

# NEW LIGHTWEIGHT AUV AT THE SPANISH RESEARCH COUNCIL

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## Abstract

The *Unidad de Tecnología Marina*, belonging to the Spanish Research Council (CSIC), is the main service provider to the Spanish marine research community. It manages different sea-going facilities as well as the Spanish Antarctic Base. In late 2010, two small AUV (Autonomous Underwater Vehicles) were acquired as testing beds for operational research on marine research at littoral and shallow waters and the UTM has spent several months acquiring experience and gathering some data to start developing tools and procedures for such platforms.

## Keywords

AUV, marine research, coastal oceanography,

## 1. INTRODUCTION

Since 2005 the number of AUV dedicated to scientific research has increased dramatically, in part due to the miniaturization of the systems and the ability to produce vehicles light and cheap enough to be acquired by non-military organization. Although a major part of such vehicles are still dedicated to military operations there is a significant part of the scientific users, mostly dedicated to robotics and platform R+D, and a increasing number of users at the research community which starts to realize the benefits of these platforms.

## 2. MOTIVATION AND OBJECTIVES

As a service unit, UTM is continuously looking for new and improved methodologies for marine research, either shipborne or standalone, that can be added to the catalog of services, instruments and platforms currently available to the Spanish Marine research community.

As early as 2005, UTM started to look the feasibility to add AUV's as scientific platforms for deployment for small and ocean-going vessels, advantages and disadvantages were analyzed and a formal proposal for a deep vehicle was included in the UTM Strategic Plan 2010-2013 and Plan of Action.

Such vehicles are expensive and need some logistic support. Given our lack of experience on the field we proposed two separate phases of the implantation process:

- Phase I: Acquisition of a lightweight vehicle. Main targets are:
  - oGain operational experience.
  - oDevelop service-oriented protocols for scientific research.
  - oMake well known these platforms among the research community.
  - oDevelop operational and technical specifications for a future mid-sized ocean-going vehicle.
- Phase II: Acquisition of an Ocean-going vehicle. This would be done at the end of the current Strategic Plan (if budget allows) or during the next one. The main characteristics of this vehicle would be:
  - oGreater payload.
  - oModularity.
  - oExtended depth range (up to 3000 m.).
  - oExtended autonomy (more than 15 h.).
  - oDeployable from small and medium ships.

## 3. VEHICLES

In late 2010 UTM-CSIC procured two small AUV (man portable) to incorporate them to the serviced platforms managed by the unit. The vehicles are two Oceanserver-Iver2 vehicles set up in two different configurations (Water Quality Control and Imaging) that give them a high flexibility on its use.

Moreover, both vehicles are prepared to accept additional sensors and have a second CPU (backseat CPU and HDD) for this purpose.

The "open architecture" has been a key item on the vehicle selection because one of its future roles is the integration and development of new sensor for such vehicles.

## 4. CURRENT WORK.

At the present moment the UTM is involved on operational trials in two main locations.

The Olympic Rowing Channel near Barcelona has been used during the winter for training and basic sensor testing.

A full operational test survey is planned for mid-May at the Bahía dels Alfacs, Tarragona. During these 5 days we plan to fully test the capabilities of both vehicles for different tasks as horizontal and vertical profiling patterns, image and side scan sonar sampling and bathymetry using the DVL beams. The objective of this test is to get an idea of the real operational envelope of the vehicles before to present them to the Spanish scientific community as an additional research platform of the UTM-CSIC inventory for coastal, shallow water and inner water surveys.

Several R+D lines related with the vehicles themselves are being evaluated at the moment but the focus will be put on small payload integration, data management and data QC.

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