One-Way Antenna (OWA)

The General Dynamics SATCOM Technologies lightweight C100F is a multi-configurable motorized auto-acquire antenna designed for worldwide auto-acquisition transmit/ receive operation in X, Ku-band and Ka-band. This portable antenna consists of a segmented High Pressure Composite reflector and motorized positioner mount. It uses industry standard Ka-band and Ku-band feeds and Low Noise Block (LNB) amplifiers that can be easily and quickly changed in the field. The universal Ku-band LNB supports remote configuration and covers all three International Telecommunication Union (ITU) regions of the Ku-band with no physical change.

The various configurations result in a lightweight and packable antenna product with superior stiffness and high performance. The unique optical shape and accurate composite reflector surface provide superior sidelobe and excellent cross-polarization performance. The tripod pedestal and configurable tilt leg allow for a level deployment, even on slopes up to 30°. High performance and repeatability is maintained with precision registration of the nine-piece reflector segments and RF components. The antenna can be quickly assembled by one person in less than 15 minutes. The auto-acquire controller can find the correct satellite and optimize co-pol and crosspol performance with the push of a button. The antenna is configured and controlled using a Web based interface, accessible from the laptop in the RBM unclassified enclave. Using the intuitive graphical user interface, this allows an operator to quickly deploy or stow the antenna and, with only one button press, acquire a particular satellite defined in its configurable database. In addition, this software provides a spectrum analyzer that can be used to verify the signal characteristics without the need for additional, expensive test equipment.

Lightweight C100F Antenna
The C100F antenna system is a multi-configurable antenna that will fit a variety of applications/ deployment scenarios.

Global Broadcast Service (GBS) Transportable Ground Receive Suite (TGRS)
Delivering Converged Communications to the Tactical Edge

Benefits

Capable of processing two fully loaded 45 Msps broadcast carrier downlinks simultaneously

Receives and processes unclassified or classified (Type 1) data and video

Utilizes COTS Technology to Reduce Cost and Enable Remote Upgrades

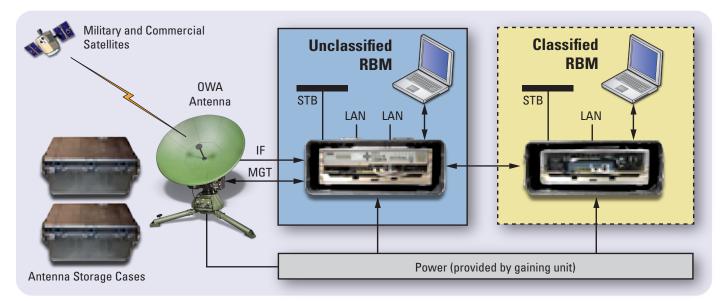Modular Design Facilitates Multiple Configuration Options

Overview

The Global Broadcast Service (GBS) Transportable Ground Receive Suite (TGRS) enables mobile users at the edge of the battlefield to receive mission-critical voice, data and video and process it for use by military decision makers and frontline troops. Made fully rugged and designed for rapid deployment anywhere in the world, GBS TGRS equipment provides users with high-speed, high-volume multimedia communications and information flow for forces on base in garrison, in transit, and in theater.

GENERAL DYNAMICS
C4 Systems

400 John Quincy Adams Rd. • Taunton, MA 02780-1069 • Tel 888 483 2472 • Fax 508 880 4388 • www.gdc4s.com
Email communication.networks@gdc4s.com

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RBM Type I and Type II case configurations

GBS Overview

GBS operates as a one-way, wideband transmission service capable of supporting timely delivery of classified and unclassified communications for mission support and theater information transfer. GBS leverages commercial satellite broadcast technology to deliver large imagery and data files that would overload typical tactical network capacity. GBS disseminates IP-based real-time video and large data files over-the-air to garrisoned and deployed combat forces using net-centric prioritized delivery based on unit mission reception priority profiles.

GBS provides relief to overburdened communications systems already in place and provides information to previously unsupportable users. GBS is designed to employ readily available commercial off-the-shelf (COTS) technologies that are inexpensive and integrated into existing systems and processes. GBS provides the DoD with an efficient, high data rate broadcast capability from distributed information sources to dispersed warfighters' who receive the broadcast directly on small, inexpensive user terminals.

GBS operates using Satellite Broadcast Manager (SBM) sites, Primary and Theater Injection Points (PIP/TIP), DoD Teleport Gateways, military and commercial satellites and one or more receive suites. The SBM is the primary broadcast content site through which information products are transmitted to the satellite via PIPs and Teleport Gateways and simultaneously received by multiple receive

suites saving valuable satellite bandwidth. Through use of the TIP, GBS is capable of injecting information directly from within a theater of operations under the theater commander's control.

The GBS TGRS Advantage

Each TGRS consists of a receive-only, One-Way Antenna (OWA) packaged in two transit cases and the Receive Broadcast Manager (RBM) packaged in two operational transit cases, one intended to serve as an unclassified enclave and one as the classified enclave.

The OWA is a very small aperture antenna compatible with multiple SATCOM systems – both DoD-developed and commercial. It receives broadcast information from Ka-band downlink signals from Ultra High Frequency Follow-On (UFO) or Wideband Global SATCOM (WGS) satellites, or from Ku-band carrier downlinks from compatible commercial SATCOM systems.

The RBM, which may be setup up to 150 feet from the OWA, receives the broadcast stream from the antenna, processes the information locally, and provides information over an Internet Protocol (IP) based network to users. Each transit case includes the networking and end user equipment to allow broadcast data to be shared with local network users and to view broadcast standard or high definition video streams. For classified broadcasts, the data is decrypted by the Type 1 High Assurance Internet Protocol Encryptor (HAIPE) and processed by equipment within the transit case intended for such data.

Flexible Modular Architecture

The initial GBS TGRS uses a modular design to provide many configuration options with the baseline system. The design facilitates set-up/tear-down, replace/repair, upgrade to next-generation products and incorporation of the Pre-Planned Product Improvement (P3I).

The mounting system used to configure the transit cases provides operator/maintainer access to the equipment for maintenance and repair. Each RBM enclave is deployed in a dedicated operational case to facilitate separation of security enclaves, rapid set-up/tear down, and the ability to add a security enclave of either type (unclassified or classified) to a deployment.

The GBS TGRS design allows additional functionality by employing the basic building blocks of the GBS TGRS system. Each antenna provides interfaces for up to four RBMs; thus allowing distribution of the received broadcast data to a larger number of groups. Each RBM provides spare Gigabit and Fast Ethernet interfaces for use by local network users.

Currently defined P3I (not yet funded) provide opportunities for the expansion of the TGRS to support new features in the future. A Two-Way Antenna provides remote users with a reach back communications capability from the RBM to the SBM. The Broadcast Receive Suite – Terrestrial (BRS-T) is a secure wireless extension kit that enables wireless access to the RBM data/video products for users in a 5 mile radius.

Receive Broadcast Manager (RBM)

The RBM uses many common COTS products and parts from established, well-known vendors to facilitate training, use, provisioning and to lower life cycle costs.

The transit cases themselves are nearly identical and contain common components, mounting trays, brackets, and cabling.

The RBM is designed to operate both physically and functionally, with either of two HAIPE devices–KG-175D or KG-250. The networking equipment provides required networking services to support the current and future GBS TGRS mission (e.g., Quality of Service (QOS), Information Assurance (IA), Layer 3 switching, and Power over Ethernet (PoE)). The networking devices also are provisioned to support connectivity to external networks for reach-back capability, when needed.

The unclassified RBM supports the receipt of non-Type 1 IP encrypted broadcast information for unclassified users. The firewall controls access to the unclassified domain. The firewall connects to the Ethernet switch via a single Ethernet connection supporting an 802.1q trunk, providing the capability to support multiple Virtual Local Area Networks (VLANs) on the Ethernet switch. The firewall and Ethernet switch are fully IPv4 and IPv6 compliant. The Ethernet switch has eight Gigabit Ethernet ports and one Small Form-Factor Pluggable (SFP) port. The Ethernet switch also enables the connection to external local networks that can provide reach-back capability to the RBM.

The classified RBM supports receipt of broadcast data for classified users. The Ethernet switch, firewall, and Set Top Box (STB) are identical to the unclassified RBM. The primary difference is that the classified enclave does not require the Joint Internet Protocol Modem (JIPM) and has provisions for an IP Encryption device (HAIPE). This case provides the same Gigabit, SFP, and Ethernet port counts as the Unclassified Type I case. The laptop is identical. All software applications on the classified laptop are identical to those on the unclassified laptop.