National Environmental Satellite, Data, and Information Service

AND ATMOSA

NOAA

STRATION

Last Updated: 08/01/2022

DCS Data on GEONETCast Americas (GNC-A)

Version 080122

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Training Outline

- DCS Data on GEONETCast Americas
 - GOES DCS System w/ GNC-A
 - Latency Test Results
- Overview of GEONETCast Americas
 - NESDIS Satellite Rebroadcasts
 - Broadcast Community
 - Broadcast Characteristics
 - GNC-A User Receive Systems
 - Ground Architecture
 - GNC-A Product Groups
 - SHOWCast Visualization Software

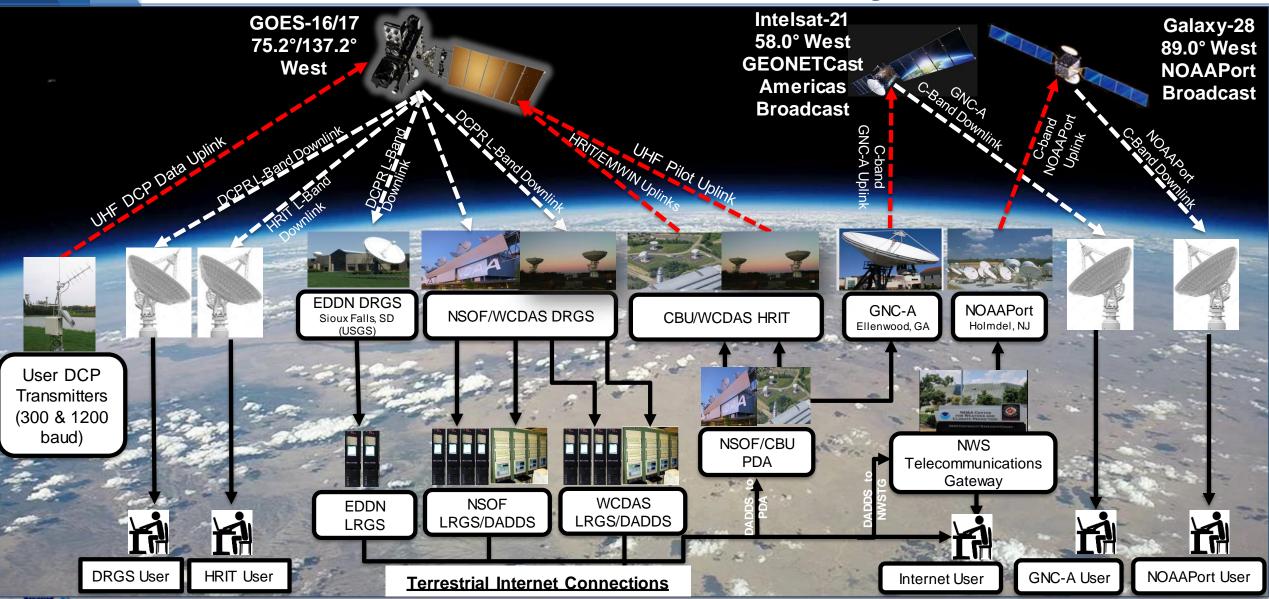


GOES DCS to GNC-A

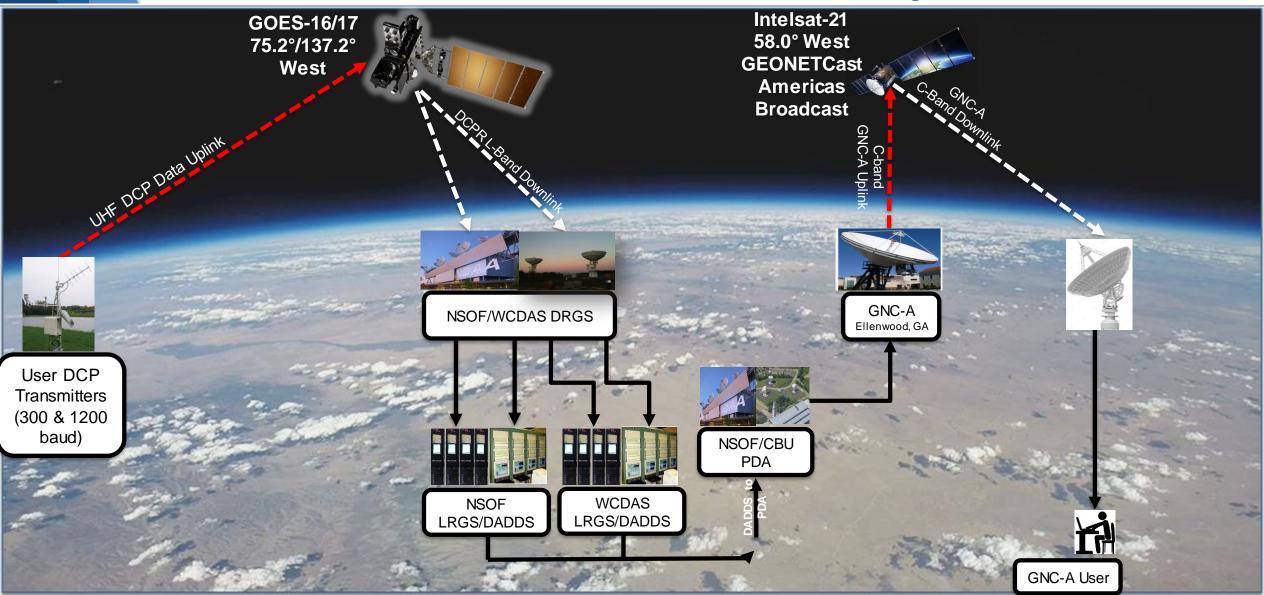
- NESDIS started to disseminate DCS data over GNC-A
 - <u>Started on June 1st, 2022</u>
 - <u>This is a secondary DCS source of data for users, primary DCS</u> recommendations are still DRGS and HRIT/EMWIN for high reliable data retrieval
 - Data will be available on the "GOES-R-DCS" labeled channel and given a high priority of broadcast distribution
 - 8KB sized .dcs files, same frequency of distribution and format provided to PDA
 - Format is unchanged over the broadcast
 - HRIT format specifications can be found on any one the DCS servers under the "System Information" hyperlink.



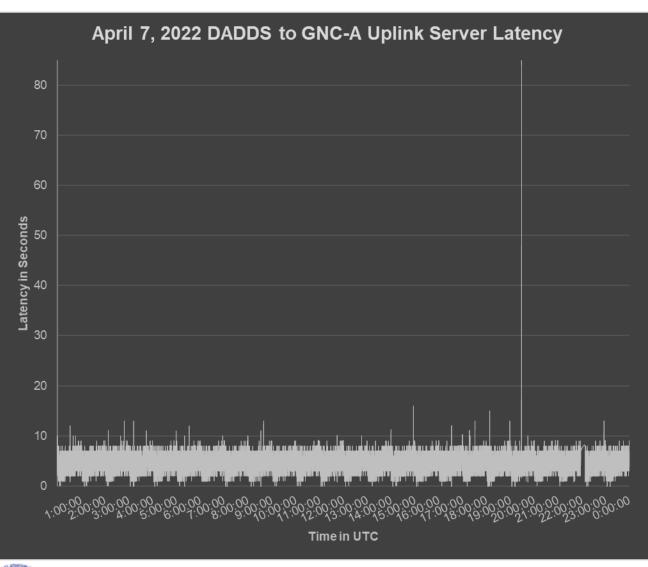
GOES Data Collection System



GOES DCS to GNC-A Datapath



DCS on GNC-A Latency 24-Hour Test



GNC-A Data Latency on 4/7/2022

Average DADDS to GNC-A Uplink Server	4.457113
Average GNC-A Uplink Server to User	1.702794
Average DADDS to GNC-A User	6.159907
Maximum DADDS to GNC-A User	85
Files Received over 24-Hours	19517

HRIT/EMWIN Data Latency on 4/7/22

Average DADDS to HRIT Queue	4.422864
Average HRIT Queue to HRIT User	4.529072
Average DADDS to HRIT User	8.951736
Max DADDS to HRIT User	90.033
Files Received over 24-Hours	19517

- There was a 24-hour test ran on April 7th, 2022 where latency statistics were gathered for both broadcasts. GNC-A's broadcast made DCS data a higher priority, but not less than ISCS Warnings and GOES GLM data.
- No issues observed during transmission, only select sites received the DCS data.
- Note data collection platform transmission and DADDS file data aggregation times not included in analysis



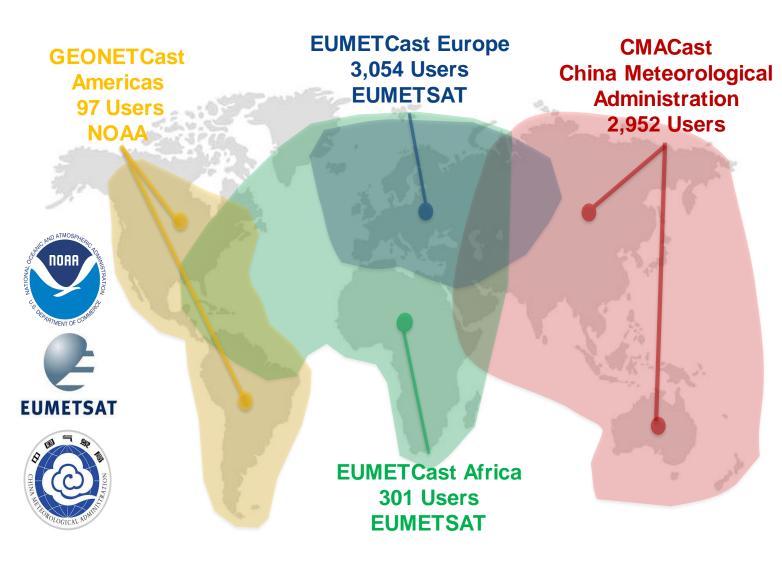
NESDIS Satellite Broadcast Data Access Overview

Acronym	System Name	Description	Satellite & Location
GRB	GOES Rebroadcast	The primary relay of full resolution, calibrated, near-real-time broadcast of GOES-R for Level 1b data products (Advanced Baseline Imager L1b, Space Weather L1b, and Geostationary Lightning Mapper L2). This data is available to all users with GRB receivers in view of a GOES-R series satellite at the East or West operational footprints.	GOES-16 @ 75.2° W GOES-17 @ 137.2°W
HRIT/ EMWIN	High Rate Information Transmission/ Emergency Managers Weather Information Network	The HRIT/EMWIN service is a high data rate (400 Kbps) broadcast for GOES-R satellite imagery and selected products to remotely-located user terminals. Combines LRIT and the EMWIN direct broadcast service that provides users with weather forecasts, warnings, graphics and other information directly from the NWS in near real-time. Also included is a copy of GOES-DCS.	GOES-16 @ 75.2° W GOES-17 @ 137.2°W
DCS	Data Collection System	Remote data collection platforms (DCP) within the footprint of the NOAA geostationary East and West satellites that collect vast array of environmental observational data (river, tidal, seismic, meteorological, etc) are transmitted to the GOES satellites and broadcasted down to users for processing, visualization and decision making.	GOES-16 @ 75.2° W GOES-17 @ 137.2°W
GNC-A	GEONETCast Americas	GEONETCast Americas is the Western Hemisphere component of GEONETCast, a near real time, global network of satellite-based data dissemination systems designed to distribute space-based, air-borne and in situ data, metadata and products to diverse communities. This is a NOAA funded, NESDIS managed commercial rebroadcast service.	Intelsat-21 @ 58°W
JPSS HRD	High Rate Data	The HRD direct broadcast is a continuous real-time downlink of JPSS mission environmental data to users on the ground that are equipped with the ground resources necessary to capture the broadcast when the polar orbiting satellite is within view. HRD data content is a full set of science and calibration data from the mission instruments, as well as the spacecraft attitude and ephemeris data necessary for data product generation.	S-NPP and NOAA-20 polar orbiting satellites



GEONETCast Global Network

- GEONETCast is a global network of sustained and cost-effective satellite-based dissemination systems based on collaboration between China (CMA), EUMETSAT and the US (NOAA), but open to all other. It delivers Earth observation (EO) data and products to and from GEO community activities, initiatives and flagships on a routine basis.
- GEONETCast Americas (GNC-A) is the
 Western Hemisphere component of
 GEONETCast. Which is a near real time,
 global network of satellite-based data
 dissemination system designed to distribute
 space-based, air-borne and in situ data,
 metadata and products to diverse communities.
 Contribution of data is via various data
 providers both internal and external to NOAA.
- GNC-A is a NOAA funded commercial rebroadcast via geostationary satellite Intelsat-21 located @ 58° West





GNC-A Community Map

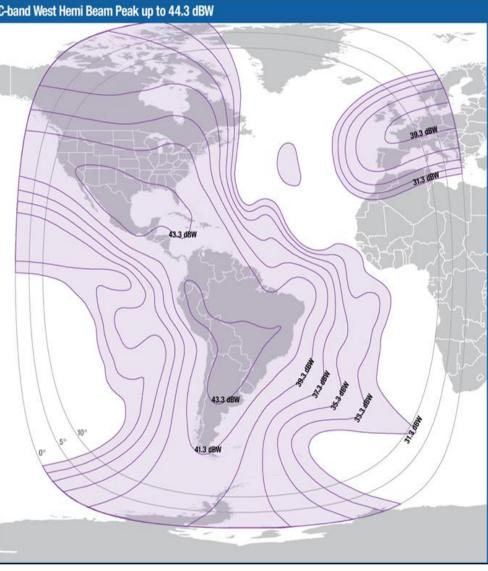


(7) GNC-A stations planned to be installed in 2022:

-Antigua & Barbuda -Barbados -Dominica -Grenada -St. Kitts & Nevis (installed) -Saint Vincent and The Grenadines -University of La Punta – Argentina -Martinique (MeteoFrance) -Canada (CMC) -Puerto Rico, (UPRM) installed

GNC-A Broadcast Characteristics

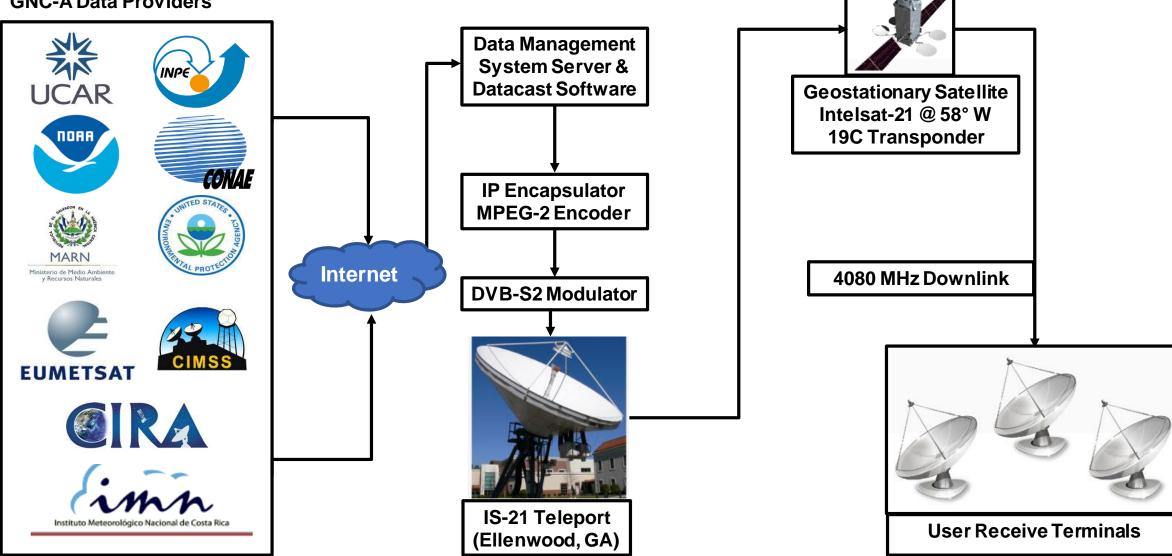
GEONETCast Americas Broadcast Parameter	Parameter Value	CH
Satellite	IS-21 (Intelsat)	
Location	58 ° West or 302° East	
PID	4201	
Transponder	19C (DVB-S2)	
Radio Frequency Band	C-band	
Frequency	4080 MHz	
Frequency Range	3700 – 4200 MHz	
Symbol Rate:	30.00 Msym	
Polarization	Linear – Vertical	
Effective Isotropic Radiated Power Coverage	> 31.3 dBW	
Datacasting Client Software (Required)	Kencast FAZZT Professional Client	
Forward Error Correction – Kencast FAZZT	5/6	
Peak G/T (antenna gain-to-noise-temperature)	Up to 2.5 dB/K	





GNC-A Architecture

GNC-A Data Providers

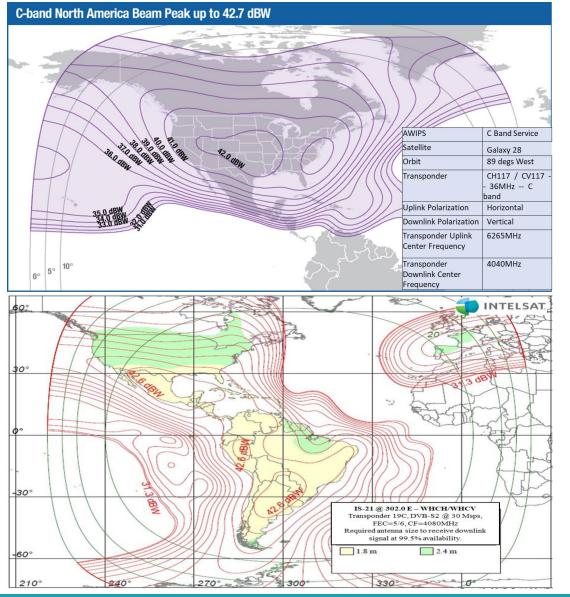




NOAA National Environmental Satellite, Data, and Information Service

Why DCS on GEONETCast?

- Available bandwidth for DCS data distribution
- It's broadcast bandwidth is scalable, allowing for more products if needed
- GNC-A's area coverage is much larger than NOAAPort's N. American C-band beam coverage. This gives users outside of NOAAPort the ability to capture DCS data
- A portion of the GNC-A community is also DCS data users
- C-band receive hardware more readily available and less expensive than L-band.
- Both CMACast and EUMETCast
 contain DCS data from their regions



What's Needed to Obtain GEONETCast

- Users will need the following hardware to obtain GNC-A:
- Antenna 1.8 2.4m,
- Low Noise Block (LNB)
- DVB-S2 compatible receiver
- Kencast FAZZT software
- CPU workstation for receiving and processing the data



For more details, please visit the GNC-A blog at the following URL: <u>https://geonetcast.wordpress.com/where-to-buy-gnc-a-equipment/</u>



Kencast FAZZT Software

- GNC-A's satellite uplink uses Kencast datacasting client requiring all users to purchase Kencast FAZZT software in order to receive/ingest GNC-A's data content
- One time fee for license (~\$600)
- Data formats are unchanged over the broadcast
- Data is separated via channels where users can "subscribe or unsubscribe" from the various channels
- Provides NOAA the ability to provide products to select Kencast ID's users

Channel 🔺	Type	
	IP Receive (Multicast)	Edit Delete Reload Disable
O 315. Main	IP Receive (Multicast)	Edit Delete Reload Disable
O □ <u>316. NOAA-NESDIS</u>	IP Receive (Multicast)	Edit Delete Reload Disable
O □ <u>317. IMN-CostaRica</u>	IP Receive (Multicast)	Edit Delete Reload Disable
O ≡ <u>318. KnightSky</u>	IP Receive (Multicast)	Edit Delete Reload Disable
O	IP Receive (Multicast)	Edit Delete Reload Disable
O	IP Receive (Multicast)	Edit Delete Reload Disable
O ■ <u>321. GOES-R-CMI-Imagery</u>	IP Receive (Multicast)	Edit Delete Reload Disable
■ <u>322. JPSS/PRODUCTS/AF</u>	IP Receive (Multicast)	Edit Delete Reload Disable
O	IP Receive (Multicast)	Edit Delete Reload Disable
O 324. GOES-R-Level-2-Products/ACHAF	IP Receive (Multicast)	Edit Delete Reload Disable
O ■ <u>325. GOES-R-Level-2-Products/AODF</u>	IP Receive (Multicast)	Edit Delete Reload Disable
● <u>326. GOES-R-Level-2-Products/VAAF</u>	IP Receive (Multicast)	Edit Delete Reload Disable
O 327. GOES-R-Level-2-Products/DSIF	IP Receive (Multicast)	Edit Delete Reload Disable
O ■ <u>328. GOES-R-Level-2-Products/FDCF</u>	IP Receive (Multicast)	Edit Delete Reload Disable
O ■ <u>329. GOES-R-Level-2-Products/DMWF-C08</u>	IP Receive (Multicast)	Edit Delete Reload Disable
● <u>330. JPSS/PRODUCTS/G-SEAICE</u>	IP Receive (Multicast)	Edit Delete Reload Disable
O ■ <u>331. JPSS/PRODUCTS/OC</u>	IP Receive (Multicast)	Edit Delete Reload Disable
O ■ <u>332. GOES-S-Level-2-Products/DMWF-C14</u>	IP Receive (Multicast)	Edit Delete Reload Disable
● <u>333. GOES-S-Level-2-Products/DMWF-C07</u>	IP Receive (Multicast)	Edit Delete Reload Disable
● ■ <u>334. GOES-S-Level-2-Products/DMWF-C02</u>	IP Receive (Multicast)	Edit Delete Reload Disable
● <u>335. EUMETSAT</u>	IP Receive (Multicast)	Edit Delete Reload Disable
O ■ <u>336. JPSS/PRODUCTS/G-PRECIPITATION</u>	IP Receive (Multicast)	Edit Delete Reload Disable
● ■ <u>337. JPSS/PRODUCTS</u>	IP Receive (Multicast)	Edit Delete Reload Disable
● <u>338. ISCS-WARN</u>	IP Receive (Multicast)	Edit Delete Reload Disable
● <u>339. ISCS-GRIB2</u>	IP Receive (Multicast)	Edit Delete Reload Disable
● ■ <u>340. GOES-R-Level-2-Products/DMWF-C07</u>	IP Receive (Multicast)	Edit Delete Reload Disable
● 341. GOES-R-Level-2-Products/DMWF-C09	IP Receive (Multicast)	Edit Delete Reload Disable
● 342. GOES-S-CMI-Imagery/Band09	IP Receive (Multicast)	Edit Delete Reload Disable
● 343. GOES-S-Level-2-Products/DMWF-C10	IP Receive (Multicast)	Edit Delete Reload Disable
● 344. GOES-S-Level-2-Products/TPWF	IP Receive (Multicast)	Edit Delete Reload Disable
● Image: 345. Training	IP Receive (Multicast)	Edit Delete Reload Disable
O	IP Receive (Multicast)	Edit Delete Reload Disable
O	IP Receive (Multicast)	Edit Delete Reload Disable
● <u>348. ISCS-SAT</u>	IP Receive (Multicast)	Edit Delete Reload Disable
	IP Receive (Multicast)	Edit Delete Reload Disable



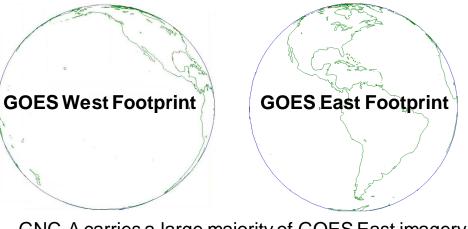
GNC-A GOES-R Level II Products

GOES-16 ABI Cloud Moisture Imagery Full Disk Scan Start Time Availabilities						
Band 1	:00	:10	Χ	:30	:40	X
Band 2	:00	:10	:20	:30	:40	:50
Band 3	:00	:10	Χ	:30	:40	X
Band 4	:00	:10	Χ	:30	:40	X
Band 5	:00	:10	Χ	:30	<mark>:40</mark>	X
Band 6	:00	:10	Χ	:30	<mark>:40</mark>	X
Band 7	:00	:10	:20	:30	<mark>:40</mark>	:50
Band 8	:00	:10	:20	:30	:40	:50
Band 9	:00	:10	:20	:30	:40	:50
Band 10	:00	:10	:20	:30	:40	:50
Band 11	:00	:10	Χ	:30	<mark>:40</mark>	X
Band 12	:00	:10	Χ	:30	:40	X
Band 13	:00	:10	:20	:30	:40	:50
Band 14	:00	:10	:20	:30	:40	:50
Band 15	:00	:10	:20	:30	:40	:50
Band 16	:00	:10	Χ	:30	<mark>:40</mark>	X

GOES-16 ABI Level II Derived Imagery Full Disk Data Time Availabilities					
Aerosol Detection	:00 :10 X :30 :40	Х			
Aerosol Optical Depth	:00 :10 X :30 :40	Х			
Clear Sky Masks	:00 :10 X :30 :40	Х			
Cloud Optical Depth	:00 :10 X :30 :40	Х			
Cloud Particle Size	:00 :10 X :30 :40	Х			
Cloud Top Height	:00 :10 X :30 :40	Х			
Cloud Top Pressure	:00 :10 X :30 :40	Х			
Cloud Top Temperature	:00 :10 X :30 :40	Х			
Derived Winds	:00				
Derived Stability Indices	:00 :10 X :30 :40	Х			
Downward Shortwave Radiation	:00				
Geostationary Lightning Mapper	Continuous ~20 seconds				
Fire/Hotspot Detection	:00 :10 :20 :30 :40 :	:50			
Land Surface Temperature	:00				
Reflective Shortwave Radiation	:00				
Rainfall Rate/QPE	:00 :10 :20 :30 :40 :	:50			
Sea Surface Temperature	:00				
Snow Cover	:00 :10 X :30 :40	Х			
Total Precipitable Water	:00 :10 :20 :30 :40 :	:50			

Legend		GOES-17 ABI Cloud Moisture Imagery Full Disk Scan Start Time Availabilities						•
	Product Unavailable	Band 2	X	X	X	X	X	:50
:00	Product Available	Band 9	X	X	Χ	X	Χ	:50
	Hourly Product	Band 13	X	X	X	X	X	:50

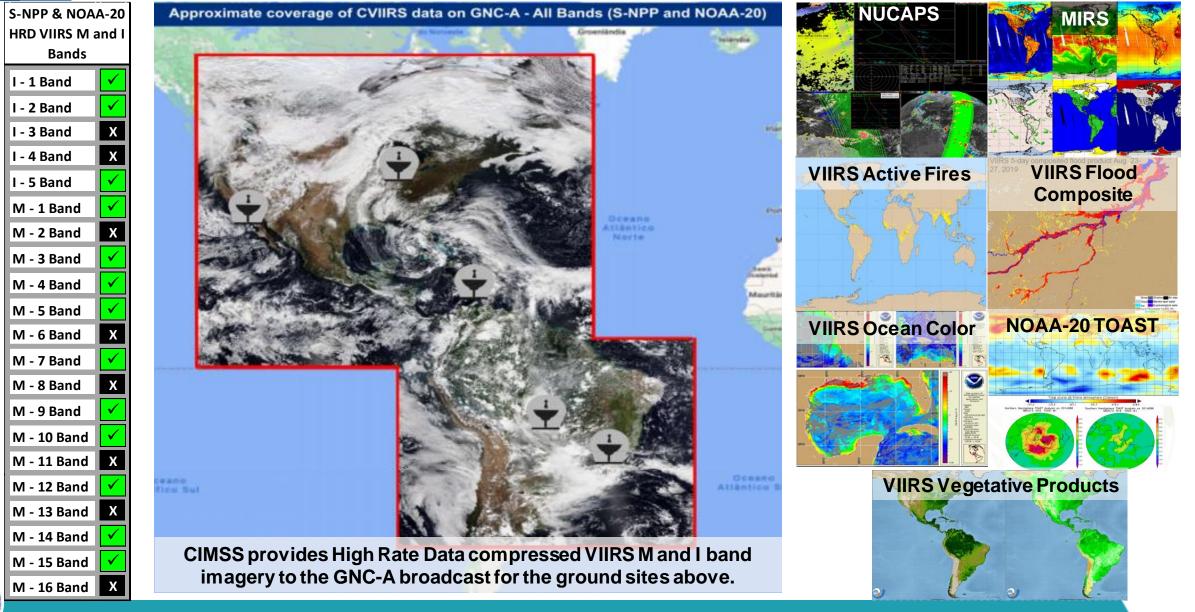
GOES West bands 2, 9 and 13 and the equivalent MSG-4 bands are available once an hour for satellite mosaics and GOES-16 ABI imagery contingencies



GNC-A carries a large majority of GOES East imagery due to the fact of GOES West's footprint does not cover a majority of South America and Caribbean.

For more product detail please visit: https://geonetcast.wordpress.com/gnc-a-product-catalog/

GNC-A JPSS Products



NOAA National Environmental Satellite, Data, and Information Service

National Weather Service ISCS Data

- → **ISCS Surface** METARS and other surface observations
- \rightarrow ISCS Forecast Forecast summaries/TAF's
- → ISCS Warning Watches/Warnings/Advisories
- \rightarrow **ISCS Climate –** Weather summaries & climate
- → **ISCS BUFR** BUFR atmospheric/oceanic products
- \rightarrow ISCS RADAR Radar PNG/GIF products
- \rightarrow ISCS Upper Air Upper Air products
- \rightarrow ISCS GRIB GRIB GFS forecast products
- \rightarrow **ISCS SAT –** Multiple graphic format products
- \rightarrow ISCS PIC Multiple graphic format products



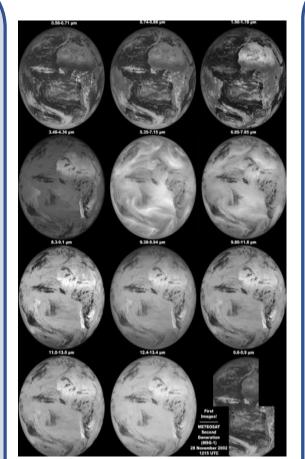
Example of surface METAR's captured and their location on GNC-A broadcast



For more product detail please visit: https://www.weather.gov/iscs/baseline

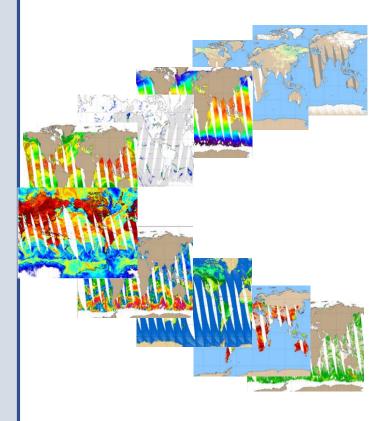
EUMETSAT & JAXA Products

- Active Fire Monitoring
- Atmospheric Motion Vectors
- Cloud Mask
- Cloud Top Height
- Global Instability Index
- Accumulated Precipitation
- METOP/NOAA-19 ATOVS Sounder Products
- ASCAT Coastal Winds 12.5km
- ASCAT Coastal Winds 25km
- Medium/Low Resolution METOP Sea Ice Drift
- Medium/Low Resolution METOP Sea Ice Concentration
- Global Sea Ice Emissivity
- METOP SST IASI
- METEOSAT 0° SST



3-Hourly Seviri Data from MSG4

- AMSR2 Brightness Temps
- Precipitation (Rain Rate, Convective and Probability)
- Soil Moisture
- Land Cover Type
- Snow Cover, Depth, Water Equivalent
- Ocean Products (SST, Ocean Wind speed, Ocean TPW and Ocean Cloud Liquid Water)
- Artic Sea Ice
 Concentration

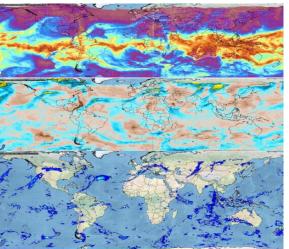


GCOM-W1 Orbital Data



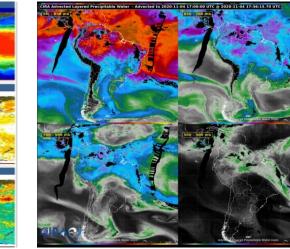
Multiple Satellite Blended GNC-A Products

Blended TPW, TPW Anomaly and Rain Rate



Blended SST, 7-Day SST Average and SST Anomaly CIRA Advected Layered Precipitable Water

Monitoring of Vegetative Fires





For more product detail please visit: https://geonetcast.wordpress.com/gnc-a-product-catalog/

Open Source Visualization Software



- SHOWCast stands for Simple HTML Operational Wrapper for GEONETCast Americas.
 - First introduced by INPE in 2019 as an open-source GNC-A data visualization tool
- Current version is 2.5.1
 - Capable of displaying 150+ different products
 - Users can supplement terrestrial data sources in lieu of satellite data as an alternative
- INPE introduced a new installation manual in 2021 that provides guidance to users on installation of SHOWCast software
- Users can visit the INPE GNC-A blog at the following URL: <u>https://geonetcast.wordpress.com/</u>
- *Note* DCS data visualization is not available via SHOWCast.

GNC-A User Group



- Four user group webinars occur quarterly similar to HRIT, GRB and HRD user group meetings
- Items that are covered are:
 - NESDIS satellite updates
 - GNC-A Programmatic updates
 - GNC-A Product updates
 - SHOWCast version updates/training
 - Future training events
 - Specific GNC-A product application training
 - User case studies



NOAA National Environmental Satellite, Data, and Information Service

👔 🌍 🥥 GEONETCast

Points of Contact

https://noaasis.noaa.gov/ORGANIZATION/contacts.html

Office of Satellite and Product Operations

 24/7 Help Desk: <u>ESPCOperations@noaa.gov</u> Data Access: <u>NESDIS.Data.Access@noaa.gov</u> Website: <u>https://www.ospo.noaa.gov/Organization/</u> <u>About/access.html</u>

Satellite Products and Services Division (SPSD) User Services

• SPSD Services: <u>SPSD.UserServices@noaa.gov</u>

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Branch Chief: Mark Turner

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• Email: <u>Mark.W.Turner@noaa.gov</u>

GEONETCast Americas (GNC): Vacant

• Email: <u>Mark.W.Turner@noaa.govor</u> <u>gnc.americas@noaa.gov</u>

HRIT/EMWIN Broadcast: lan Avruch

• Email: <u>lan.Avruch@noaa.gov</u>(HRIT) or <u>Bob.Gillespie@noaa.gov</u>(EMWIN)

Argos Data Collection System: Scott Rogerson

Email: <u>Scott.Rogerson@noaa.gov</u>

GOES Data Collection System: William Dronen

• Email: <u>William.Dronen@noaa.gov</u>or <u>dcs@noaa.gov</u>

