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
NESDIS started to disseminate DCS data over GNC-A

- **Started on June 1st, 2022**
- This is a secondary DCS source of data for users, primary DCS 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 DCS to GNC-A Datapath

User DCP Transmitters
(300 & 1200 baud)

GOES-16/17
75.2°/137.2° West

Intelsat-21
58.0° West
GEONETCast Americas Broadcast

NSOF/WCDAS DRGS

NSOF/CBU PDA

WCDAS LRGs/DADDS

NSOF LRGs/DADDS

GNC-A Ellerwood, GA

GNC-A User

NOAA National Environmental Satellite, Data, and Information Service
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.
<table>
<thead>
<tr>
<th>Acronym</th>
<th>System Name</th>
<th>Description</th>
<th>Satellite &amp; Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRB</td>
<td>GOES Rebroadcast</td>
<td>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.</td>
<td>GOES-16 @ 75.2° W&lt;br&gt;GOES-17 @ 137.2° W</td>
</tr>
<tr>
<td>HRIT/EMWIN</td>
<td>High Rate Information Transmission/ Emergency Managers Weather Information Network</td>
<td>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.</td>
<td>GOES-16 @ 75.2° W&lt;br&gt;GOES-17 @ 137.2° W</td>
</tr>
<tr>
<td>DCS</td>
<td>Data Collection System</td>
<td>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.</td>
<td>GOES-16 @ 75.2° W&lt;br&gt;GOES-17 @ 137.2° W</td>
</tr>
<tr>
<td>GNC-A</td>
<td>GEONETCast Americas</td>
<td>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.</td>
<td>Intelsat-21 @ 58° W</td>
</tr>
<tr>
<td>JPSS HRD</td>
<td>High Rate Data</td>
<td>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.</td>
<td>S-NPP and NOAA-20 polar orbiting satellites</td>
</tr>
</tbody>
</table>
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
(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

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

GNC-A Data Providers

Data Management System Server & Datacast Software

IP Encapsulator MPEG-2 Encoder

DVB-S2 Modulator

IS-21 Teleport (Ellenwood, GA)

Geostationary Satellite Intelsat-21 @ 58° W 19C Transponder

4080 MHz Downlink

User Receive Terminals

Internet

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
  • Kenecast FAZZT software
  • CPU workstation for receiving and processing the data

For more details, please visit the GNC-A blog at the following URL:
https://geonetcast.wordpress.com/where-to-buy-gnc-a-equipment/
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
### GNC-A GOES-R Level II Products

#### GOES-16 ABI Cloud Moisture Imagery Full Disk Scan Start Time Availabilities

<table>
<thead>
<tr>
<th>Band</th>
<th>Start Time Availabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Band 1</td>
<td>:00 :10 X :30 :40 X</td>
</tr>
<tr>
<td>Band 2</td>
<td>:00 :10 :20 :30 :40 :50</td>
</tr>
<tr>
<td>Band 3</td>
<td>:00 :10 X :30 :40 X</td>
</tr>
<tr>
<td>Band 4</td>
<td>:00 :10 X :30 :40 X</td>
</tr>
<tr>
<td>Band 5</td>
<td>:00 :10 X :30 :40 X</td>
</tr>
<tr>
<td>Band 6</td>
<td>:00 :10 X :30 :40 X</td>
</tr>
<tr>
<td>Band 7</td>
<td>:00 :10 :20 :30 :40 :50</td>
</tr>
<tr>
<td>Band 8</td>
<td>:00 :10 :20 :30 :40 :50</td>
</tr>
<tr>
<td>Band 9</td>
<td>:00 :10 X :30 :40 X</td>
</tr>
<tr>
<td>Band 10</td>
<td>:00 :10 :20 :30 :40 :50</td>
</tr>
<tr>
<td>Band 11</td>
<td>:00 :10 X :30 :40 X</td>
</tr>
<tr>
<td>Band 12</td>
<td>:00 :10 X :30 :40 X</td>
</tr>
<tr>
<td>Band 13</td>
<td>:00 :10 :20 :30 :40 :50</td>
</tr>
<tr>
<td>Band 14</td>
<td>:00 :10 :20 :30 :40 :50</td>
</tr>
<tr>
<td>Band 15</td>
<td>:00 :10 :20 :30 :40 :50</td>
</tr>
<tr>
<td>Band 16</td>
<td>:00 :10 X :30 :40 X</td>
</tr>
</tbody>
</table>

#### GOES-16 ABI Level II Derived Imagery Full Disk Data Time Availabilities

<table>
<thead>
<tr>
<th>Product</th>
<th>Start Time Availabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerosol Detection</td>
<td>:00 :10 X :30 :40 X</td>
</tr>
<tr>
<td>Aerosol Optical Depth</td>
<td>:00 :10 X :30 :40 X</td>
</tr>
<tr>
<td>Clear Sky Masks</td>
<td>:00 :10 X :30 :40 X</td>
</tr>
<tr>
<td>Cloud Optical Depth</td>
<td>:00 :10 X :30 :40 X</td>
</tr>
<tr>
<td>Cloud Particle Size</td>
<td>:00 :10 X :30 :40 X</td>
</tr>
<tr>
<td>Cloud Top Height</td>
<td>:00 :10 X :30 :40 X</td>
</tr>
<tr>
<td>Cloud Top Pressure</td>
<td>:00 :10 X :30 :40 X</td>
</tr>
<tr>
<td>Cloud Top Temperature</td>
<td>:00 :10 X :30 :40 X</td>
</tr>
<tr>
<td>Derived Winds</td>
<td>:00 :10 X :30 :40 X</td>
</tr>
<tr>
<td>Derived Stability Indices</td>
<td>:00 :10 X :30 :40 X</td>
</tr>
<tr>
<td>Downward Shortwave Radiation</td>
<td>:00 :10 X :30 :40 X</td>
</tr>
<tr>
<td>Geostationary Lightning Mapper</td>
<td>Continuous ~20 seconds</td>
</tr>
<tr>
<td>Fire/Hotspot Detection</td>
<td>:00 :10 :20 :30 :40 :50</td>
</tr>
<tr>
<td>Land Surface Temperature</td>
<td>:00 :10 :20 :30 :40 :50</td>
</tr>
<tr>
<td>Reflective Shortwave Radiation</td>
<td>:00 :10 :20 :30 :40 :50</td>
</tr>
<tr>
<td>Rainfall Rate/QPE</td>
<td>:00 :10 :20 :30 :40 :50</td>
</tr>
<tr>
<td>Sea Surface Temperature</td>
<td>:00 :10 X :30 :40 X</td>
</tr>
<tr>
<td>Snow Cover</td>
<td>:00 :10 X :30 :40 X</td>
</tr>
<tr>
<td>Total Precipitable Water</td>
<td>:00 :10 :20 :30 :40 :50</td>
</tr>
</tbody>
</table>

#### Legend

- **Product Unavailable**
- **Product Available**
- **Hourly Product**

**GOES West Footprint**

- 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.

**GOES East Footprint**

- 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/
CIMSS provides High Rate Data compressed VIIRS M and I band imagery to the GNC-A broadcast for the ground sites above.
→ ISCS Surface – METARS and other surface observations
→ ISCS Forecast – Forecast summaries/TAF’s
→ ISCS Warning – Watches/Warnings/Advisories
→ ISCS Climate – Weather summaries & climate
→ ISCS BUFR – BUFR atmospheric/oceanic products
→ ISCS RADAR – Radar PNG/GIF products
→ ISCS Upper Air – Upper Air products
→ ISCS GRIB – GRIB GFS forecast products
→ ISCS SAT – Multiple graphic format products
→ ISCS PIC - Multiple graphic format products

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: https://geonetcast.wordpress.com/
- *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
Points of Contact

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

Office of Satellite and Product Operations
• 24/7 Help Desk: ESPCOOperations@noaa.gov
  Data Access: NESDIS.Data.Access@noaa.gov
  Website: https://www.ospo.noaa.gov/Organization/About/access.html

Satellite Products and Services Division (SPSD)
User Services
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