OBSEA — EXPANDABLE SEAFLOOR OBSERVATORY

OBSEA: A Cabled Seafloor Observatory at the Spanish Mediterranean Coast

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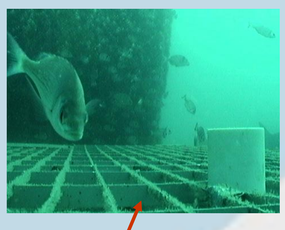
Introduction

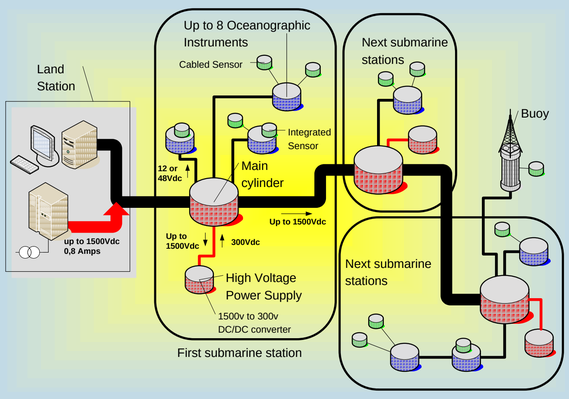
Abstract

The implementation of submarine sensors at regional scale has been considered within the ESFRI Roadmap as a European strategic infrastructure. In this sense European Union has funded projects as ESONET and EMSO that are initiatives to establish a network of long-term deep sea observatories. Within this framework, Spanish Ministry of Science and Innovation has made an effort, supporting and funding several projects concerning marine platforms at submarine and coastal areas to accomplish these technological challenges.
The OBSEA submarine platform was deployed by the BO Sarmiento de Gamboa last **19th May**, since then is working properly and only some adjustments have been needed. In this initial period the submarine laboratory OBSEA will be available for ESONET and EMSO communities for testing and developing new sensors, with the advantage of an easily reachable location and online checking through web page.

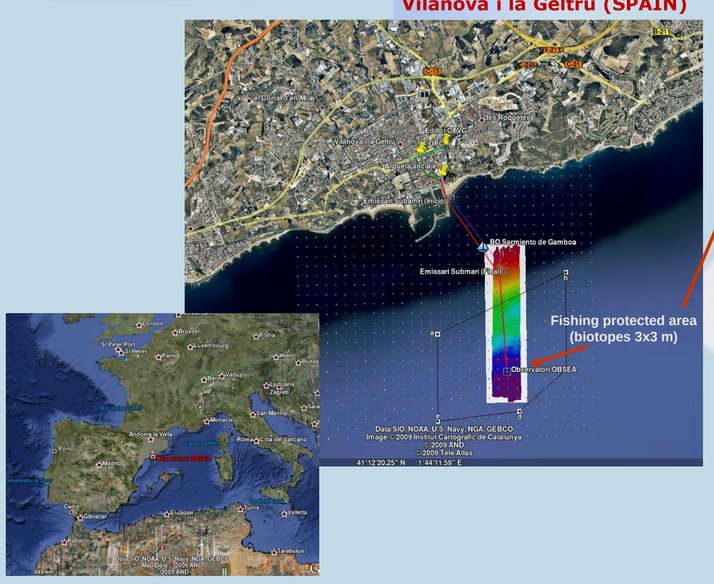
The Objectives

The main goal of the OBSEA is to provide a relatively low cost infrastructure for easy technological test bed and development of new sensor with the aim to extend it with more nodes to a regional deep sea observatory, and alongside real time monitoring of some physical parameters.





Vilanova i la Geltrú (SPAIN)



Acknowledgement

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The Mission

The OBSEA is a pioneer singular installation in Spain, and in this first phase will have a double mission: To start with a multi-parametric observation system, appropriate for environmental research and to provide a test-bed site to draw the attention of marine engineers, scientists and small to medium sized enterprises (SMES) in offshore technology.

Architecture

Main Components Fundamentals

SHORE
Simple and reliable standard network protocols. TCP/IP over ethernet.
1+1 optical trunk line at 1Gbps
Up to 320V and 11 Amps of direct current, 3.6kW power supply

SUBSEA NODE
Connectivity of multiple oceanographic instruments in key places.
8 wet-mateable external instruments
up to 3 amps at 12 or 48V per instrument
10/100Mbps Ethernet connection

SeaBird CTD Instrument
Bjorge Naxys Ethernet hydrophone
Ocean Presence underwater IP camera system

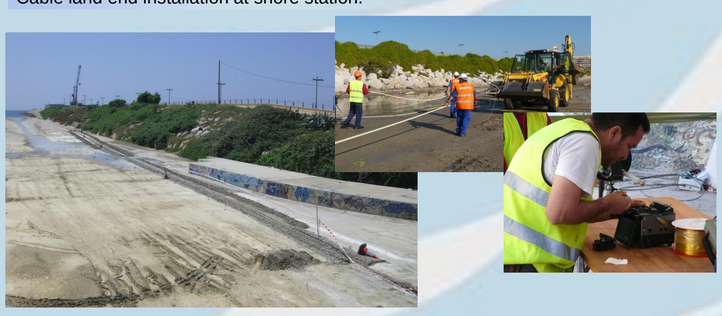
Deployment and cable installation

Phase 1

Main operations ship. ***BO SARMIENTO DE GAMBOA***
Dynamic Positioning System

Cable with buoyancy towed to shore by a Pilot boat

Cable land end installation at shore station.

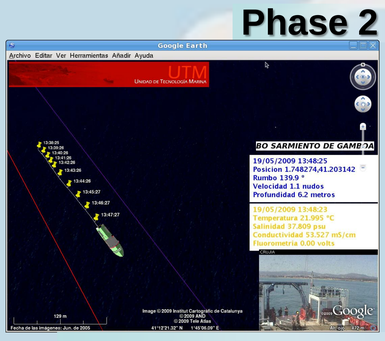


Phase 1:
Pilot boat pulling the cable to the shoreline(1.5 km at 1m/s)
Ship standing at site with DP facilities
Onboard people put buoyancy into cable (170 buoys)
Scuba dive activity: Remove and recover buoys. Cable verification
Onshore activity: Deployment of the firsts 200 m of cable at shore into a concrete protection pipe.

Phase 2:
Cable connection to the land anchorage point
Ship pulling cable at very slow speed
Deployment of 3000 m of cable

Phase 3:
Cable connection to junction box
Final cable installation to the precise location with the help of scuba divers

Phase 2



Deployed cable path adjustment

Phase 3

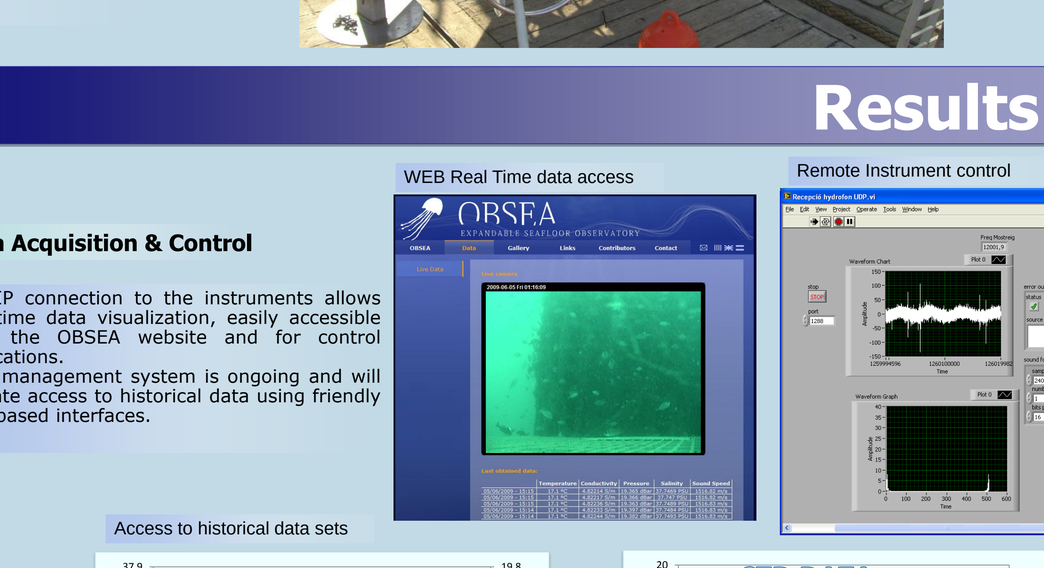
Installing the stainless steel Structure

Keys for the success

- ✓ Ship with Dynamic Position System
- ✓ Multibeam detailed bathymetry for mapping the cable path
- ✓ Onsite recognition by scuba divers
- ✓ Absolute care with the cable strength during all maneuvering phases

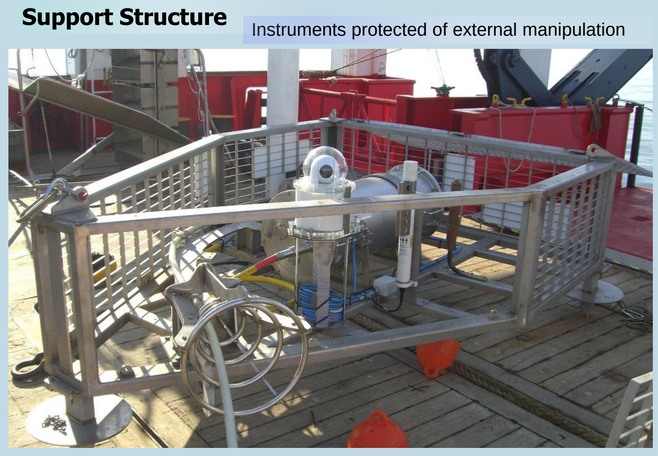
Subsea node

Lat: 41°10'53.82"N
Long: 1°45'8.40"E



Support Structure

Instruments protected of external manipulation



Results

Data Acquisition & Control

The IP connection to the instruments allows real time data visualization, easily accessible from the OBSEA website and for control applications.
Data management system is ongoing and will allocate access to historical data using friendly web-based interfaces.

WEB Real Time data access

Remote Instrument control

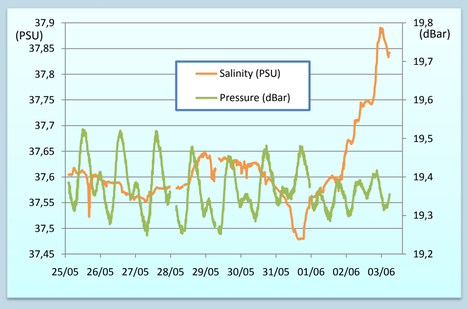
Future works

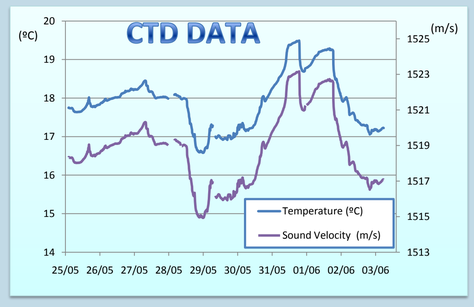
Possible expansion to more deeper locations

At short term the observatory can be easily broadened simply adding cable segments and new junction boxes.

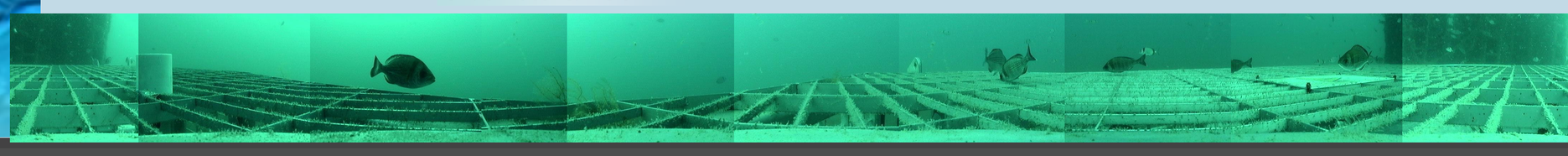
At medium term new extensions for the deep seafloor require that the cylinder with the payloads needs to be certified for higher pressures environment.

Access to historical data sets





Underwater camera



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