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 11 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.

Features:

- 30 centimeters to 11 meters antenna size
- X/Y axis configuration (Series A 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)
**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 RSSI auto-track (ideal for X/Y low dynamic)

**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. Some X/Y positioner stock is maintained on the shelf and ready for delivery, please inquire.

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. Heated reflectors for ice and snow removal are available.

Environmental Resilience: System designed for operation in coastal, arctic, and desert environments.
## Mechanical Specifications

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Pedestal</th>
<th>Dish Sizes</th>
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<th>Dish Sizes</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Weight (lbs)</td>
<td>Height (ft/in)</td>
<td>Weight (lbs)</td>
<td>Height (ft/in)</td>
</tr>
<tr>
<td><strong>Apertures sizes:</strong></td>
<td></td>
<td></td>
<td>Type 3</td>
<td></td>
</tr>
<tr>
<td>Series A</td>
<td>45lbs</td>
<td>30cm to 50cm</td>
<td>(2,700lbs)</td>
<td>(9’10”-14’9”)</td>
</tr>
<tr>
<td>Series B</td>
<td>90lbs</td>
<td>80cm to 1.2m</td>
<td></td>
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<tr>
<td>Series C</td>
<td>165lbs</td>
<td>1.4m to 1.8m</td>
<td>Type 4</td>
<td></td>
</tr>
<tr>
<td>Type 1</td>
<td>(725lbs)</td>
<td>(72° to 94°)</td>
<td>1.8m—3.4m (Outdoor System)</td>
<td>3.7m (In-Radome)</td>
</tr>
<tr>
<td>Type 2</td>
<td>(2,200lbs)</td>
<td>(9°10” - 12°2”)</td>
<td>3.0m—3.7m (Outdoor System)</td>
<td>4.2m—4.5m (In-Radome)</td>
</tr>
</tbody>
</table>

### Point Accuracy
- 0.1° to 0.05° (configuration dependent)

### Position Step Resolution
- 0.0004°

### Acceleration
- 10°/s² max

### Velocity
- 5°/s typical to 20°/s max (note k/θ configuration only requires a fraction of the velocity that would be required with a typical El/Az configuration)

### Axis Configuration
- X over Y geometry

### Horizon Limits
- -1° typical

### RF Specifications

<table>
<thead>
<tr>
<th>Frequency Ranges</th>
<th>L, S, X, C, Ku, Ka, Q and V bands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polarization</td>
<td>Left Hand and/or Right Hand Circular Polarization (linear on request)</td>
</tr>
<tr>
<td>Feed Configurations</td>
<td>Multi-band prime focus and/or Cassegrain configuration</td>
</tr>
<tr>
<td>Autotrack feed options</td>
<td>Mode-coupler mono-pulse or RSSI software tracking</td>
</tr>
</tbody>
</table>

### G/T Performance Samples

1. 2.4-meter S-band 10.7dB/K Prime focus feed
2. 3.0-meter X-band 24.0dB/K Prime focus feed
3. 3.7-meter X-band 27.5dB/K Cassegrain feed
4. 4.2-meter S-band 16.0dB/K Prime focus feed
5. 5.0-meter X-band 29.5 dB/K Cassegrain feed
6. 5.5-meter X-band 30.2dB/K Cassegrain feed
7. 6.1-meter X-band 31.0dB/K Cassegrain feed
8. 7.3-meter X-band 32.6dB/K Cassegrain feed

### Control System

<table>
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<tr>
<th>Monitor &amp; Control</th>
<th>Full Linux based, includes satellite scheduler and TLE propagator.</th>
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</thead>
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<tr>
<td>Interface</td>
<td>1Gig Ethernet (TCP/IP) (fiber optic interface can be provided), includes SMNP and XML modules</td>
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<tr>
<td>Power</td>
<td>100/240Vac, 1phase, 15-30A; Types 5 and 6 require 3-phase 208VAC or 380/415VAC</td>
</tr>
</tbody>
</table>

### Environmental (without Radome)

| Wind Speed | 80km—100km/hr wind (62 mph) Operational [1][2] |
| Temperature | -40°C—+70°C (-40°F - +158°F) Survivable |
| Humidity | 100% Relative Humidity |
| Driving rain | Up to 10cm/hr (4 in/hr) |

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[1] G/T Performance at 5° elevation clear sky
[2] Optional measures (heaters, radomes, HVACs) can be taken to improve operational environmental limits
[3] Depends on pedestal/antenna combination

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## Contact

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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.