Technical Specifications

Buoy Overall Dimensions
Weight: 924kg
Diameter of hull: 2.8m (with fender)
Buoy total height: 6.75m (mast to keel)
Buoyancy: 3000kg

Power Supply
Solar panels: 80W
Lead acid battery bank: 240Amph
Lithium backup: 385, 770, 1155 or 1540Amph

Navigation
Navigation light and radar reflector in compliance with IALA requirements

On Board Processor
32-bit microprocessor, flash disk data storage
Real-time operating system, low power consumption
A large number of serial and analogue inputs
Flexible data acquisition software

Data Communication Systems

Satellite	Inmarsat-C and ORBCOMM two-way communication
	ARGOS one-way communication
Telephone	GSM, two-way communication
Radio	UHF/VHF two-way communication

Operating Temperature: -5 to 55°C (min.)
Storage Temperature: -20 to 50°C (min.)

Engineering Wave Parameters
Based on validation inter-comparison trials (papers sent on request)

Significant wave height	< 5cm bias
Mean period	< 0.05sec bias
Direction	< 2° bias
Maximum wave height	< 15 cm bias

Directional Wave Data Sensor

Parameter	Range	Accuracy
Heave, Surge, Sway	±15m (adjust.)	< 10cm
Direction	0 - 360°	0.3°
Wave Period	2-30sec	< 2% of value

Full wave directional analysis on-board based on spectral analysis and user friendly configuration tools.

Surface Current Velocity
Range 0 to 600cm/s
Accuracy 1cm/s or 2% of reading

Surface current direction
Range 0 to 360°
Accuracy ±2.5°

Sea Surface Temperature
(from current meter)
Range -5 to +32°C
Accuracy ±0.03°C

Sea Surface Conductivity
(from current meter)
Range 0 to 9.0 S/m
Accuracy ±0.002 S/m

Wind Direction Sensor
Range 0 to 360°
Accuracy ±3°

Wind Velocity Sensor
Range 0 to 60m/s (0-70 on request)
Accuracy ±0.3 m/s

Air Pressure Sensor
Range 800 to 1100hPa
Accuracy ±0.15hPa

Air Temperature Sensor
Range -30 to +75 °C
Accuracy ±0.1 °C

Buoy Position
Inmarsat-C GPS
ORBCOMM GPS
ARGOS ARGOS one-way position transfer
Radio GPS optional
GSM GPS optional

Additional Sensors
CTD profiler
Dissolved oxygen
Gamma radiation
Light attenuation
Chlorophyll-a
Hydrocarbon

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Wavescan Buoy

- **A metocean data collection buoy measuring wave, current and meteorological parameters**
- **The ideal buoy for deep water measurements and severe current conditions**
- **A unique design optimises wave direction measurements**
- **Modular shaped hull for easy transport and local assembly**
- **Designed for safe and easy handling and deployment**
- **Data presentation in real-time**
- **Full on-board processing of all measured data**
- **Two-way communication link for data transfer and control of a number of buoys**
- **Flexible configuration of sensors and data collection**
- **Special mooring design minimises mooring influence on buoy motion**
- **Insensitive to extremes of temperature**
- **Position tracker for increased safety and drift tracking (option)**
- **Successful track record world-wide since 1985**

The Wavescan Buoy

A metocean data collection buoy that provides wave height and direction, sea surface temperature, salinity and temperature profiles, surface current speed and direction, and meteorological parameters. It is the ideal buoy for deep-water measurements, remote locations and strong current conditions.

Preparing a Wavescan buoy

Additionally, the buoy can be equipped with numerous other sensors such as oxygen, hydrocarbon, gamma radiation measurement and an optical sensor for algae detection, to meet the client's specific configuration requirements.

The buoy hull design is based on the dynamic response and stability requirements from comprehensive wave tank testing.

Directional Wave Sensor

The buoy is fitted with an Motion Reference Unit (MRU) for wave direction measurements, based on the heave/ slope measuring principle. This sensor offers the unique advantage of being insensitive to either high or low temperatures as well as spinning and rough handling.

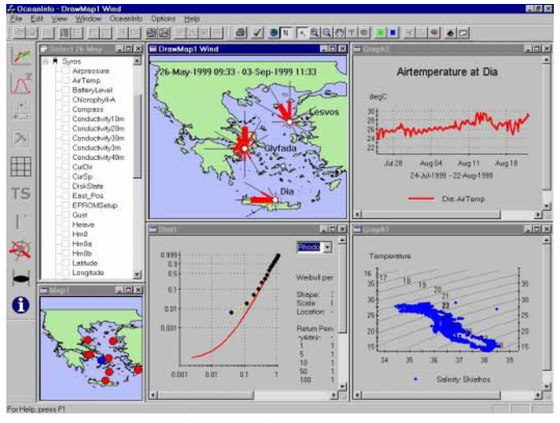
The MRU incorporates an accurate 3-axis fluxgate compass for buoy orientation measurements. This is important for high-quality wind and wave directional data.

Data Communication
The Wavescan buoy allows two-way communications via either satellite or radio. The buoy position can also be monitored by means of one-way satellite position tracking.

Data Presentation
OceanInfo is a PC-based system for the presentation of metocean data collected by the buoys or from other sources. It has the following functions: time series plots and wind roses; simple univariate statistics, univariate and bivariate distribution tables and curves; extreme analysis (based on a 3-parameter Weibull distribution fit), gamma spectrum and TS diagram (temperature/ salinity); and print, copy or export of graphs, maps and data.

The Hull
The Wavescan buoy has a discus-shaped hull that can be separated into two parts for easy transportation. A keel with counterweight is mounted under the hull to prevent capsizing of the buoy. A cylinder at the centre of the buoy hull contains all the electronic modules, the power package and the wave sensor. The different electronic modules are mounted in special splash-proof compartment boxes to ensure the safety of the sensitive electronics. The buoy is equipped with a mast to support the meteorological sensors and the antennae.

The mechanical design objective was to construct a strong but lightweight buoy. The materials are polyethylene, aluminium and stainless steel.



OceanInfo data presentation screen

Fabrication of a Wavescan buoy in Norway

Power Supply
Maintenance-free solar panels and sealed lead-acid backup batteries enable long-term unattended operations. For low sun radiation conditions, lithium batteries can be supplied.

Mooring
The Wavescan buoy can be equipped with two kinds of mooring depending on the customer's specification. A single-point, taut mooring is recommended for normal conditions and heavily trafficked areas whilst an S-mooring is used for deep-water, hostile environments. The specific mooring design and choice of materials also takes into consideration factors such as current conditions and even the danger of fish bite on the mooring line.

Both mooring types are specially designed to minimise the effect of the mooring on the wave following performance of the buoy.

Applications

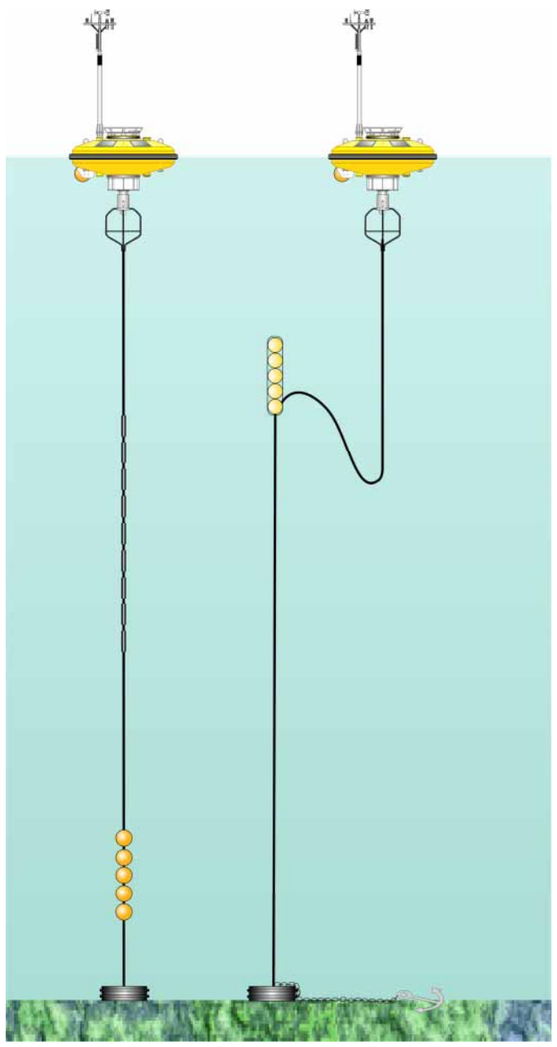
- Harbour and coastal monitoring
- Coastal engineering
- Offshore design and operations
- Scientific studies
- Wave energy studies
- Meteorological and climatological studies
- Maritime traffic control
- Water quality control studies

Wavescan around the World
More than 30 Wavescan buoys are presently operating and providing data around the world.

Some customer references:

- IMARPE, Marine Research Institute of Peru
- National Institute of Ocean Technology, Woods Hole Oceanographic Institution
- Department of Navy, Cape Canaveral, Florida, USA
- Centro de Estudios y Experimentacion de Obras Publicas (CEDEX), Spain Ministry of Transport, Port Authority Department, Spain
- Woodside Offshore Petroleum Pty. Ltd. Australia. WNI Science & Engineering
- Statoil, Norway
- Petrobras, Brasil
- Finnish Institute of Marine Research
- Navy submarine base, Kings Bay, Georgia, USA

A Wavescan buoy on board ready for deployment


Taut (left) and S-shaped (right) single-point moorings