



Transition from GOES Variable Format (GVAR) to GOES Rebroadcast (GRB) Data



Current situation:

The GOES I-N series (currently GOES 8-13) imager and sounder raw data downlink is 2.6 Mbps. The corresponding entire Level 1b data stream, 2.11 Mbps, is uplinked to the GOES I-N series satellite for broadcast as GOES Variable Format (GVAR) data. GVAR data is broadcast in L-band (1685.7 MHz), with binary phase shift keyed (BPSK) modulation.

Need for Change:

The GOES-R instrument raw data downlink (includes imager, sounder, lightning mapper, and two space environmental instrument suites) is expected to be approximately 70 Mbps. The corresponding entire Level 1b data stream may be in the order of 40 Mbps. The goal is to downlink the entire Level 1b data stream as GOES Rebroadcast (GRB) data. This data stream exceeds the bandwidth capacity of the current GVAR implementation.

Service	Current Frequency Spectrum	Current Data Rate	Future Frequency Spectrum	Future Data Rate
GVAR/GRB	1685.7 MHz	2.11 Mbps	1690.2 MHz	<40 Mbps
LRIT	1691 MHz	128 kbps	1696.4 MHz	256 kbps
EMWIN	1692.7 MHz	9.6 kbps	1695.7 MHz	56 kbps
DCS/DCPR	1694.5 MHz	100/300/1200 bps	1697.65 MHz	1.2 kbps

Figure 2 - Impact on Transmission Frequencies/Data Rates for GOES-R

filtered out of the data stream. In addition to the traditional direct broadcast mode, GRB is expected to be distributed via terrestrial networks to authorized users in a "push/pull" mode as the GFUL data service, so that some users with less stringent data continuity requirements can opt not to invest in new/updated Earth station receive systems. File sizes of all products are expected to be targeted for moderate line-rate web porting to support users with multi-megabit or Giga-bit connectivity.

A key feature in the GPO transition plan is the planned development of a GVAR-like processed data stream containing selected products from GOES-R ABI, but relayed through the existing GOES-N/P series spacecraft. This service will allow legacy GVAR users to transition more gradually to the new receive and processing systems required for GRB. However, operation of the GOES-R GVAR-like service is planned as a stop-gap measure and is not expected to continue indefinitely.

Finally, the GPO plans to develop a prototype GRB ground receive system as a proof of concept prototype. The design for this prototype is expected to be made available to the user community.

Note: The GRB transmission format has not been defined; however, the intent is to take advantage of standard formats and technologies. The GVAR data transmission format was developed to allow full use of the capabilities of the advanced, three-axis stabilized spacecraft while retaining as much commonality as possible with receiving equipment in use from earlier spin-stabilized GOES spacecraft. The GVAR format is based on the operational visible and infrared spin scan radiometer atmospheric sounder (VAS) mode AAA format, which consisted of a repeating sequence of 12 fixed-length equal size blocks. The transmission of these blocks was synchronized with the spin rate of the earlier GOES spacecraft, that is, one complete 12 block sequence per satellite rotation.

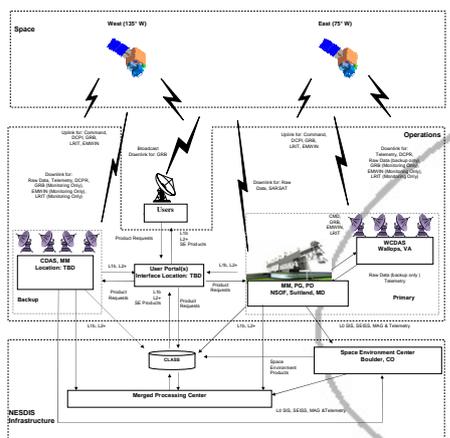


Figure 1 - Government Reference Architecture

The GOES-R Program Office Plan:

The GOES-R Program Office (GPO) has developed a Government Reference Architecture (see Figure 1) that provides a workable solution to the GOES-R GRB requirements. (The final design could be significantly different based on the results of the GOES-R Program Definition and Risk Reduction acquisition activity.) To minimize the impact on the user, the GRB is expected to continue to be transmitted in L-band, but use an expanded bandwidth (1682 MHz -1695 MHz). Emergency Managers Weather Information Network (EMWIN), Low Rate Information Transmission (LRIT) and Data Collection Platform Report (DCPR) will then be operated in the 1695 MHz to 1698 MHz range (see Figure 2). Understanding that the entire data downlink may not be of interest to every user, the GRB is expected to be formatted to allow data of interest to be

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