

Seaborne Satellite Communications

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Sea Tel[®]

Transmit and Receive Systems





You won't lose the signal due to stabilization errors at any frequency even in storm conditions.

An order of magnitude more accurate than systems previously available! Less than 0.2° mispointing even at $\pm 25^\circ$ roll.

Voice, fax, television, weather, high speed data, video, Internet ...
Sea Tel's patented, three-axis, servo-controlled stabilization systems minimize or eliminate signal dropout for "business as usual," reliable satellite communications, even in storm conditions.

An unmatched range of additional powerhouse features means a system you can rely on whatever the weather or the sea conditions:

- Automatic satellite acquisition with programming smart enough to initiate a search pattern if acquisition isn't immediate.
- Automatic linear Polang Positioning eliminates unintended interference with satellite signal transmissions.
- Unlimited azimuth (no cable unwrap) provides uninterrupted coverage however the ship turns.
- Built-In Test (BIT) Internal diagnostics permit you to find out what's wrong and get it fixed fast.
- Unlimited distance between outdoor and indoor equipment lets you put the antenna where it belongs and the controls where it's convenient, whatever your ship's layout.
- Cable installation requirements minimized by multiplexing control data on coax cable. The result? A less expensive installation due to fewer interconnect cables.
- Versatile gyrocompass interface assures a match with your ship's navigation system.
- Multiple monitor and control functions give you the ability to keep your antenna system tuned and operating for optimum performance.
- Recovery in seconds after over-limit events keeps you in business precisely when it's most important – when conditions are at their worst.
- Optional air conditioned radome maintains stability of RF system and minimizes humidity for extended parts life.



Don't settle for less. Don't pay more!

More reliable performance wherever you sail.

Which antenna is best for your ship?
Sea Tel lets you choose from two
basic models in five configurations.

From C-Band to Ku-Band, you'll see the difference in more stable signal levels, fewer acquisition losses, lower bit-error rates.

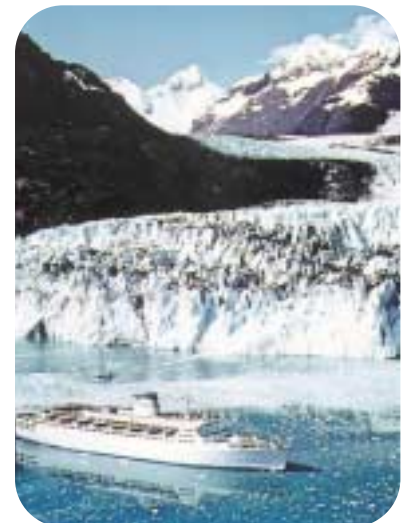
Future compatibility! When Ka-Band satellites come on line, the same antenna system will let you bring high-speed data services on board. Our pointing accuracy is already fully tested for Ka-band frequency on NASA's A.C.T.S. As new commercial Ka-band services at T1 to T3 data rates become available, you will have on board all the data intensive services you expect from land-based systems: multi-conferencing, Internet, video, high-speed data transfers, etc.

Sophisticated design and tight quality control allow Sea Tel Series 96 and Series 97 stabilized antenna systems to deliver premium U.S. Navy MIL-Spec performance at no premium in price. Up to now U.S. Navy MIL-Spec quality has meant premium prices. Not any more. With Sea Tel you pay only commercial prices – or less – for an antenna system that meets MIL-STD-901D for GRADE A shock and MIL-STD-461 for EMI and RFI (including 200V/M) ... and actually exceeds MIL-STD-167 for vibration.

A combination of performance and affordable pricing that leaves the competition playing catch-up — again! Forgive us for bragging but we don't want you to miss that we've used a major new design approach to achieve our superior performance. By designing smart, we are able to bring you more at no increase in price or reduction in quality. In fact we've raised the price/performance bar so high, the competition is going to have a very hard time reaching it any time soon!

The World's Standard In
**Seaborne Satellite
Communications**

Sea Tel® Transmit and Receive Systems



This isn't future technology.

It's available and performing beautifully around the world today.

WHATEVER SIZE
YOUR VESSEL
WHATEVER YOUR
APPLICATION
WHATEVER YOUR
BUDGET

There's an advanced Sea Tel Series 96 or Series 97 stabilized antenna system that will do the job and do it right.

Sea Tel Series 96 stabilized antenna systems



1.0 METERS
MODEL 4096S



1.2 METERS
MODEL 4996T

Sea Tel Series 97 stabilized antenna systems



2.0 METERS
MODEL 8797



2.4 METERS
MODEL 9797

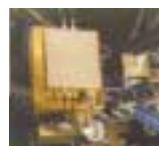


2.4 METERS
MODEL 9997

Fast-acting electronics are backed up by sophisticated horizontal and vertical mechanical shock absorbers.



High-torque motors position the antenna and keep the antenna firmly locked-in on the selected satellite.



Shielded electronics for system eliminate EMI emissions and RF.

Sensitive motion sensors are positioned to permit fastest possible response to ship movements.

Sea Tel's patented, 3-axis stabilization system isolates the antenna from the ship's motion no matter how rough the weather and seas. The antenna system responds to ship's movement at a rate as fast as 90 degrees per second.

The result? A maximum 0.2° error in the presence of +25° roll or +15° pitch ship motion and the ability to acquire the full range of frequencies from L-band to Ka-band. At last high-frequency, high-speed satellite data transmissions can be reliably received at sea!

CONSCAN: The Final Touch.

As satellite frequencies climb into the Ka-band range, antenna misalignment tolerances become vanishingly small. We have chosen to leave nothing to chance. All antenna systems incorporate an aggressive, proactive signal tracking system called conical scanning CONSCAN. This system reads the signal strength in each quadrant of the antenna and feeds this information to the system's Digital Antenna Control Unit which then micro-steps the antenna alignment to ensure equal signal strength in all four antenna quadrants.

The signal is sampled at 1,000 times per second with the

tracking sensitivity adjustable to the frequency and the antenna size. **The result?** a remarkably stable signal, even at the highest frequencies!



There's a Sea Tel
Series 96 or Series 97
Stabilized Antenna
System for every
ship and application.

Series 96 and Series 97 Stabilized Antenna System Features and Specifications

STANDARD SYSTEM FEATURES

- Automatic satellite acquisition
- Automatic linear Polang positioning
- CONSCAN (via Sea Tel Dishscanning Software)
- Internal tracking receiver
- Unlimited azimuth
- Internal diagnostics
- CE Marked
- Unlimited distance between outdoor and indoor equipment
- Antenna control data multiplexed on coax cable
- Versatile gyrocompass interface
- Multiple monitor and control (M&C) functions

BELOW DECKS EQUIPMENT

- Sea Tel antenna control unit with GPS interface internal tracking receiver (70 MHz, 140 MHz, or L-band), conical scanning and universal gyrocompass interface
- Operation and instruction manuals

TECHNICAL SPECIFICATIONS

- TYPE OF STABILIZATION:** 3-axis servo for all systems
- STABILIZATION ACCURACY:** <0.2 degrees peak mispointing full motion
- ROLL AND PITCH RANGE:** Up to +/-25° roll or +/-20° roll and +/-15° pitch
- AZIMUTH RANGE:** Unlimited azimuth turning for all systems
- ELEVATION RANGE:** 0 to 90 degrees for all systems
- STABILIZATION RESPONSE RATE:** No practical limits for all axes
- MIL STD TESTING COMPLIANCE**
- Meets U.S. Navy MIL-STD-167-1 vibration specification
 - Meets U.S. Navy MIL-STD-EMI & RFI (including 200V/M)
 - Meets U.S. Navy MIL-STD-901D GRADE A shock

Series 96 System-Specific Performance Specifications

	Model 4096S Linear Ku-band	Model 4996T Linear Ku-band
ABOVE DECKS EQUIPMENT		
Antenna Size	1.0 meter/ 40 inch diameter	1.2 meter/ 48 inch dia.
Radome Size	60 inch diameter foam radome	90.8 inch diameter foam radome
Antenna Platform	All antennas: 3-axis servo-controlled stabilized antenna platform	
Feed Assembly	All antennas: Ku-band Tx/Rx Cross Pol linear feed assembly with CONSCAN	
RF Packages	All antennas: Integration of RF equipment either customer-furnished or Sea Tel supplied	

ANTENNA

Type	Aluminium, Ring Focus	Composite, Gregorian (dual optic)
Transmit Gain, Typical at 14.25 GHz	41.8 dB	42.5 dB
Receive Gain, Typical at 11.7 MHz	40.1 dB	41.65 dB
System G/T (Calculated)	Approx. 18.2 dB/K Typical	Approx. 19 dB/K Typical
Crosspolarization Isolation	30 dB min.	30 dB min.
Sidelobes	** see note	Meets Eutelsat
Feed Assembly	Back fire linear orthogonal	Offset focus linear orthogonal

* Also available in X-band for military applications

** Meets or exceeds IESS 601 (Standard G) rev 9

*** Dual option

COMMUNICATIONS SYSTEM NOTE: Sea Tel does not represent any data rate performance in its specifications, only power output to the feed. Antenna system gain values measured outside of radome. Ku-band systems of 100 watts and more and C-band systems over 150 watts require rigid waveguide and waveguide rotary joint modifications on the feed at additional expense. Sea Tel reserves the right to change specifications and prices without notice.

Series 97 System-Specific Performance Specifications

	Model 8797 *Linear/ Circular C-band	Model 9797 *Linear/ Circular C-band	Model 9797 Linear/ Ku-band	Model 9997 Linear/ Ku-band
ABOVE DECKS EQUIPMENT				
Antenna Size	2.0 meter/ equivalent diameter	2.4 meter/ equivalent diameter	2.4 meter/ equivalent diameter	2.4 meter/ 96 inch diameter
Radome Size	126 inch diameter foam radome with GPS antenna	144 inch diameter foam radome with GPS antenna	144 inch diameter foam radome with GPS antenna	126 inch diameter foam radome with GPS antenna
Antenna Platform	All antennas: 3-axis servo-controlled stabilized antenna platform			
RF Packages	All antennas: Integration of RF equipment either customer-furnished or Sea Tel supplied			

ANTENNA

Type	Composite, Radical Offset	Composite, *** Radical Offset	Composite, *** Radical Offset	Composite, Axis Symmetric
Transmit Gain, Typical at 14.25 GHz	6.18 GHz 39.8 dB min	6.175 GHz 41.7 dB min	14.25 GHz 48.5 dB min	14.25 GHz 48.9 dB min
Receive Gain, Typical at 11.7 MHz	3.95 GHz 36.4 dB min	3.95 GHz 38.5 dB min	12.2 GHz 47.6 dB min	12.2 GHz 47.7 dB min
System G/T (Calculated)	Approx. 16.8 dB/K Typical	Approx. 19.0 dB/K Typical	Approx. 26.0 dB/K Typical	Approx. 26.0 dB/K Typical
Crosspolarization Isolation	27 dB min.	** see note	30 dB min.	30 dB min.
Sidelobes	** see note	** see note	29-25 log theta	
Feed Assembly	Prime focus, circular orthogonal	Radical offset, linear/circular polarization	Radical offset, linear polarization	Cassegrain, linear orthogonal