The LinkWay S2 system is a hubless MF-TDMA VSAT system that enables you to cost-effectively integrate a variety of applications into a single platform in any network topology — mesh, star, or hybrid. Adaptive on-demand bandwidth allocation and bandwidth-efficient coding and modulation engineered into the LinkWay S2 system gives you cost-effective broadband connections between any LinkWay®-equipped sites. Features such as turbo coding and 8PSK modulation provide substantial bandwidth savings, reducing your transponder costs compared with other solutions.

The system provides true network-centric connectivity, integrating seamlessly with your IP networking applications and automatically routing your network data via satellite.

The LinkWay S2 terminal includes an integrated DVB-S2 receiver/decoder which can receive a broadband IP data stream from a DVB-S2 hub, providing efficient broadband star connectivity to a central data source while simultaneously providing full-mesh capability. The LinkWay S2 system, for example, can support bandwidth-intensive IP applications such as streaming video over the DVB-S2 link while supporting intrinsically mesh applications such as VoIP over mesh TDMA. Also, the terminal is interoperable with ViaSat’s LinkStar™ system, providing a universal, flexible networking solution.

The LinkWay S2 system can be used over any fixed satellite on any satellite radio frequency band. Combined with the appropriate RF equipment, the LinkWay S2 terminal can operate on C-band, Ku-band, Ka-band, or X-band — on loop-back, split-beam, or cross-strapped transponders. The system can operate on up to 200 non-contiguous satellite carriers, allowing access to any available bandwidth on any transponder on the satellite, for optimal use of costly satellite resources.
The Most Advanced VSAT Networking Technology

ViaSat continues to offer the most innovative satellite networking products with its LinkWay S2 system. The LinkWay S2 terminal builds upon and expands the capabilities of the successful LINKWAY 2100.

The LinkWay S2 terminal uses a revolutionary new mesh TDMA modem design. Turbo coding provides quasi-error-free connections with minimal carrier power requirements. 8PSK modulation provides dramatically improved spectral efficiency. Combined with an improved, shorter TDMA preamble, the terminal is more efficient than convolutional-encoded Reed-Solomon systems, increasing throughput, reducing station size, and reducing satellite bandwidth requirements.

The LinkWay S2 terminal provides choices of carrier rate from 312 Ksps to 10 Msps, enabling system operators to select the optimum carrier rate for their particular network traffic profile. With efficient TDMA operation at lower symbol rates, this terminal provides an excellent solution for low-throughput applications, such as voice. With carrier rates up to 10Msps, the terminal also handles high-throughput applications, such as video or large media file transfers.

Unique in the industry, the LinkWay S2 terminal is a mesh MF-TDMA modem with completely independent fast-hopping transmit and receive sections. The transmit modulator and receive demodulator can each tune on a burst-to-burst basis, independently and automatically, to any of 200 carriers across an 800 MHz frequency range spanning multiple transponders, multiple symbol rates, multiple coding rates, and modulation schemes. This allows the most efficient allocation of bandwidth on the network carriers, on any available timeslot on any available carrier frequency, for the most flexible and frequency-agile system available.

The LinkWay S2, DVB-S2 receiver, with EN 302 307-compliant coding, provides bandwidth-efficient broadband download capability to the LinkWay system. The DVB-S2 coding scheme is so advanced, it may represent the last major development in high-speed satellite modem design. With higher throughput at lower Eb/No than other systems, it enables broadband connections into reduced size stations. Operators may use LinkWay S2 system with a standard EN 302 307 DVB-S2 modulator and IP encapsulator or with the LinkStar S2 hub.

LinkWay S2 Terminal Description

The terminal is designed for stand-alone operation, requiring no local operator control. Configuration and monitoring of remote sites is done over-the-air via the LinkWay Network Management System (NMS), or via telnet. The IDU also includes a console interface port for unit installation.

The IDU features an extended 950-1750 MHz L-band interface to the radio frequency transceiver (RFT), for operation across multiple RF bands limited only by the capability of RFT. The built-in DVB-S2 receiver uses the same L-band receive interface as the TDMA mesh modem for a simple, clean design. The complete LinkWay S2 VSAT terminal includes an RFT consisting of C- or Ku-band radio equipment and an antenna. Typical radio transmit powers are 2, 4, 8, and 16 Watts in Ku-band, and 5, 10, and 20 Watts in C-band.

Typical antenna sizes are 1.2, 1.8, and 2.4 meter for Ku-band, with 1.8, 2.4, and 3.8 meter in C-band. The terminal can be deployed with a variety of RFT sizes throughout the network, with size based on the satellite parameters, station traffic requirements, and geographic location of network stations.
The LinkWay\textsubscript{S2} terminal can also be used in a maritime or ground-mobile environment on a stabilized platform. When combined with GPS, terminal acquisition, synchronization and timing are automatic even when the terminal is in motion.

The LinkWay\textsubscript{S2} terminal may be operated in a LINKWAY 2100-compatible mode, for adding or replacing sites in an existing LINKWAY 2100 network, ensuring an operator’s investment in LINKWAY 2100 remains solid for years to come.

**Network Control and Management**

LinkWay\textsubscript{S2} terminals are controlled by a full-featured Network Control Center (NCC) workstation that manages TDMA network timing, synchronization, terminal acquisition, network configuration, and bandwidth management. The NCC also acts as the NMS server. The NMS is a client-server system with an easy-to-use Web-based graphical interface. With this approach, a PC-based remote NMS client can securely access the NCC server from anywhere in the world.

The NMS user windows make it simple to access key information. Network status, network station maps, system configuration, alarm status, circuit set-up, accounting, link performance, and diagnostic commands are available with the click of a mouse.

The NCC database files can be shared with other operational tools such as billing systems, and the network may also be monitored via SNMP. Multiple levels of access control ensure that security is maintained.

**Satellite Network Architecture**

The NCC is collocated with the Master Reference terminal (MRT). The MRT acts as a conduit for the NCC network control messages to the remote terminals, providing timing and signaling which enable over-the-satellite control of the network from the NCC and NMS. Any LinkWay\textsubscript{S2} terminal can be configured to be the MRT — no special hub hardware is needed, reducing expense and improving logistics.

Local or geographic redundancy is provided for the NCC and MRT to ensure reliable network operation and provide automatic network recovery.

Unique among TDMA systems, LinkWay\textsubscript{S2} terminals do not all have to be in the same satellite beam — i.e., the MRT does not require direct loop-back connectivity with itself or the remote terminals. Advanced control algorithms allow multi-beam or even cross-strapped network architectures using a Supporting Reference Terminal (SRT).

Multi-beam operation allows a single LinkWay\textsubscript{S2} network to span across the entire footprint of all transponders’ single satellite — enabling transoceanic, transcontinental, and hemispheric networks. The flexibility of the system make it ideal for large, multinational networks, such as embassy networks, international organization networks, air traffic control networks, and military networks.
**SPECIFICATIONS**

**MF-TDMA MODEM**  
Modulation: BPSK, QPSK, 8PSK  
Symbol Rates: 312.5Ksps to 2.5Msps; 5Msps*;10Msps*  
Forward Error Correction: Turbo Coding  
FEC Rates: BPSK: 1/3; QPSK: 1/2, 2/3, 3/4, 4/5; 8PSK: 3/4, 4/5, 6/7

**DVB-S2 RECEIVER**  
Modulation: QPSK, 8PSK  
Symbol Rates: 1Msps to 30Msps  
Forward Error Correction: LDPC Turbo Coding per EN 302 307  
FEC Rates:  

- QPSK: 1/2, 3/4, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10  
- 8PSK: 3/4, 2/3, 3/4, 5/6, 8/9, 9/10

**L-BAND INTERFACE**  
Tx: F-type, 75 Ohm; 950-1750 MHz range, -30 to 0 dBm  
Rx: F-type, 75 Ohm; 950-1750 MHz range, -75 to -35 dBm  
Reference & Power  
Software controllable enable/disable DC power and 10 MHz reference on each IFL interface.

**DVB-S2 Rx IF**  
950 - 2150 MHz, -140 to -90 dBm/Hz, Type-F

**PHYSICAL INTERFACES: IP**  
Expansion: 2 PMC interface slots  
Console Port: RS-232 electrical, RJ-11 physical  
External Reference  
10MHz, BNC  
Summary Alarm  
Form C Contact Closure, DB9

**NETWORK INTERFACES**  
IP: 10/100BT IEEE 802.2 Ethernet (RJ45)

**TRAFFIC ENGINEERING**  
QoS Queuing Type: Priority Queuing or CBWFQ  
Number of QoS Queues: 16  
QoS Queuing Mapping: Configurable by IP DSCP  
Priority Burst Types: CIR (Static & Dynamic) bursts  
Traffic Burst Types: Unicast or Multicast

**ENVIRONMENTAL**  
Temperature Range:  
Operational: 0°C to +60°C; Storage: -40°C to +70°C  
Relative Humidity:  
Operational: 0 to 95%; Storage: 0 to 95% (non-condensing)

**ELECTRICAL**  
Power Supply: 50/60 Hz, Autorange 100-240VAC

**MECHANICAL**  
Dimensions:  
1.75 X 17 X 15 in. (4.45 x 43.2 x 38.1 cm)  
Weight: ~6 lbs (~2.8 kg)

**OUTDOOR UNITS**  
Ku-Band Antennas: 1.2, 1.8, or 2.4 meter  
Ku-Band RFTs: 2, 4, or 16 Watt  
C-Band Antennas: 1.8, 2.4, 3.8 meter  
C-Band RFTs: 5, 10, or 20 Watt  
Interfacility Link: L-band  
Certification: CE, FCC, R&TTE, ANATEL

* Optional

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**Advanced Internet Protocol Networking**  
The LinkWay S2 terminal acts as a virtual satellite-based router. IP packets entering one terminal are automatically routed to the destination terminal. Quality of service is maintained via differential services-compatible prioritization with 16 transmit queues. The IP multicast feature enables one LinkWay S2 site to simultaneously communicate with multiple other LinkWay S2 sites — perfect for multi-party videoconferencing or distance learning. The LinkWay S2 terminal can be used with peripheral IP encryption devices supporting IPSec traffic transparently.