

MIROS WAVEX

THE X-BAND RADAR-BASED WAVE, CURRENT AND SPEED THROUGH WATER SENSOR



DATASHEET

Wavex® captures and processes sea surface backscatter data from a standard X-band marine navigation radar. Through robust, accurate and adaptive algorithms it calculates directional wave, surface current and speed through water (STW) data. Measurements are made in a relevant area of the waterbody, unaffected by the vessel or offshore structure itself.

Novel data fusion techniques combine Wavex STW, gyro, GPS and speed log data to maintain accurate STW measurements, even when conditions for radar-based STW measurements are too marginal.

Wavex provides easy and secure data access, both locally and remotely, by utilising modern IoT technologies – view and analyse real-time and historical data anytime, anywhere, on any device.

KEY FEATURES

- Real-time directional wave measurements
- Real-time surface current measurements
- Real-time STW measurements
- Operates at any ship speed, or from fixed or floating locations
- No calibration required
- No parts submerged in water
- Low maintenance costs
- Integrates with third-party systems
- IoT-enabled & Cloud-integrated
- Access data locally & remotely
- Advanced AI data quality control

ESSENTIAL FOR

- Accurate vessel performance analysis
- Accurate fuel optimisation
- Structural integrity verification
- Reducing damage to vessel & cargo
- Increasing passenger comfort
- Reducing uncertainty in weather claims



Wavex is an IoT-enabled device that can be easily and securely integrated with both local and remote systems.

The system's web-based user interface visualises wave, current and STW data, combining them with weather data to easily understand how your asset is affected by the prevailing weather conditions.

SPECIFICATIONS

Wave Data	Range	Resolution	Accuracy
Height	0.5 - 5 m	0.1 m	0.2 m ¹
	5 - 10 m	0.1 m	6 % ¹
	10 - 15 m	0.1 m	20 % ²
Period	3.2 - 5.0 s	0.1 s	0.5 s ²
	5.0 - 13.0 s	0.1 s	10 %
	13.0 - 25.3 s	0.1 s	20 % ²
Direction	0 - 360°	1°	20°, 2° ²

Surface Current ³	Range	Resolution	Accuracy
Speed	0 - 5 m/s	0.01 m/s	0.05 m/s
Direction	0 - 360°	1°	10°

STW ^{3,4}	Range	Resolution	Accuracy
Speed	Any ship speed	0.01 m/s	0.05 m/s
Direction	0 - 360°	1°	1°

Interfaces

Output Interfaces

Wave, Current, STW: NMEA (Proprietary format)

Input Interfaces

Heading: NMEA - HDT
Position: NMEA - GGA/GLL
Draught⁵: NMEA - XDR
Wind: NMEA - MWV
Date/Time: NMEA - ZDA or NTP

X-Band Radar Interface

Ant. Beam Width: 2° or less (4 feet or more)
Ant. Rot. Speed: 15 - 48 RPM
Ant. Mount. Height: 15 - 100 m above sea level⁶
Pulse Mode: Short pulse (50 - 80 ns)
Pulse Rep. Freq: 1000 Hz or higher
Output Power: 10 kW or more
Radar Signals: Raw video, sync, heading and azimuth
Ant. Polarisation: Horizontal

Electrical Data⁷

Supply Voltage: 100 - 250 VAC, 50/60 Hz
Power Consumption: < 200 W

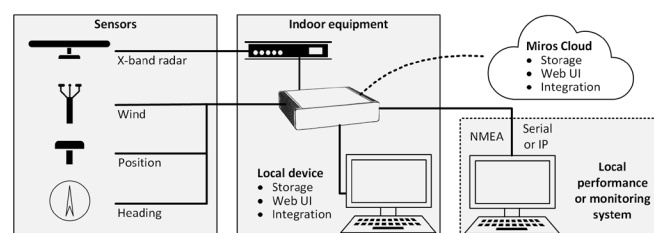
Wavex is compatible with a wide range of X-band radars and supports a range of IP radar protocols.

Operation requires the radar being in short pulse mode, with free view to the ocean surface in a 180° azimuth sector. Wavex does not interfere with, or affect, the navigation system radar signals.

On moving installations, Wavex requires data input from a gyro compass and a GPS. Wind and draught data inputs are optional.

Wavex can be complimented with a number of value-adding Cloud services from Miros. These services include web displays, data processing, data push, and device management services.

Wavex requires at least 1-3 m/s wind, and waves long enough to be imaged by the radar. Affected data will be tagged appropriately by the automatic AI data quality control. Current measurements are representative for the upper 10 m of the water column.



Compliance

EU Directives: LVD, EMC
Environmental Data & EMC: IEC 60945, IMO Res. A694(17)
Communication Interfaces: IEC 61162-1, IEC 61162-450

Notes

- Estimated accuracy as documented in Miros whitepaper "Automatically Calibrated Wave Spectra by the Miros Wavex System".
- Theoretical measures.
- Miros whitepapers: "Ocean Surface Current Measurements by the Miros Wavex System", "Surface Current Measurements from Moving Vessels by Wavex" and "Measuring the Speed Through Water by Wavex".
- No practical upper speed limit for vessels in normal operation. STW direction accuracy is better than 1° for vessel speeds greater than 3 m/s.
- Recommended for vessels with significant draught variations.
- Lower antenna heights are possible depending on site and desired wave height range.
- For Miros supplied EM-129 Integrated Video Digitiser, Marine-certified Computer and Display.
- To obtain specified accuracy, Wavex requires water depths greater than 40 m on moving installations. On fixed installations, Wavex can achieve specified accuracy for water depths greater than 20 m by utilizing accurate water depth data for the measure area.

Specifications are subject to change without prior notice.