CABLING, CONNECTORS AND SPLICES STRUCTURE FOR THE OBSEA. EXPANDABLE SUBSEA OBSERVATORY

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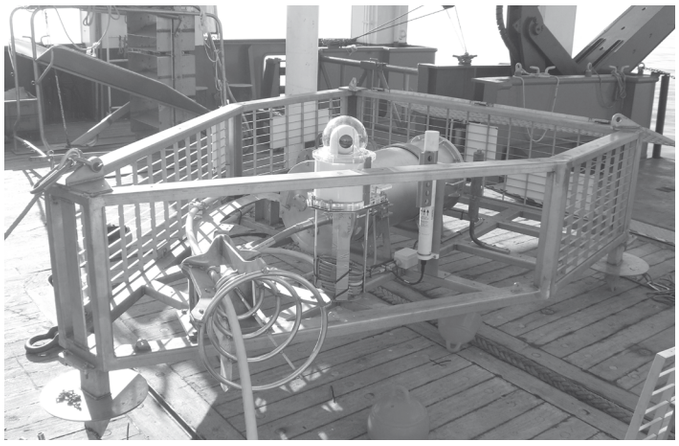
Abstract - The OBSEA observatory, for its construction, characteristics and location in the seafloor, needs a cabling and connections structure capable to satisfy its finality and to resist de adverse conditions of the sea environment.

Keywords - OBSEA, observatory, underwater cabling, wet-mateable connectors

I. INTRODUCTION

Along the OBSEA development many possibilities have been analyzed regarding the subsea and ground cables to be used, equipments and sensors as well as structure materials and containers for electronic equipment (instruments, sensors, power supplies, and control unit).

The submersed module has specific cables, hybrid connectors with power and



optics, electrical wet-mateable instrument connectors and watertight boxes that resist substantial pressures.

The future topology is based in a collection of cabled subsea modes that are forming a expandable communications network powered and communicated from land using a submarine cable. The network is supplying the electrical power to the connected oceanographic instruments and performs the monitoring, supervision and maintenance tasks to guarantee the maximum reliability and availability of the installation for what the cabling and connectors structure is a fundamental part of the project.

II. EVOLUTION AND RESULTS.

After the analysis of several options, were selected next elements:

Submarine cable:

STC hybrid; copper conductor and 6 single mode optical fibers, 31.8 mm diameter, 2 steel wires layers for protection and traction, polyethylene isolation, aluminum sheet and white polyethylene outer jacket.

Trunk cable connector:

Hybrid flexible cable assembled by an oil filled high pressure hose with standard electrical and optical wires and terminated with a connector for the junction box and a penetrator for the termination box. The connector and penetrator are a GISMA series 40 size 4 with 6 optical single mode fibers and 2 electrical conductors.

Instrument connection cables:

Combined power and signal cable MacArtney type 4622 with 2x1mm2 power conductors and 6 x 0,22m2 twisted pairs. Constructed with Polyurethane outer jacket colour blue.

Instrument connectors:

GISMA series 10 size 3 wet mateable connectors with 7 x Ø 1,5mm electrical pins

Underwater termination box:

Is a box used to adapt the rigid submarine cable with a flexible one that can be connected to the junction box. This box contains the splices of the optical fibers and the electrical connection of the copper conductors. The box has been provided by Telefonica and mounted by Tyco Telecom. The box given by Telefonica was previously used as a ground to sea connections box in Conil in the Columbus III cable (cable between the Americas and Southern Europe) and it is a Ø 200mm stainless steel cylinder designed to resist 5 Bar. It gives continuity for electrical connections (up to 100kv) and optical fibers (up to 30 fibers).

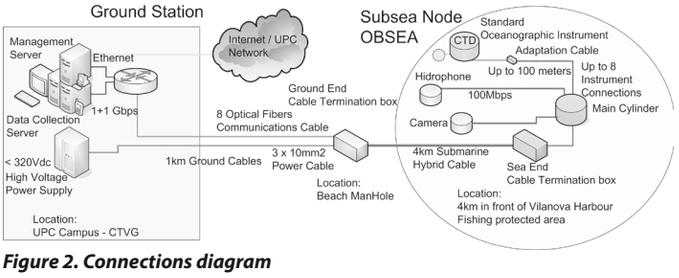


Figure 2. Connections diagram

Beach Manhole termination box:

Plastic splice box provided by Tyco Telecom holds the connection between the submarine cable coming from the observatory and the two terrestrial cables (optical and power) going to the ground station. It is the ground to sea interface.

Ground optical and electrical cables

1,5 km of standard outdoor cable with 8 Optical fibers given by telefonica and same length of electrical cable of 3x10mm2 given by Prysmian and installed by Abentel

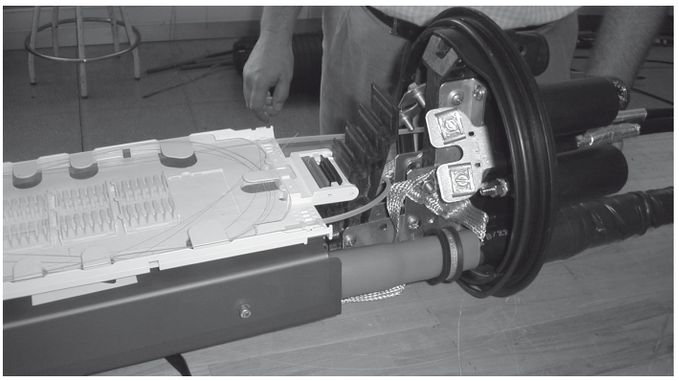


Figura 3. Beach ManHole termination box.

III. CONCLUSIONS

The analysis task required to choice the OBSEA components between the several existing alternatives has been vital to reach the objective of high reliability at low cost. The design of the connections and its implementation has been done following the initial specifications. A subsea observatory is an installation subjected to harsh environmental conditions such as high pressure, corrosive agents or biofouling, that are imposing continuous supervision and maintenance tasks, and the quality of the materials will establish its useful live.

IV. ACKNOLEDGEMENTS

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