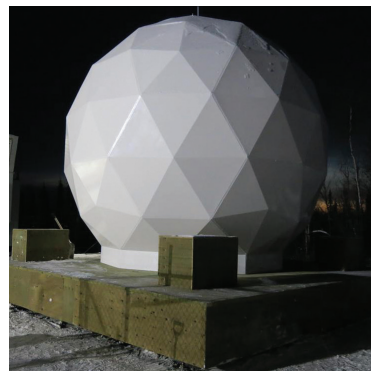


Low/Medium Earth Orbit Satellite Tracking Antenna Systems



Cost-Effective | Precision Tracking | Unlimited Configuration Flexibility

X/Y Antenna Pedestal Technology



Fixed and Deployable Systems and Radomes

Space & Component Technology | www.trackmysat.com

Comtech Introduction

Comtech Space & Component Technology has developed a cost-effective X/Y antenna pedestal technology that specializes in precision antenna tracking. Our systems are specifically designed for low and medium earth orbits that support Remote Sensing, Earth Observation, and TT&C applications.

We offer a range of X/Y tracking antennas from 30 centimeters to 14 meters coupled with our installation expertise and worldwide support in extreme environments such as the Arctic, Middle East and Tropics. Comtech Space & Component Technology provides the customer a complete satellite and tracking solution for your ground stations.



Type 1 Deployable with non-ground penetrating mount



Type 1 on a platform



Type 2 ground mount

Features:

- 30 centimeters to 14 meters antenna size
- X/Y axis configuration (Type 000 through Type 6 for increasingly larger dishes)
- Transmit/receive feed technologies through V-band
- Designed for tracking LEO, MEO, HEO and GEO spacecraft
- Applications include Earth Observation, Remote Sensing, Communications and TT&C functions
- Lights-out operation, including ethernet (TCP/IP) and M&C software is provided with Linux-based M&C system, includes SNMP and XML support
- Program and Auto Track Performance
 - Effective program track capabilities that utilize ephemeris data in the form of Two Line Element (TLE) data and other formats
 - Autotrack Capabilities:
 - » Low loss mode coupler tracking system for high frequencies and larger aperture antennas that does not affect G/T performance
 - » Software assisted autotrack - the low velocity tracking dynamic of the X/Y allows the implementation of real time signal level peaking throughout the track by utilizing unique tracking algorithms to control the servo control system

Radome Options:

The Comtech X/Y Antenna Systems do not require a radome for operation, but for extreme locations Comtech can provide a cost-effective radome solution. A radome offers many advantages like protection from extreme weather conditions, extension of component life and provides antenna position concealment.

- Radome Diameter Sizes: 1.5 meters to 20 meters (larger on request) tuned for the frequency or frequencies of interest
- Foam Core Sandwich Composition – three types of construction
 - ‘A’ sandwich consisting of three layers
 - ‘C’ sandwich consisting of five layers
 - ‘S’ space frame design using a fiberglass framing with a reinforced PTFE-impregnated glass fiber (Teflon) fabric (ideal for wideband applications)
- Wind Speed: Radomes capable of surviving in winds up to 200 km/hr – 300 km/hr (depending on specific model)



Antenna in 5m radome with integrated ring wall

Additional Features & Options:

- Deployable, trailer, truck and skid mounts
- High-performance shaped Cassegrain feed configurations
- Multi-frequency feed systems
- Highly-responsive installation and maintenance services
- Full RF and data chain including:
 - » Frequency converters, spectrum analyzers, RF switching, demodulators/modems, uplink amplifiers
- Mode coupler auto-track and software assisted auto-track (ideal for X/Y low dynamic) available



Type 1 on trailer mount



Type 4



Type 5 ground mount



Deployable with breakaway X/Y mount

X/Y System Advantages:

Cost Advantage: Simplified and elegant design, advanced manufacturing techniques, and use of commercial components makes the X/Y one of the most cost-effective antenna products available in the industry

High Performance:

- System **eliminates the “keyhole” at zenith** or “cone of silence” associated with overhead passes experienced on other pedestal configurations
- **Less dynamic tracking motion** of the X/Y antenna over an El/Az provides for **more accurate pointing**, which is especially important when tracking Ka-band
- Low dynamic of movement greatly **reduces system wear**, thus extending the system life and reducing maintenance
- **No cable wrap issues**; no need for rotary joints or slip rings
- Precision gear assemblies **eliminate drive-system backlash**

Delivery: 14 to 26 weeks (ARO) for the 1st system, delivery schedules will vary based on system requirements, antenna size and factory loading at the time of the order.

Carbon Fiber Reflectors: No need to heat the dish to avoid expansion and contraction as temperatures change; greater gain performance over an aluminum dish, especially at the higher Ka-band through V-band ranges.

Environmental Resilience: System designed for operation in coastal, arctic, and desert environments



Type 5 on a tower

| Mechanical | | | | |
|--|--|--|--|---|
| Specifications | Pedestal <i>Weight (lbs) Height (ft/in)</i> | Dish Sizes | Pedestal <i>Weight (lbs) Height (ft/in)</i> | Dish Sizes |
| Apertures sizes: | Type 000 (45lbs) | 30cm to 50cm | Type 3 (2,700lbs) (9'10"-14'9") | 3.0m—5.0m (Outdoor System) 3.0m—6.1m (In-Radome System) |
| | Type 00 (90lbs) | 80cm to 1.2m | | |
| | Type 0 (165lbs) | 1.4m to 1.8m | Type 4 (3,850lbs) (9'10"-14'9") | 3.4m—4.5m (Outdoor System) 3.4m—6.1m (In-Radome System) |
| | Type 1 (725lbs) (72" to 94") | 1.8m—2.4m (Outdoor System) 1.8m—3.0m (In-Radome) 3.0m Low Wind Variant | Type 5 (5,500lbs) (14'9"-20') | 5.0m—7.3m (Outdoor System) 5.0m—9.0m (In-Radome System) |
| | Type 2 (2,200lbs) (9'10" - 12'2") | 3.0m—3.7m (Outdoor System) 3.0m—4.2m (In-Radome) | Type 6 (12,500lbs) | 6.1m—9.0m (Outdoor System) 6.1m—14.0m (In-Radome System) |
| Point Accuracy | 0.1° to 0.05° (configuration dependent) | | | |
| Position Step Resolution | 0.0004° | | | |
| Acceleration | 10°/S ² max | | | |
| Velocity | 4°/s typical to 20°max (note X/Y configuration only requires a fraction of the velocity that would be required with a typical E/Az configuration) | | | |
| Axis Configuration | X over Y geometry | | | |
| Axis Travel | Full hemispheric coverage | | | |
| Horizon Limits | -2° typical | | | |
| RF | | | | |
| Frequency Ranges | L, S, X, C, Ku, Ka, Q and V bands | | | |
| Polarization | Left Hand and/or Right Hand Circular Polarization (linear on request) | | | |
| Feed Configurations | Multi-band prime focus and/or Cassegrain configuration | | | |
| Autorack feed options | Mode-coupler mono-pulse or RSSI software tracking | | | |
| G/T Performance Samples ⁽¹⁾ | 2.4-meter S-band 10.7dB/K Prime focus feed 3.0-meter X-band 24.0dB/K Prime focus feed 3.7-meter X-band 28.5dB/K Cassegrain feed 4.2-meter S-band 16.0dB/K Prime focus feed 5.0-meter X-band 29.5 dB/K Cassegrain feed 5.5-meter X-band 30.2dB/K Cassegrain feed 6.1-meter X-band 31.0dB/K Cassegrain feed 7.3-meter X-band 32.6dB/K Cassegrain feed | | | |
| Control System | | | | |
| Monitor & Control | Full Linux based, includes satellite scheduler and TLE propagator. | | | |
| Interface | 1Gig Ethernet (TCP/IP) (fiber optic interface can be provided), includes SMNP and XML modules | | | |
| Power | 100/240Vac, 1phase, 15~30A (Depends on configuration Types 00- 4); Types 5 and 6 require 3-phase 208VAC or 380/415VAC | | | |
| Environmental (without Radome) | | | | |
| Wind Speed | 100km/hr wind (62 mph) Operational ⁽²⁾ | | | |
| Temperature | -40°C—+70°C (-40°F - +158°F) | | | |
| Humidity | 100% Relative Humidity | | | |
| Driving rain | Up to 10cm/hr (4 in/hr) | | | |

[1] G/T Performance at 5° elevation clear sky

[2] Optional measures (heaters, radomes, HVACs) can be taken to improve operational environmental limits

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About Comtech

Comtech Telecommunications Corp. (Nasdaq: CMTL) designs, develops, produces and markets innovative products, systems and services for advanced communications solutions. The Company sells products to a diverse customer base in the global commercial and government communications markets. For more information visit www.comtechtel.com.

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