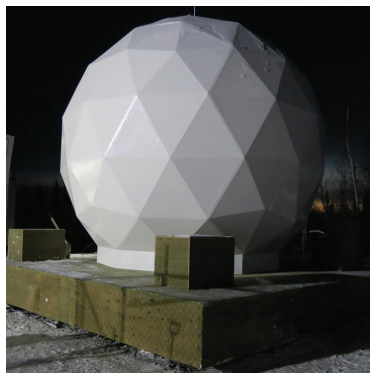


Low/Medium Earth Orbit Satellite Tracking Antenna Systems



Cost-Effective | High Reliability | Precision Tracking | Configuration Flexibility



Fixed and Deployable Systems and Radomes

Overview/Situation

Comtech Satellite & Space provides the customer a complete turn-key satellite and tracking solution for your ground stations in frequency bands ranging from UHF, L, S, X, C, and Ku to Ka, Q, and V. We offer the most extensive line of X/Y antennas in the industry supporting LEO and MEO constellations worldwide.

We offer a range of X/Y tracking antennas from 30 centimeters to 7.3 meters and larger coupled with our installation expertise and worldwide support in extreme environments such as the Arctic, Middle East and Tropics. We also offer specialty multi-band feed design capabilities. Comtech Satellite & Space provides the customer a complete satellite and tracking solution for your ground stations.



Type 0.5 Deployable



Type 1 with weight trays



Type 1 ground mount

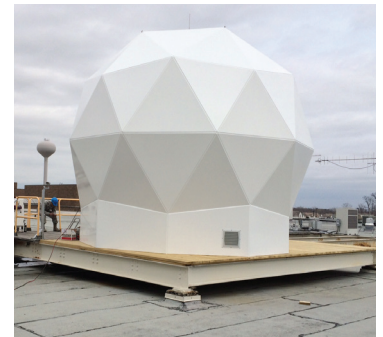
Solution Details:

- 30 centimeters to 7.3 meters and larger antenna size
- X/Y axis configuration Transmit/receive feed technologies through V-band
- Designed for tracking LEO, MEO, HEO and GEO spacecraft
- Applications include Earth Observation/Remote Sensing, Data Gateways, 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:
 - » 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 Solution Options:

The Comtech X/Y Antenna Systems do not require a radome for operation, but for extreme locations Comtech can provide cost-effective radome solutions. 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
- Software RSSI auto-track (ideal for X/Y low dynamic)
- Integrated UHF Transmit and Receive capabilities



6.3m antenna on trailer mount



Type 2 ground mount



Type 3 on a Platform



Type 5 ground mount

X/Y Customer Benefits:

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

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. We offer carbon fiber reflectors up to 7.3m in diameter and larger.

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



Micro Deployable



Type 5 on a tower

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Mechanical				
Specifications	Pedestal Weight (lbs) Height (ft/in)	Dish Sizes	Pedestal Weight (lbs) Height (ft/in)	Dish Sizes
Apertures sizes:	Micro Deployable X/Y (45lbs)	30cm to 50cm	Type 2 X/Y (2,200lbs) (9'10"-12'2")	3.0m—3.7m (Outdoor System) 4.2m—4.5m (In-Radome)
	Global Deployable X/Y (Type .5 X/Y) (370lbs)	.9m to 2.4m	Type 3 X/Y (2,700lbs) (9'10"-14'9")	3.5m—5.5m (Outdoor System) 6.1m (In-Radome System)
	Type 1 X/Y (725lbs) (72" to 94")	1.8m—3.4m (Outdoor System) 3.7m (In-Radome)	Type 5 X/Y (5,500lbs) (14'9" - 20')	5.0m – 7.3m (Outdoor System) 7.6m – 9.0m (In-Radome System)
Point Accuracy	<0.1°			
Position Step Resolution	0.0004°			
Acceleration	10°/S ² max			
Velocity	5°/sec typical – higher available upon request (note X/Y configuration only requires a fraction of the velocity that would be required with a typical El/Az configuration)			
Axis Configuration	X over Y geometry			
Axis Travel	Full hemispheric coverage			
Horizon Limits	-1° typical			
RF				
Frequency Ranges	UHF, 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			
Autotrack feed options	Mode-coupler mono-pulse or RSSI software tracking			
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; Type 5 requires 3-phase 208VAC or 380/415VAC			
Environmental (without Radome)				
Wind Speed	80-100+km/hr wind (50-62+ mph) Operational ^{[1][2]} 200 km/hr wind (124 mph) Survivable			
Temperature	-40°C—+70°C (-40°F - +158°F)			
Humidity	100% Relative Humidity			
Driving rain	Up to 10cm/hr (4 in/hr)			

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

[2] Depends on pedestal/antenna combination

About Comtech

Comtech Telecommunications Corp. is a leading global technology company providing terrestrial and wireless network solutions, next-generation 9-1-1 emergency services, satellite and space communications technologies, and cloud native solutions to commercial and government customers around the world. Our unique culture of innovation and employee empowerment unleashes a relentless passion for customer success. With multiple facilities located in technology corridors throughout the United States and the world, Comtech leverages its global presence, technology leadership and decades of experience to create the world's most innovative communications solutions.

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