

Trunking Earth Station (TRES™)

Low-cost, flexible satellite earth station

HUGHES
NETWORK SYSTEMS



TRES incorporates proven Hughes Network Systems (HNS) technology and innovation into a versatile and cost-effective solution for today's satellite communications applications. TRES provides data rates from 32 Kbps to 2.048 Mbps, flexible station sizing, excellent performance and outstanding value.



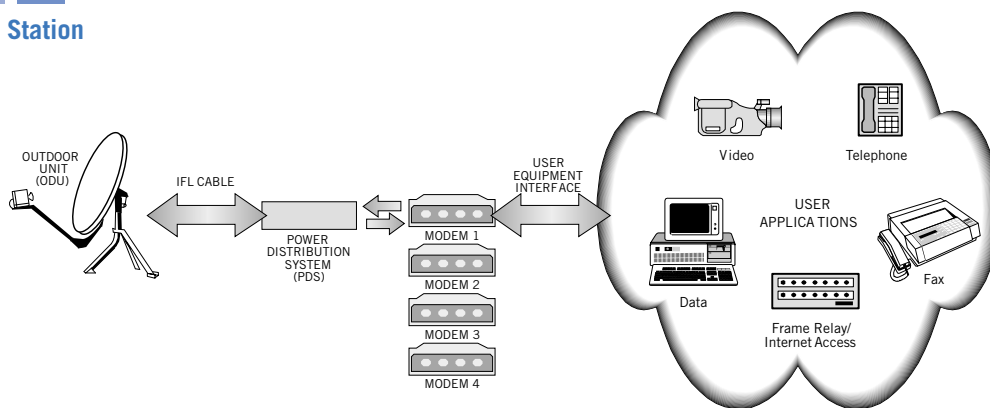
TRES is used in point-to-point and star networks. HNS leads the world in VSAT networking and TRES continues this tradition of leadership through innovation, performance, and value.

TRES Features

- Low-cost VSAT earth stations
- Carrier spacing of 1.2 x symbol rate (less than 0.1 dB degradation)
- Data rates from 32 Kbps to 2.048 Mbps, in 32 Kbps increments, plus 1.544 Mbps
- Better than Intelsat BER specifications
- Antenna alignment with DC voltmeter (pointing mode)
- Single IFL cable
- No outdoor AC power for 5W C-band and 2W Ku-band outdoor unit (ODU)
- Upgrades for 20W C-band and 8W Ku-band
- RF equipment controlled from inside facility
- Integrates with other HNS VSAT products
- Designed for multi-carrier operation with up to four TRES modems on a single, low-cost radio

TRES Station Architecture

The TRES is provided either as a stand-alone modem with a 70 MHz transmit and L-band receive interface, or alternatively, the TRES can be provided in a complete earth station configuration. The earth station configuration consists of a modem, power distribution system (PDS), outdoor unit (ODU) and antenna. The indoor equipment consists of a modem and PDS. The modem provides the functions associated with modulation, forward error correction and demodulation. The PDS provides DC power, a high-stability frequency reference and high frequency/low frequency combining and multiplexing over a single cable to the ODU. The outdoor equipment consists of RF equipment and an antenna. The RF equipment provides frequency conversion and amplification functions. The outdoor equipment is available in a variety of frequency bands and station sizing configurations. For multi-carrier operation, simply add up to four TRES modems to one PDS.



System Specifications

Station Performance

C-Band Extended:

Antenna

Size	G/T	5W EIRP	20W EIRP
1.8M	14.2dB/K	45.5dBW	51.5dBW
2.4M	16.8dB/K	48.0dBW	54.0dBW
3.8M	21.8dB/K	52.0dBW	58.0dBW

Note: G/T@30 elevation, mid-band, 65K LNB, Linear Antenna

Ku-Band Extended:

Antenna

Size	G/T	2W EIRP	8W EIRP
1.8M	21.7dB/K	49.3dBW	54.8dBW
2.4M	24.4dB/K	52.0dBW	57.5dBW
3.8M	28.7dB/K	56.0dBW	61.5dBW

Note: G/T@30 elevation, mid-band, 150K LNB

Modem

Modulation:	QPSK and BPSK
Forward Error Correction:	Viterbi, Concatenated (Viterbi-Reed Solomon)
Coding Rates:	1/2, 3/4
Data Rates Range:	32 Kbps to 2.048 Mbps and 1.544 Mbps
Data Rate Step Size:	32 Kbps
Carrier Spacing:	1.2 x symbol rate (<0.1 dB degradation)
User Equipment Interface:	RS-422...EIA530 25 pin D connector
Elastic buffer:	Up to 16,384 bytes

Interfacility Link (IFL)

One coaxial cable, terminated with type "N" male connectors

C-band:	Type 1 = 18 to 81 ft. (5.5 to 24.7m) Type 3 = 87 to 390 ft. (26.5 to 118.8m)
Ku-band:	Type 1 = 54 to 81 ft. (16.5 to 24.7m) Type 3 = 260 to 390 ft. (79.2 to 118.9m)

Outdoor Unit (ODU)

C-band

Frequency range:	
Transmit:	5.85 - 6.425 GHz
Receive:	3.625 - 4.2 GHz
Transmit power levels:	5 watts at 1 dB compression Optional SSPA 20 watts at 1 dB compression
Prime power:	5 watts - from indoor equipment 20 watts - 100 Vac to 240 Vac external AC power

Ku-band

Frequency range:	
Transmit:	14.0 - 14.5GHz
Receive:	11.7-12.2 GHz, 12.25-12.75 GHz or 10.95-11.7 GHz

Transmit power levels:	2 watts at 1 dB compression Optional SSPA 8 watts at 1 dB compression (matched unit)
Prime power:	2 watts - from indoor equipment 8 watts - 100 Vac to 240 Vac external AC power

Monitor and Control

Terminal interface command set (for use with ASCII terminal)
Front panel LED status indicators

Power Requirements

Modem:	90-240 Vac
PDS:	90-240Vac
Optional HPA:	90-240 Vac
Frequency:	47 to 63 Hz

Options

- Overhead channel, for remote monitor and control
- Concatenated Viterbi/Reed Solomon FEC (147, 130)
- 70 MHz TX IF for TRES modem
- MS Windows based Graphical User Interface (GUI) Monitor and Control Software
- 20 watt booster amplifier, C-band
- 8 watt booster amplifier, Ku-band
- Antenna deicing
- Antenna non-penetrating mount (1.8 M and 2.4 M)
- Plenum IFL cable
- 50°K LNB for C-band