Product Brochure

GLT Network

Net-Centric System for Tactical Satellite Networks

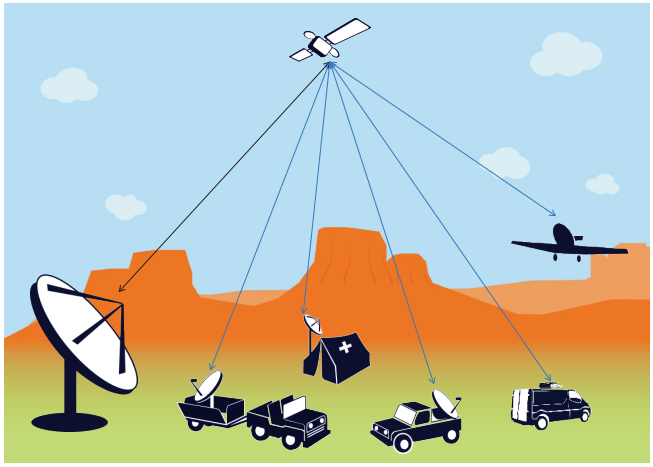
Gilat's GLT network unifies a variety of terminals: fixed, on-the-move, or on-the-pause, in a single platform. Dynamic and flexible, this network addresses any operational need. PAMA- or DAMA-configurable, it offers efficient space segment utilization.

At the heart of this network is the GLT/MLT modem with its innovative waveform —ACSM (Adaptive Coding Spreading and Modulation). This modem is used in several terminals: fixed sites with GLT1000 modems, Satcom-on-the-Move terminals with the military MLT1000, or the quick-deploy SOTP manpack terminal — the SatTrooper1500 or 2000.

When a large number of remote terminals are used and the traffic patterns are such that bandwidth sharing is allowed, the modem can also operate in a Point to Multi Point (PtMP) configuration. This saves satellite bandwidth, making network operation more efficient.

In PtMP, a single outbound (OB) carrier is shared by all active remote terminals in the network. The outbound traffic to the terminals is multiplexed to a single carrier using time division multiplexing. All modems receiving this OB signal filter out the messages intended for them. Filtering is based on terminal ID.

In some applications, fixed bandwidth allocation (PAMA) is not the optimal solution. One example is when a large number of terminals are offline or in storage and require going operational very quickly without operator intervention. In other networks, only some of the terminals are active at any given time, or transmitting part of the time according to the mission or the application. For these cases, the system uses a DAMA (Demand Assigned Multiple Access) mechanism.



Benefits

- High-performance carriers with speeds up to 80Mbps
- Innovative ASCM waveform with full adaptivity and high efficiency
- End-to-end solutions within the same network and NMS
- Scalable hub
- Dynamic allocation of bandwidth according to operational needs

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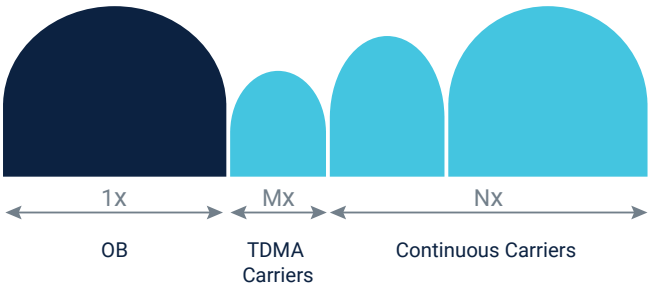
System Features

ACSM Waveform

The innovative ACSM (patented) waveform was designed to allow an optimal adaptive communication link from poor channel conditions (Signal to Noise (SNR) of -13 dB) to medium and high SNR conditions. It utilizes direct sequence spreading technique to enable operation at very low SNR.

Access and Carrier Plan

In PtMP topology, both PAMA and DAMA are supported, and a variety of OB and IB carriers are supported as well.
In DAMA, allocation is automatic according to demand.



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The system operates in Routing mode. IP routing is performed by the modem, and all L2 headers are removed to reduce overhead in the satellite link.

The following features are supported:

- Static routing
- Dynamic routing
- RIP, OSPF and BGB routing protocols
- Configuration of modem to provide DHCP Server and NAT
- Modem support for TCP Acceleration, VLANs and Quality of Service (QoS) operations

The QoS capabilities include MIR and traffic prioritization based on data packet classifications. Data classifications can be based on a source and target IP, VLAN, TOS, protocol, and port. Real-time traffic is classified as such and given a priority over non-real time traffic.

Tactical Communication

The GLT network supports small aperture terminals, on-the-move or quick-deploy on-the-pause, thanks to the unique communication performance of the modem: SNR of -13dB, fast reacquisition after disruptions, low modulation and coding and Spread Spectrum.

A variety of terminals based on this modem are supported by the network.

Hub Elements

Hub

The hub is the heart of the network. Installed in a 19" rack and located in an earth station/teleport together with the RFT and the hub antenna, it transmits and receives signals towards the terminals via the satellite. Various RF bands are supported: C-band, Ku-band, Ka-band and X-band.

Network Segments

The network is divided into one or more Network Segments (NS). The hub includes a Network Controller (NC) for each NS and a Network Management System (NMS).

An NS is a network unit that represents a single forward carrier and a group of return channels. Each NS serves a group of terminals that share the same OB. The NS is comprised of a network controller (NC), transmitter and a pool of receivers.

The NC consists of two different functionalities: Access Layer Controller (ALC) and Hub Data Processor (HDP). The ALC manages the satellite resource allocation according to remote terminals' bandwidth request. The HDP handles all user traffic, acts as the next-hop router for the Outbound traffic destined to the remote terminals, advertises routing information, and implements spoofing for the TCP traffic and QoS policies.

Transmitters and receivers

The hub is populated with GLT modems for each network segment. Modems are used as transmitters and receivers, depending on the network topology. The modems in the hub are identical to the remote sites' modems, assuring full compatibility.

The number of receivers is scalable. Some are used to receive the TDMA carriers, including M&C, and some are used for the continuous return carriers.

Redundancy

To ensure network availability, there is no single point of failure in the hub. Each component at the hub has a redundant component in a 1:1 redundancy scheme. In the case of the demodulators, an N:M redundancy is employed. The ALC manages the modulators and demodulators and their redundancy. All components are connected to two Ethernet switches operating in a redundant configuration.

Scalability

Network segments and modems can be added to the network to carry larger traffic or support additional beams and terminals.

GLT-1000

SatTrooper

MLT-1000

TotalNMS

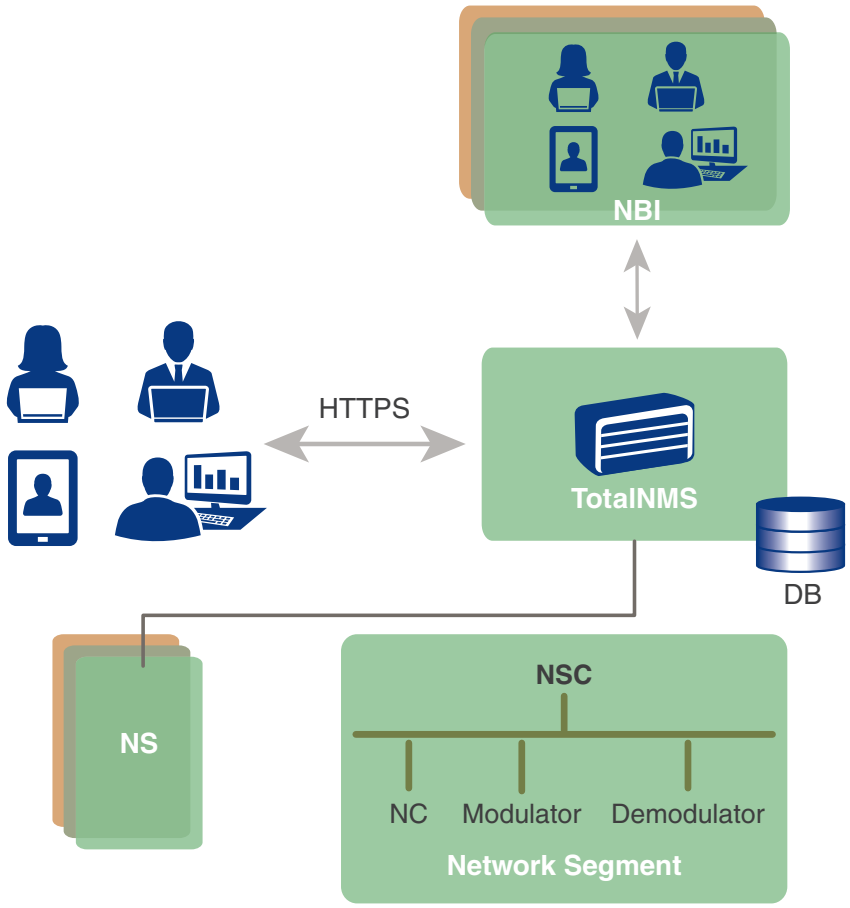
Gilat's TotalNMS system provides centralized management for monitoring and control of networks, collection of SCPC links, and both. TotalNMS distributed architecture provides increased flexibility, scalability, and reliability. TotalNMS provides secured and customized user administration, standard browser-based user interface with easy access from any location. TotalNMS provides FCAPS (Fault, Configuration, Accounting, Performance, and Security) to improve management functions to maximize operations efficiency, improve troubleshooting, and advanced diagnostic capabilities.

TotalNMS also provides a standard northbound interface to the operator's OSS/BSS.

Operators as well as operational/business support-systems have a single management interface for Hub elements installed at multiple network segments (NS) and large numbers of terminals. This facilitates management tasks by reducing the number of management system interfaces.

Focusing on simplified operation, TotalNMS is designed to streamline NOC operations of networks of any size. Its hierarchical network setup, profile-based service provisioning and built-in troubleshooting capabilities enables fast service introduction and effortless maintenance while maximizing the network's potential and assuring the end-users satisfaction.

TotalNMS supports variety of network architectures, topologies and access schemes.



Technical Specifications

System

Frequency bands: C, X, Ku, Ka
Topology: PtMP, Star
Network Segments/Carriers:
Up to 200 carriers spread over any number of satellites, beams, transponders
Terminals: Up to 65,000 terminals
Redundancy:
1+1 and N+1;
Hub geographical redundancy

Carriers and Access

Waveform: ASCM
Forward (OB):
Up to 80Mbps/30Msps
Return (IB): Up to 80Mbps/30Msps
Modulation:
BPSK, QPSK, 8PSK, 16QAM
Spectral Shaping:
SRRC, Rolloff=0.2
Spread Spectrum:
Spreading factor up to 8
SNR: Minimal SNR -13dB
Coding:
LDPC, 1/4, 1/3, 2/5, 1/2, 2/3, 3/4, 5/6, 8/9
Block Length:
4032, 6048,8064,12096
BER:
Typical Eb/No of 0.8dB for BER=10-8 (QPSK 1/3, normal block length)
Access Scheme:
PAMA or DAMA, TDMA and FDMA
RF Interface:
L band, 950-2150MHz

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Protocols:
IP, Routing mode (layer 3), RIP v1 and v2, OSPF v2 , BGP v4, PIM-SM v2, IGMP v2, TCP acceleration, VLAN 802.1q, DHCP, NAT, Static IP routing, Static multicast routing
Interface:
Ethernet 10/100/1000 base-T
QoS and Priorities:
Destination and source IP addresses, Ports, Diffserv

Terminals

Terminals Supported:
GLT, MLT, SatTrooper, BlackRay

Management & Control

NMS: Centralized TotalNMS
Platform:
Intel Server System, CentOS
GUI Interface:
Web browser over HTTPS
North Bound Interface: SNMPv2c
Access Control:
Permissions management
Network Controller:
Intel Server System, CentOS

Web Manager

GUI: HTTPS server
Interfaces: SNMPv2, Telnet/SSH

Hub

Dimensions:
19" rack, 42U, 1000mm
Environment:
0-33deg. C, 90% relative humidity
Power: 100-240VAC, 50-60Hz
CE Mark:
EN 55022 radio frequency Interferences, EN 60950 Safety
FCC: Part 15 Class B

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