ID6- TELE-OPERATED ECOLOGICAL MONITORING AT THE SEAFLOOR OBSERVATORY (OBSEA)

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ABSTRACT
The development of new cabled oceanographic observatories is becoming of extreme importance to monitor in real-time a continuously changing environment. In this context, a local coastal network of fixed and mobile video-monitoring platforms was created at the OBSEA (www.obsea.es; [1]) as European Multidisciplinary Seafloor and water column Observatory EMSO Testing-Site [2]. The cabled platform is located 4 km offshore of Vilanova i la Geltrú coast (Barcelona, Spain), at a depth of 20 m. The observatory has been used to install a network of cameras including OBSEA fixed camera, plus a movable satellite tripod. Also, a mobile camera will be installed on an Internet Operated Vehicle (IOV), as a coastal crawler. These tele-operated vehicles are being used by marine scientists, to carry out multiparametric environmental studies (via the diversified set of oceanographic and geochemical sensors) centered on faunal monitoring via imaging. As far as cabled seafloor observatories (and also OBSEA) are not able to move and their data collection capability is limited, it was decided to expand the monitoring capacity of the OBSEA, by connecting it to a new costal crawler. This crawler is a modified prototype of the "Wally" platform series, which is operating at the Ocean Networks Canada (ONC; www.oceannetworks.ca) since 2010 [3]. This coastal crawler will be used to perform back and forth video transects between the fixed OBSEA camera and its satellite tripod camera (80 m away), to analyze the possible effect of environmental heterogeneity on the perceived fish community abundance and composition. This will also allow scaling the biodiversity gathered data over a larger and more ecologically-representative area. In this scenario, we aim to present the technological design and specifications of the modified coastal crawler (Fig. 1). A mobile camera (1) in a glass sphere (rated for 3000 m depth) with 360° pan and 180° tilt operability has been installed, to allow the operator to perform SCUBA divers as visual census transects, by looking forward during transect progression, widening the visual field with panoramic sweeps when needed. The tracks (2) are independent parts allowing to scale the inner part of the vehicle simply by mounting a broader main plait. The chains are made of rubber with embedded steel. Each track is driven by a powerful DC motor with a reduction gear of 989:1. The motor housings are pressure compensated by fluid filling. The junction cylinder (3) contents the driving electronics and an Ethernet switch to connect the camera and the control cylinder to the main communication cable. This housing can variate in material and dimensions to allow its use at different depths. The main cable (4) is a of special underwater Ethernet floating type to avoid problems like seabed abrasion and platform entanglement. A control cylinder (5) is used for controlling the crawler and the camera, providing power from the junction cylinder to supply motors. Finally, there are two 12V, 3W lights (6) that can turn on for filming at night.

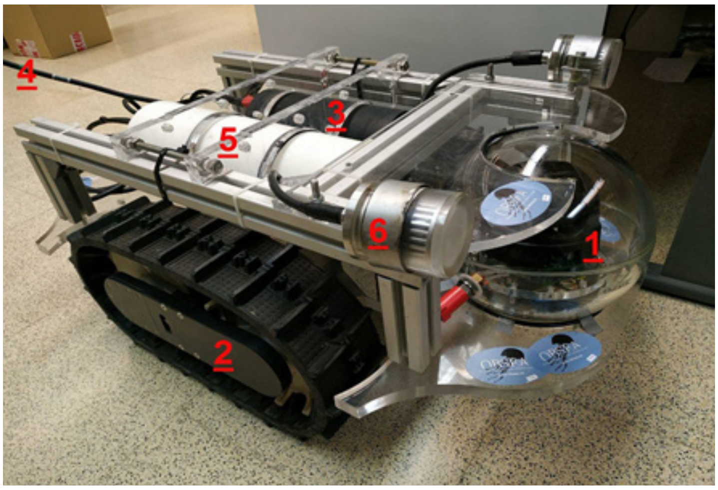

Fig. 1: The crawler with the components numerically listened, as described by ordinal number in the text.

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