

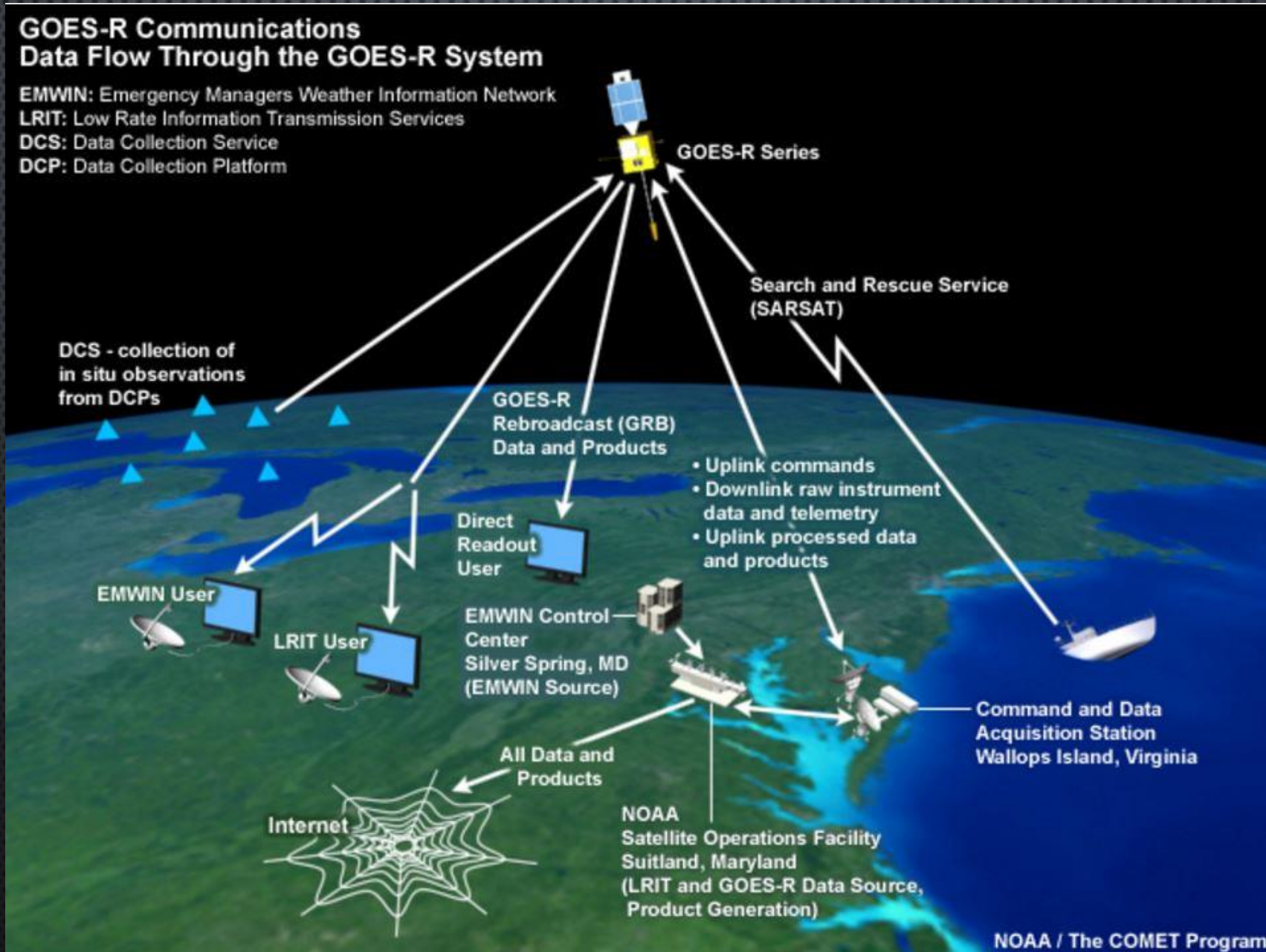
GEOS-16/17 HIRT Weather Satellite Receiver Project

"Its 30 days after a very bad day, there is no internet or weather reports."

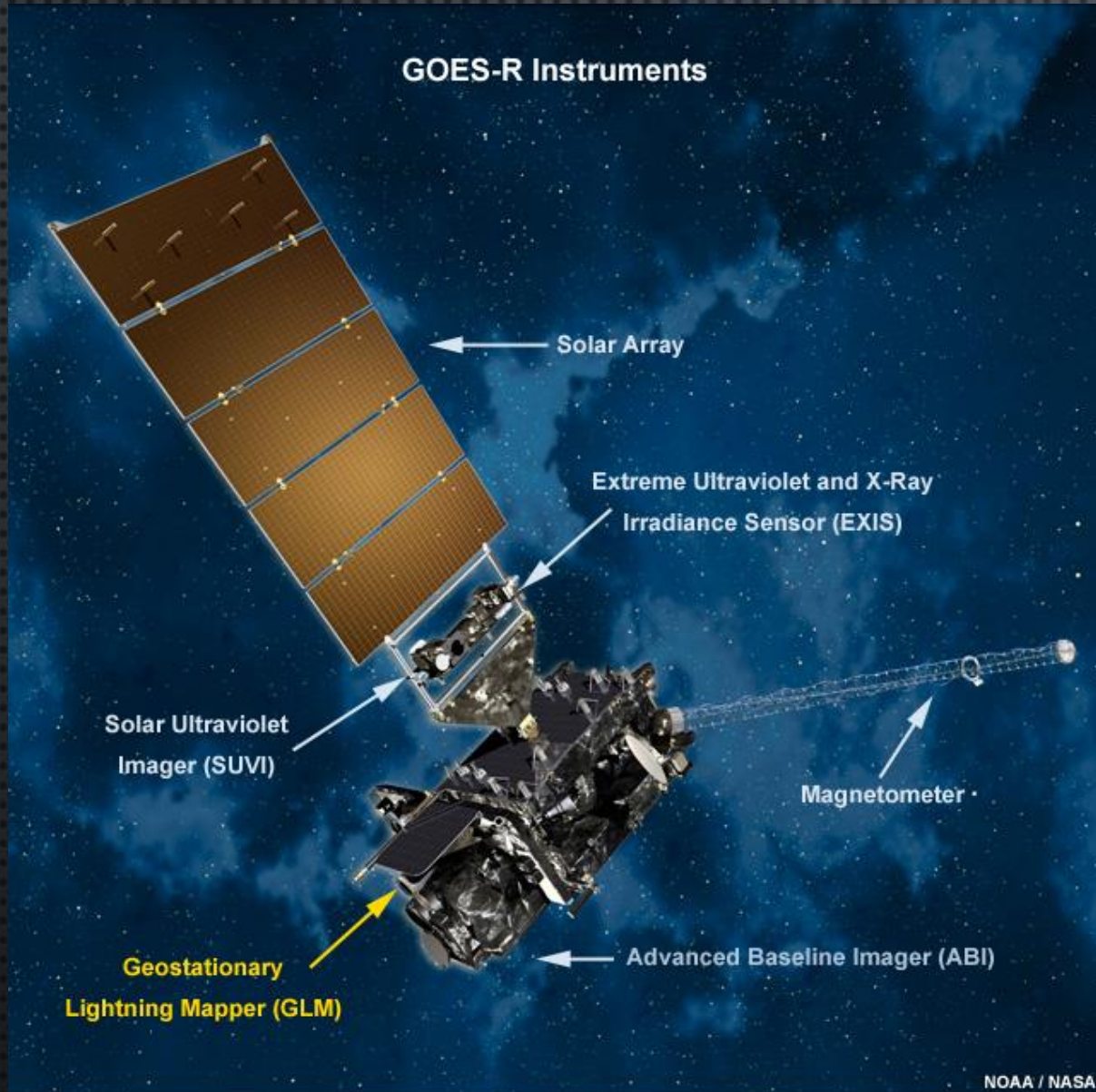
This project may be the only information you have regarding severe weather or hurricane formation.



GEOS-16/17 HIRT Weather Satellite Receiver Project



GEOS-16/17 HIRT Weather Satellite Receiver Project



GEOS-16/17 HIRT Weather Satellite Receiver Project

This setup uses off-the-shelf components, is really easy to put together, and is comparatively low in cost.

- A key component of the low-cost HRIT/LRIT system is a new LNA for GOES satellite reception that NooElec, Inc. has been developing (now commercially available).
- The key elements of the system are as follows:
 - Satellite Dish,
 - LNA,
 - Various N to SMA Cables,
 - An SDR receiver as specified in a later slide
 - Windows PC with a free USB.

Detailed information on the system elements follows.

GEOS-16/17 HIRT Weather Satellite Receiver Project

https://www.amazon.com/Premiertek-Directional-High-Gain-Parabolic-ANT-GRID-24DBI/dp/B005M8KU3W#HLCXComparisonWidget feature_div



Premiertek Outdoor 2.4GHz 24dBi Directional High-Gain N-Type Female Aluminum Die Cast Grid Parabolic Antenna (ANT-GRID-24DBI)

by **Premiertek**



9 customer reviews | 7 answered questions

Available from these sellers.

- Superior Performance Aluminum Die Cast Grid UV Stable Light Gray Powder Coat Finish All Weather Operation Easy to Assemble
- Frequency Range: 2400~2483MHz Gain: 23.50.5dBi VSWR: <=1.5 Impedance: 50 Ohm Polarization: Vertical or Horizontal
- Beam width/Horizontal: 14 Beam width/Vertical: 10 F/B Ratio-dB: >30 Max Input Power: 200W
- RF Connector: N-Type female Survival wind speed: 148mile/hr Temperature: -40C~+80C Humidity: 100%at25C
- Antenna Weight Grid Antenna: 3.5lbs Antenna+Feed Antenna: 4.1lbs Package Weight Net 5.2lbs. Gross: 6.2lbs Antenna Dimensions: 60cm x 106 cm (HxW)

New (20) from \$50.99 & FREE shipping.

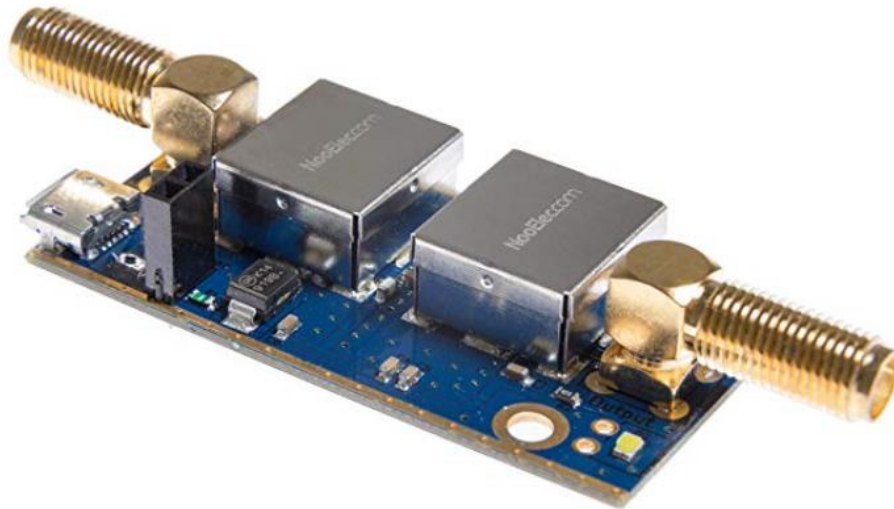
Free shipping
on all Prime Pantry orders over \$35
prime pantry

- The Premiertek ANT-GRID-24DBI is being used at 1.694 GHz with the secondary reflector flipped.
- This antenna is specified for operation from 2.4 to 2.483 GHz and the GOES HRIT signal is at 1.6941 GHz. The flipped secondary reflector helps with reception at 1.6941 GHz on this antenna.



GEOS-16/17 HIRT Weather Satellite Receiver Project

https://www.amazon.com/dp/B07GBFNV1H/ref=sspa_dk_detail_3?psc=1



Nooelec SAWbird+ GOES Barebones - Premium Saw Filter & Cascaded Ultra-Low Noise LNA Module for NOAA (GOES/LRIT/HRIT) Applications. 1688MHz Center Frequency.

by NooElec

Be the first to review this item

Price: **\$34.95** & **FREE Shipping**. [Details](#)

- SAWbird+ GOES is a self-contained LNA module designed for capturing beautiful weather images available from NOAA GOES satellites
- The module uses 2 ultra-low-noise LNAs and a custom high-performance SAW filter centered at the frequency of interest
- SAWbird+ GOES can be powered in 3 ways: via bias tee, through the on-board microUSB connector, or through the on-board female header
- Though compatible with most SDRs, we recommend use in conjunction with NESDR SMaRtTee XTR v2 (available on Amazon, item ID B06Y1GN5RP)
- Full 1 year warranty and support direct through Nooelec!

New (2) from **\$34.95** & **FREE shipping**.

[Explore the Electronics Gift Guide](#)



Gadgets & Gizmos



Active Lifestyle



Computers & Accessories

- Nooelec now has two versions of the SAWbird GOES, you will need the version of LNA that operates at 30mA, since the specification from the listed SDR receivers is 100mA or less for the BIAS-T.
- The other version of Nooelec SAWbird GOES operates at around 180mA and the listed SDR receivers won't support that (they stop providing power to the BIAS-T power required if greater than 100mA).

GEOS-16/17 HIRT Weather Satellite Receiver Project

Sponsored products related to this item

Page 1 of 33

2PCS DHT Electronics 15cm FPV Antenna Extension Cable RP-SMA Male to RP-SMA Female ...

\$6.00 ✓prime

15-Meter(49.2 Ft) RG58 SMA Female to SMA Male Extension RF Coaxial Cable Connector ...

★★★★☆ 16

\$17.98 ✓prime

DZS Elec 2pcs RG316 Wire Jumper 15cm SMA Male to SMA Male with Connecting Line RF C...

★★★★☆ 17

\$4.59 ✓prime

15-Meter(49.2 Ft) RG58 Reverse Polarity SMA Female to RP SMA Male Extension Coaxial...

\$17.98 ✓prime

DHT Electronics 2PCS 20CM SMA Female to U.FL IPX IPEX WiFi Cable for U.FL Mini PCI ...

★★★★☆ 4

\$6.00 ✓prime

exgoofit F-Type to SMA Male Female 2 Sets 6pcs RF Coaxial Coax Adapter Connector

★★★★☆ 2

\$5.90 ✓prime

RF Coaxial SMA Male to RP SMA Male Female Pin Jumper Cable Connector for Audio FPV ...

★★★★☆ 8

\$5.50 ✓prime

SMA Adapter Kit SMA Male Female WiFi Antenna Extension Connector Pack of 15

★★★★☆ 15

\$11.88 ✓prime

DHT Electronics 2PCS UHF Female SO239 Jack 4 holes Panel Chassis Mount Flange Solde...

★★★☆☆ 1

\$7.50 ✓prime

Ad feedback

Customers who bought this item also bought

Page 1 of 11

uxcell 2pcs N Female to Female Coax Connector Adapter Couplers

★★★★☆ 24

\$7.47 ✓prime

Premiertek ANT-Y702711 Wide Band 698-2700MHz 9dBi/11dBi Directional Yagi Antenna N Female...

★★★★☆ 2

\$50.72 ✓prime

Nooelec SAWbird+ GOES Barebones - Premium Saw Filter & Cascaded Ultra-Low Noise LNA Module for NOAA (GOES/LRIT...

\$34.95 ✓prime

Maxmoral N type Male To SMA Male Convertor Wi-Fi Adaptor Connector

★★★★☆ 7

\$6.99 ✓prime

MOFI4500-4GxLTE-SIM4 4G/LTE Router AT&T T-Mobile Verizon Embedded SIM with...

★★★★☆ 79

\$329.99

Wilson Electronics Wideband Directional Antenna 700-2700 MHz, 50 Ohm (314411)

★★★★☆ 154

\$49.20 ✓prime

OdiySurveil(TM 1M RF Type-N Male to SMA Male WLAN Antenna Extension Coaxial Cable,39",RG316

★★★★☆ 8

\$12.09 ✓prime

C2G/Cables to Go 42206 N-Female to N-Female Wi-Fi Adapter Coupler

★★★★☆ 52

\$5.97 ✓prime

DHT Electronics RF coaxial coax cable assembly SMA male to N female bulkhead 6"

★★★★☆ 12

\$6.50 ✓prime

GEOS-16/17 HIRT Weather Satellite Receiver Project

In-Stock

Free Shipping!

SDRplay SDRplay RSP2

RSP2 Enhanced Radio Spectrum Processor SDR Receiver W/SDR-UNO Software

HRO Discount Price: \$169.95*

Buy It

*After Coupons & Promotions.

Tweet

Share

Save

Add To Wish List





- The set up and software will work with the RSP1A, RSP2, RSPduo, AirSpy MINI and AirSpy R2.
- All support bias-T, but are limited to 100ma.

GEOS-16/17 HIRT Weather Satellite Receiver Project

Some Assembly Required

- You should first put together the PremierTech grid antenna.
 - Note that the smaller secondary reflector must be flipped over from what is indicated in the instructions that come with this antenna.
 - It is helpful to use sandpaper or a file to remove the coating on the inside of the tabs that mate the two halves, so that there is a good electrical connection across the primary reflector.
- Mount the antenna to the tripod.
 - You will need to take into account the polarization of the satellite that you wish to receive from.
 - In the United States for GOES 16, the polarity that works best is a diagonal polarity from bottom right to upper left when facing the satellite.
 - For GOES 17 vertical polarity works well at present.

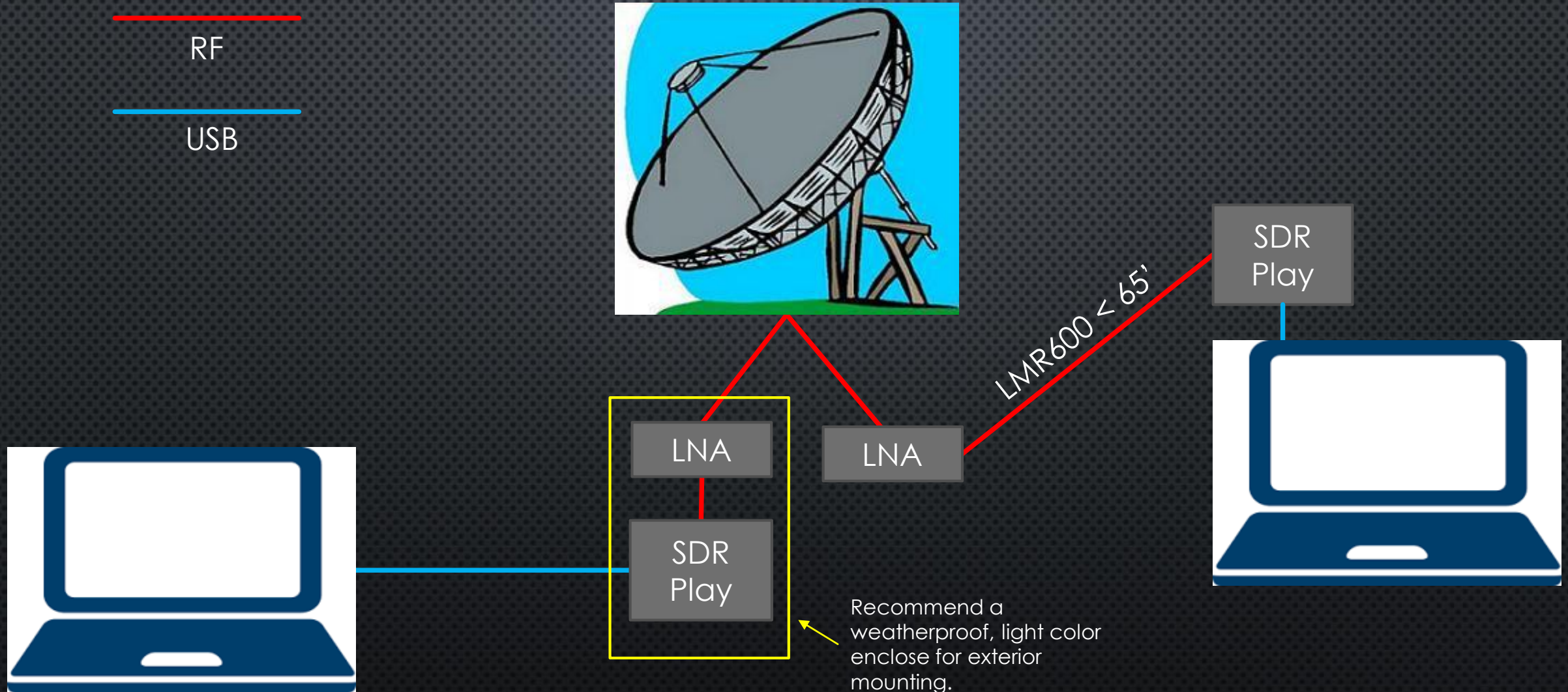


GEOS-16/17 HIRT Weather Satellite Receiver Project

Additional Antenna Mounting Options

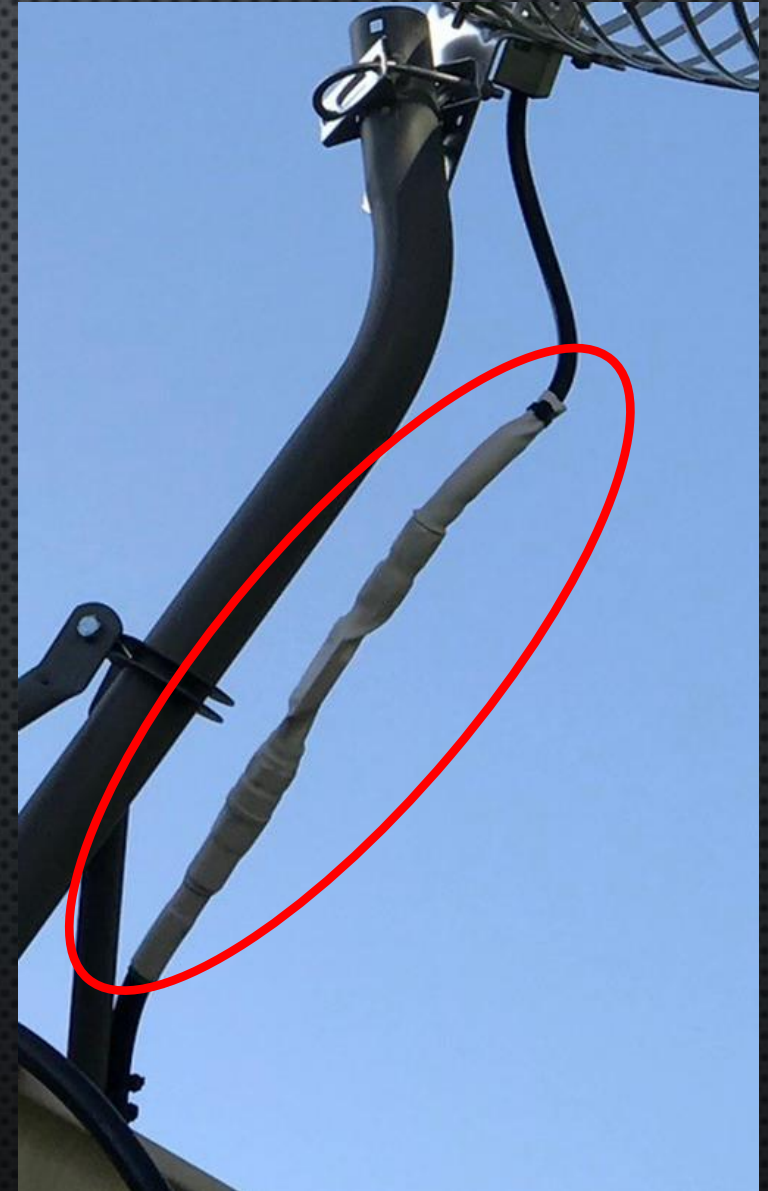


GEOS-16/17 HIRT Weather Satellite Receiver Project Configuration Options

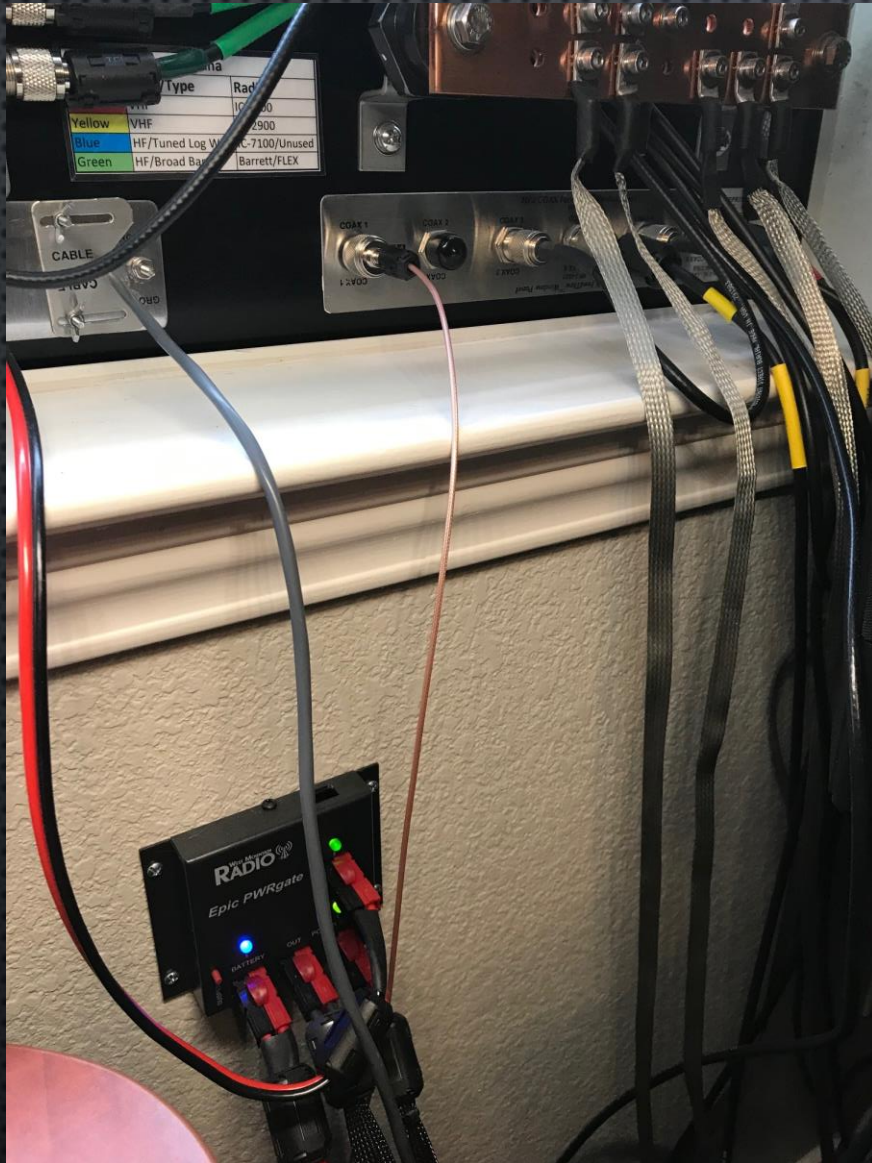


Long USB Cables Require Repeaters

GEOS-16/17 HIRT Weather Satellite Receiver Project Configuration Options



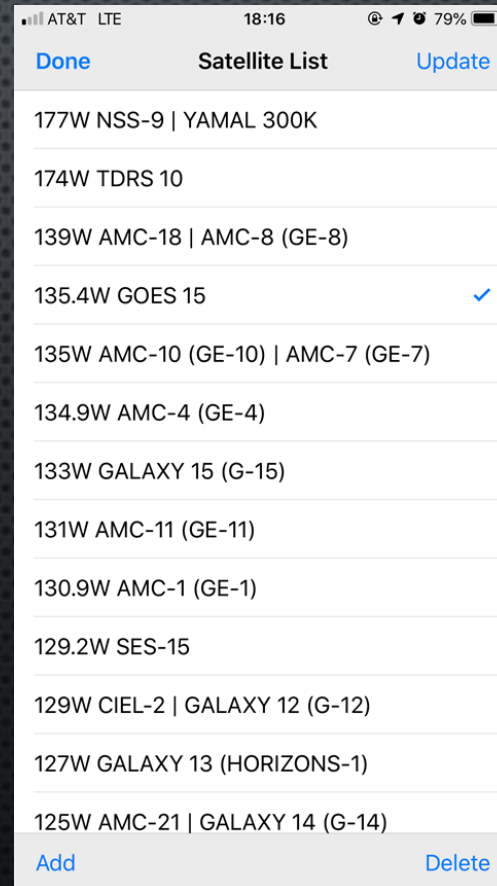
GEOS-16/17 HIRT Weather Satellite Receiver Project Configuration Options



GEOS-16/17 HIRT Weather Satellite Receiver Project

Antenna Alignment

There are many Smartphone apps to assist with alignment.



GEOS-16/17 HIRT Weather Satellite Receiver Project

Software

Software is required to interface with the SDR, stream the data to a demodulator, the ingestor, finally to a file manager to create the final images. We created a batch file to maintain the folders as the package can fill a drive with high resolution images in less than a week.

The 3 software packages are:

- rsp_streamer,
- xrit_decoder (which include ingestor), and
- xrit_file_manager.

The Software package is available by contacting Joe at the the following link:

https://usa-satcom.com/contact_form/

If you are contacting from a .me or .icloud account, it may not work. Please contact me at rhwarner@me.com and I can contact Joe by alternate means. Joe distributes this software for free. Due to the libraries used, if you wish to have a copy past the trial period, the licensing fee is around \$100 USD. Once the license fees are paid, you will receive access to a group.io where update are distributed and tech support is available.

In the next set of images, we will show the GUI and the settings I am using with the configuration described.

GEOS-16/17 HIRT Weather Satellite Receiver Project

Software

RSP Streamer X

Set defaults in
the
rsp_streamer.exe
.config file.

The screenshot displays the 'USA-Satcom RSP Streamer X' application window. It features two main panels for 'Stream A' and 'Stream B'. At the top, there's a 'SDR Selection' section with dropdowns for '171701AD21 [RSP2]', 'Single Tuner', and '2 MSPS', along with a green 'CONNECTED' button. Below this, a status bar shows '1.0.6875.27322' Version, '3.01' API, '1' SDRs, and 'STREAMER1' Streamer Server ID. The 'Antenna Selection' section on the right has radio buttons for 'Port A' and 'Port B' (selected), and a checked 'Bias-T (Ant B)' checkbox. The 'Stream A' panel includes a 'Single Tuner' button, 'Notch Filters' (DAB, MW FM), 'IF Mode' (Zero IF), 'Bandwidth' (1.536 MHz), 'LNA Gain' (LNastate 0, 0dB), 'IF AGC Control' (OFF, Loop Filter BW 5 Hz, 50 Hz, 100 Hz), a volume slider set to -40dBFS, 'RF Gain' (25dB), 'Atten Level' (53dB), 'RF Gain Attenuation' (+56.9dB), 'System Gain', 'Frequency Control' (1,694,100,000 Hz, TUNE, RSP-STREAM-A, Track checked), and 'Networking' (127.0.0.1 IP, 8890_ Port, STREAMING button, 0 USB Errors, Clear Errors button). The 'Stream B' panel has similar controls but with 'NA' for the tuner, '20dB' for RF Gain, '+.0dB' for RF Gain Attenuation, and 'RSP-STREAM-B' for Frequency Control. A green progress bar is visible at the bottom of the Stream A panel.

GEOS-16/17 HIRT Weather Satellite Receiver Project

Software

XRIT Demodulator

Set defaults in
the
`xrit_decoder.exe`
`.config` file.

© USA-Satcom XRIT Demodulator

SDR Link Mode: ☒ SDRplay ☐ SpyServer

GOES Mode: ☐ LRIT ☒ HRIT

Sample Rate (MSPS): ☒ 2.0 ☐ 2.5 ☐ 3.0

SDR Link

Device Serial #: 171701AD21 Device Name: 2162690

Remote IP: 127.0.0.1 Port: 8890

Network Drops: 0 **Connected**

Server ID: STREAMER1 Stream ID: STREAM-A

Frequency: 1694.1 MHz ☒ Track

Gain: 19

IQ Buffering

Overflows: 0 Capacity: 0.2 %

Packer Buffering

Buffers Used: 0 Peak Buffers: 2404

L-EMWIN Link

Server Port: 50003 Client IP:

Packets: 0 CRC Errors: 0

Len Errors: 0

Start Emwin: **Off**

Demodulator

Stop Demod: **Locked**

927,000 Symbol Rate

2.1.0.0 XRIT Core Version

FEC

91 Viterbi

0.01111 BER

+0 +0 +0 +0 RS

Signal Quality

93.9 %

IQ

CF: -1048.74 Hz NORMAL

Sync Correlation

8 Uncoded 0 Coded

Clear Counters

Error Counters

11238 Bad Uncoded

1 Bad Coded

0 Bad RS

GEOS-16/17 HIRT Weather Satellite Receiver Project

Software

XRIT Ingestor

Set defaults should
save in the
xrit_decoder.exe.co
nfig file upon exit.

© USA-Satcom GOES XRIT Ingestor

Ingestor Control

CCSDS Transport Frames
VC ID:
VC CNT:

OSP Enable Products

OSP Recording

OSP Statistics

Bugs	Len Errors	Frame Loss	Frame Jumps	CRC Errors	Packets	OSP Version	
<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="3090458"/>	<input type="text" value="1.4.6872.25153"/>	<input type="button" value="Clear"/>

NOAA Product Status

BUSY	VCID 0	VCID 1	Products
L-EMWIN	H-EMWIN	Other1	Other2
<input type="text"/>	<input type="text" value="713"/>	<input type="text"/>	<input type="text"/>
GOES 13 ABI	GOES 15 ABI	GOES 16 ABI	GOES 17 ABI
<input type="text"/>	<input type="text" value="307"/>	<input type="text" value="7348"/>	<input type="text"/>
Himawari ABI	NOAA Text	Weather Data	DCS
<input type="text" value="960"/>	<input type="text" value="32"/>	<input type="text" value="132"/>	<input type="text" value="26332"/>

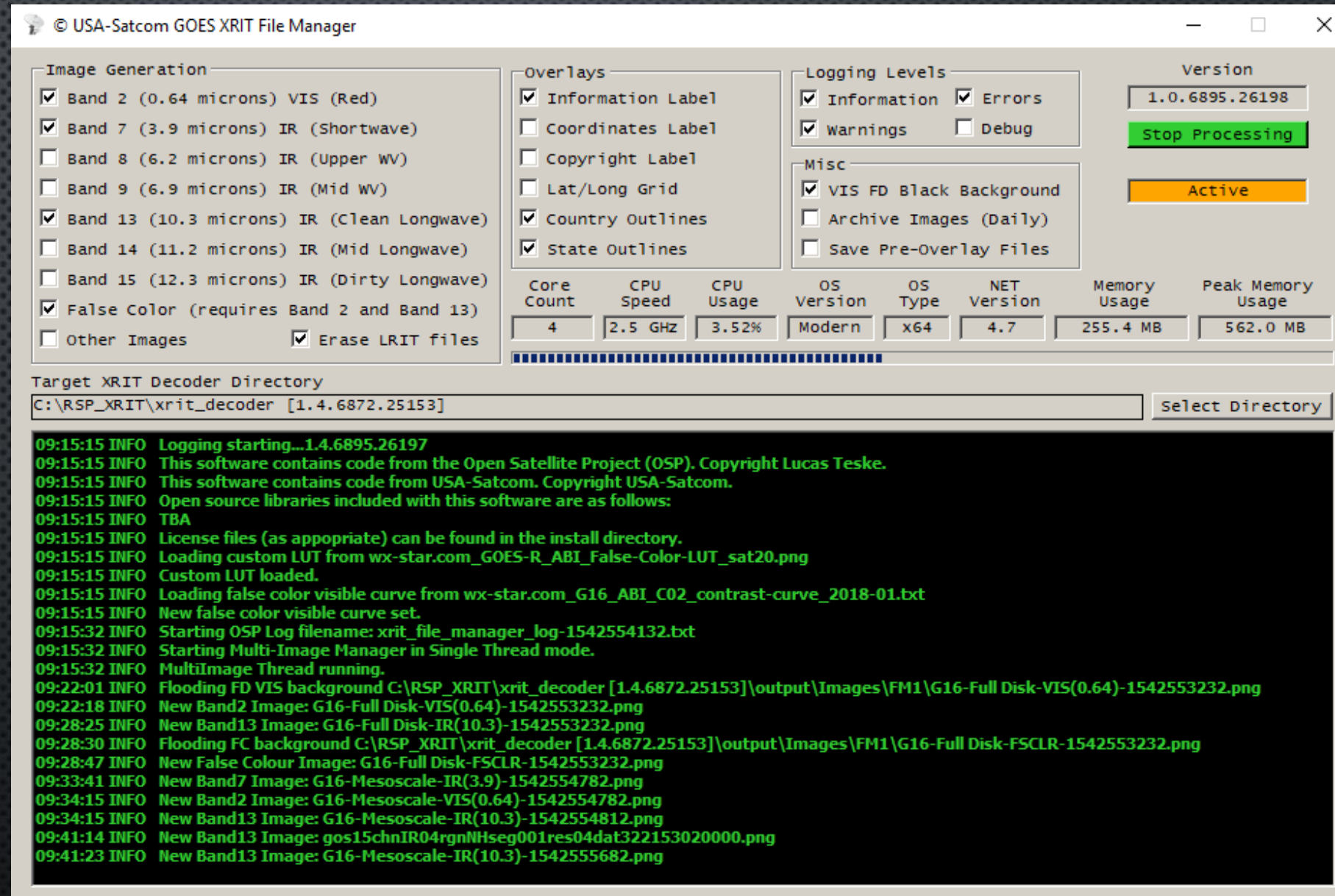
```
18:10:26 INFO New HIMAWARI8 ABI - Channel 1 (ID: 0 Seg: 6/10)
18:10:51 INFO New GOES 15 ABI - Infrared Full Disk (ID: 11260 Seg: 1/5)
18:10:52 INFO New HIMAWARI8 ABI - Channel 3 (ID: 0 Seg: 3/10)
18:10:54 INFO New HIMAWARI8 ABI - Channel 1 (ID: 0 Seg: 10/10)
18:10:57 INFO New HIMAWARI8 ABI - Channel 1 (ID: 0 Seg: 4/10)
18:11:01 INFO New HIMAWARI8 ABI - Channel 1 (ID: 0 Seg: 7/10)
18:11:04 INFO New HIMAWARI8 ABI - Channel 1 (ID: 0 Seg: 3/10)
18:11:09 INFO New HIMAWARI8 ABI - Channel 1 (ID: 0 Seg: 5/10)
18:11:14 INFO New HIMAWARI8 ABI - Channel 1 (ID: 0 Seg: 1/10)
18:11:15 INFO New HIMAWARI8 ABI - Channel 1 (ID: 0 Seg: 8/10)
18:11:16 INFO New HIMAWARI8 ABI - Channel 1 (ID: 0 Seg: 2/10)
18:11:18 INFO New GOES 16 ABI - None (Mesoscale)
18:11:40 INFO New GOES 16 ABI - None (Mesoscale)
18:11:42 INFO New GOES 16 ABI - None (Mesoscale)
18:13:29 INFO New GOES 16 ABI - Channel 7 (ID: 11264 Seg: 11/16)
18:13:34 INFO New GOES 16 ABI - Channel 7 (ID: 11264 Seg: 0/16)
18:13:49 INFO New GOES 16 ABI - Channel 7 (ID: 11264 Seg: 7/16)
18:14:01 INFO New GOES 16 ABI - Channel 7 (ID: 11264 Seg: 5/16)
18:14:07 INFO New GOES 16 ABI - Channel 7 (ID: 11264 Seg: 15/16)
18:14:15 INFO New GOES 16 ABI - Channel 7 (ID: 11264 Seg: 1/16)
18:14:25 INFO New GOES 16 ABI - Channel 7 (ID: 11264 Seg: 12/16)
18:14:39 INFO New GOES 16 ABI - Channel 7 (ID: 11264 Seg: 10/16)
18:14:55 INFO New GOES 16 ABI - Channel 7 (ID: 11264 Seg: 6/16)
```


GEOS-16/17 HIRT Weather Satellite Receiver Project

Software

XRIT File Manager

Set defaults in
the
`xrit_file_manage
r.exe.config` file.






GEOS-16/17 HIRT Weather Satellite Receiver Project

Software

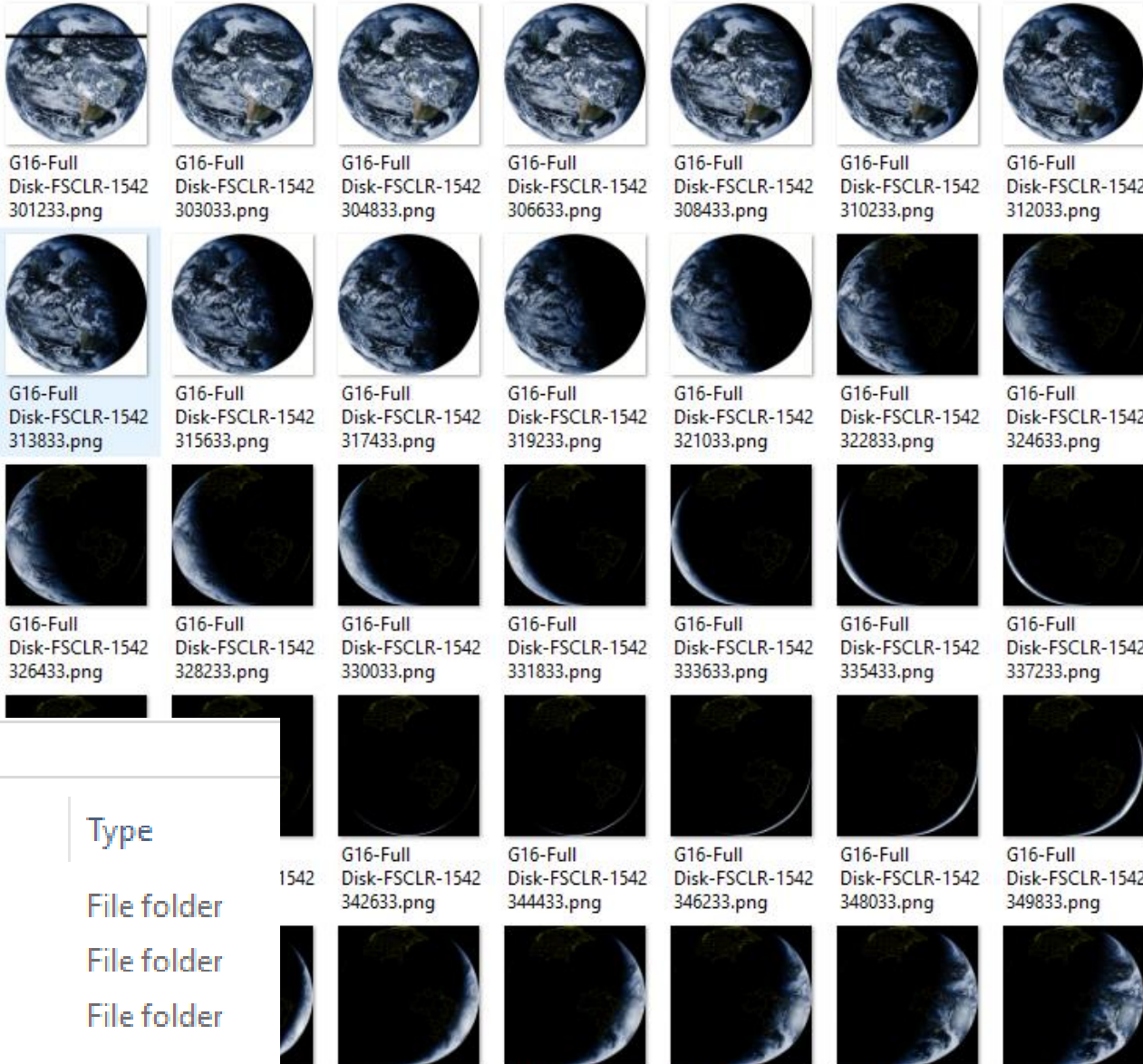
File Structure

Windows (C:) > RSP_XRIT

Name	Date modified	Type
 rsp_streamerx [1.0.6875.27322]	13-Nov-18 18:15	File folder
 xrit_decoder [1.4.6872.25153]	13-Nov-18 21:57	File folder
 xrit_file_manager [1.0.6887.14915]	16-Nov-18 18:00	File folder

Windows (C:) > RSP_XRIT > xrit_decoder [1.4.6872.25153] > output > Images > FM1

Search FM1



GEOS-16/17
HIRT Weather
Satellite
Receiver Project

Images

False Color

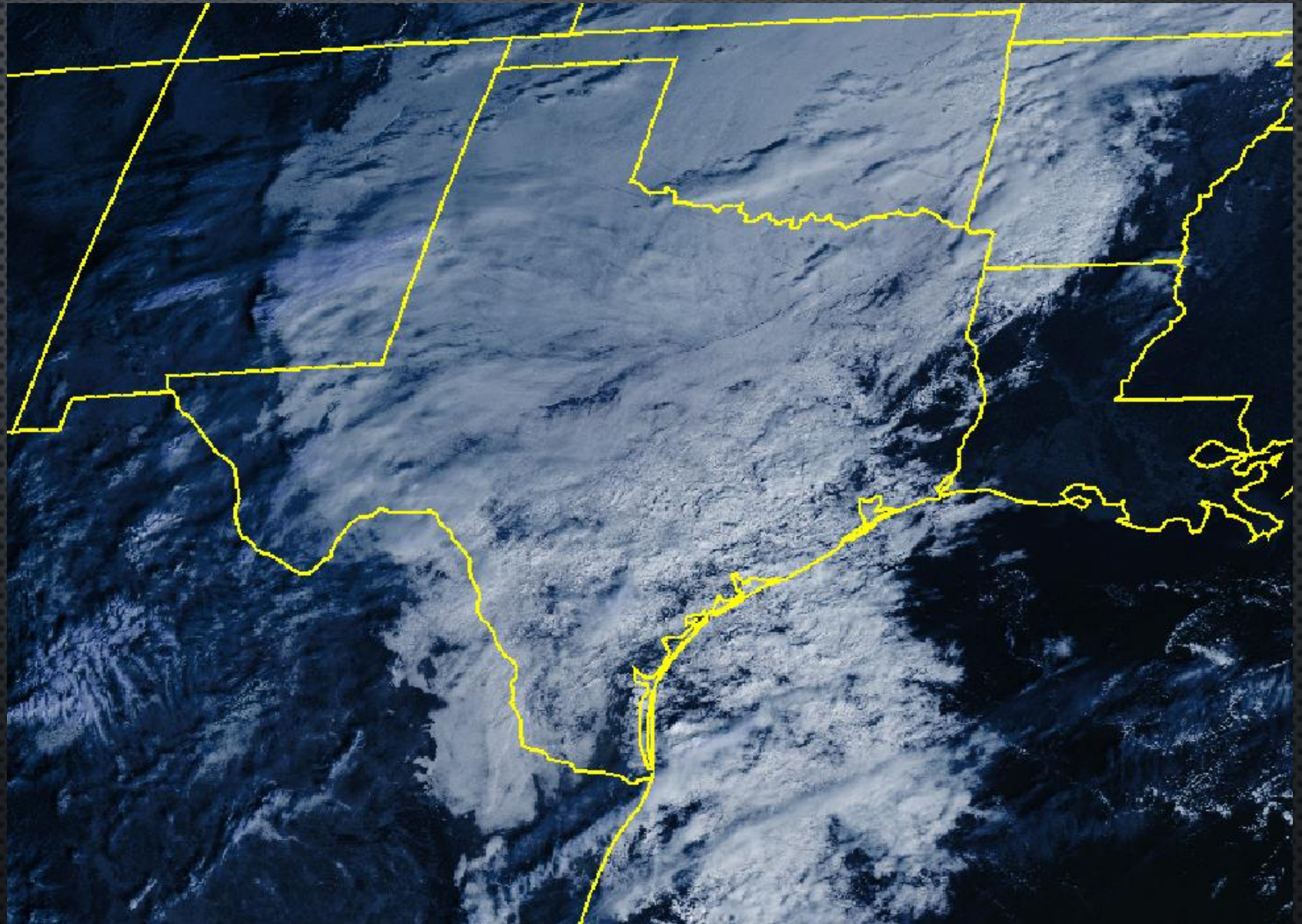
G16 (-75) - Full Disk - Channel 2



GEOS-16/17
HIRT Weather
Satellite
Receiver Project

Images

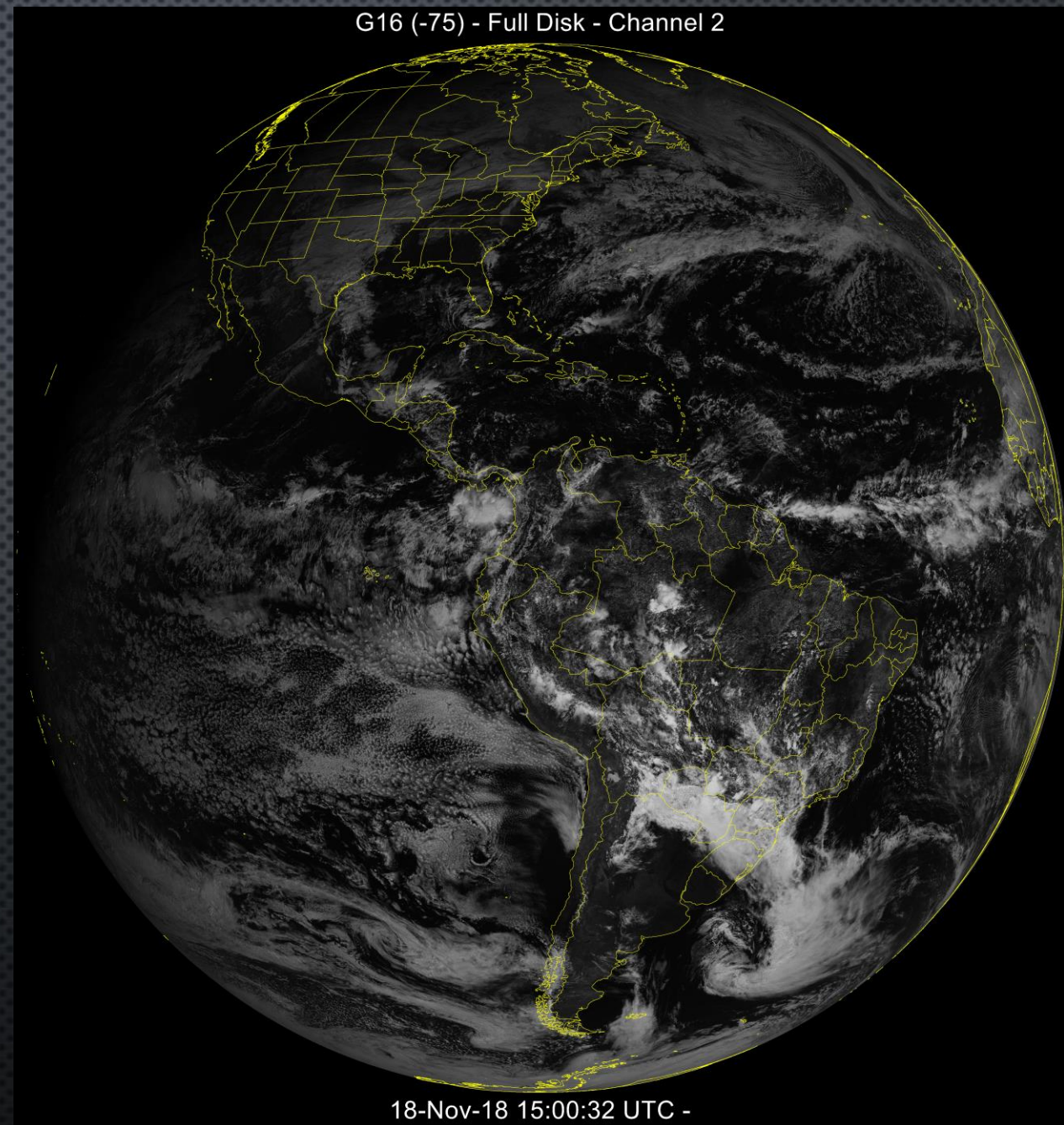
False Color
FEMA Region 6



GEOS-16/17 HIRT Weather Satellite Receiver Project

Images

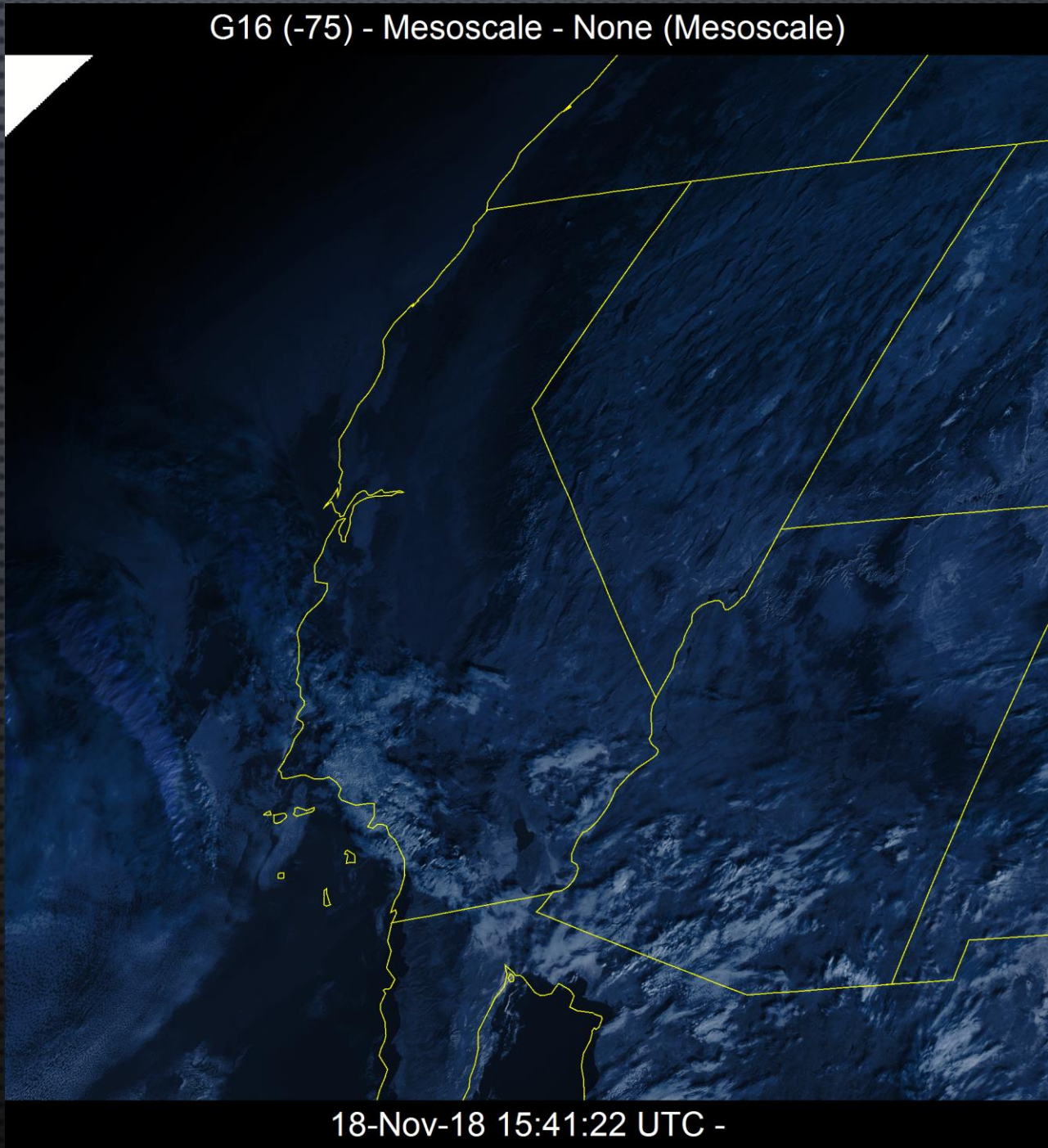
VIS 0.64 Micron
(RED)



GEOS-16/17 HIRT Weather Satellite Receiver Project

Images

Meso Scale
False Color



GEOS-16/17 HIRT Weather Satellite Receiver Project

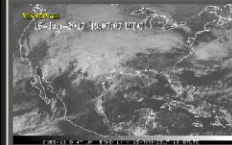
Images

Product Description Guide

GOES_16_Guides_FINALBIS.pdf

GOES-16 Band Reference Guide

Patrick.Ayd@noaa.gov



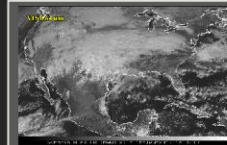
ABI Band #1

0.47 microns

Visible ("Blue Band")

Primary Uses:

- Monitoring aerosols (smoke, haze, dust)
- Air quality monitoring through measurements of aerosol optical depth



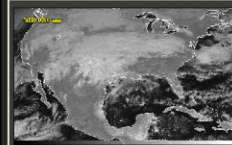
ABI Band #2

0.64 microns

Visible ("Red Band")

Primary Uses:

- Daytime monitoring of clouds (0.5-km spatial resolution)
- Volcanic ash monitoring



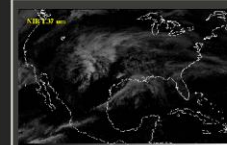
ABI Band #3

0.86 microns

Near-IR ("Veggie Band")

Primary Uses:

- High contrast between water and land
- Assess land characteristics including flooding impacts, burn scars, and hail swath damage



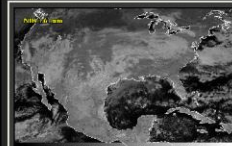
ABI Band #4

1.37 microns

Near-IR ("Cirrus Band")

Primary Uses:

- Thin cirrus detection during the day as the lower troposphere is not routinely sensed
- Volcanic ash monitoring



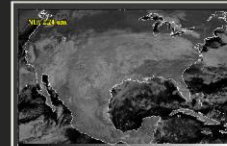
ABI Band #5

1.6 microns

Near-IR ("Snow/Ice Band")

Primary Uses:

- Daytime snow, ice, and cloud discrimination (Snow/Ice dark compared to liquid water clouds)
- Input to "Snow/Ice vs. Cloud" RGB



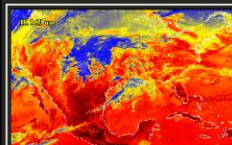
ABI Band #6

2.24 microns

Near-IR ("Cloud Particle Size Band")

Primary Uses:

- Cloud particle size, snow, and cloud phase
- Hot spot detection at emission temperatures of greater than 600K



ABI Band #7

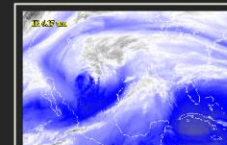
3.9 microns

IR ("Shortwave Window Band")

Contains daytime solar reflectance component

Primary Uses:

- Low stratus and fog (especially when differenced with the 11.2-micron IR channel taking advantage of emissivity differences)
- Fire/hot spot detection and volcanic ash



ABI Band #8

6.2 microns

IR ("Upper-Troposphere WV")

In a standard US atmosphere the weighting function peaks around 340 mb. **NOTE: The sensed radiation is from a layer, not just the peak pressure level which itself varies from the standard value

Primary Uses:

- Upper-level feature detection (jet stream, waves, etc.)

GEOS-16/17 HIRT Weather Satellite Receiver Project

Thanks

The image displays two overlapping web browser windows. The top window is the USA-Satcom website, featuring a dark header with the text "USA-Satcom" and the tagline "Monitoring worldwide communications on HF through Microwaves...". Below the header is a large photograph of several large satellite dish antennas in a desert landscape. The bottom window is a Groups.io forum page for the "xrit@groups.io" group. It shows a list of topics, including "Archive operation", "Counties & States Borders", and "New file uploaded to xrit@groups.io". The forum posts include details about a user reporting an issue with the "archive" operation, a message of appreciation for Darryl Zimmer, and a notification about a new file upload.

USA-Satcom
Monitoring worldwide communications on HF through Microwaves...

Home UHF Satcom Waveforms Equipment Antennas Pro

Groups.io Your Groups Find or Create a Group Help Rodney warner

Home Subscription Messages Hashtags New Topic New Poll Chats Directory

xrit@groups.io / Topics

Topics Search

Date 1 - 15 of 15

Archive operation 2
All There is one user that is reporting an issue with the "archive" operation. As many of your know at your local midnight time the file_manager, if enabled to do so, will move image...
By Trango · 10:00am

Counties & States Borders
Bravo Joe !!! You are AWESOME !!! Please do keep up the Outstanding work !!! Darryl Zimmer
By Darryl Zimmer · Nov 17

New file uploaded to xrit@groups.io 2
Hello, This email message is a notification to let you know that a file has been uploaded to the Files area of the xrit@groups.io group. File: xrit_file_manager [1.0.6895.26198].zip U...
By xrit@groups.io Notification · Nov 17

GEOS-16/17 HIRT Weather Satellite Receiver Project

Questions?

MARS Members Contact:

Rodney Warner

rhwarner@me.com

512-496-4301