

# OceanTRx 4MIL

1.15m (4') Ruggedized Maritime VSAT System





The OceanTRx 4MIL is the latest addition to a long line of field-proven, maritime SatCom systems deployed in leading NATO and allied navies. The OceanTRx 4MIL builds on over 30 years' of vast experience with demanding customers while introducing innovative concepts of environmental immunity and resilient, simultaneous RF band operations for mission-critical applications. It provides reliable, high capacity, long-range multiband communication to navy vessels under extreme conditions.

## Main Characteristics

- Designed as mission-critical equipment from the start, achieving the highest levels of availability and resilience, even in the harshest environmental conditions.
- Built for the severe platform dynamics typical of smaller vessels, while maintaining no compromise of pointing accuracy required for High Throughput Satellite networks, even at Sea State 6.
- A modular system, which can be tailored to specific customer needs using single, dual and multiband RF variants including X, Ku, Commercial and Mil Ka band frequency coverage. This technology simplifies upgrades and ensures that performance can keep pace with the rapidly changing demands placed on military networks.
- Compatible with a wide range of both COTS and military modems, including spread spectrum anti-jamming modems.
- Designed to operate in the crowded and hostile EMC environment of a modern warship, the OceanTRx MIL family of products has minimal impact on other communication, radars, sensor and weapon systems.
- Field-proven operation with MEO and LEO satellites, utilizing "make-before-break" soft handovers.

## Innovation in Action

The OceanTRx 4 MIL family incorporates Orbit's patented, simultaneous RF band antenna technology, delivering outstanding RF performance and pointing accuracy over time across all bands and eliminating rotating mechanical parts and cables. Single bands and "zero touch" switchable or simultaneous X/Ka, Ku/Ka, and X/Ku/Ka multiband terminals provide users with unprecedented flexibility, enabling hybrid Geo Stationary Orbit (GSO) and None GSO interoperability via high data-rate spot beams, as well as ubiquitous global coverage with single antennas or multi-antenna arrays.

## Reliability and Durability

Designed and tested to withstand the most demanding sea conditions, the OceanTRx 4MIL features a rugged electrical and mechanical design that complies with the most stringent environmental standards for shocks, vibrations, and electro-magnetic interference, including MIL-STD-810G and MIL-STD-461G enhanced configurations for defense applications.

## High Versatility and Multiple Configurations

The OceanTRx 4-MIL's modular approach enables a wide range of configurations, RF packages, frequency bands and modem platforms. This flexibility greatly facilitates reconfiguration, upgrades and field maintenance, without the need for additional modifications or rebalancing. Other options include air conditioning, heaters, and a wide choice of radome colors.



## Seamless Connections in Multiple Bands

A combination of OceanTRx 4MIL Single or Dual X/Ka, Ku/Ka systems, and Multiband X/Ku/Ka (each with respective RF chains), provides seamless connectivity between satellites in MEO/LEO constellations or GEO. Continuous service is assured by automatically transferring active Ka-band or Ku-band links between setting and rising LEO/MEO satellites, and by automatically switching to backup X-band, Ka-band, or Ku-band GEO links in the event of deep rain fade or when exiting a MEO/LEO spot coverage area. In addition, a fleet operating OceanTRx 4MIL can extend its operations to polar regions while maintaining constant connectivity through non-GEO constellations such as HEO and LEO.

## Monitoring and Control

OceanTRx terminals employ an intuitive, user-friendly interface via the Antenna Control Unit for total management of system operations. The controller allocates antenna resources while managing constellation tracking of the LEO, MEO and GEO satellites. Under normal conditions, it receives and processes satellite configuration and position updates from the satellite operator's Network Operations Center for completely hands-off operation.

## High Availability

OceanTRx 4MIL systems enable unprecedented levels of operational flexibility and resiliency. A fully active second antenna is perfect for MEO/LEO satellite zero handoff connectivity or to enable 360 degree coverage due to superstructure blockage, while a third antenna serves as a hot-standby – further optimizing system availability. Blockage is overcome by system switchover based on antenna Azimuth and Elevation blockage zones predefined during system installation.

## Full Regulatory Compliance

The OceanTRx 4-MIL system complies with industry regulations and standards including ITU, FCC, ETSI, Eutelsat, Intelsat, ANATEL, and Mil-STD-188-164C.

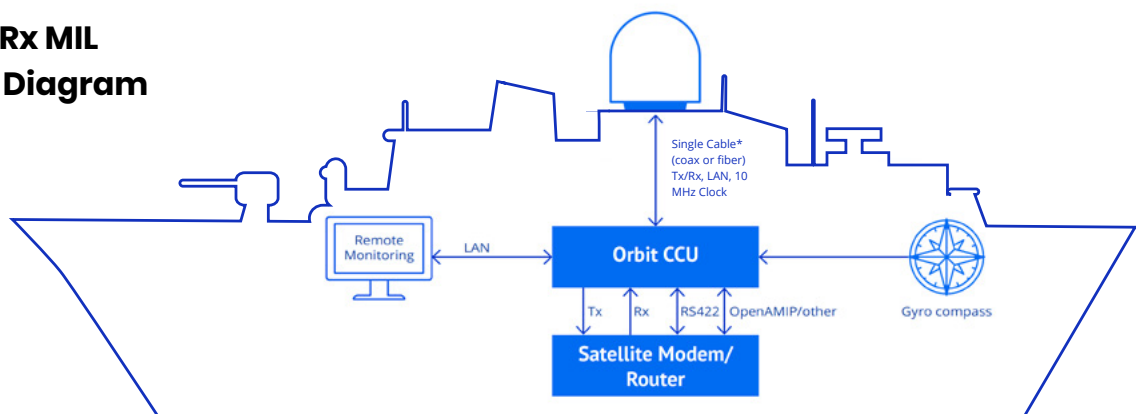
## World-Class Customer Support

Through our International Service Centers, Orbit's trained support engineers are available 24/7 to handle the urgent needs of customers worldwide. A global inventory replenishment system ensures efficient spare parts distribution across regions. With the capability to remotely access systems for troubleshooting and diagnostics, Orbit's real-time service support increases availability for enhanced customer satisfaction and cost benefits.

## Key Features

- Simultaneous operation or automatic switching of Dual X/Ka, Ku/Ka and Multiple bands
- Optional, fast manual band swapping with multiple BUCs per system
- Designed and tested for the strictest MIL-STD-810G Environmental conditions
- Designed and tested for the strictest MIL-STD-461G EMI/EMC conditions
- Superior stabilization and tracking under severe sea conditions
- Single, dual and multiple-antenna architecture, including combination with OceanTRx 7 per vessel
- Electronic Field Replaceable Units (FRUs) and software common to OceanTRx 4 and 7 systems
- Compact – two fully-assembled and tested units fit in a 20-foot container
- Advanced remote-monitoring, diagnostics, and troubleshooting capabilities
- Patented algorithm enables seamless MEO/LEO satellite handover

## OceanTRx MIL System Diagram



\*In case of simultaneous operation over more than one band, additional ADE-BDE cable will be required per band

# OceanTRx 4 MIL – Features and Specifications

## Features

Antenna Type	Dual offset Gregorian	Ship Gyro Interface	NMEA 0183, Step by Step, Synchronized
Antenna Size	1.15 m (45")	Modem Interface	L-band
Radome Size	D: 1.55 m (61") H: 1.69 m (67")	System Weight (including radome, RF dependent)	< 250 kg
Dynamic Accuracy under Typical Sea Motion	0.25 dB RMS	Enhanced Environmental Conditions Compliance	<ul style="list-style-type: none"> <li>Temperature: -25°C +49°C as per MIL-STD-810G</li> <li>Humidity: MIL-STD-810G</li> <li>Rain &amp; Spray: MIL-STD-810G</li> <li>Vibration: MIL-STD-810G</li> <li>Wind: Up to 115 knots</li> <li>EMI/EMC: MIL-STD-461G</li> </ul>
Dynamics (motion on a 40m ship as per DOD-STD-1399-301A)	Tracking: Up to Sea-State 6 Survival: Up to Sea-State 8		
Range of Mechanical Pedestal Axes	Azimuth: Continuous Elevation: -30° to +120° Cross Elevation: -75° to +75°		

## Single Band Specifications

Frequency Band	X	Ku	Ka	Ka-Wideband
Frequency Transmit	7.9 to 8.4 GHz	13.75 to 14.50 GHz	29 to 31 GHz	27.5 to 30 GHz
Frequency Receive	7.25 to 7.75 GHz	10.95 to 12.75 GHz	19.2 to 21.2 GHz	17.7 to 20.20
Polarization Control	RHCP/LHCP Mechanically/ Electrically Switchable	HOR/VER Electrically Switchable	RHCP/LHCP Electrically Switchable	RHCP/LHCP Electrically Switchable
System G/T (Typical at mid-range, 30° elevation, clear sky including all losses)	14.0 dB/°K	19.2 dB/°K	20.3 dB/°K	19.5 dB/°K
System EIRP (Typical at mid-range including all losses)	48 dBW (with 20W BUC)	53 dBW (with 16W BUC)	57 dBW (with 12W BUC)	57 dBW (with 12W BUC)
BUC Output Power	Multiple options are available – Please consult with Orbit			
Power Requirements Typical ADE & BDE 100 130 VAC or 200 250 VAC 50/60 Hz	ADE system < 500 W Without the BUC BDE equipment < 100 W			
Weight (Typical depending RF package)	<250 kg			

## Multi Band Specifications

Frequency Band	Ku/Ka	X/Ka	X/Ka/Ku
Frequency Transmit	Ku: 13.75 to 14.5 GHz Ka: 29.0 to 31.0 GHz	X: 7.9 to 8.4 GHz Ka: 29.0 to 31.0 GHz	X: 7.9 to 8.4 GHz Ka: 29.0 to 31.0 GHz Ku: 13.75 to 14.5 GHz
Frequency Receive	Ku: 10.95 to 12.75 GHz Ka: 19.2.0 to 21.2 GHz	X: 7.25 to 7.75 GHz Ka: 19.2 to 21.2 GHz	X: 7.25 to 7.75 GHz Ka: 19.2 to 21.2 GHz Ku: 10.95 to 12.75 GHz
Polarization Control	RHCP/LHCP Co-Cross (Ka) and HOR/VER Cross Pol (Ku)	RHCP/LHCP Co-Cross (Ka) and RHCP/LHCP Cross Pol (X)	RHCP/LHCP Co-Cross (Ka) and HOR/VER Cross Pol (X) HOR/VER Cross Pol (Ku)
Axial Ratio X and Ka on axis	Compatible with MIL-STD-188-164C		
System G/T (Typical at mid-range, 30° elevation, clear sky including all losses)	Ku: 19.2 dB/°K Ka: 20.3 dB/°K	X: 14.5 dB/°K Ka: 20.3 dB/°K	X: 14.5 dB/°K Ka: 20.3 dB/°K Ku: 19.2 dB/°K
System EIRP (Typical at mid-range including all losses)	Ku: 56.6 dBW (with 40W BUC) Ka: 61.0 dBW (with 25W BUC)	X: 48 dBW (with 20W BUC) Ka: 61.0 dBW (with 25W BUC)	X: 48 dBW (with 20W BUC) Ka: 61.0 dBW (with 25W BUC) Ku: 56.6 dBW (with 40W BUC)
BUC Output Power	Multiple options are available – Please consult with Orbit		
Power Requirements Typical ADE & BDE 100-130 VAC or 200-250 VAC 50/60 Hz	ADE system < 500 W Without the BUC BDE equipment < 100 W		
Weight (Typical depending RF package)	<250 kg		