

# 3.5 Meter LEO XY ESA

Like all Kratos earth station antennas, the 3.5 Meter Earth Station Antenna provides high gain and exceptional pattern characteristics.

This antenna system is designed to address the stringent requirements of Low Earth Orbit tracking for operators who demand unsurpassed flexibility and electrical performance in high-quality, cost-effective, and reliable packages.

The electrical performance and exceptional versatility provides the ability to configure the antenna with your choice of linearly- or circularly- polarized combining networks and an optional conical scanning feed. That versatility is provided at the time of initial purchase, as well as in the future, as your satellite communication requirements evolve.

The antenna reflector is used worldwide in broadcast applications and high density data, voice and communications networks. The Kratos 3.5 meter earth station antenna features a computer-optimized precision single or two-piece spun aluminum reflector with a dual optics Gregorian sub reflector .

This reflector is designed for ease of installation even at Ka or higher bands without the need for reflector adjustment, optimization or specialized tools.

The reflector is installed on an X-Y positioner, the X-Y positioner provides high output torque with low backlash, covers 360° continuous azimuth range (with slipping), and +5° to +175° elevation range and no keyhole effect.

This combination provides extremely accurate surface contour resulting in exceptionally high gain and closely controlled pattern characteristics. Kratos earth station antennas provide maximum durability with minimal maintenance.



## Features

- Ka Band Applications
- Single or Two-Piece Main Reflector without need for adjustment, optimization or special tools
- Bonded and riveted torsion box for rigidity
- Heavy duty mounting ring for strength
- Advanced dual reflector Gregorian optics
- Conical Scanning Feed
- X-Y pedestal with high precision (near-zero backlash) drives
- On-axis, High Accuracy Absolute encoders (+/- .005°)
- NGC Antenna Control Unit
- Power and control interfaces
- Beacon Tracking Receiver
- 3 year warranty on all structural components

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## Design Standards

Reflector	Aluminum painted with highly diffusive white paint
Ground Mount	Hot-dipped galvanized steel, per ASTM-A123 for structural steel.
Hardware	Sizes $\leq$ 3/8 in (9.5mm), stainless steel, passivated per MIL-F-14072-E300 Sizes $\geq$ 3/8 in (9.5mm), hot-dipped galvanized stainless steel, passivated per ASTM-A123

## Environmental Information

Temperature	Operating	-40° to 52°C
	Storage	-54°C to +71°C
Seismic (Earthquake)	1 G Vertical and Horizontal acceleration. Equivalent to a Richter Magnitude 8.3, and Grade 11 on the modified Mercalli Scale	
Operational Winds	56 km/h / 35 MPH (gusting to 72 km/h / 45 MPH)	
Survival Winds	125 mph (200 km/h) in any position of operation	
Rain	4 in (102 mm) per hour	
Solar Radiation	360 BTU/hr/ft <sup>2</sup> (1135 Watts/m <sup>2</sup> )	
Relative Humidity	100%, including condensation	
Shock and Vibration	As encountered by commercial Air, Rail and Truck shipment.	
Weight (reflector + pedestal)	depends on configuration contact Kratos	
Power Requirements	110-220 VAC, 50-60 Hz, 1Ø	

## Mechanical Performance

The 3.5m Antenna mechanical general specifications and performances are listed in below table. Additional information, dimensions and layout may be provided by Kratos on a case-by-case basis.

Reflector		
Optics Type	Dual Reflector Gregorian	
Reflector Material	Precision-Formed Aluminum	
Reflector Segments	1 or 2	
Positioner		
Mount Type	X/Y	
Velocity	6°/sec	
Acceleration	12°/sec <sup>2</sup>	
Tracking Accuracy	<0.05°	
Travel	Azimuth	360° continuous with slipping
	Elevation	+5° to +175°
Torque	Continuous	3,600 ft. lbs.
	Peak	7,200 ft. lbs.

## Shipping Information

Packing Options		
Standard Commercial Domestic Pack	Included	
Ocean Export Pack - For non-containerized, packed for seal against salt water spray	OCEANSHIP	
Air Export Pack - For freighter aircraft shipments. Lower deck AirPack requires specialized bids	AIR EXPORT PACK	
Container Packaging	CNTPCK	

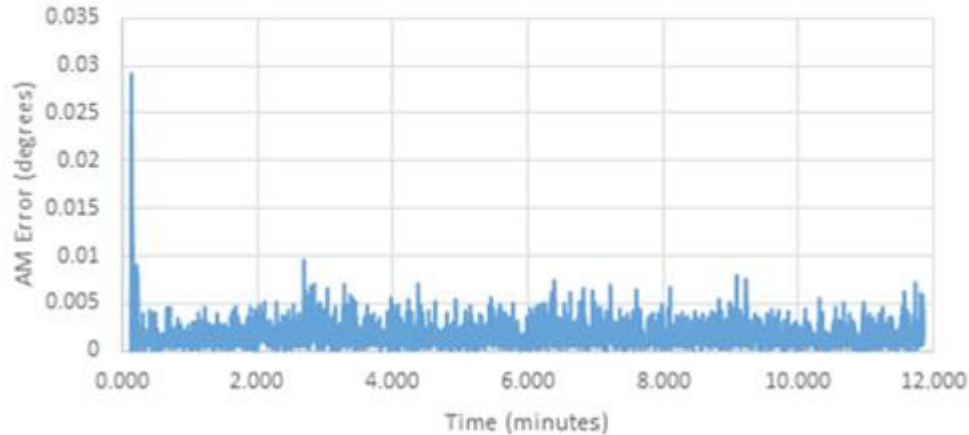
Required Shipping Container		
Open Top 20 ft land/sea container	Quantity 1	

Shipping container information is given for basic configuration and may vary depending on the selected options, please contact Kratos for specific container loading plan.

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## Antenna Conscan Tracking Performance and Receiver Characteristics

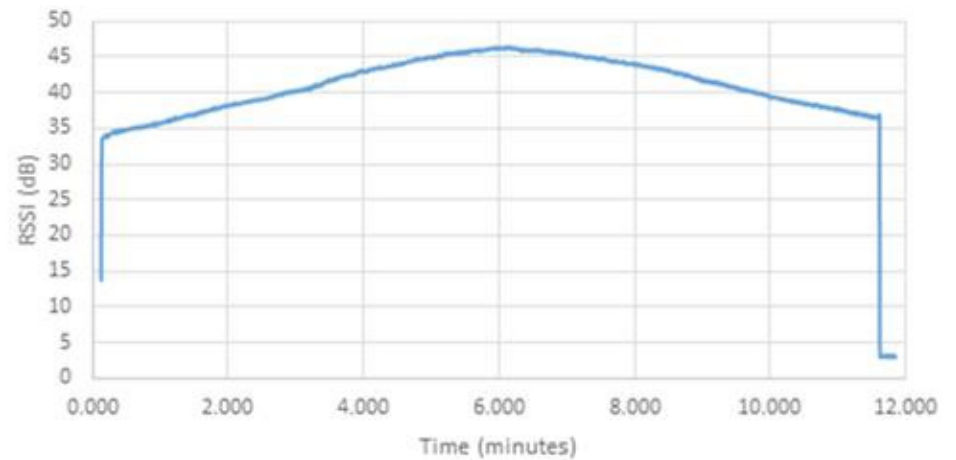
Tracking Log - AM Error



The receiver board outputs include RSSI (signal strength) and AM error measurements. RSSI measurements over 12 minute Iridium satellite pass show stable signal strength during complete track cycle. Tracking receiver capable of both narrow and broadband signal (data), downconverted within the range of 925 – 2400 MHz. Board includes multiple band pass filter settings ranging from 100KHz to 3000KHz

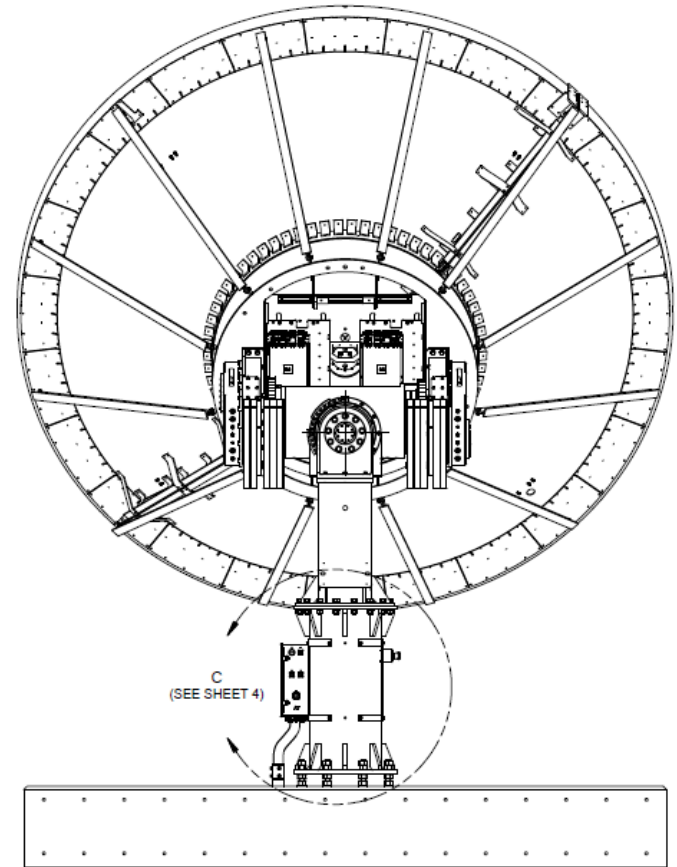
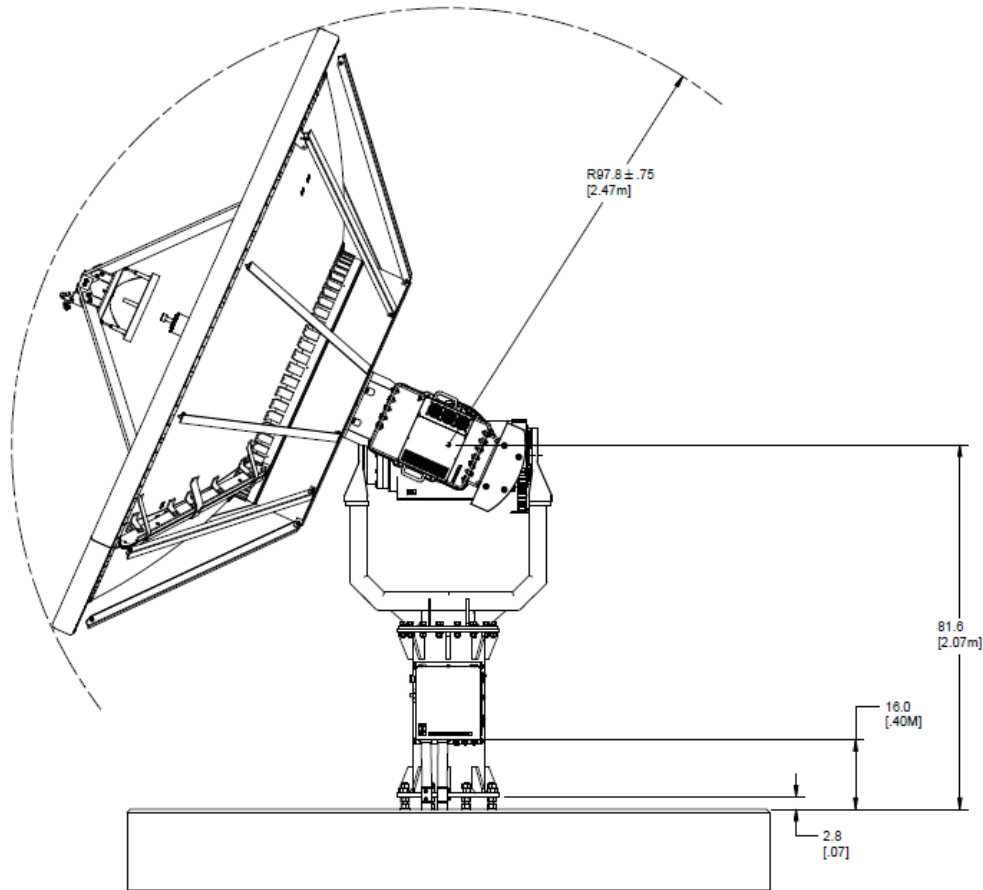
TT&C conical scanning 3.5m system tracking a LEO satellite. over the Ka band receive frequency range of 19.4-19.6 GHz. Actual log file showing excellent antenna tracking performance, overall rms error < 0.005°. (< 2% 3dB beamwidth). Stable acquisition and tracking performance from low elevation angles starting at 5 deg, through overhead trajectories, without keyhole degradation typical of el over az systems

Tracking Log - RSSI



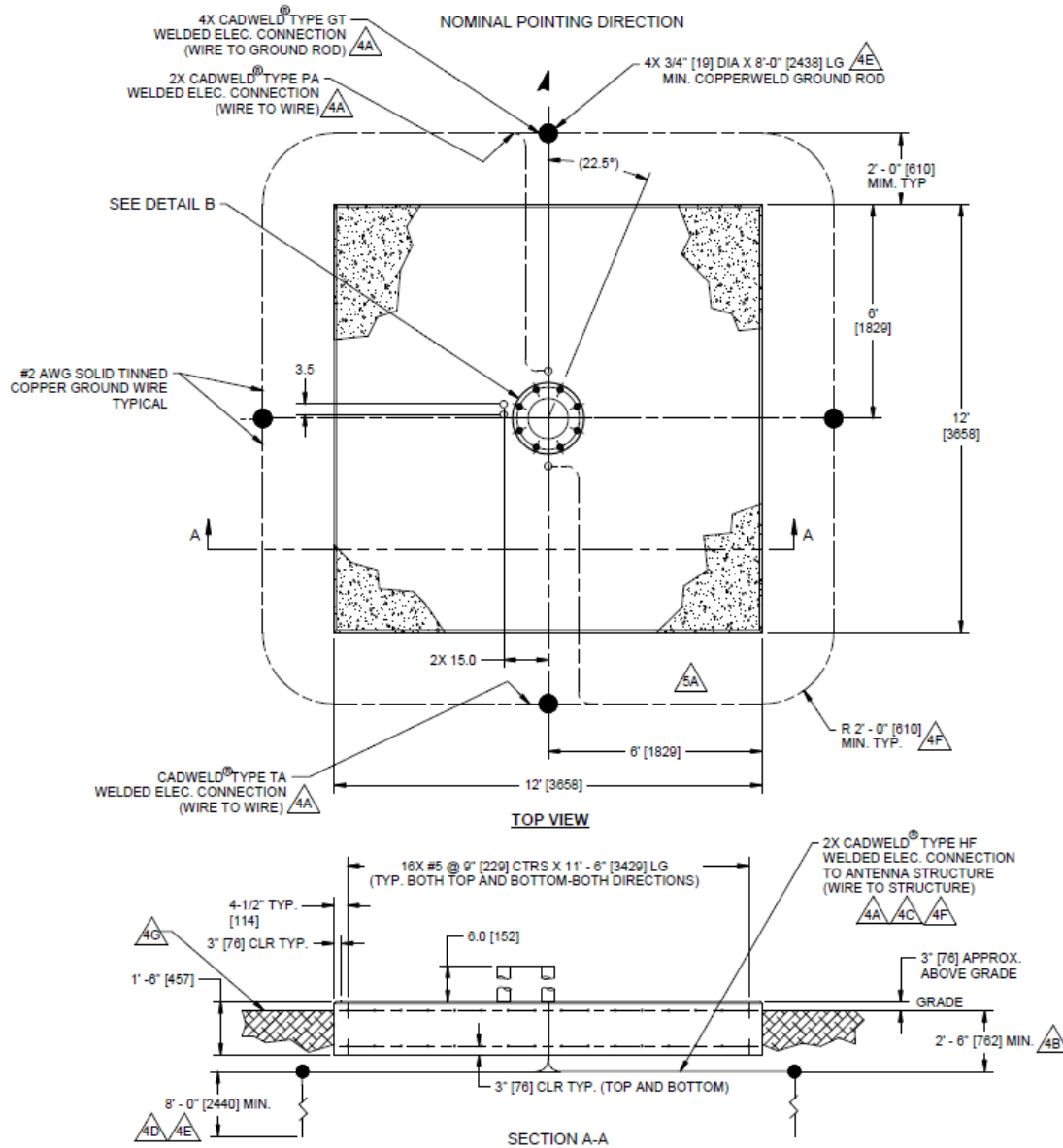
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## Dimensional Drawings



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## Typical Foundation Design



Foundation information is provided in a special bulletin, please contact Kratos.

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## Drive System

Drive System	
Drives	
X	Brushless DC Servo
Y	Brushless DC Servo
Features	
Controllers	COTS Digital Servo Controller
Absolute Encoders	25 Bits Resolution
EMI Filtering	Yes
Protection	Over-current
	Over-voltage
	Over-temperature

## ACU System

ACU System	
NGC Control System	
Operational Control	Manual Control
	Standby Mode
	Pointing
	Tracking
Open Loop Tracking	TLE Data Set
	Data Set
	External Live Source
Closed Loop Tracking	Beacon Sources
	Step Track
	Conical Scan

## Motorization and NGC Options

Indoor	
NGC2-IDU	NGC Rack Mounted Antenna Controller W/LCD Touch Panel
NGC2-001	NGC-IDU Analog Telephone Modem
NGC2-002	NGC-IDU Spectrum Analyzer Card, Analog
NGC2-003	NGC-IDU DVB Receiver Card
NGC2-004-02	NGC IDU, L-Band Internal Beacon Receiver
NGC-004-02-IDU	NGC 1RU, L-Band External Beacon Receiver
NGC2-006	NGC-IDU Emergency Stop Button
NGC2-007	NGC-IDU 10 Mhz Reference Source
NGC2-008	NGC-IDU Redundant Power Supply
NGC2-009	NGC-IDU Rack Slides
NGC2-101	NGC-IDU Step Tracking Software
NGC2-102	NGC-IDU Smartrack Software
NGC2-103	NGC-IDU Predictive Track Software
NGC2-104	NGC-IDU Full Tracking Capability Software
NGC2-118	NGC-IDU Conical Tracking Software
NGC2-106	NGC-IDU Remote Access Software Package
NGC2-107	NGC-IDU Spectrum Analyzer Enhanced User Interface
NGC2-108	Receive Pattern Test Tool
NGC2-109	Redundancy Control Software
NGC2-111	Sand/Dust Deviator Feature
NGC-2-119	NGC High Availability System Redundancy Software
Outdoor	
NGC2-206	NGC Exterior Emergency Stop Button
NGC2-207	Pre Movement Alert Warning Light And Annunciator
NGC2-211	Dual Path NGC Redundancy
NGC2-AESC	Environmental System Controller

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## Feed Matrix

KA- BAND FEED SYSTEMS	PORT	LP	CP	RX 17.7 - 21.2 GHz	RX 17.8 - 20.2 GHz	RX 21.4 - 22.0 GHz	TX 27.0 - 30.05 GHz	TX 27.50 - 31.00 GHz	TX 28.3 - 30.0 GHz
4CPKAOW-35-1	4		X		X			X	
4CPWWKA-35-206	4		X	X				X	

## Antenna Configurations

Ka Band Earth Station Antennas	
3.5m with X/Y Mount.	ES35C

## Antenna Options and Spares

Anchor Bolt and Template Kits Option	
4905307-01	Anchor Bolt and Template Kits

Heating Options	
FAD35	Anti-Dew Kit
FH35	Feed Heater Ka-Band
RMHC35	Remote Heater Controller

Environmental Systems Options	
PDCPKA-35-208	Precipitation Deviator Ka-band 208 VAC, 3 Phase
PDCPKA-35-380	Precipitation Deviator Ka-band 380 VAC, 3 Phase

Safety Options	
ANTGND-5	Foundation Installed Grounding Kit
4715910-01	Lightning Kit

Other Options	
FTST	Feed System Testing
TK-MAN-SML	Tool Kit, Small Manual Antennas
TK-MOT-SML	Tool Kit, Small Motorized Antennas



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