**Model 2.4m HWT Troposcatter Antenna**

**Troposcatter Antennas**

**Description**

The General Dynamics SATCOM Technologies 2.4m HWT antenna, configured for troposcatter operation, utilizes either a "conventional" C-band (4.4 to 5.0 GHz) feed or a proprietary dual-beam Ku-band feed (14.9 to 15.4 GHz) to provide high-quality, over-the-horizon communications. In C-band applications, space diversity is normally achieved using dual antennas in each terminal. For Ku-band applications, a unique, patent-pending, dual-beam feed is incorporated to provide two closely-spaced beams in elevation to achieve angle diversity in the troposcatter link.

Engineered to stringent standards for multiple applications, the 2.4m HWT delivers performance suitable for multi-band satcom and troposcatter operation. Various modes and/or frequency bands of operation are readily accommodated via interchangeable feed packages, making the antenna truly field-configurable. In any operational mode or frequency band, antenna performance is outstanding, with high gain, low sidelobes and high crosspol and port-to-port isolation values. The use of carbon fiber technology and precision-machined aluminum components provides the ultimate in transportability, wind performance and longevity in tactical environments.

This flyaway antenna is designed to meet robust mission requirements and for longevity in hostile environments. This results in a medium-weight, motorized antenna with superior stiffness and high performance under high wind loading conditions. Repeatability is maintained with precision registration of the nine reflector segments and the feed support structure. The complete antenna system, including a single feed and a motorized positioner, can be packaged in nine rugged, portable cases.

**Options**

- Complete tropo terminals available, including amplifiers, frequency converters, modems, antenna control systems and monitor and control systems
- Finishes (green, tan or per customer spec)
- Pedestal/T-head riser for boom mounting options
- Lightning protection/grounding
- Transit cases
- IFL cables
- Satcom capable (L, C, X, Ku, DBS, Ka, low-PIM)

**The Strength to Perform**

- Carbon fiber reflector provides lightweight, precision surface and high stiffness
- Jack/gear-driven positioner is of aluminum construction, lightweight and sturdy
- Easy deployment – two-person assembly in less than 30 minutes, captive hardware, precision alignment
- High performance, low sidelobes
Technical Specifications

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Mechanical

Azimuth Travel ±120° (consult factory for CFE equipment mounting)
Elevation Travel -4° to +90° (consult factory for CFE equipment mounting)
Polarization Travel ±90° (satcom operation, linear only)
Reflector Structure 2.4m (94.5 in) carbon fiber reinforced polymer (CFRP)
Pedestal Structure Aluminum alloy
Boom Mounted Electronics Loading* 120 lbs. (54 kg), not including feed assembly (electronics may limit travel)
Antenna Weight
  Reflecter (9-piece) 120 lbs. (54 kg)
  Pedestal Assembly 589 lbs. (267 kg)
  Packaging Consult factory for details
Approximate Feed Weights
  C-Band Feed 30 lbs. (13.6 kg)
  Ku-Band Feed 15 lbs. (6.8 kg)

Environmental

Wind Loading
  Operational (no ballast) 25 mph (40 km/h) gusting to 30 mph (48 km/h)
  Operational (with ballast) 45 mph (72 km/h) gusting to 60 mph (97 km/h)
Survival (stowed) 90 mph (145 km/h)

Painting Loss (operational/ winds) Maximum 2.0 dB Rx loss (Ku-band)

Temperature
  Operational -22° to +122° F (-30° to +50° C)
  Survival (stowed) -40° to +158° F (-40° to +70° C)
Relative Humidity (operational and survival) 0% to 100%
Solar Radiation 360 BTU/h/ft2 (1000 Kcal/h/m2)

Shock and Vibration Tolerant to conditions encountered during shipment by airplane, ship or truck. Atmospheric tolerant to conditions encountered in coastal regions and/or heavily industrialized areas.

* Consult factory for mounting locations and apparatus.

Electrical

Frequency (GHz)
Receive 4.400 - 5.000
Transmit 14.900 - 15.400
Antenna Gain at Midband, dBi
Receive 38.30
Transmit 49.70
Antenna Noise Temperature
Receive 81 K (1° elevation)
Transmit 72 K (2° elevation)
Packaging Consult factory for details

Typical G/T
  at 20° Elevation, Clear Horizon, 4.400 GHz
    35° X LNA 18.3 dB/K
    90° X LNA 17.3 dB/K
  at 1° Elevation, Clear Horizon, 15.150 GHz
    70° K LNA 20.7 dB/K
    90° K LNA 20.3 dB/K

Pattern Beamwidth (in degrees at midband)
  .3 dB Beamwidth 2.08
  1.5 dB Beamwidth 4.37

Sidelobe Performance
  First Sidelobe Across the Band -20.0 ± 2 dB
  For Angle A from 14° to 22° -26 dB
  For Angles Greater Than 22° -30 dB

Cross Polarization Isolation
  On Axis 30.0 dB
  Within 1.0 dB Beamwidth 30.0 dB

VSWR 1.30:1

Port-to-Port Isolation
  Rx/Tx (Rx frequency) 0 dB
  Tx/Rx (Tx frequency) 0 dB

Feed Insertion Loss
  0.15 dB

Waveguide Interface Flange
  CPR-187G
  WR-62

Total Power Handling Capability
  2 kW CW

RF Specification 975-3524

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Tropo C-Band 2-Port Linear Polarized**
Electrical
  Frequency (GHz)
  Receive 4.400 - 5.000
  Transmit 4.400 - 5.000
  Antenna Gain at Midband, dBi
  Receive 38.30
  Transmit 49.70
  Antenna Noise Temperature
  81 K (1° elevation)
  72 K (2° elevation)

Model 2.4m HWT Troposcatter Antenna

Dual Beam Tropo Ku-Band 4-Port Linear Polarized
Electrical
  Frequency (GHz)
  Receive 14.900 - 15.400
  Transmit 14.900 - 15.400
  Antenna Gain at Midband, dBi
  Receive 49.70
  Transmit 49.70
  Antenna Noise Temperature
  72 K (2° elevation)
  58 K (10° elevation)

** Tropo C-band operation requires dual antennas to achieve signal diversity.