.49%** |
| **08Z Night time Lull %** | **69.9%** |
| **Imagery Group** | **63.1%** |
| **DCS** | **3.25%** |
| **EMWIN** | **3.59%** |
| **Daily Total Data Size** | **56.9 Gb** |

# March 2020 GOES West HRIT Statistics
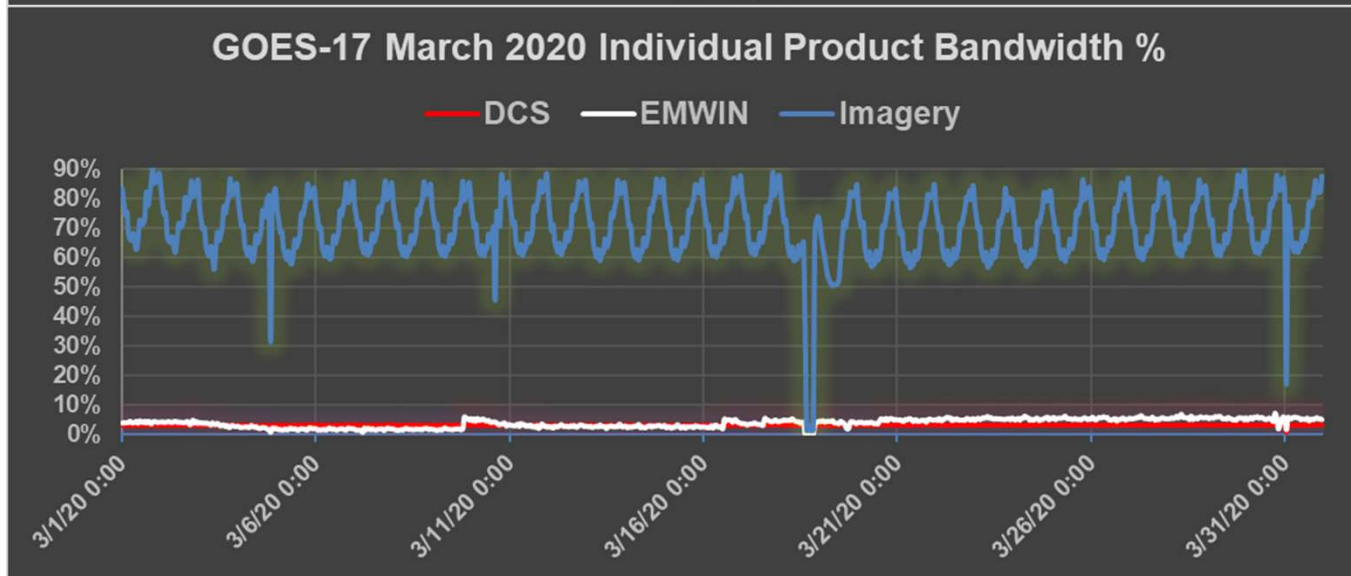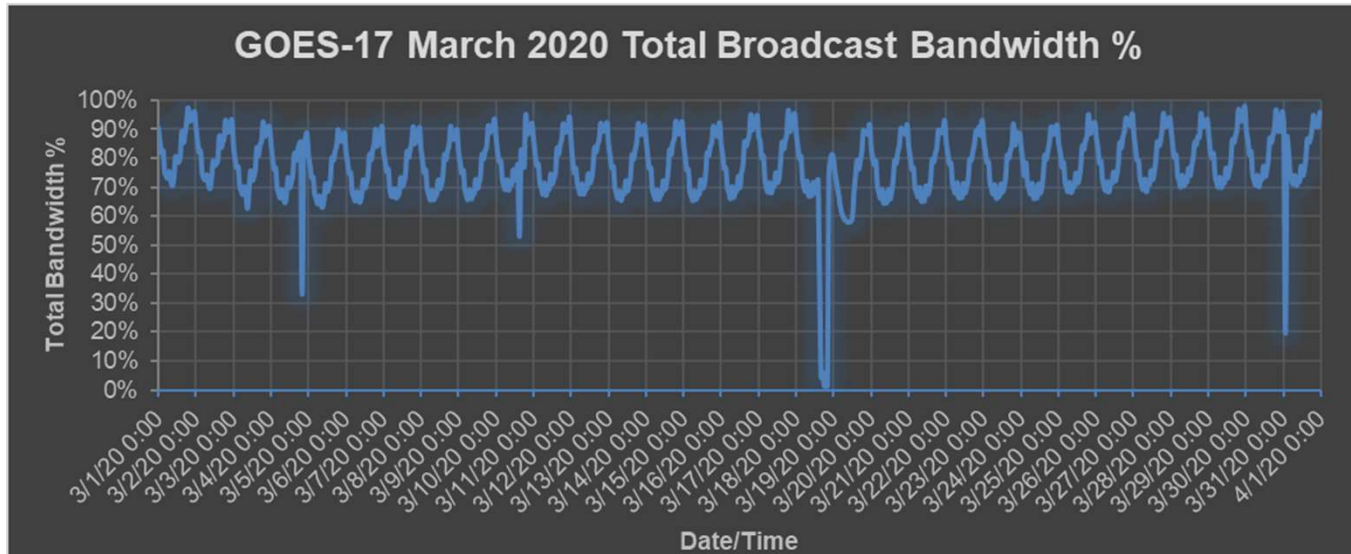


| Monthly Averages | |
|---|---|
| 23Z Daytime Peak % | 92.4% |
| Imagery Group | 85.2% |
| DCS | 3.36% |
| EMWIN | 3.90% |
| 08Z Night time Lull % | 67.8% |
| Imagery Group | 60.5% |
| DCS | 3.35% |
| EMWIN | 3.81% |
| Daily Total Data Size | 53.8 Gb |

# April 2020 GOES West HRIT Statistics
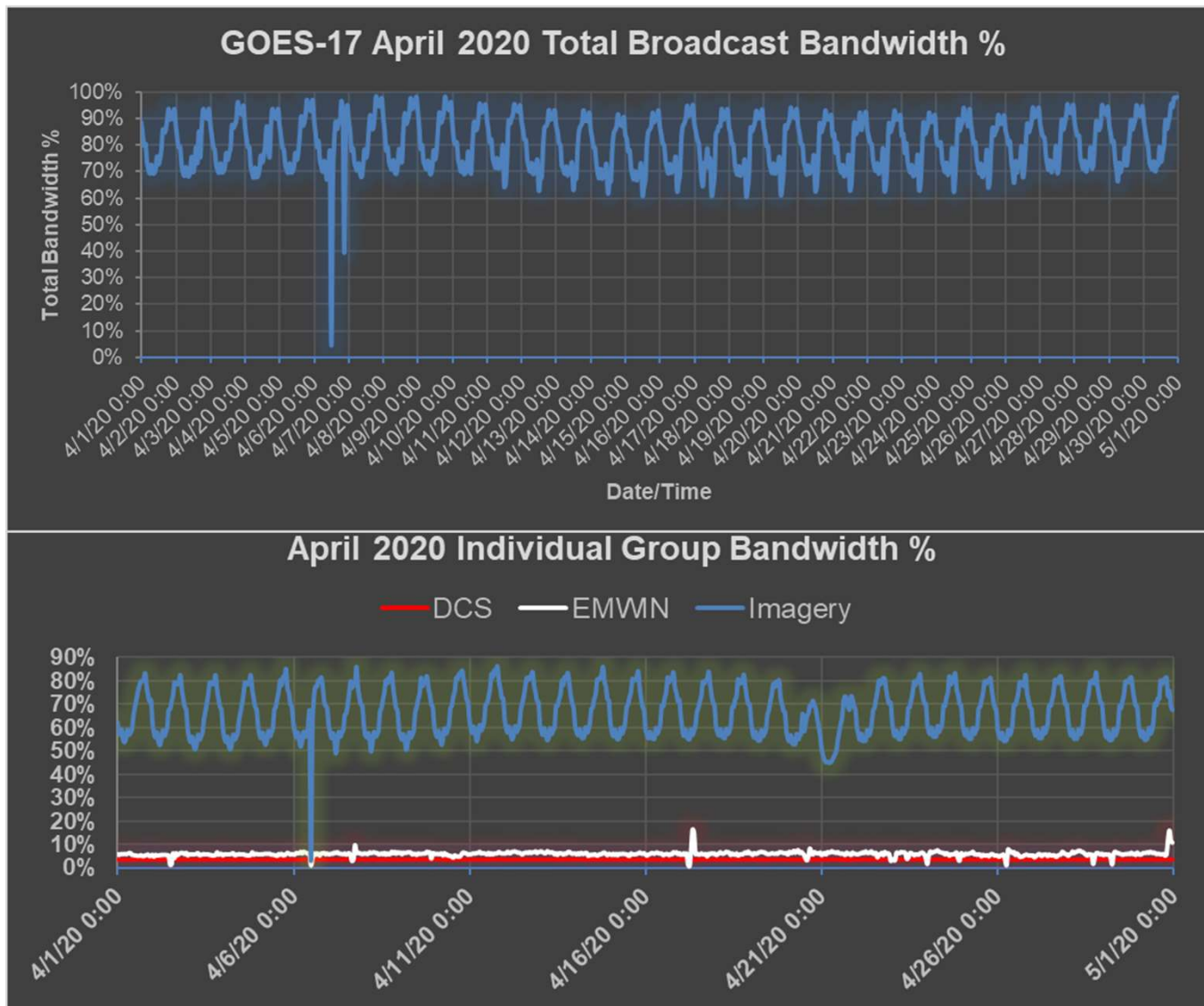


**Monthly Averages**

| | |
|---|---|
| 19Z Daytime Peak % | 94.7% |
| Imagery Group | 85.7% |
| DCS | 3.38% |
| EMWIN | 5.35% |
| 08Z Night time Lull % | 69.3% |
| Imagery Group | 60.1% |
| DCS | 3.35% |
| EMWIN | 5.89% |
| Daily Total Data Size | 53.7 Gb |

# GOES-17 ABI Seasonal Dependence
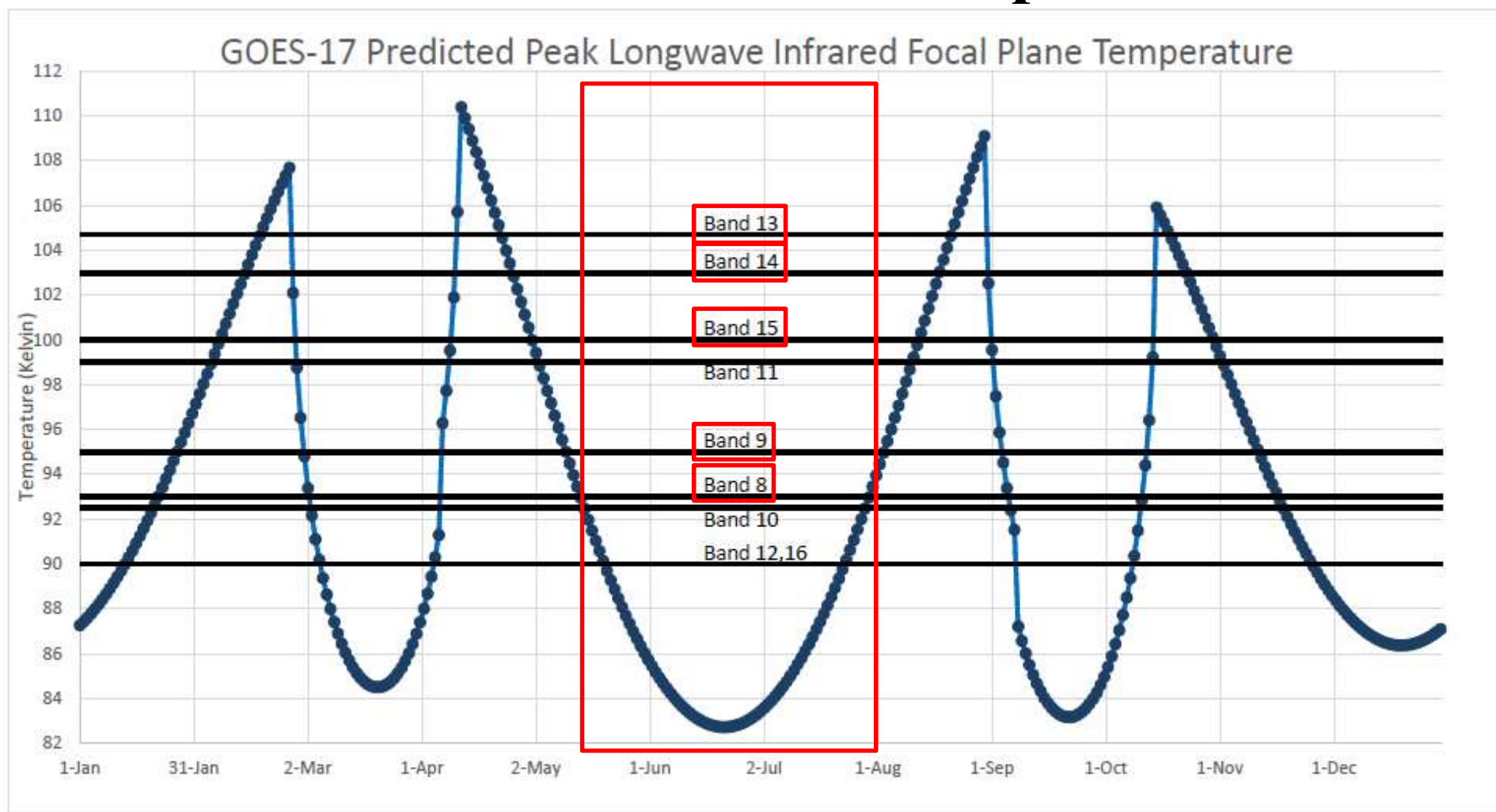


This plot shows daily maximum temperature of the ABI focal plane module. These maximums occur at night. The higher the temperature, the more saturated imagery becomes. Where the temperature rises to approach a black line for each band, marginal saturation may be observed in imagery. Where the temperature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

# GOES-17 ABI Mitigation

- On February 26$^{th}$, NESDIS implemented Mode 3 during the hours of 06-1200 UTC daily through March 2$^{nd}$.
- The 18 hours outside will still be Mode 6 (10 min FD)
- This is a permanent G17 mitigation strategy to create usable products during saturation periods.
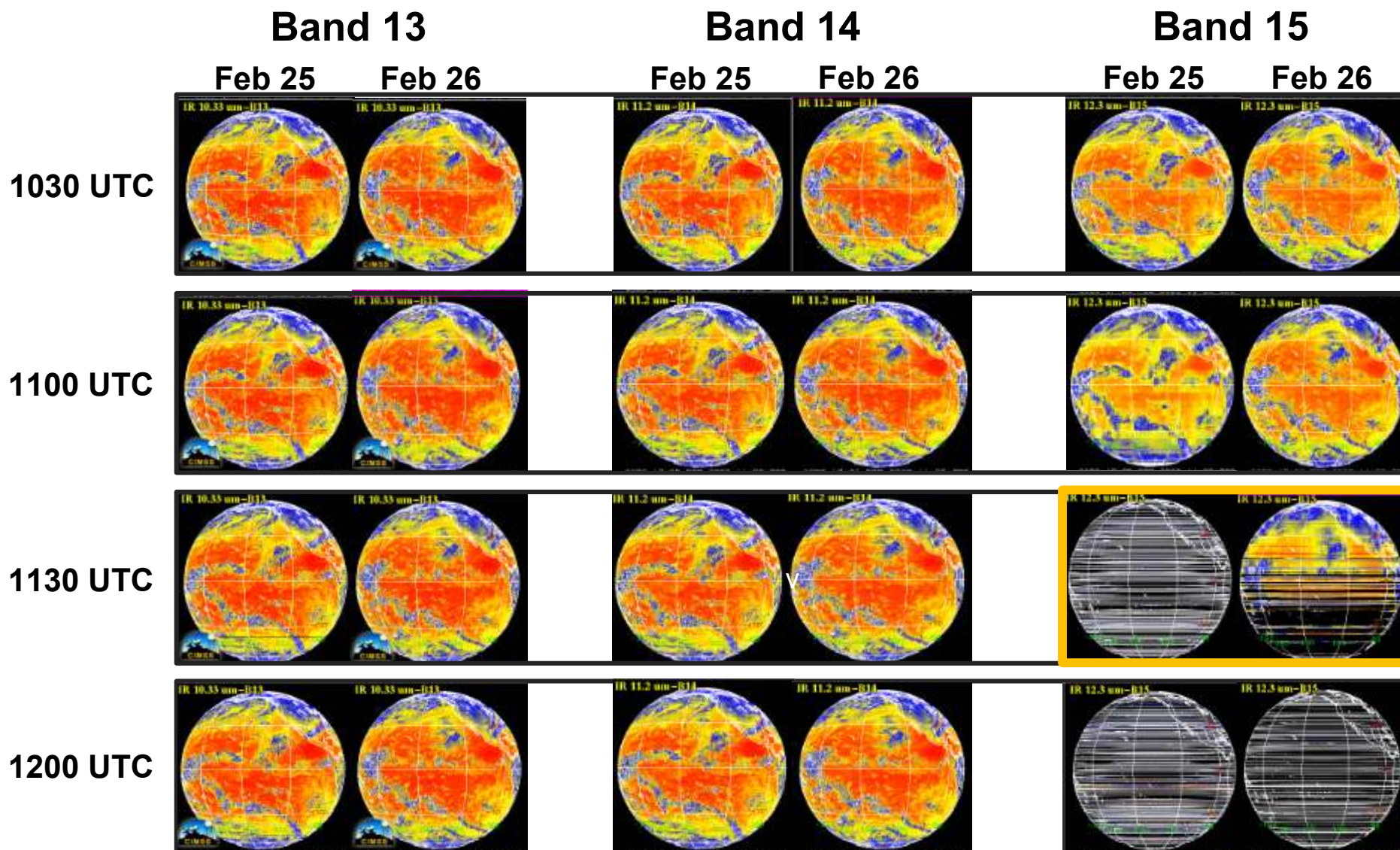
## Upcoming Mode 3 Schedule

- April 9$^{th}$ – May 2$^{nd}$, 2020
- August 12$^{th}$ – September 1$^{st}$, 2020
- October 14$^{th}$ – October 31$^{st}$, 2020
- 2021 is still TBD

# GOES-17 ABI Mode 3 Results Bands 7-9
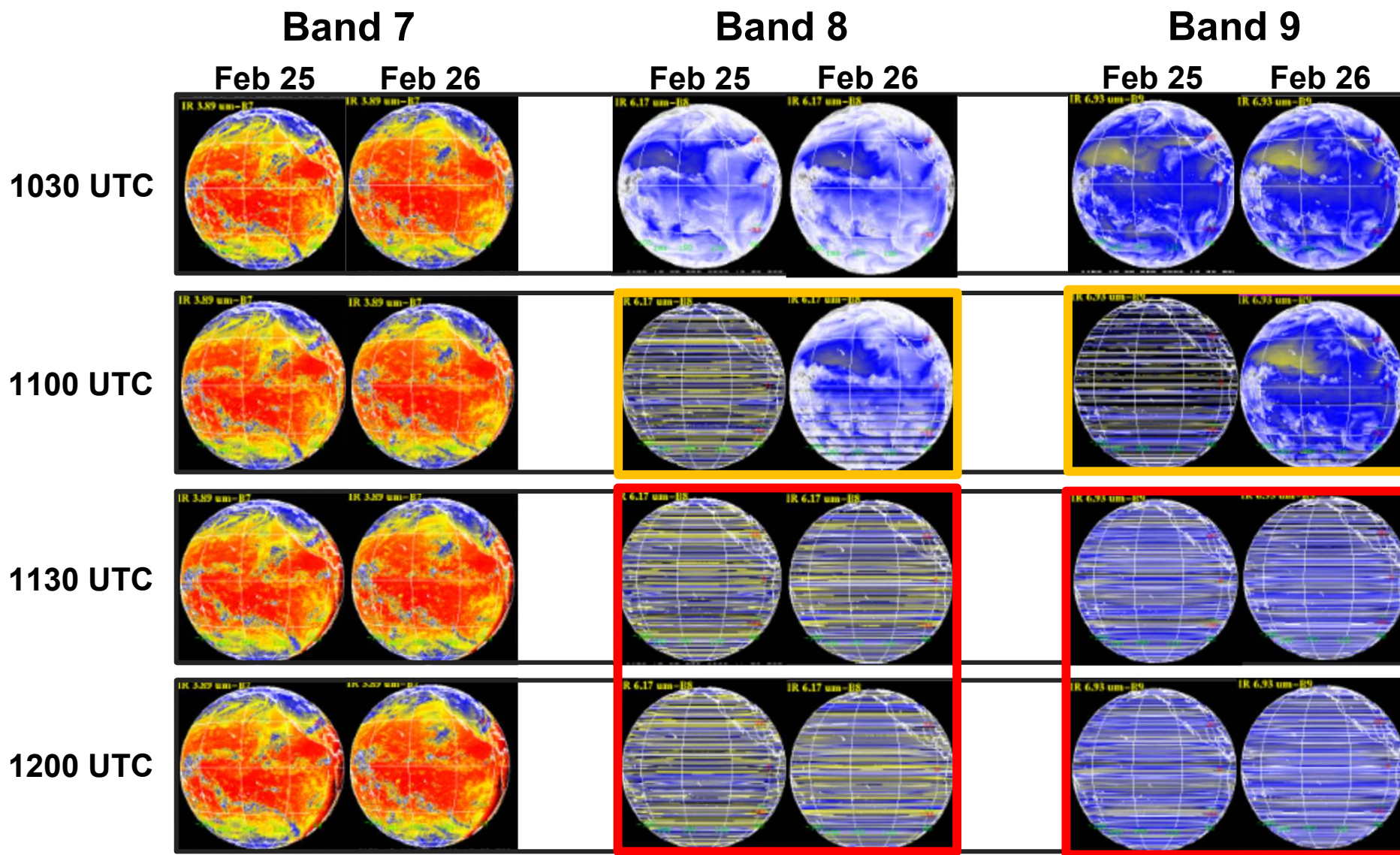
# GOES-17 ABI Mode 3 Results Bands 13-15

# 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

# PDA Release 3.5 Changes

✓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: DSIF Products at same time

✓Small High Priority files are not prioritized in anomalous conditions.

–Ex: Only DCS/EMWIN files during PDA backlog events

# 4/22/2020 DCS End-to-End Latencies Post Release 3.5
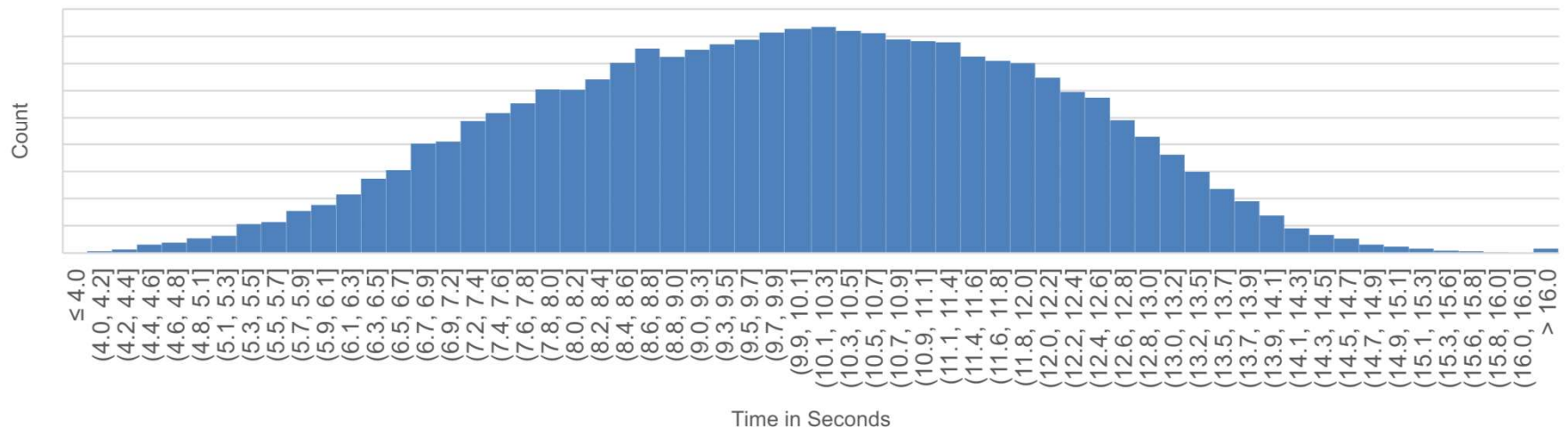


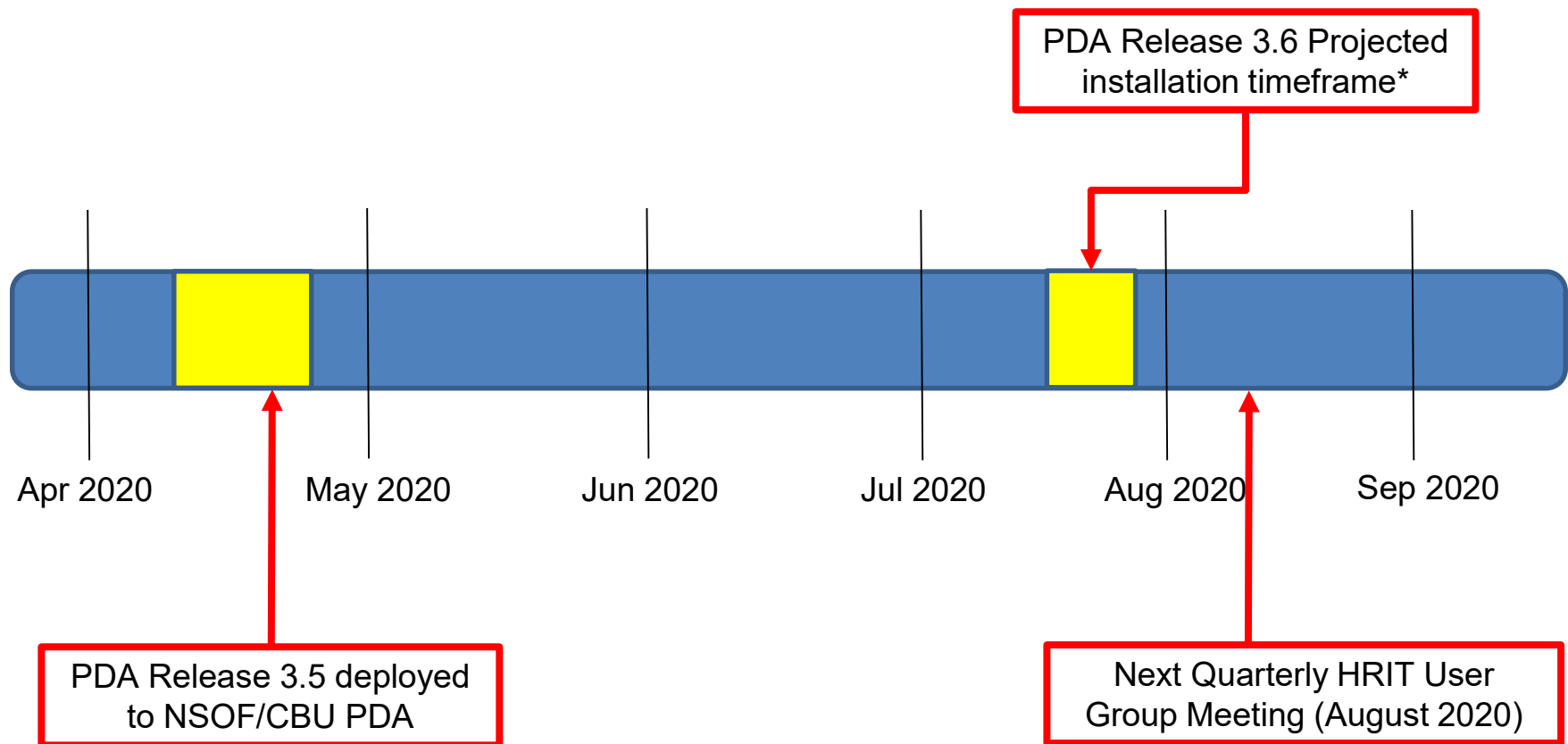| DCS End-to-End Latency 12/18/2018 | | DCS End-to-End Latency 11/11/2019 | | DCS End-to-End Latency 04/22/2020 | |
|---|---|---|---|---|---|
| Mean | 21.41062 | Mean | 12.62271 | Mean | **9.960817** |
| Median | 17 | Median | 11.167 | Median | 10.003 |
| Mode | 16 | Mode | 12.085 | Mode | 10.309 |
| Standard Deviation | 27.14868 | Standard Deviation | 15.52087 | Standard Deviation | 2.194221 |
| Minimum | 8 | Minimum | 4.491 | Minimum | 3.971 |
| Maximum | 686 | Maximum | 360.65 | Maximum | 62.622 |
| File % > 30-60 sec | 2.80% | File % > 30-60 sec | 0.57% | File % > 30-60 sec | **0.04%** |
| Files % 60-120 sec | 1.11% | Files % 60-120 sec | 0.42% | Files % 60-120 sec | **0.00%** |
| Files % 120-300 sec | 0.79% | Files % 120-300 sec | 0.50% | Files % 120-300 sec | **0.00%** |
| Files % > 300 sec | 0.27% | Files % > 300 sec | 0.04% | Files % > 300 sec | **0.00%** |
| Total % Latent >30 sec | 6.60% | Total % Latent >30 sec | 1.53% | Total % Latent >30 sec | **0.04%** |

# PDA Release 3.6 Changes

• PDA Release 3.6 involves no changes to the HRIT broadcast that will impact end users

   • All changes are for internal operational updates

# HRIT/EMWIN User Group Event Timeline

PDA Release 3.6 Projected installation timeframe*

PDA Release 3.5 deployed to NSOF/CBU PDA

Next Quarterly HRIT User Group Meeting (August 2020)

Apr 2020　　May 2020　　Jun 2020　　Jul 2020　　Aug 2020　　Sep 2020

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

# 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
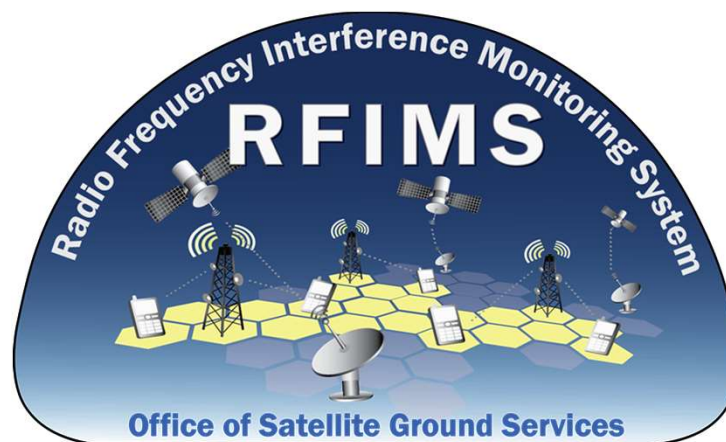
Email: seth.clevenstine@noaa.gov

Tel: 301-817-4558

# RFIMS update for HRIT user group

Dr. Pouyan Amirshahi, RFIMS Chief Scientist, Aerospace Corporation
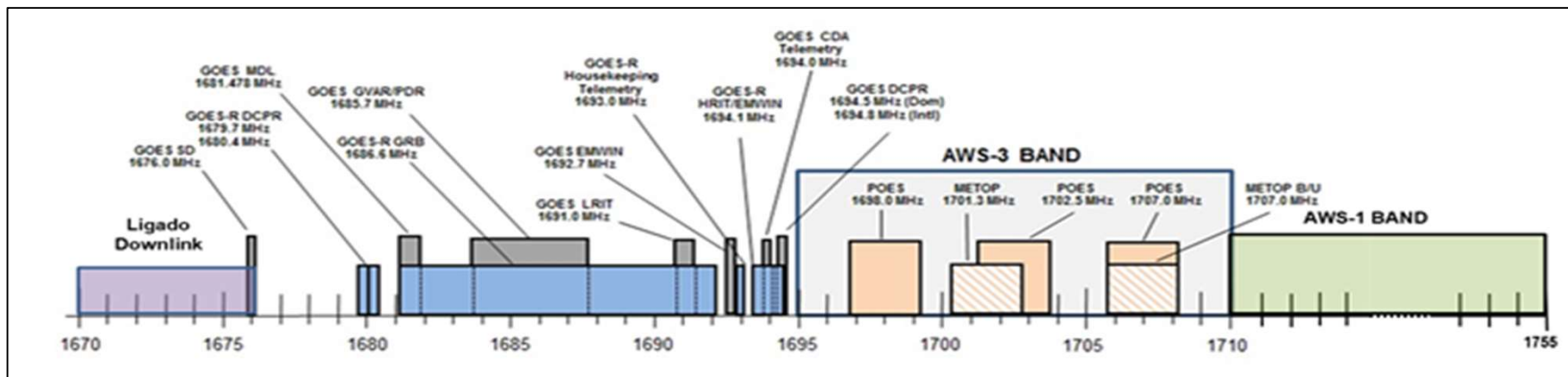Steven Grippando, RFIMS Project Manager, NOAA

May 12, 2020

- FCC AWS-3 auction in Jan 2015 auctioned licenses to commercial LTE wireless carriers to operate in the 1695-1710 MHz band.

- RFIMS project started in late 2015 with a goal to monitor 1670-1755 MHz.

- RFIMS will Detect/Classify/Identify the interference events and Notifies wireless carriers that cause interference.

- L3Harris was selected to produce the RFIMS prototype and first article.

- In September 2019, RFIMS team had its first executive demonstration.

- The operational L-band RF environment at NOAA's ground stations are very crowded and it is going to be more utilized in near future.
- RFIMS will monitor for both in-band and out of band interference events.
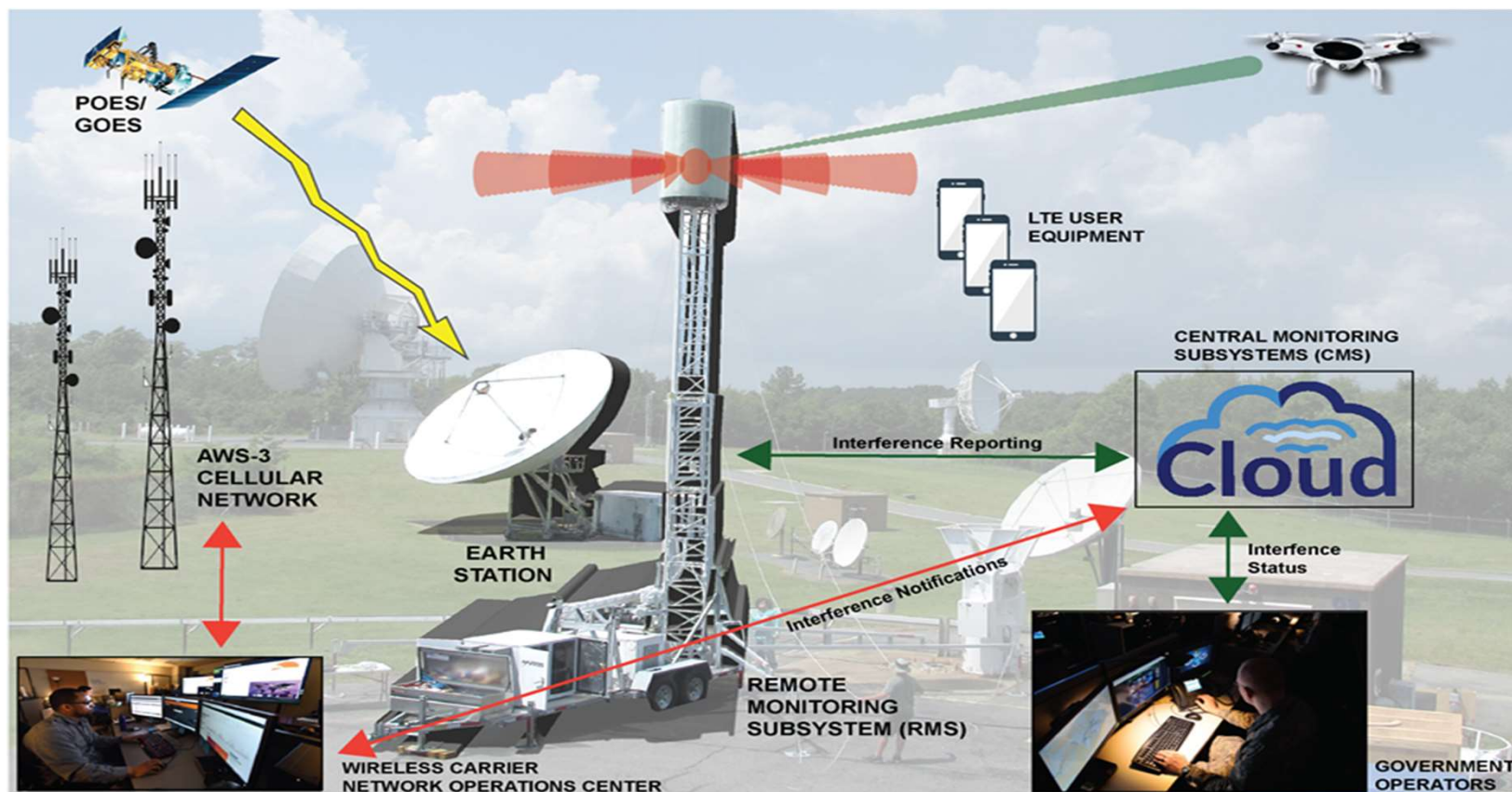- Therefore, RFIMS monitors all of 1670-1755 MHz.

Signal at the receiver ≥ -10 dB INR

Central Monitoring Subsystem

Notification Service

RFI Event Workflow

Web Services

RFI DB

RFI Metadata

Remote Monitoring Subsystem

Incident Report

**Notify Stakeholders**

Operations

Government Analyst

Wireless Carrier
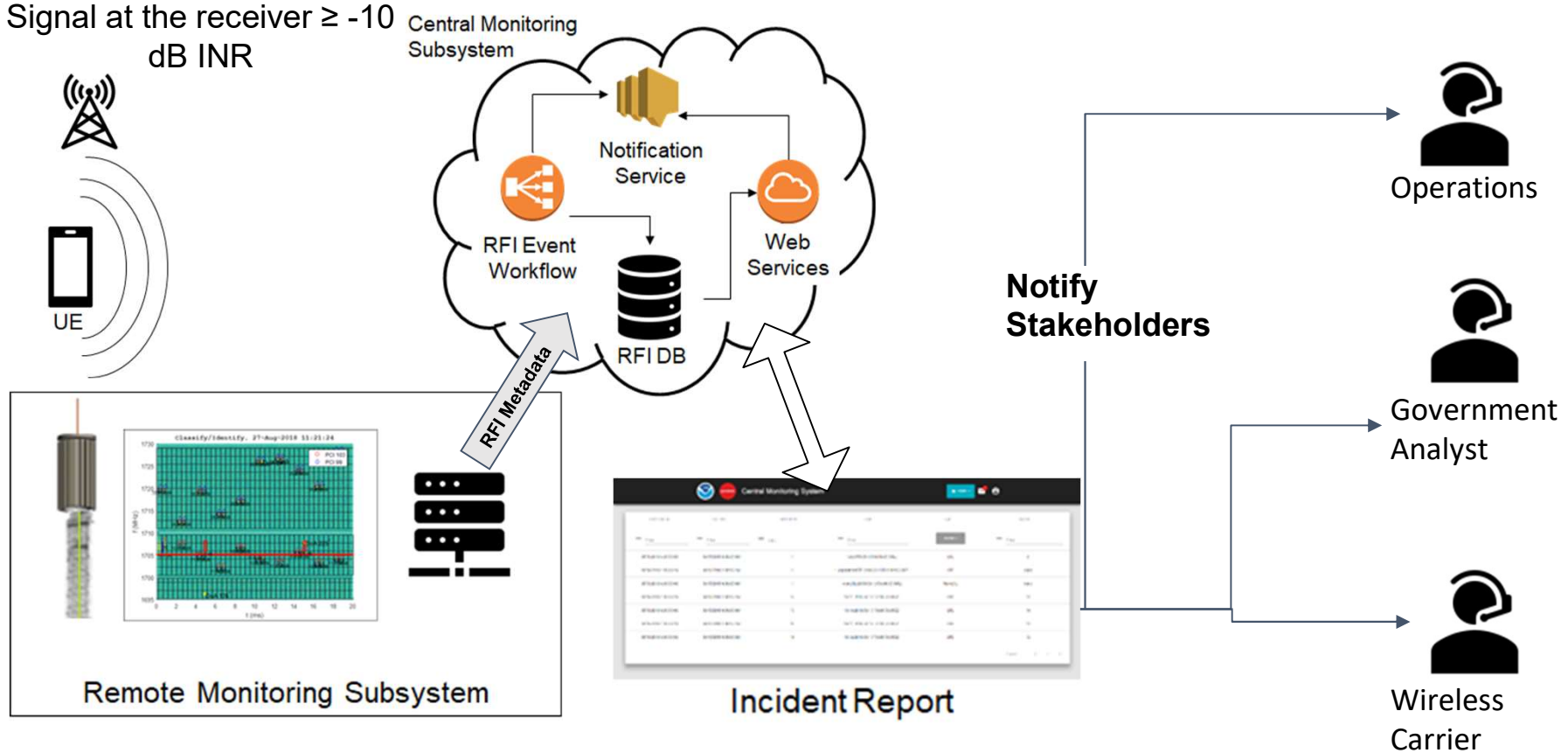
- L3Harris has started developing first article with a new and more robust antenna design.
- FAT of the system is scheduled for October 2020.
- The first article will be delivered to Table Mountain test range in Boulder, CO.
  - Table Mountain facility is a radio quiet zone.
  - The facility is equipped with antennas and receivers that are normally found at NOAA's ground stations. i.e. POES and Metop systems, GRB, (DCS and HRIT/EMWIN soon to be acquired).
  - The facility will also house an emulated LTE network that operates its uplink at AWS-3.
- SAT is schedule for February 2020.

- RFIMS team established a Capability Assessment Working Group (CAWG) to identify tests and experiments to better validate the RFIMS solution at Table Mountain.
- CAWG will develop test scenarios that will emulate an operational environment to better validate the system.
- CAWG will also conduct tests to characterize the systems deployed at Table Mountain.

# EMWIN & HRIT

Deployment to Pacific Island Countries

Robert Bubon

Systems Administrator
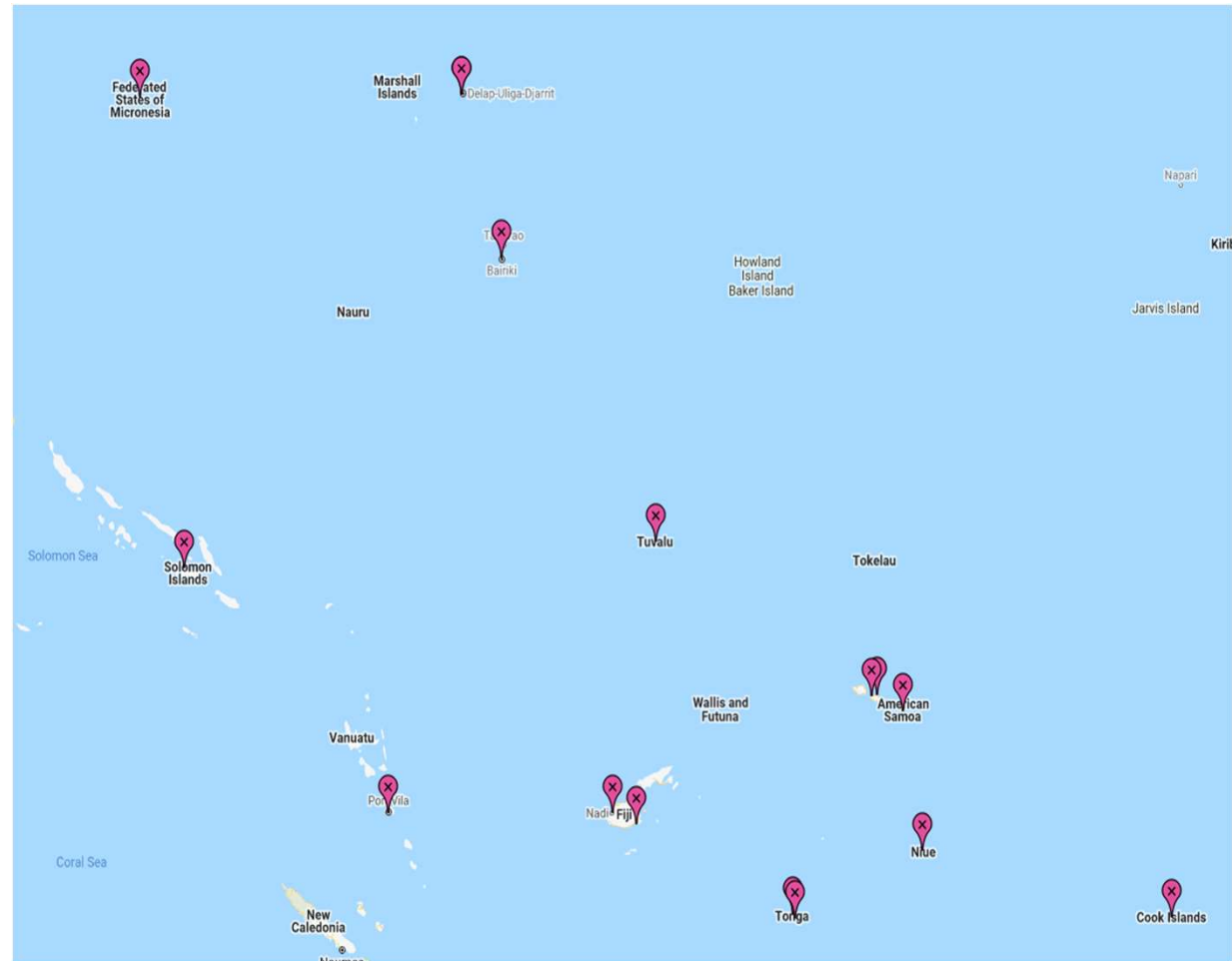
UCAR / Comet / IEPAS

# EMWIN/HRIT Project

Upgrade Pacific Island Dartcom systems for GOES-17 and add an EMWIN solution for Emergency Managers.

## Island Countries

Cook Islands
Fiji
Kiribati
Majuro (Marshall Islands)
Niue
Papua New Guinea
Pohnpei (FSM)
Samoa
Solomon Islands
Tonga
Tuvalu
Vanuatu

## Status

Dartcom/EMWIN: Deployed
EMWIN Only: In Progress

# IEPAS & Funding Source

- IEPAS, the International Extension and Public Alert Systems program, engages in research and undertakes projects to improve rural and remote communication of meteorological information.

- IEPAS programs are administered by the COMET Program, part of the University Corporation for Atmospheric Research Community Programs (UCAR).

- Primary support for the program is provided by the USAID Office of Foreign Disaster Assistance (OFDA).

- Funding is provided through an inter-agency agreement with the NOAA National Weather Service (NWS) International Activities Office (IAO).

# Dartcom LRIT/HRIT System with EMWIN station

The Dartcom LRIT/HRIT System can receive, archive, process and display LRIT and HRIT data from EUMETCast and HimawariCast DVB services, and GOES, GK-2A and Electro direct broadcast services.
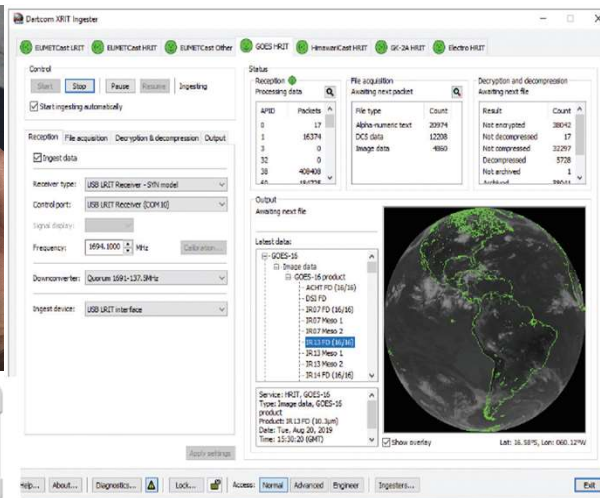
https://www.dartcom.co.uk/products/lrit-hrit-system/overview
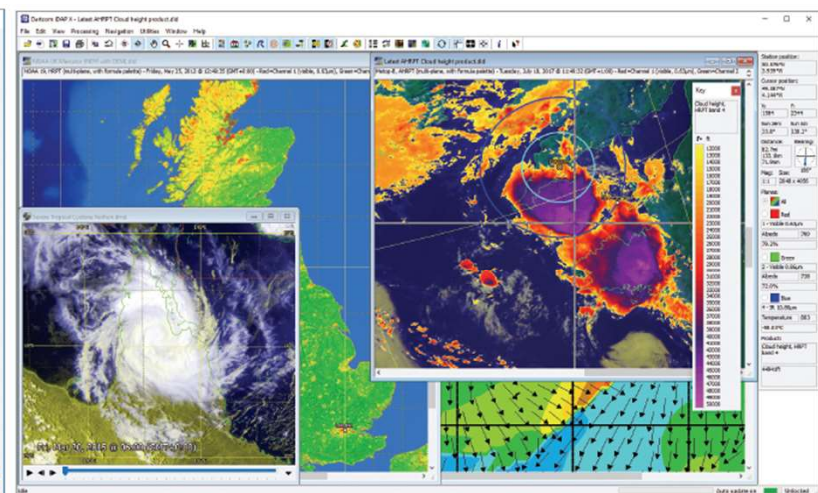
JOYSAT 2.3 Meter Antenna

Quorum Feed / Down Converter



Dartcom USB LRIT receiver
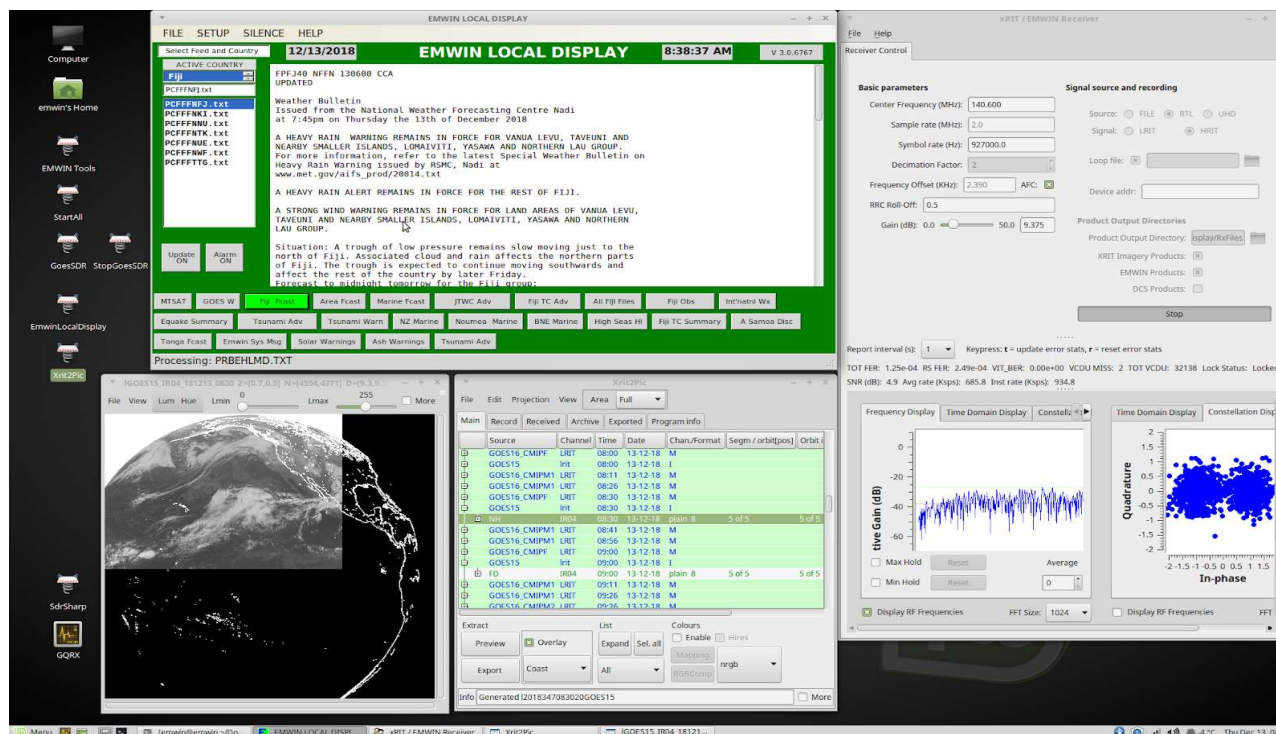
Dartcom XRIT Ingester software

Dartcom iDAP and MacroPro software

# EMWIN Solution

- Receive and decode EMWIN/HRIT data
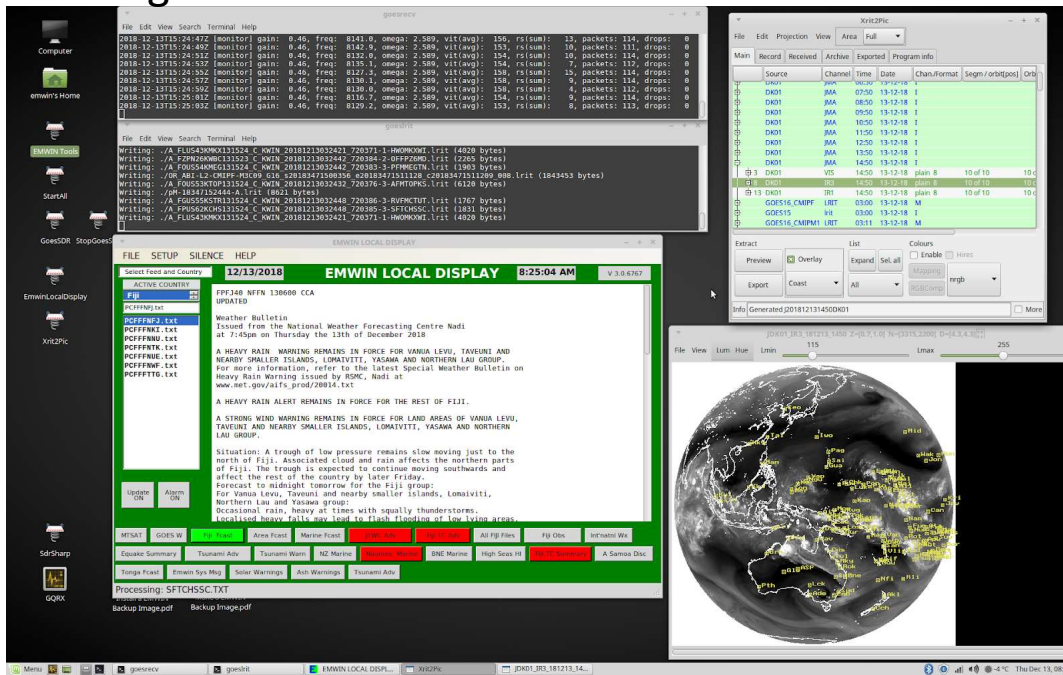- Provide User Interface for viewing EMWIN products and configure alerts

Goals
- Provide User interface to view HRIT products
- Low cost ... Non Quorum Feed / Down Converter solution
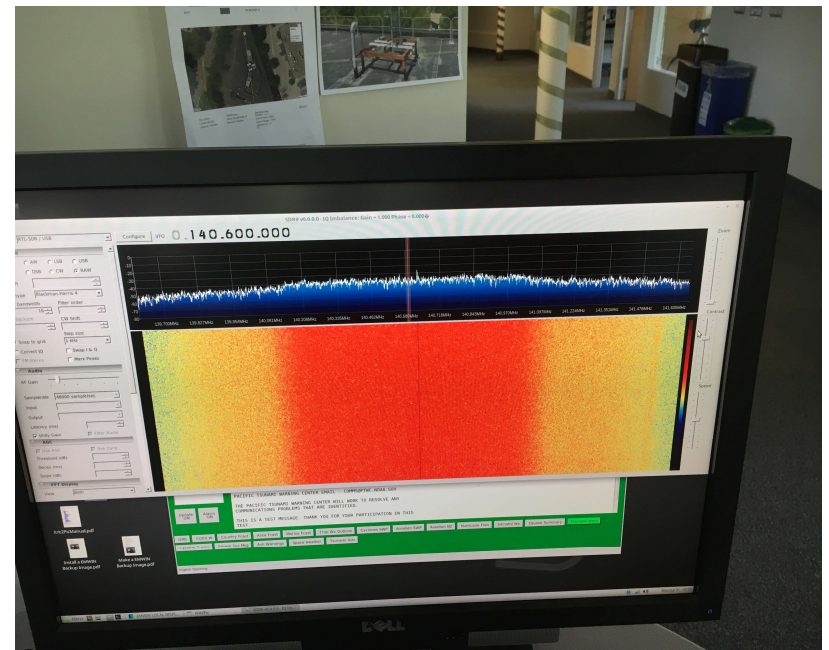- Ease of Setup ... Dish alignment



Ingest with GoesSDR

# EMWIN Solution

Ingest with GoesTools

SDRSharp – with Quorum

# EMWIN Solution

Equipment and Software

- DIRECTV 1.2m Satellite Dish Reflector (DTVAH12DISH) & Mount (DTVAH12AZEL)
- Quorum Integrated Feed / Downconverter (99R011204 IFD-1691.0-137.5-FL)
- BIAS-T with a 12v Power supply
- DC Block
- NooElec NESDR SMArTee XTR SDR
- Fitlet 2 PC – Atom x7-E3950 [CE3950]  4C/4T, 1.60GHz, 4GB Ram, 128SSD
- Linux Mint OS Install
- Ingest Options:  GoesSDR – Developed by Aero   &   GoesTools – Developed by Pieter Noordhuis
- User Interface:
  - EMWIN Local Display – Custom Software provided by Danny Lloyd
    Creator of Weather Message software
    https://www.weathermessage.com/Home.aspx
  - Xrit2pic for HRIT Visualization
    http://www.alblas.demon.nl/wsat/software/soft_msg.html
- Additional Dish Alignment Tools: GQRX and SDRSharp

# EMWIN Feed and Amplifier – Did not work

Quorum Feed and Down Converter are around $1900. So we tried to design our own feed and amplifier. It worked. BUT not enough signal to do a proper dish alignment. We abandoned the effort.



Dual polarity feed antenna 1700-2700 MHz (WiFi,GSM) for parabolic dish reflector
https://www.ebay.com/itm/Dual-polarity-feed-antenna-1700-2700-MHz-WiFi-GSM-for-parabolic-dish-reflector/232797598911

WH-08 WH Series Hinged NEMA Enclosures
https://www.polycase.com/wh-08

Nooelec SAWbird+ GOES Barebones - Premium Saw Filter & Cascaded Ultra-Low Noise LNA Module for NOAA (GOES/LRIT/HRIT) Applications. 1688MHz Center Frequency
https://www.amazon.com/Nooelec-SAWbird-GOES-Barebones-Applications/dp/B07GBFNV1H
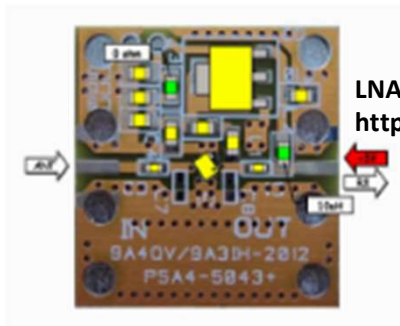
LNA for all - Low Noise Amplifier 28 MHz to 2500 MHz
http://lna4all.blogspot.com/

Yosoo 1 Pcs 10MHz-6GHz Bias Tee 10MHz-6GHz Broadband Radio Frequency Microwave Coaxial Bias, Coaxial Bias, Broadband Bias Tee

# Various Topics of Discussion

- Seth has a spreadsheet with our parts lists.
- Quorum now called Orbital Systems after a buy out last year.
  - Purchasing the Feed/Downconverter is a special order request.
  - May not sell just one if they need to build it.
- Mounting Feed to Dish – Creativity



- Aligning the DirectTv Offset Dish
  - DishPointer Website  http://www.dishpointer.com  - Very usefull
  - Phone App SatellitePointer used to see where satellite is – Useful
  - GoesSDR and GoesTools provided better feedback for the fine  adjustments than GQRX and SDRSharp.
  - Elevation angle can be measured using the angle of the feed arm. Docs did not say this.
- Custom Feed and Amplifier Direction
  - Don't put an amplifier before Sawbird filter. You will over load it.
  - The LNA4ALL amplifier after seemed to help. Was also used for the Bias-T to power the sawbird.
  - Additional amplifiers did not seem to help.

# Various Topics of Discussion

- EMWIN Local Display
  - Was produced for UCAR for use by UCAR for the non-USA countries. It was never anticipated that state side users would want the application. However, anyone interested in purchasing a copy of Local Display, send an email to danny@weathermessage.com
- GoesSDR
  - GoesSDR is a beast to compile. Aero is providing other solutions for install.
  - Nice visuals on signal and noise. Useful in aligning dish.
  - Requires a bit of CPU. Will exit and restart if having issues and dropping packets.
    - The noisier the signal, the more cpu needed and the more this can happen.
- GoesTools
  - Install less involved.
  - Easier on CPU requirements
  - Will log drop packets and just keep processing.
  - Seeing packet rate and drops on a 2 second sample is helpful in aligning the dish.
- Xrit2pic HRIT Visualization
  - To see current items in the listing requires manual refresh.
  - I recall trying to configure the processing of incoming data being a rabbit hole of problems and it was disabled.
    - Aging off and 128gig SSD was part of the issue.

# HRIT/EMWIN User Group

## Next meeting will be August 2020

## Thanks for your participation!

# HRIT/EMWIN User Group

# Open Discussion

# Seth Clevenstine