



## Environmental Monitoring Buoy System for Open Waters

Construct your own monitoring system

### Full availability of marine environmental data, tailor-made to your needs

With a buoy system from DHI you will receive near real time online information about selected hydrodynamic, meteorological, biological or chemical conditions on the site of your choice.

Together with specialists from the DHI Survey and Monitoring Group, you can design a system that meets your needs and fulfils your expectations regarding sensor types, registration intervals, transfer intervals, measuring location, service and maintenance, etc.



*A 10-m buoy is deployed in the open sea.*

The survey and monitoring group will help you select the optimal site for deployment and operation of the buoy within the area defined by the client. With more than 30 years of experience, we use our thorough understanding of the challenges involved and, combined with our in-house modelling capabilities or an on-site survey, we will select the best measuring point.

### SUMMARY

#### Client

Port authorities, marine operators, hydrologists and meteorologists

#### Challenge

- Long term and short term water environment monitoring
- Operational monitoring
- Input to forecast systems
- Biological monitoring
- Pollution monitoring

#### Solution

The buoy system allows to track the environmental conditions at a nearshore or offshore site in water depths of up to 50 m. Data are delivered in near real time via the most convenient means of transmission, considering both economy and safety.

#### Benefits

- Data are delivered in near real time
- Data are available on the Internet
- Data are valuable as on line decision tools as well as long term modelling bricks
- Various types of sensors are available

### The DHI buoy concept

The DHI buoy concept consists of a prestressed mooring connecting the buoy to the seafloor. Instruments can be attached both to the mooring and to the hull of the buoy.

DHI will construct and deliver a buoy in the size adequate for your task. Smaller buoys are deployed from our own vessels, while larger buoys are handled from hired vessels.



## Instrument definitions

Your choice of instruments is nearly unlimited: sensors for waves, current, water level, temperature, conductivity (salinity), chlorophyll, turbidity etc. Each instrument is calibrated by the manufacturer and/or DHI.

Our experienced survey and monitoring staff will assist you in configuring the buoy's instrumentation. Each buoy can accommodate instruments from the surface down to the seabed. However, one should carefully consider the needs and distribution throughout the water column. DHI experts help you optimise your system.

## Operating the buoy

The buoy will typically send data to a reception point on the Internet according to the intervals defined by the client. In most cases the client and DHI receive updates at hourly intervals. Thereby it is possible to secure the quality of the recorded data and keep track of the buoy's technical stability. DHI offers the proper tools for these purposes.

Frequent transmission of data from the buoy system requires much electrical energy. As the battery capacity is generally limited, the optimal operating conditions in

respect to update transmission rate, number of instruments, etc should be well planned. DHI will provide you with the necessary information about best performance conditions.

When data from the buoy hit the Internet, they will be distributed according to the plans laid out by the client and DHI. The data server receives the data, transforms them to a format accepted by the receiving bodies and eventually forwards the data.

DHI offers storage and presentation facilities as well as tools for distributing service information by means of SMS and e-mail to client representatives and to DHI personnel in the DHI Data Centre. This Centre collects data from a number of meteorological and hydrological stations and offers web presentations of a major part of these data.

## Specialists provide worldwide expertise in your field of operation

DHI is an independent research and consultancy organisation with the most advanced forecasting and numerical modelling tools as well as highly qualified staff.

Data from the client's buoy combined with relevant data from other sources provide our clients with a thorough knowledge of the conditions at a specific site. DHI's Survey and Monitoring Group help you get in touch with the right specialist and get the service you need.

## Communication

The buoy communicates with the server on the Internet using the technically most convenient and economically efficient transmission channels. Satellite communication is by far the most expensive means of communicating. It is therefore preferable to use the public switched phone network or radio transmission. Satellite communication is only recommended for covering long distances.

## Logistics and service

Operating this kind of buoy naturally involves vessels in varying sizes. In most cases, DHI's Survey and Monitoring Group provides the vessel and tools necessary for the process of deploying, recovering and servicing a buoy.

Should a client want to provide the necessary logistic tools for these operations himself, this can be arranged in most cases. It may even make operations easier and more efficient if the client's vessel operates in the vicinity of the buoy.

Usually, the battery capacity needs to be upgraded from time to time. Renewable energy sources such as solar panels or wind turbines are normally not sufficient to power buoys of this size. Service of buoys is therefore planned to take place at regular intervals. In addition to the changing of battery, cleaning and servicing of instruments is carried out when necessary.

To date, all instruments provided by DHI can send the recorded data online to the Internet. Moreover, these data are stored internally in the instruments. As a result, a backup of all data is available in the instruments in the unlikely case that data sent to the Internet are lost.



*Buoys on board the ship being prepared for deployment.*



*A set of instruments for the buoy on a snowy ship deck.*