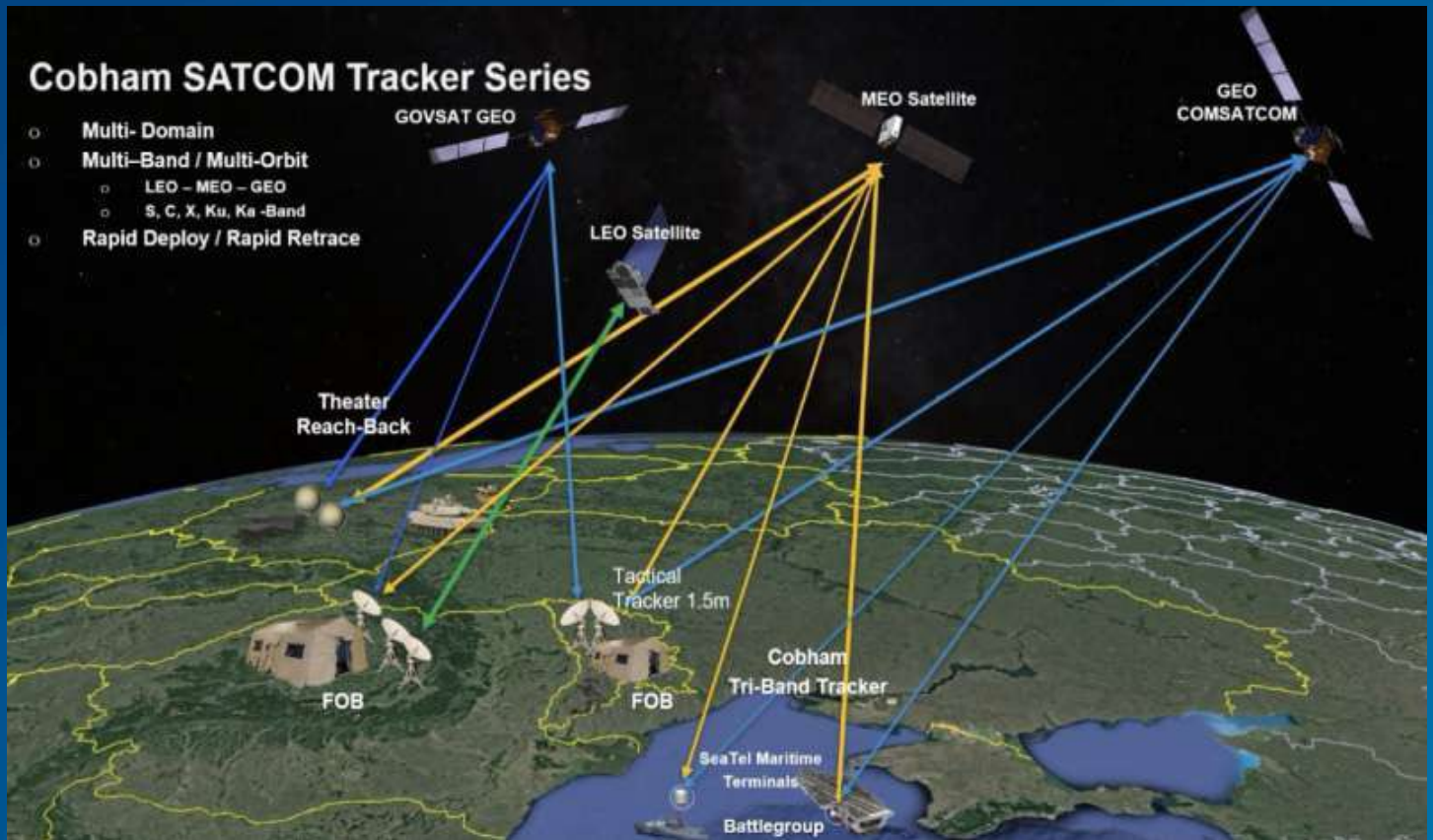


# **COBHAM SATCOM**

Connecting the future



**Tactical Tracker Technical Specification**  
S/C/X/Ku/Ka-band



Today, the US Military is the largest user of COMSATCOM across all services, agencies, and COCOMS. Despite the sizable current dependency on commercial SATCOM, its usages and expenditures continue to grow - coupled with Five Eyes, NATO, and US military allies, it's evident the industry's demand and scope are going through significant changes. In addition, the need to operate across multiple LEO, MEO, and GEO constellations at multiple RF Bands is driving the commercial SATCOM industry to develop new and innovative technologies.

## Tactical Tracker Series Terminals TTS

Multi-Orbit, Multi-Band, Multi-Operator Network when every mission matters

Cobham Satcom has developed the X-Y Tactical Terminal Series in three aperture sizes of 1.3 meter, 1.5 meter, and 2.6 meters. They can operate individually or in pairs for seamless "Make Before Break" MEO operations or an additional arbitration for a third antenna with a different mission set, constellation, orbit, or RF band. Users can quickly switch between different RF bands, orbits, and satellite operators. The X-Y Axis pedestal provides excellent high-speed, accurate performance for LEO, MEO, GEO, and HEO applications.

With an upgraded drive motor design and new software, the Tactical Tracker series 1.3 meter and 1.5 meter are capable of rapid retrace speeds (approx. 6 seconds), enabling a "Break Before Make" single antenna and single modem topology on mPower MEO without dropping encryption. This minimizes SATCOM system complexities by reducing the number of terminals that are essential to the mission requirements – **a single terminal at the FOB!**

## The Overall Thrust is to Enable Mission Command at the Tactical Edge!

The Tactical Tracker Series is a compact, modular, and cost-effective user terminal that provides secure, mission-critical data and control links for a growing range of defense and government applications. The 1.3 meter and the 1.5 meter assembly times are approximately 30 minutes, making this system satellite acquisition ready. Additionally, the servo systems provide full-motion control for a continuous operation designed for high-duty cycle LEO/MEO satellite tracking.

The shaped/parabolic is a 10-pc segmented carbon fiber composite reflector and a high-performance Y over -X servo control system. Various RF packages and feeds can be exchanged in the field, with optional Ku/Ka dual band feed and RF equipment upgrades. The Ka-Band feed seamlessly covers the full 3.5 GHz RF bandwidth to cover all COMSATCOM and MIL requirements.

The Tactical Tracker Series enables “Multi-Band, Multi-Orbit, Multi-Operator” functionalities, giving our customers unparalleled new capabilities demanded by the next generation of spacecraft designs



- Accurate/reliable antenna beam pointing on LEO, MEO, GEO, and HEO constellations
- Full hemispheric coverage, no keyhole effect
- Industry-leading satellite pointing software
- 1.3 m and 1.5 m RF bands, X, Ku, Ka
- Full Ka-Band Tx RF 27.5 GHz to 31.0 GHz
- Full Ka-Band RX RF 17.7 to 21.2 GHz
- 2.6 m RF bands S, C, X, Ku and Ka
- Ultra-stiff carbon fiber reflector technology
- User-friendly assembly, operation, disassembly, and pack up (no tools required)
- Meets MIL-STD-1472G two-person lift

# TRACKER 1300 TT

Product Sheet



MECHANICAL	
EL/CL Drive	Motorized Y or X Positioner
Polarization	Circular X, Ka, Linear Ku
Reflector	Segmented 10-Piece Carbon Fiber
Retrace Speed	30 Degrees per second
Power Supply	110/220 V 50/60 Hz-

PACKAGING (4 Cases)	
Reflector Case	26.5 x 26.5 15.6 (~65 lbs.)
Positioner Case	37.5 x 27.5 x 14.5 (~90 lbs.)
Pedestal/Controller Case	44.9 x 25.3 x 16.5 (~115 lbs.)
RF Case	26.5 x 26.5 x 15.6 (~60 lbs.)

ENVIRONMENTAL	
Wind-Operational	~30 MPH Gusting to - 45 MPH
Wind-Survival	60 MPH
Temperature Operational	-30° to 60° C
Temperature Survival	-40° to 70° C

RF/ELECTRICAL	Ka BAND COMMERCIAL		Ka BAND MILITARY		Ku BAND		X BAND	
	Receive	Transmit	Receive	Transmit	Receive	Transmit	Receive	Transmit
RF Parameters								
Frequency	17.7-20.2 GHz	27.5-30.0 GHz	20.2-21.2 GHz	30.0-31.0 GHz	10.7-12.75 GHz	13.75 - 14.5 GHz	7.25-7.75 GHz	7.9-8.4 GHz
Polarization	RHCP+LHCP	RHCP+LHCP	RHCP+LHCP	RHCP+LHCP	Linear Xpol	Horiz or Vert	RHCP+LHCP	RHCP+LHCP
Gain @ Mid Band (dBi)	46.8 dBi	49.4 dBi	47.0 dBi	49.6 dBi	42.5 dBi	43.8 dBi	38.2 dBi	38.8 dBi
VSWR	1.3: 1 Typical	1.3: 1 Typical	1.3: 1 Typical	1.3: 1 Typical	1.3: 1 Typical	1.3: 1 Typical	1.3: 1 Typical	1.3: 1 Typical
Radiation Pattern Compliance	FCC 25.209, Mil-STD-188-164A	FCC 25.209, Mil-STD-188-164A	Mil-STD-188-164A	Mil-STD-188-164A	FCC 25.209, ITU-R S.580-6	FCC 25.209, ITU-R S.580-6	Mil-STD-188-164A	Mil-STD-188-164A
Power Handling Capability	NA	250 Watts	NA	250 Watts	NA	400 Watts	NA	500 Watts
G/T @ Mid-Band (40 Degrees)	23.3 dB/K	NA	23.7 dB/K	NA	20.7 dB/K	NA	17.5 dB/K	NA
Axial Ratio	1.5	1.0	1.5	1.0			1.2	2.0
Cross Pol Isolation	>22 dB Typical	>25 dB Typical	>22 dB Typical	>25 dB Typical	>30 dB	>30 dB	>23 dB Typical	>20 dB Typical
Feed Port Isolation	> 35 dB	> 80 dB	> 35 dB	> 80 dB	> 35 dB	> 80 dB	> 110 dB	> 110 dB

CONTROL INTERFACE
Controller is embedded into pedestal
OpenAMIP 1.17 compatible
Enhanced GUI for ease of setup and operation
Advanced software to actively track the best signal available
Supports GEO, MEO, and LEO tracking
Supports HTTPS for secure connection
Support for TLE as well as ECEF tracking formats

OPTIONS
Various RF kits available: Ka, Ku, X Bands available upon request
Various BUC options with mounting kits available
Anchoring kit options available
Spare parts kit available
Other packaging configurations available upon request

# TRACKER 1500 TT

Product Sheet



MECHANICAL	
EL/CL Drive	Motorized Y over X Positioner
Polarization	Circular X, Ka, Linear Ku
Reflector	Segmented 8-Piece Carbon Fiber
Retrace Speed	30 Degrees per Second
Power Supply	110/220 V 50/60 Hz

PACKAGING (4 Cases)	
Reflector Case	26.5 x 26.5 x 15.6 (~ 70 lbs.)
Positioner Case	37.5 x 27.5 x 14.5 (~ 90 lbs.)
Pedestal/Controller	44.9 x 25.3 x 16.5 (~ 115 lbs.)
RF Case	26.5 x 26.5 x 15.6 (~ 60 lbs.)

ENVIRONMENTAL	
Wind-Operational	~ 30 MPH Gusting to ~ 45 MPH
Wind-Survival	60 MPH
Temperature Operational	-30° to 60° C
Temperature Survival	- 40° to 70° C

RF/ELECTRICAL	Ka BAND COMMERCIAL		Ka BAND MILITARY		Ku BAND		X BAND	
RF Parameters	Receive	Transmit	Receive	Transmit	Receive	Transmit	Receive	Transmit
Frequency	17.7-20.2 GHz	27.5-30.0 GHz	20.2-21.2 GHz	30.0-31.0 GHz	10.7-12.75 GHz	13.75 - 14.5 GHz	7.25-7.75 GHz	7.9-8.4 GHz
Polarization	RHCP+LHCP	RHCP+LHCP	RHCP+LHCP	RHCP+LHCP	Linear Xpol	Horiz or Vert	RHCP+LHCP	RHCP+LHCP
Gain @ Mid Band (dBi)	47.8 dBi	51.2 dBi	48.1 dBi	51.4 dBi	43.5 dBi	45.2 dBi	39.0 dBi	39.6 dBi
VSWR	1.3: 1 Typical	1.3: 1 Typical	1.3: 1 Typical	1.3: 1 Typical	1.3: 1 Typical	1.3: 1 Typical	1.3: 1 Typical	1.3: 1 Typical
Radiation Pattern Compliance	FCC 25.209, Mil-STD-188-164A	FCC 25.209, Mil-STD-188-164A	Mil-STD-188-164A	Mil-STD-188-164A	FCC 25.209, ITU-R S.580-6	FCC 25.209, ITU-R S.580-6	Mil-STD-188-164A	Mil-STD-188-164A
Power Handling Capability	NA	250 Watts	NA	250 Watts	NA	400 Watts	NA	500 Watts
G/T @ Mid-Band	24.8 dB/K	NA	25.0 dB/K	NA	22.9 dB/K	NA	17.5 dB/K	NA
Axial Ratio	1.5	1.0	1.5	1.0			1.2	2.0
Cross Pol Isolation	>22 dB Typical	>25 dB Typical	>22 dB Typical	>25 dB Typical	>30 dB	>30 dB	>23 dB Typical	>20 dB Typical
Feed Port Isolation	> 35 dB	> 80 dB	> 35 dB	> 80 dB	> 35 dB	> 80 dB	> 110 dB	> 110 dB

CONTROL INTERFACE
Controller is embedded into pedestal
OpenAMIP 1.17 compatible
Enhanced GUI for ease of setup and operation
Advanced software to actively track the best signal available
Supports GEO, MEO, and LEO tracking
Supports HTTPS for secure connection
Support for TLE as well as ECEF tracking formats

OPTIONS
Various BUC options with mounting kits available
Anchoring kit options available
Spare parts kit available
Other packaging configurations available upon request

# TRACKER 2400 TT

Product Sheet



MECHANICAL	
EL/Cl Drive	Motorized Y over X Positioner
Polarization	Circular X, Ka, Linear Ku
Reflector	Segmented 8-Piece Carbon Fiber
Retrace Speed	~5 Degrees per second
Power Supply	110/220 V 50/60 Hz

PACKAGING (6 Cases) <small>* All case weights are estimated</small>	
Reflector Case	~ 150 lbs.*
Leg/ Strut	~ 114 lbs.*
Positioner Lower	~ 99 lbs.*
Positioner Upper	~ 91 lbs.*
Pedestal/Controller	~ 115 lbs.*
RF Integration	~ 80 lbs.*

ENVIRONMENTAL	
Wind-Operational	~ 30 MPH gusting to 45 MPH
Wind-Survival	60 MPH
Temperature Operational	-30° to 60° C
Temperature Survival	-40° to 70° C

RF/ELECTRICAL	Ka BAND COMMERCIAL		Ka BAND MILITARY		Ku BAND		X BAND	
RF Parameters	Receive	Transmit	Receive	Transmit	Receive	Transmit	Receive	Transmit
Frequency	17.7-20.2 GHz	27.5-30.0 GHz	20.2-21.2 GHz	30.0-31.0 GHz	10.7-12.75 GHz	13.75 - 14.5 GHz	7.25-7.75 GHz	7.9-8.4 GHz
Polarization	RHCP+LHCP	RHCP+LHCP	RHCP+LHCP	RHCP+LHCP	Linear Xpol	Horiz or Vert	RHCP+LHCP	RHCP+LHCP
Gain @ Mid Band (dBi)	51.8 dBi	54.9 dBi	52.1 dBi	55.2 dBi	47.5 dBi	49.0 dBi	43.4 dBi	44.1 dBi
VSWR	1.3: 1 Typical	1.3: 1 Typical	1.3: 1 Typical	1.3: 1 Typical	1.3: 1 Typical	1.3: 1 Typical	1.3: 1 Typical	1.3: 1 Typical
Radiation Pattern Compliance	FCC 25.209, Mil-STD-188-164A	FCC 25.209, Mil-STD-188-164A	Mil-STD-188-164A	Mil-STD-188-164A	FCC 25.209, ITU-R S.580-6	FCC 25.209, ITU-R S.580-6	Mil-STD-188-164A	Mil-STD-188-164A
Power Handling Capability	NA	250 Watts	NA	250 Watts	NA	400 Watts	NA	500 Watts
G/T @ Mid-Band	28.1 dB/K	NA	28.4 dB/K	NA	27.1 dB/K	NA	21.7 dB/K	NA
Axial Ratio	1.5	1.0	1.5	1.0			1.2	2.0
Cross Pol Isolation	>22 dB Typical	>25 dB Typical	>22 dB Typical	>25 dB Typical	>30 dB	>30 dB	>23 dB Typical	>20 dB Typical
Feed Port Isolation	> 35 dB	> 80 dB	> 35 dB	> 80 dB	> 35 dB	> 80 dB	> 110 dB	> 110 dB

CONTROL INTERFACE
Controller is embedded into pedestal
OpenAMIP 1.17 compatible
Enhanced GUI for ease of setup and operation
Advanced software to actively track the best signal available
Supports GEO, MEO, and LEO tracking
Supports HTTPS for secure connection
Support for TLE as well as ECEF tracking formats

OPTIONS
Various RF kits available: Ka, Ku, X Bands available upon request
Portable radomes and custom colors available
Anchoring kit options available
Spare parts kit available
Other packaging configurations available upon request

# TRACKER DETAILS

**TRACKER**<sup>TM</sup>  
COBHAM SATCOM

The Cobham Satcom Tactical Tracker Series X-Y antenna system is purpose-designed as the industry's premier LEO/MEO/GEO quick deploy tracking antenna with rapid retrace functionality that maintains encryption layer stability. Verified video teleconference is four tunnels deep without dropping the link integrity, although packet losses occur during the retrace transition time.

It consists of a lightweight, high-precision carbon fiber reflector driven by a servo-controlled closed-loop positioner. The Tactical Tracker is capable of horizon-to-horizon travel with speeds up to 16.4 deg/s and an acceleration rate of 10 deg/s<sup>2</sup>. These speeds and acceleration rates are achieved using high-power density BLDC motors driving low backlash gearboxes.

There are three primary electronic components that make up the Integrated Control Unit (ICU):

- The antenna control processing
- The Inertial Measurement Unit (IMU) is used to indicate to the control system the movement the antenna is experiencing.
- The tracking receiver, which can be utilized for initial site calibration when modem RSSI is not available using sources such as the sun or GEO satellites.

The Tactical Tracker Series use Cobham Satcom's trusted Antenna Control Software (ACS), which performs the

ACS provides multiple user interfaces to the ICU, which include serial, USB, and IP via Ethernet. The user interfaces include a command line interface and an embedded web server, with a completely redesigned GUI introduced in 2022-Q4.



Tactical Tracker Series X over Y motor drive placement

Cobham Satcom's pointing and tracking algorithms are industry-leading, refined, and perfected over three decades. The TLE ephemeris information for the satellite in question is received beforehand and is available in the antenna control unit (ACU) for a complete satellite pass.







## **ANY ORBIT, ANY BAND, ANY NETWORK**

- Family of Network Terminals
- Multi-Orbit – LEO/MEO/GEO/HEO
- Greatest Pointing Accuracy – .05-.02\*
- Gateways & User Terminals
- ISMS/ISO270001 Compliant
- JADC2

# IN DEVELOPMENT

Cobham Satcom is moving quickly with engineering development efforts for expanded GUI features capabilities, RF switching, multi-band feeds, and increased retrace speeds on the larger 2.6 meters Tactical Tracker.

Future Advanced SATCOM (FAST) began over a decade ago with CERDEC and has now progressed to where the commercial satellite industry has become interested. A significant benefit of FAST architecture is enabling Digital RF/IF processing such that software-defined platforms and/or software-defined modems (SDM) can be utilized to meet evolving mission requirements. Secondary benefits would include improved channel topology management for the next generation of satellites with advanced DSP payload architectures.

## UPGRADES AND OPTIONS:

- A range of LNAs, LNBS and BUCs, Feeds and Switching configurations
  - Full coverage Ka-Band BUCs
  - Wide Band Programable LNB's
- FAST, (Future Advanced SATCOM), ready Digital IF
- IFL
- QD transportable radome (environmental protection)
- Anchoring Kits
- Grounding Kits
- Spares Kits
- Alternate colors and patterns and Logos

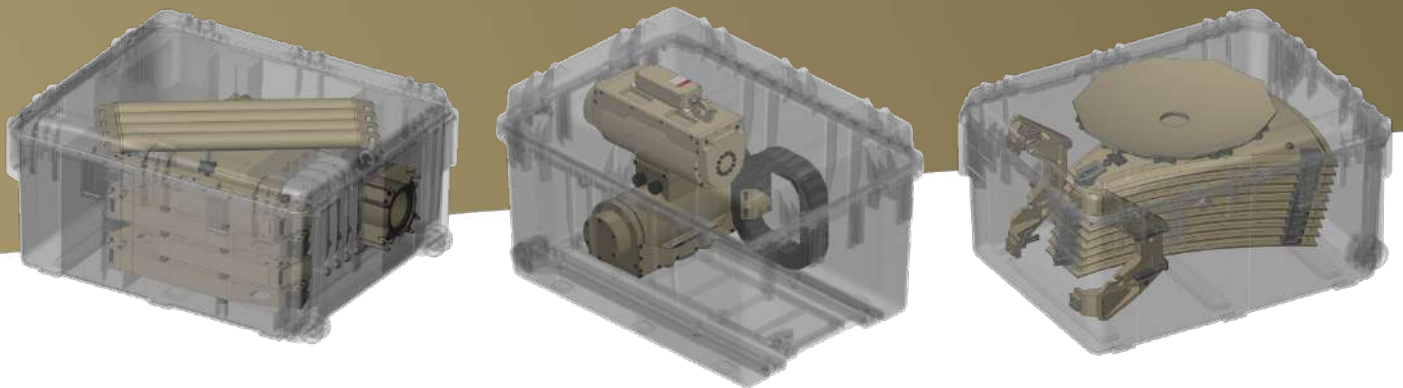
## TIME TO RETRACE

The Tactical Tracker Series has the added design feature of a "Break Before Make" capability giving the customer the operational topology options to reduce the number of antenna terminals required at any location for MEO to MEO or MEO to GEO. Performance results are currently 6 seconds before modem and IP layer lock

No. Satellites	11	MEO
Separation	32.73	degrees
1/2 Separation	16.36	
Accel	10	deg/sec/sec
Time	5	sec
Velocity	16.1	deg/sec
Distance	32.72	deg
Goal Distance	54	deg
Time	4.6475	sec
Velocity	23.2379	deg/sec

Retrace is calculated at the equator but improves with latitude positioning. Demodulator lock, IP Layer setup latencies are not included.

## TACTICAL TRACKER SERIES PACKING CONFIGURATION





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