MIROS

WAVEX - Wave Monitoring System

Directional wave monitoring by means of a standard marine x-band radar
At night you don’t see the waves - Wavex does!

- measuring the ocean surface

DNV
TYPE APPROVED
PRODUCT

Real time Wave Measurements

WAVEX is a tool especially designed for wave monitoring from ships in transit or from an onshore location. It is a very useful tool which gives information about the actual wave parameters in the area at operator selected intervals down to every 2 min.

The Wavex system uses data from astandard marine X-band (3 cm) radar as signal input and the system is operative at all ships speeds and from a fixed location.

Wavex Type approved Hardware

Applications

Wavex can be used either as a stand alone system, or for providing wave data and wave spectra input to Decision Support Systems or as part of a hull- or structural monitoring system. The Wavex system is quite compact and takes up little space. It can easily be fitted on existing ships and can often use the existing X-band radar antenna for signal input. The installation itself does not interfere with the ship's operation and can in most cases be done within one or two days.

WAVEX is especially helpful in heavy weather and during the hours of darkness. It enables the ship's crew to monitor the sea condition and provides information regarding increasing or decreasing sea-state and wave heights. The crew can thus optimize the vessel speed and course without waiting for daylight. In the case of offshore installations WAVEX enhances the operational safety.

For passenger ships and for high speed crafts, WAVEX provides information on significant wave height which is an operational parameter used by authorities and class. WAVEX will help to improve regularity for such vessels and result in safer and smoother passages for all types of passenger ships.

For traditional displacement vessels such as shuttle tankers, large tankers, bulk carriers, LNG carriers and fast container, WAVEX is also a tool for reducing hull and cargo damage in heavy weather either as a stand alone system or as part of a hull monitoring system.

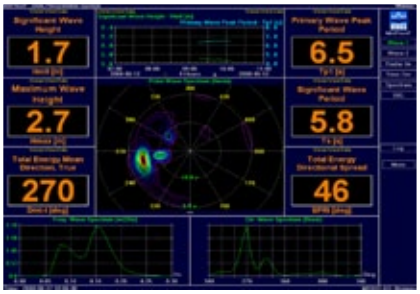
Data Presentation and External Interfaces

The wave data are presented in figures and easy to understand graphics on a display screen in addition to being stored on the system computer in historical files. Each data set is time stamped for easy later retrieval and use if needed.

A number of data windows can be arranged in any combination, and the set-up saved for easy availability. Eight screen presets or user configurations are available with the push of a button. An "unlimited" number of custom made configurations can be stored and accessed with a few mouse clicks. Surface current data are optionally available for shore based and stationary installations.

The wave data are stored on the system's hard disc and also transferred by RS 422 line in Miros proprietary NMEA format. GPS, log, gyro and wind data may if supplied in NMEA format be used or logged by Wavex as an option.

Current information is available as an option



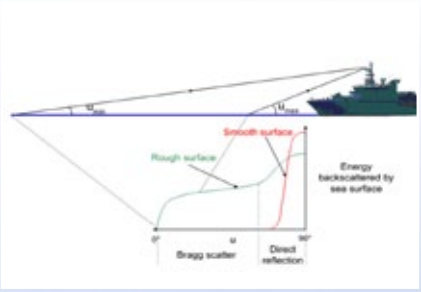
Measurement Principle

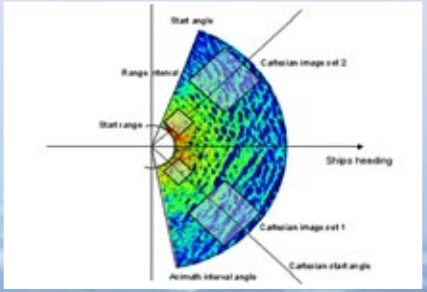
The WAVEX system measures surface wave variables on the basis of digitized sea-clutter images provided by a standard non-coherent marine X-band radar operated in short pulse mode.

For an X-band radar, low grazing angle backscattering from the sea surface is caused by the electromagnetic wave's interaction with the wind generated sea surface capillary waves, a mechanism known as Bragg scattering.

The Radar sea-echo amplitude depends on the "roughness" of the sea surface. Gravity waves form images because they modulate the sea surface radar cross section by angular modulation, shadowing and hydrodynamic interaction. A full three dimensional wave spectrum is derived from the digitized radar back scatter images.

A minimum of 2 m/s of wind must be present in order for Wavex to operate and record wave data.





WAVEX - Marine Radar Wave Extractor type approved since 1999

The WAVEX system was conceived by MIROS in 1988-90 and provided for research purposes.

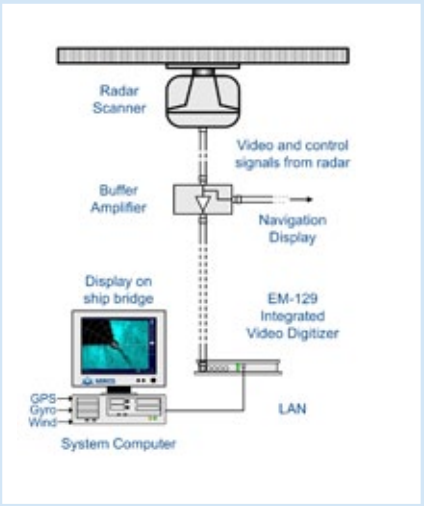
A cooperation agreement with Det Norske Veritas and Stena Rederi AB was entered into and Miros developed during 1996-99 a commercial system for use on board vessels in transit, offshore units and shore sites. The system has been subjected to a long term verification program in the North Sea.

The WAVEX system was type approved in 1999 by Det Norske Veritas according to their Rules for Classification of Ships and Mobile Offshore Units. This was the first certificate issued for any such "Wave Monitoring System" by DNV and it underlines the fact that this type of equipment is considered and becoming more and more important in connection with design and daily operation of both traditional ships, high speed crafts and offshore units.

System Componets

A typical WAVEX system hardware conficguration comprises the following components:

- IEC certified marine system computer
- Flat screen monitor with or without night vision dimming functionality
- Miros Integrated Video Digitizer unit
- Gyro, GPS and Wind sensor interfaces
- Marine X-band radar, either the existing ship's navigation radar or a dedicated radar for the WAVEX system.



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