



ROSE project : development and demonstration of a “Mobile Response Observatory” prototype.

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ROSE project was aimed at developing an underwater monitoring system deployable in case of crisis situation such as wreck pollution or risky natural sea bottom events. The system is based on the deployment of a set of subsea stations integrated in an acoustic network and communicating with shore through a radio link. The project scope also comprised the building of a prototype system intended to a near shore demonstration of limited duration.

The project was supported by the French Research Ministry. Project partnership coordinated by Ifremer comprised the companies Sercel, NKE instrumentation and Atlantide, the pollution research center Cedre and the telecommunication school ENST Bretagne. Project tasks were initiated mid year 2004 and at sea demonstration was performed in Douarnenez bay in Brittany from mid June to early September 2006.

The prototype system comprised :

- . two floating measuring stations anchored some meters above sea bottom
- . a simplified station acting as a third node in the acoustic network
- . a relay buoy

Measuring stations were developed and built by Ifremer. The concept of floating station anchored to sea bottom is a genuine ROSE development. It makes possible to position sensors at a convenient height above sea bottom e.g in accordance with pol-

lutant emissions. Station recovery is done by unlatching it from the lost part of the mooring by actuating an acoustic release. Stations are structured in several areas dedicated to the various equipment pieces : electronics and energy containers, sensor area, floatation volumes, free area aimed at specific uses.

The buoy is derived from designs already used by Ifremer by taking into account return of experience of past buoy deployments.

The bi-directional communication system was developed and implemented by Sercel UAD. The acoustic network of MATS200 Net type is composed of a buoy modem and modems installed on each of the subsea stations. Radio communication between the operating station onshore and the relay buoy consists of a radio link of cellular phone, VHF radio or satellite type depending on deployment site . The set of data registered by the stations is periodically transmitted onshore and stored in a data server. For the prototype demonstration, the radio link was of GPRS phone type; the server was located in Sercel Nantes premises and could be reached from Sercel in Brest.

NKE has developed the messengers, which are positively buoyant beacons enabling the retrieval of data in addition to or in absence of the acoustic-radio communication system. Up to 8 messengers can be stored in a rack on the station. Messengers successively receive summaries of registered data and can be released either at predefined time steps or on a command. Once at sea surface they transmit the data load via Argos system.

Station design enables easy changing of sensor set according to the type of event to be monitored.

In case of a pollution event the set is composed of pollutant and environmental parameter sensors. The prototype system was fitted with the following ones :

Station n°1 :

Transmissometer : WETLABS BBRTD-226R

Dissolved O2 sensor : AANDERRA optode sensor

Station n°2 :

Hydrocarbon fluorometer : TRIOS EnviroFlu

CTD sensor : SBE 37-SMP microCAT

ADCP profiler : RDI 300kHz

Fluorometer, transmissometer and O2 sensor are optical sensors requiring protection against biofouling. They are protected by a process developed and previously tested

by Ifremer, based on chlorine generation on a titanium grid surrounding the sensor glass. Grids are each connected to a tension generator provided by NKE.

The prototype system was deployed in Douarnenez bay in Brittany, at 25-30 meter depth, with the Ifremer coastal oceanographic ship Thalia from 14 to 16 June 2006 and recovered on 5 and 6 September. The 2.5 month long deployment enables to draw experience return on :

- . at sea operations and system behaviour on site
- . data acquisition by the various sensors and biofouling protection efficiency
- . operation of the communication system and messenger system