

# 13.5 Meter ESA

The Kratos 13.5 Meter Earth Station Antenna gives you high-performance in C-, Ku- or DBS-band geostationary satellite applications. The shaped Cassegrain reflector provides superior gain and sidelobe performance, meeting stringent FCC and international requirements. Precision stretch-formed and interchangeable aluminum panels are attached to a central structural steel hub with rigid, interchangeable structural trusses. The panels are coated with a solar-diffusive white coating system that provides years of environmental protection while minimizing thermal expansion effects. The reflector back structure and subreflector spars are designed to exacting rigidity requirements under wind and gravity loads. The hub provides a protective enclosure for sensitive electronics.

The Kratos "Turning Head" mount provides an efficient structure for supporting and positioning the feed/reflector system over a full 360° in 70° continuous sectors. Elevation travel provides 0° to 90° of continuous travel. Extended azimuth travel is available as an option. Antenna Control System options range from Step track, SmarTrack®, Predictive track and monopulse tracking systems.



## Features

- Antenna patterns compliant with FCC, ITU, and Eutelsat regulations
- High efficiency shaped-Cassegrain optics
- Various C-, Ku- and DBS-band feed configurations
- Steel turning head mount
- CE compliant antenna controller and tracking options
- Easily accessible hub space for electronics packages
- Rugged aluminum and steel construction

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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 Performances

Operating Temperature	-40° to 65°C (-40° to 150°F)
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	30 mph (48 km/h) Gusts to 45 mph (72 km/h)
Drive to Stow Survival	80 mph (129 km/h)
Survival Winds	125 mph (200 km/h) in any stow position
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%
Shock and Vibration	As encountered by commercial Air, Rail and Truck shipment.
Atmospheric Conditions	As encountered by Moderately Corrosive Coastal and Industrial Areas.

## Mechanical Performances

The 13.5m Antenna mechanical general specifications and performances are listed in the table below. Additional information, dimensions and layout may be provided by Kratos on a case-by-case basis.

Optics Type	Dual reflector, shaped axi-symmetric
Reflector Material	Precision-Formed Aluminum
Reflector Segments	36
Mount Type	EI over Az

### Antenna Pointing Range Coarse/(Continuous)

Elevation:	0-90° (90°)
Azimuth:	360° (70°)
Polarization	180° (180°)

### Hub/Enclosure External Dimensions

Diameter/depth	2.14m (84 in)
Depth	1.19m (47 in)

## Shipping Information

### Packing Options

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

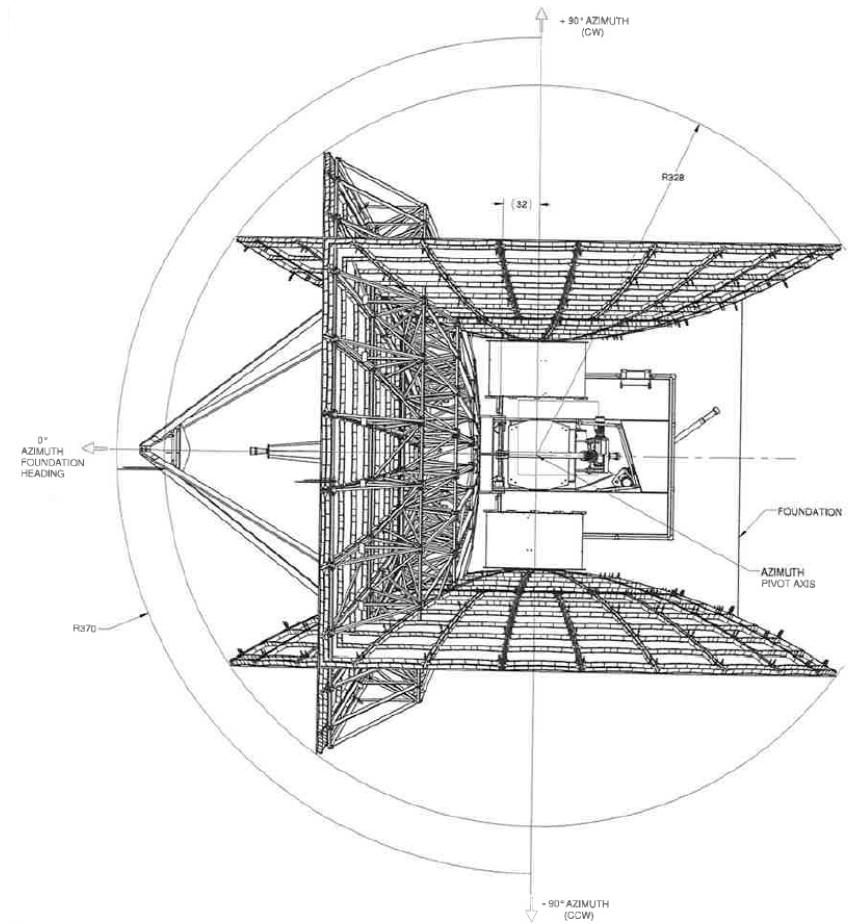
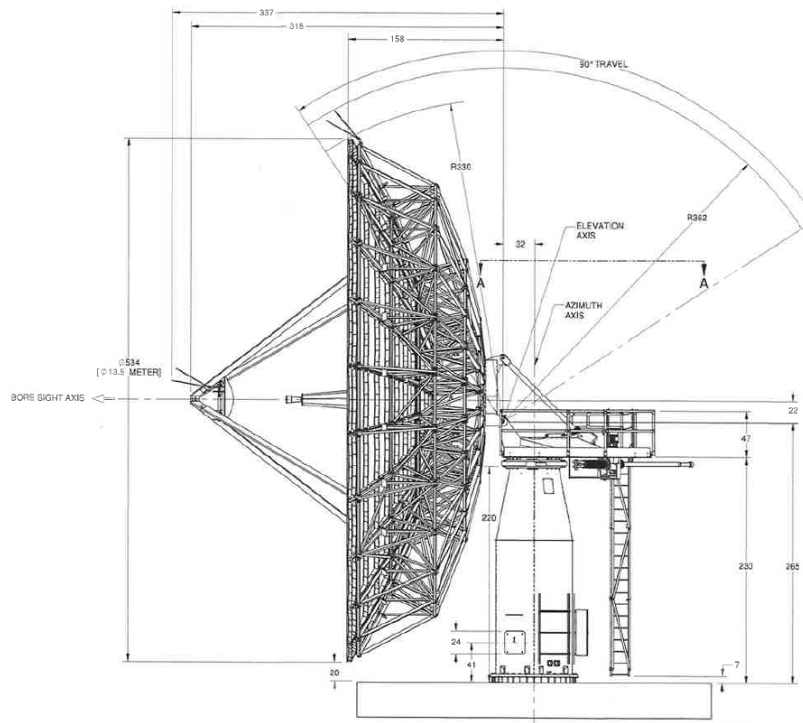
### Required Shipping Container

Standard 20 ft land/sea container	contact Kratos
Standard 40 ft land/sea container	contact Kratos

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

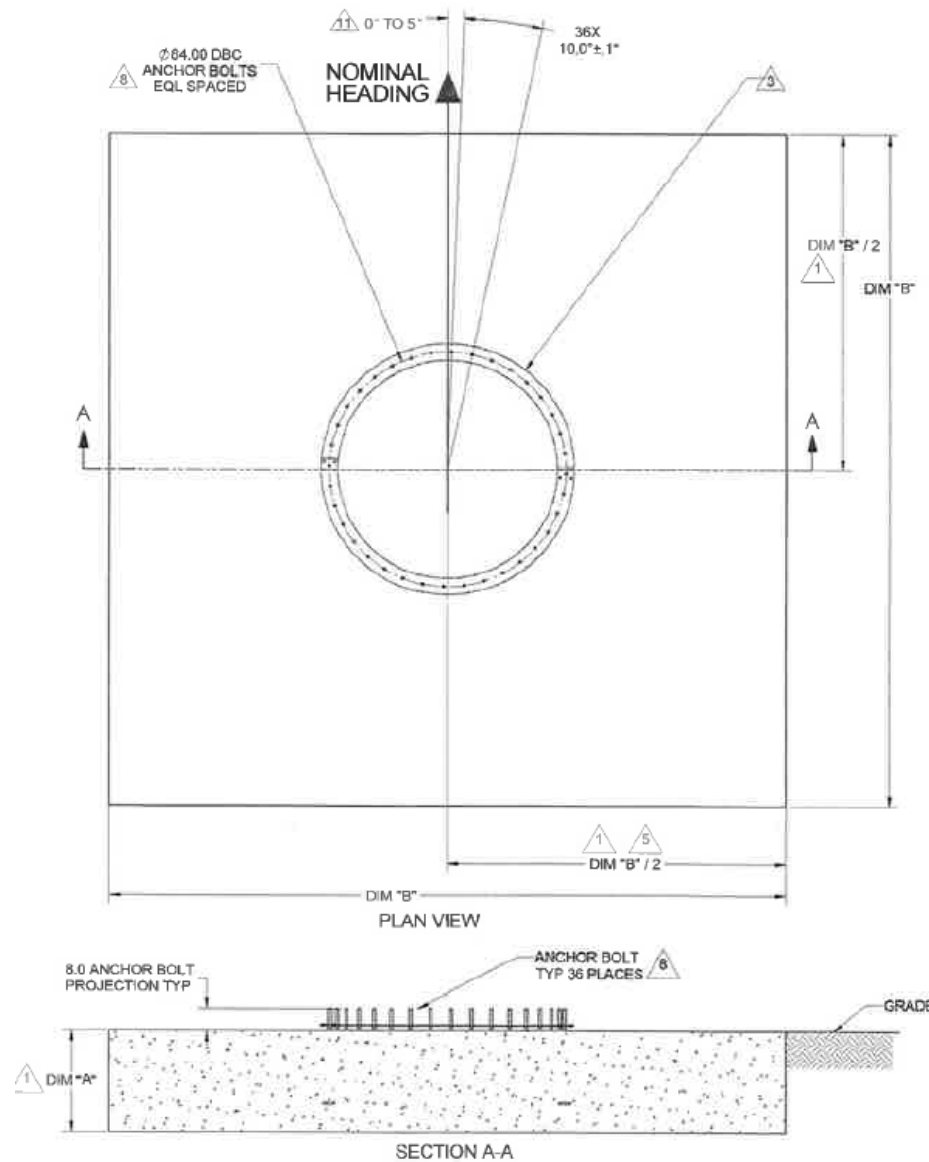
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### Dimensional Drawings



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### Typical Foundation Design



Foundation information are provided in specific bulletin, please contact Kratos.

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## Motor Drive Speed Summary

	Variable	
Azimuth	0.05°/s	0.5°/s
Elevation	0.05°/s	0.5°/s
Polarization	1°/s	

## Motorization

One motorization system is available for this antenna: the NGC tracking system that can support Steptrack, Smartrack and Ephemeris orbital tracking.

### Motor Kit

Azimuth/Elevation Motor Kit	NGC-MK135
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### Outdoor Unit Controller (Tracking)

Power 200 - 230 VAC, 3 Phase 50/60 Hz	NGC-ODU-208-135
Power 380 - 460 VAC, 3 Phase 50/60 Hz	NGC-ODU-380-135

Antenna controller, motorization and options are detailed in specific bulletins, please contact Kratos.

## Antenna Configuration

### Earth Station Antennas

Motorizable Mount with Az/EI Jackscrews.	ES135-1
Low PIM Motorizable Mount with Az/EI Jackscrews.	ES135-1-LP

## Motorization and NGC Options

Indoor	
NGC-IDU	NGC Rack Mounted Antenna Controller W/LCD Touch Panel
NGC-001	NGC-IDU Analog Telephone Modem
NGC-002	NGC-IDU Spectrum Analyzer Card, Analog
NGC-002-EDR	NGC-IDU Spectrum Analyzer Card, Analog Enhanced Dynamic Range
NGC-003	NGC-IDU DVB Receiver Card
NGC-004-02	NGC IDU, L-Band Internal Beacon Receiver
NGC-004-02-IDU	NGC 1RU, L-Band Beacon Receiver
NGC-006	NGC-IDU Emergency Stop Button
NGC-007	NGC-IDU 10 Mhz Reference Source
NGC-008	NGC-IDU Redundant Power Supply
NGC-009	NGC-IDU Rack Slides
NGC-101	NGC-IDU Step Tracking Software
NGC-102	NGC-IDU Smartrack Software
NGC-103	NGC-IDU Predictive Track Software
NGC-104	NGC-IDU Full Tracking Capability Software
NGC-106	NGC-IDU Remote Access Software Package
NGC-107	NGC-IDU Spectrum Analyzer Enhanced User Interface
NGC-108	Receive Pattern Test Tool
NGC-109	Redundancy Control Software
NGC-111	Sand/Dust Deviator Feature
NGC-119	NGC High Availability System Redundancy Software
Outdoor	
NGC-201	NGC ODU Low Temperature Kit (-40 C)
NGC-202	NGC ODU High Temperature Kit (+60 C)
NGC-206	NGC Exterior Emergency Stop Button
NGC-207	Pre Movement Alert Warning Light And Announcator
NGC-211	Dual Path NGC Redundancy
NGC-AESC	Environmental System Controller

Antenna controller, motorization and options are detailed in specific bulletins, please contact Kratos.

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## Feed Matrix

C- BAND FEED SYSTEMS	PORT	Co-Pol	CP	LP	RX 3.625 - 4.2 GHz	RX 3.4 - 4.2 GHz	RX 4.5 - 4.8 GHz	TX 5.850 - 6.425 GHz	TX 5.850 -6.725 GHz	TX 5.725 - 6.725 GHz	TX 6.725 - 7.025 GHz
4CPWWC-13-206	4		X			X				X	
4LPWWC-13-VP	4			X		X				X	

Ku- BAND FEED SYSTEMS	PORT	LP	RX 10.7 - 12.5 GHz	RX 10.7 - 12.75 GHz	RX 10.7 - 11.7 GHz	TX 12.75- 13.25 GHz	TX 12.75 - 14.5 GHz	TX 13.0 - 14.5 GHz	TX 13.75- 14.5 GHz	TX 13.75- 14.8 GHz
4LPKU-13-1-VP	4	X		X						X

K- BAND FEED SYSTEMS	PORT	CP	LP	RX 10.7 - 12.75 GHz	TX 17.3 - 18.4 GHz
4LPKK-13-VP	4		X	X	X
4CPKK-13	4	X		X	X

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## Antenna Options and Spares

Anchor Bolt and Template Kits Options	
1061858	Foundation Kit
Azimuth and Elevation Cross Axis Waveguide Options	
XAPC-135	C-Band cross Axis and Polarization Axis Waveguide Kit.
XAPC-135-UPG	C-Band Cross Axis and Polarization Axis Waveguide Kit Upgrade. Upgrades XAPC-135 for use with 4-port C-Band Feeds.
XAPKK-135	K-Band cross Axis and Polarization Axis Waveguide Kit.
XAPKK-135-UPG	K-Band Cross Axis and Polarization Axis Waveguide Kit Upgrade. Upgrades XAPKK-135 for use with 4-port K-Band Feeds.
XAPKU-135	Ku-Band Cross Axis and Polarization Axis Waveguide Kit. Single run for 2-Port Ku-Band Feeds.
XAPKU-135-UPG	Ku-Band Cross Axis and Polarization Axis Waveguide Kit Upgrade. Upgrades XAPKU-135 for use with 4-Port Ku-Band Feeds. Provides Additional Waveguide Run.
Heating Options	
FHC-135	C-Band Feed Heater
FBKUK-135	Ku and K-Band Feed Heater
FHX-135	X-Band Feed Heater
WEC135R-208-100	Electric Hot Air De-Ice System, 208 VAC, 3 Phase
WEC135R-380-100	Electric Hot Air De-Ice System, 380 VAC, 3 Phase

Hub Equipment Options	
EMRGYLT-115	Emergency Hub Light Kit, 115 VAC
EMRGYLT-230	Emergency Hub Light Kit, 230 VAC
721734	Fan Vent Kit, 115 VAC
578904	Fan Vent Kit, 230 VAC
HUBHTR-230	Antenna Hub Heater, 230 VAC
HUBLCNTR-115/240	Hub Power Center, 115/240 VAC
HUBLCNTR-230	Hub Power Center, 230 VAC
HUBLT-115	Hub Light Kit, 115 VAC
HUBLT-230	Hub Light Kit, 230 VAC

Safety Options	
ANTGND-13	Foundation Installed Grounding Kit
LRK135	Lightning Rod Kit
MANPL135-TH	Full Maintenance Platform and Ladder Kit
OBWRNLT-UNV	Obstruction Warning Light Kit

Other Options	
209906-13	Lubrication and Maintenance Kit
201769-13	Handwheel Kit
FTST	Feed System Testing
TK-VEP-LG	Tool Kit, Large Motorized Antennas
ANGVERN-13	Manual Angle Indicator
516212	Theodolite Alignment Kit

Environment Systems Options	
PDKUK-135-208	Precipitation Deviator, 208/230 VAC.
PDKUK-135-380	Precipitation Deviator, 380/415 VAC.





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