

VSAT Master satellite terminal with 3.8m antenna

Construction of the terminal

VSAT Master satellite terminal is designed to secure broadband satellite connections based on geostationary satellites operating in the basic Ku-band, extended Ku-band in any network topology (P-t-P, STAR, MESH, HYBRID). The terminal has a Dual Offset 3.8m parabolic antenna and equipment allowing the antenna to work with several TDMA modems providing them with the possibility of simultaneous operation, including one modem with two demodulators. Each of the topologies can be easily reached for each of the modems independently by changing the configuration of the modem or modems. 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 configuration.

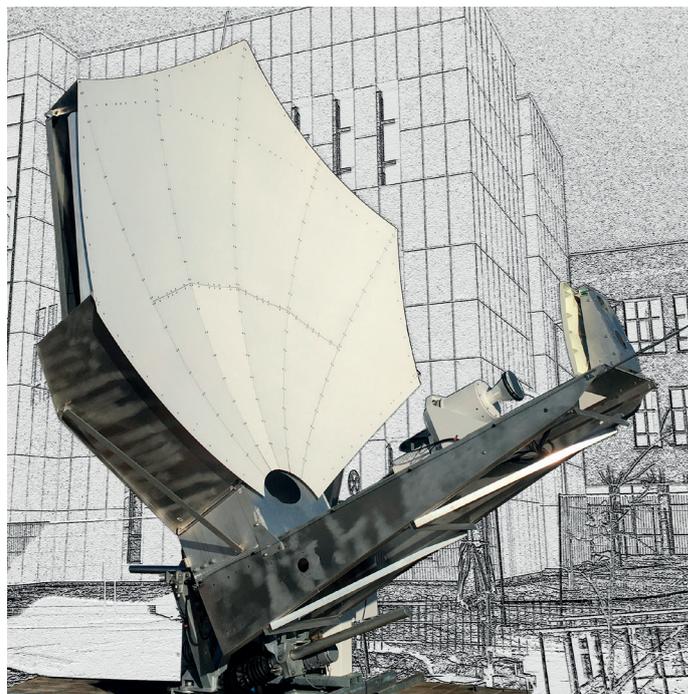




both via local GUI and via WWW). In addition, it is possible to set the antenna to the position specified by the operator.

The system has a built-in spectrum analyzer module, but additionally the system provides the possibility of connecting an external analyzer in both IDU and ODU.

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



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

In the Ku-band - with linear polarity:

- transmission (TX): 13.75 - 14.5 GHz,
- receiving (RX): 10.70 - 12.75 GHz available in three sub-bands: (1) 10.70 - 11.45 GHz, (2) 11.45 - 12.20 GHz, (3) 12.20 - 12.75 GHz,

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

In the X-band - with circular polarity:

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

In C-band - with circular polarization:

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

In Ka-band - with circular polarization:

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

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

- 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,
- as a fiber optic cable connection for 10MHz, L-Band, Ethernet and M&C reference signals.

Terminal antenna positioning is possible in the manual antenna positioning mode (local service), in the electric antenna positioning mode (using the local terminal interface as well as via the remote GUI via 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 optimization of the antenna position based on detected beacon type, DVB type or TDMA type signals of the MASTER station (procedure available

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 mechanized base. The state-of-the-art design provides exceptional performance for low levels of cross-polarization and excellent side-lobe characteristics. The robust radiator arm can hold up to 300 lbs. (136 kg) of integration equipment. The reflector is mounted on a powered or fixed base made of galvanized 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 be easily adapted to 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 31 GHz and the design can withstand wind forces up to 200 km/h (125 mph).



Wiring

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

Integrated Terminal Controller GISS ZKT19-04

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

This device provides communication with RFT / BUC transmitters in accordance with SMCPv3 protocol of such manufacturers as Advantech Wireless or Actox, but also has the ability to expand with solutions used by other manufacturers, such as ATOM NORSAT, CPIO / LUCUS providing the necessary for the proper operation of VSAT stations protocol translation function between the transmitter and modem. Additionally, it controls the state of functioning of LNB receiving amplifiers.

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

ACU GISS PA19-03 antenna positioner

Control unit - ACU antenna positioner in GISS PA19-03 version is dedicated to control and control GD 3.8m antenna equipped with drive system compliant with GD 930A Antenna Control System. ACU allows for cooperation with TDMA SkyWAN 7000, SkyWAN 5G and optionally with SCPC modems of Paradise family, e.g. PD25 (PD25, Q-flex, Q-lite) or Comtech family. In addition, the ACU controller directly supervises the antenna mounted transmitter in the version compatible with Advantech Wireless Denali Line transmitters (the latest product series replacing the SSPB-K2xxx series transmitters) and allows translation of SMCPv3 protocol for communication with SkyWAN 7000 modems. The ACU controller is integrated in the box of the Antenna Control System-ACS GD 930 Antenna Control System-ACS, 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 prod. GISS provides for implementation of two independent power supply lines: guaranteed power supply (via UPS) and unguaranteed power supply. Guaranteed power supply is dedicated for critical system components such as: ACU, ZKT, satellite transmitter and modems.

In case 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 influence of unfavorable weather conditions on the antenna system operation - anti-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 anti-icing systems is of particular importance in climatic conditions where snowfalls 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 center 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 -3 dB, -15 dB.	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) 4.000 GHz, 30 K LNA 7.500 GHz, 50 K LNA 11.725 GHz, 70 K LNA 19.450 GHz, 120 K LNA 19.450 GHz, 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	
Kropolarization separation (dB) In the axis In a 1.0 dB 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 informations

Mechanical configuration	Wersja z podstawą montowaną na stałe (PM)	Wersja z podstawą V-frame (VX)
Antenna size	3.8 m (12.5 stóp)	
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	45 mph (72 km/h) in gusts up to 60 mph (97 km/h)	
Survival wind load	125 mph (200 km/h) at 58° F (15° C), in any position; 130 mph (209 km/h) in a preferential setting	
Operating temperature	+5° do +122° F (-15° do +50° C)	
Maximum permitted temperature	-22° to +140° F (-30° do +60° C), options with lower temperatures also available	
Rainfall	Up to 4 inches / h (10 cm / 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.