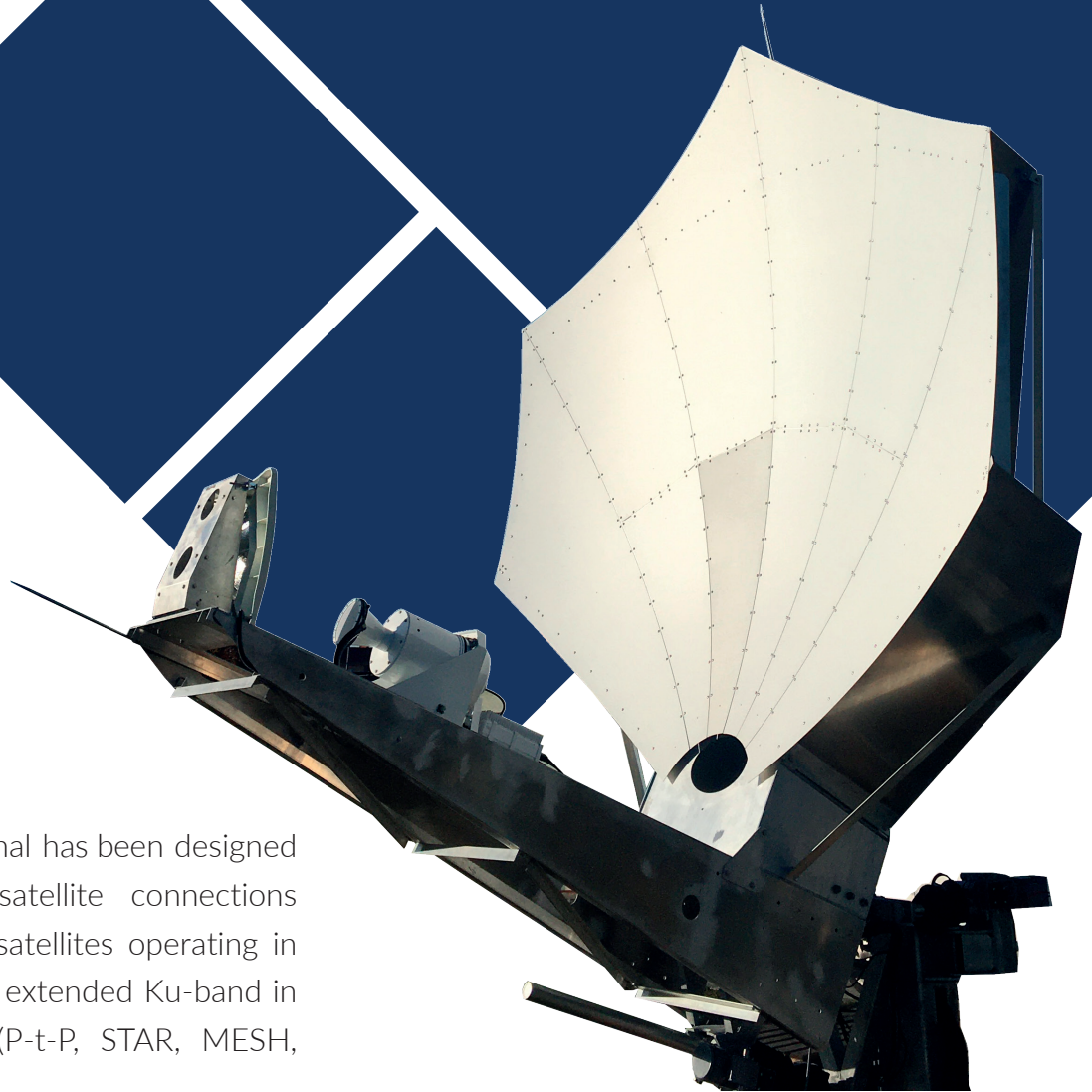


VSAT Master Satellite Terminal

with 3.8m antenna



Design

The VSAT Master Terminal has been designed to secure broadband satellite connections based on geostationary satellites operating in the basic Ku-band or the extended Ku-band in any network topology (P-t-P, STAR, MESH, HYBRID).

The terminal is based on a 3.8m Dual Offset parabolic antenna and equipment allowing the terminal to operate with several TDMA modems providing them with the possibility for simultaneous operation.

Each of the topologies can easily be reached by each of the modems independently by changing the configuration of the modem. The station is basically designed to work in a network as a master station, but the final role in the network depends on the modem's configuration.





The frequency range provided by the VSAT Master terminal is as follows:

Ku-band - with linear polarisation:

- transmission (TX): 13.75 to 14.5GHz,
- reception (RX): 10.70 to 12.75GHz available in three sub-bands:
 10.70 to 11.45GHz,
 11.45 to 12.20GHz,
 12.20 to 12.75GHz,

The frequency range is available after the extension of the antenna's RF equipment to support additional bands:

X-band - with circular polarisation:

- transmission (TX): 7.9 to 8.4GHz,
- reception (RX): 7.25 to 7.75GHz,

C-band - with circular polarisation:

- transmission (TX): 5.85 to 6.425GHz,
- reception (RX): 3.625 to 4.20GHz,

Ka-band - with circular polarisation:

- transmission (TX): 27.50 - 31.00GHz,
- reception (RX): 17.70 - 21.20GHz.

The connection between the IDU (terminal controller with connected modems) and the ODU (antenna with antenna positioner and RF equipment) is executed by:

- traditional copper cables: using coaxial cables for L-Band signals, using Cat 5e twisted pair cable for Ethernet and M&C connections to the antenna controller and RFT,
- fibre optic cable connection for 10MHz, L-Band, Ethernet and M&C reference signals.

Terminal antenna positioning is available:

- in manual mode (local service),
- in electric antenna positioning mode (using the local terminal interface),
- via remote GUI based on WWW,
- in the automatic pre-positioning mode (based on the position of the station and the selected satellite),
- in the automatic precise positioning mode and optimisation of the antenna position based on detected signal: Beacon, DVB-S2 or TDMA MASTER station signal (procedure is available both via the local GUI and WWW).

In addition, it is possible to set the antenna to the position specified by the operator.

The system has a built-in spectrum analyser module; the system, however, additionally provides a possibility for connecting an external analyzer in both IDU and ODU.

Positioning, controlling, monitoring and diagnosing the terminal operation is centralised through the Integrated Terminal Controller (ZKT) and supported by an antenna positioning unit (ACU) and an automatic antenna drive control system (ACS).



Antenna

GD Satcom's 3.8m antenna provides exceptional performance in transmitting/receiving and receive-only applications in the L to Ka frequency bands. The antenna has a double offset reflector, consisting of precisely formed radially-profiled panels and a mechanised base. The state-of-the-art design provides exceptional performance for low levels of cross-polarisation and excellent side-lobe characteristics. The robust radiator arm can hold up to 300lbs. (136kg) of integration equipment. The reflector is mounted on a powered or fixed base made of galvanised steel to provide the required structural rigidity during positioning and tracking of the selected satellite. The bases are designed for full coverage of the orbital arc and can easily be adjusted for ground or roof installations using concrete foundations, load frames or non-penetrating fixtures.

The electrical parameters are in accordance with FCC 25.209 and ITU-RS-580 side-lobe specifications.

The antenna allows operation in the frequency range from 1.5 to 31GHz and the design can withstand wind forces up to 200km/h (125 mph).



Cabling

Depending on the characteristics of specific use, it is possible to use cabling based on traditional copper cables as well as fibre optic links. The limited use of copper cabling primarily relates to the maximum permissible losses in the L-Band for RF cabling (up to about 70m - depending on the type of cable used). Alternatively, it is possible to base the entire communication between the IDU and ODU equipment on a fibre optic link, so that the distance between the control devices and the antenna is not a constraint. Optical communication outside the fibre optic cabling is based on a set of fibre optic converters by GISS interoperating with ZKT and ACU modules.

GISS ZKT19-04 Integrated Terminal Controller

VSAT GISS ZKT19-04 Satellite Integrated Terminal Controller is designed to integrate control functions of all devices included in the terminal system. The ZKT19-04 model allows integration of functions provided by TDMA SkyWAN IDU7000, IDU2570, IDU 5G modems working both as SLAVE and as MASTER stations, but it also offers integration with SCPC modems, such as Paradise or Comtech.

The device provides communication with RFT/BUC transmitters in accordance with the SMCPv3 protocol provided by such manufacturers as Advantech Wireless, Amkom or Actox, but it is also capable of being expanded with solutions used by other manufacturers, such as ATOM NORSAT, CPII/LUCUS providing for a protocol translation function between the transmitter and the modem that is necessary for the proper operation of VSAT stations. Additionally, it controls the functioning of LNB receiving amplifiers.

ZKT is designed to work with ACU series PA19-03 (GISS) or RC4000 (ResearchConcept) with the possibility of extending its functionality to include NGC (CPI). It offers a possibility for using the satellite terminal monitoring and management functions via a local terminal (GUI interface accessible via an OLED screen and a built-in keyboard) without the need to use additional devices for this purpose.

ACU GISS PA19-03 antenna positioner

The Antenna Control Unit in the ACU GISS PA19-03 version is dedicated to controlling a 3.8m GD antenna equipped with a drive system compliant with the GD 930A Antenna Control System. The ACU provides interoperability with TDMA SkyWAN 7000, SkyWAN 5G, optionally with SCPC modems of the Paradise family, e.g. PD25 (PD25, Q-flex, Q-lite) or the Comtech family. In addition, the ACU controller directly supervises the antenna mounted transmitter in a version compatible with Advantech Wireless Denali Line transmitters (the latest product series replacing the SSPB-K2xxx series transmitters) and allows the SMCPv3 protocol to be translated for communication with SkyWAN 7000 modems. The ACU controller is integrated in the box of the Antenna Control System or the GD 930 Antenna Control System, which is installed directly behind the antenna reflector.

Power supply

For Master class satellite systems, it is extremely important to ensure continuity of operation without interruptions related to power instability. The GISS Master satellite system provides the implementation of two independent power supply lines: an emergency power supply (via UPS) and a non-guaranteed power supply. The emergency power supply is dedicated to critical system components such as ACU, ZKT, the satellite transmitter and modems.

In the event of power failure, it is possible to manually position the antenna with a set of gears and manual cranks.

Weatherproof systems

It is possible to equip the 3.8m antenna with systems eliminating the impact of unfavourable weather conditions on the antenna system operation de-icing systems and systems for removing rainwater from the antenna surface. The operation of these systems can be controlled manually or in a fully automated way, with the possibility of setting and controlling the state of operation from the ACU, ZKT and WWW interface modules. The use of de-icing systems is of particular importance in climatic conditions with snowfall and long-lasting icing, which can contribute to a significant degradation of the useful signal on the reflecting surfaces of antennas.

Antenna parameters

Parameters	C-Band 2-Port Circular polarization		X-Band 2-Port Circular polarization		Ku-Band 2-Port Linear polarization		DBS-Band 2-Port Linear polarization		KA-Band 4-Port Linear polarization	
	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx
Frequency (GHz)	3.625 4.200	5.850 6.425	7.250 7.750	7.900 8.400	10.700 12.750	13.750 14.500	10.700 12.750	17.300 18.400	17.700 21.200	27.500 31.000
Antenna gain for centre frequency (dBi)	42.00	45.90	47.30	47.70	51.10	52.40	51.40	54.60	54.90	57.80
VSWR	1.50:1	1.30:1	1.25:1	1.25:1	1.30:1	1.30:1	1.30:1	1.30:1	1.30:1	1.30:1
The width of the main characteristic beam ² -3dB, -15dB.	1.35° 2.84°	0.87° 1.83°	0.72° 1.51°	0.69° 1.45°	0.47° 0.99°	0.41° 0.86°	0.45° 0.94°	0.31° 0.65°	0.28° 0.59°	0.20° 0.42°
G/T ratio (dB/K) 4.000GHz, 30 K LNA 7.500GHz, 50 K LNA 11.725GHz, 70 K LNA 19.450GHz, 120 K LNA 19.450GHz, 200 K LNA	23.8		27.5		29.9		30.9		30.9 29.7	
Powerfulness (total)	1kW CW		5kW CW		2kW CW		2kW CW		1kW CW	
Cross-polarisation separation (dB) In the axis In a 1.0dB beam	20.8 20.8	27.3 27.3	21.3 21.3	21.3 21.3	35.0 35.0	35.0 35.0	35.0 35.0	35.0 30.0	30.8 30.8	30.8 30.8

Technical information

Mechanical configuration	Version with a permanent base (PM)	Version with a V-frame base (VX)
Antenna size	3.8m (12.5ft)	
Antenna type	Construction with a dual-offset reflector	
Antenna construction	Precisely formed aluminium panels with white heat dissipating paint; cleaned and brightened aluminium support structure	
Type of drive	Manual adjustment	Electrical drive control
Movement in azimuth	360° coarse, 40° fine	Electrical drive control 190° (2 continuous segments of 120° each)
Moving in the elevation	Continuous from 0 to 90°	Continuous from 0 to 90°
Operational wind load	45mph (72km/h) in gusts up to 60mph (97km/h)	
Survival wind load	125mph (200km/h) at 58° F (15° C), in any position; 130mph (209km/h) in a preferential setting	
Operating temperature	+5° to +122° F (-15° to +50° C)	
Maximum permitted temperature	-22° to +140° F (-30° to +60° C), options with lower temperatures also available	
Rainfall	Up to 4 inches/h (100mm/h)	
Relative humidity	0 to 100% with condensation	
Solar radiation	360 BTU/h/ft ² (1,000 Kcal/h/m ²)	

² Technical parameters of other elements of the system, i.e. ACU, ZKT and optical fibre converters are specified in separate data sheets. Please contact GISS company in order to receive materials.