

Beeper Evo—An Easy-to-Handle ROV for Benthic Study

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INTRODUCTION

Beeper Evo is a remotely operated vehicle (ROV) developed by the company Praesentis in collaboration with Instituto de Ciències del Mar (CSIC) in Barcelona. The main goal of this project was to develop an “easy-to-handle” ROV for benthic studies on the continental shelf. The 40-kg, 110 x 80 x 40-cm *Beeper Evo* is capable of seafloor surveys to a maximum depth of 100 m. This ROV can be operated from small boats without a winch system and provides high-quality video images along with temperature and depth data. Two parallel laser beams (532 nm, 50 mW) provide scale in video footage, enabling quantitative analyses of seafloor features as well as characterization and measurement of substrate and fauna.

TECHNICAL FEATURES

Beeper Evo is constructed from polyamide-coated aluminium. Its electronic components are contained within an aluminum cylindrical box. Two high-density PVC floats covered with fiberglass and polyester provide positive flotation of 0.1 kg in seawater. Four horizontal and two vertical engines (24 Vcc volts, 75 W) control ROV movement, and four halogen lights (12 Vcc, 20 W) provide illumination. A Hitachi HV-D30 camera with three CCDs (470,000 pixels each) records video images, and a Sea-Bird 39 sensor provides depth and water temperature data. These data, as well as electronic compass information are reported in real time on the control panel monitor. The ROV is connected to the control panel aboard the vessel through an umbilical cable 70 mm in diameter and 220 m in length, comprising copper twisted pairs protected by Kevlar. All waterproof connectors are from SubConn Power (220 Vca) supplied by a generator is transformed (400 Vcc) and provided to the ROV through the umbilical

cable. The power is again transformed in order to supply all the electronic and electric ROV components, which work at 12 or 24 Vcc. A monitor on the control panel displays images from the video camera. A video output device connects the control system to a video recorder, which records images on MiniDV tapes. The control panel permits regulation of depth, ROV movement over the seabed, and light intensity.

RESULTS

Between October 2007 and March 2008, a total of 23 dives were performed to test and improve the *Beeper Evo* prototype, using a variety of small boats in a range of sea conditions. A maximum water depth of 102 m was successfully reached. *Beeper Evo* is light, easy to handle, simple to operate, and has good maneuverability over different bottom types and can cope with strong wave action or bottom-current conditions. High-quality video images can be recorded and coupled with exact data on depth as well as seawater temperature. Easy management and the ability to deploy from small boats make *Beeper Evo* a useful instrument for performing both large-scale benthic studies and quick surveys of the seafloor, allowing the observation of stochastic events in coastal waters.

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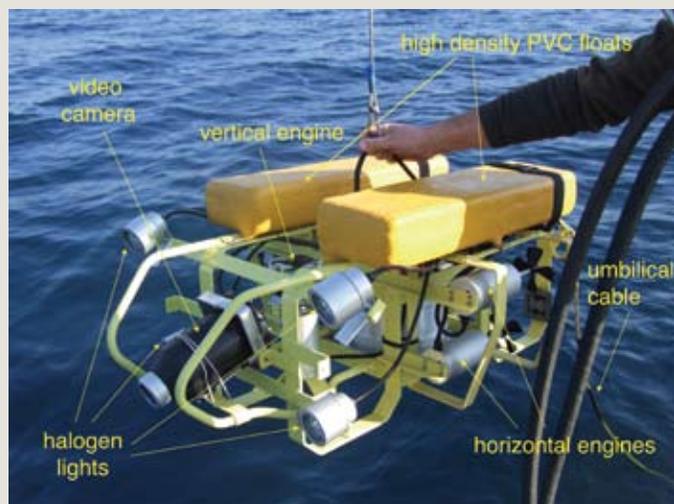


Figure 1. *Beeper Evo* just before a test dive. Arrows show the main technical elements.

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