Universitat de Girona

UNDERWATER VISION AND ROBOTICS LAB

INSTITUT DE RECERCA EN VISIÓ PER COMPUTADOR I ROBÒTICA

STAFF	ONGOING PROJECTS	AVERAGE ANUAL INCOME
24	10	600K €

UNDERWATER VISION AND ROBOTICS

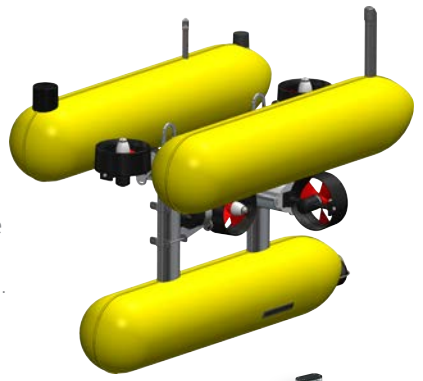
The Underwater Vision and Robotics research lab was created more than **20 years ago** with the objective of becoming a reference in the research and development of **Autonomous Underwater Vehicles** (AUVs) for accurate seafloor mapping and light intervention.
As a consequence of this, several AUV prototypes have been implemented, all with different conceptual design, being the Girona 500 and Sparus II AUVs the currently operative platforms.

In parallel, a lot of effort has been devoted to the development of better **sensor processing algorithms** for the creation of **accurate maps**, target identification and motion planning, allowing the close inspection of underwater structures.

More recently, the efforts of the lab have focused on developing the technologies that will allow the transition of AUVs from survey vehicles to platforms with intervention capabilities.

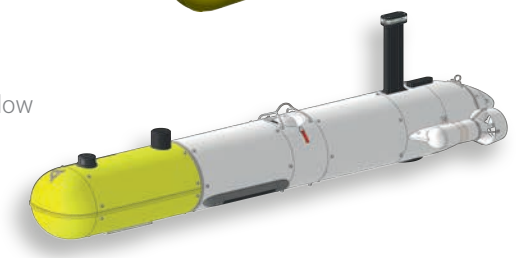
TECHNOLOGIES

AUTONOMOUS UNDERWATER VEHICLES (AUV)



GIRONA 500

Three hull design for increased **stability** and **compactness**. High **maneuverability** with hovering capabilities, ideal for constrained environments or low altitude navigation. Medium-sized vehicle which can be deployed from small boats. 35 liters **payload volume available**.
Open hardware which can be easily reconfigured by the end user with mission specific payloads.
Open software based on the ROS architecture available for download.



SPARUS II

Torpedo-shaped vehicle with efficient hydrodynamics and **long endurance**.
High **maneuverability** with **hovering capabilities**, ideal for constrained environments or low altitude navigation. Lightweight and easy to deploy from the shore or with a small boat.
Open hardware which can be easily reconfigured by the end user with mission specific payloads. Open software based on the **ROS architecture** available for download.

DATA PROCESSING

Our research on mapping techniques has lead to several processing workflows for the generation of 2D and 3D photomosaics, sonar mosaics and bathymetries of high quality, accuracy and resolution.

2D Photo-mosaics

Our automated system for optical mapping can create and visualize large scale and high resolution photo-mosaics of the seabed, with areas covering several square kilometers and with an impressive resolution of up to one millimeter per pixel.

3D Photo-mosaics

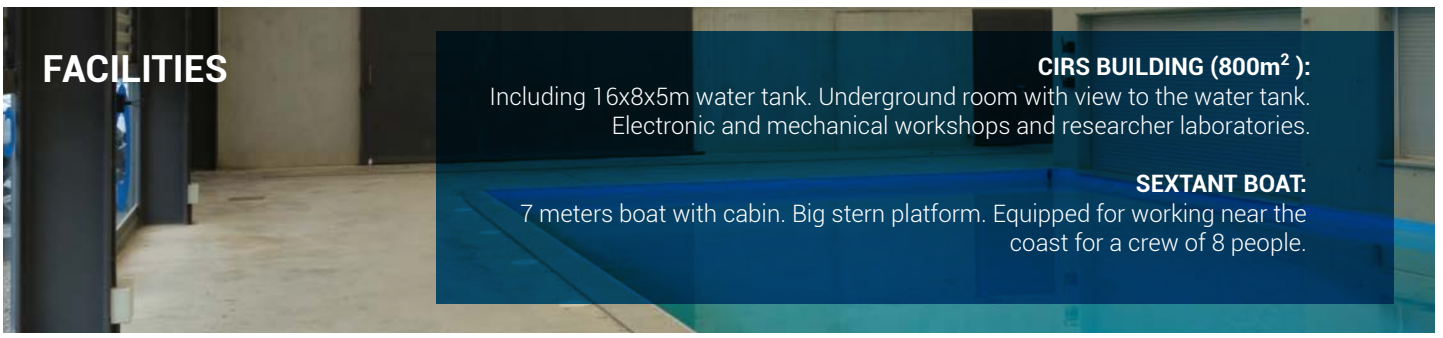
A new pipeline for the processing of tridimensional photo-mosaics has been developed for those geometries which are too difficult to handle with traditional mapping techniques. The generation of astounding 3D models enables the study of complex underwater environments as never before.

Sonar Mosaicing

The underwater range of optical sensors is often compromised by water turbidity. We have developed a mosaicing pipeline tailored to the characteristics of forward-looking sonar imagery that enables the rendering of consistent acoustic mosaics regardless of the visibility conditions.

DEVELOPMENT OF UNDERWATER COMPONENTS

Taking part on research projects often requires the development of new equipments. Because of that, we are also experts on designing underwater technology for custom solutions.



FACILITIES

CIRS BUILDING (800m^2):
Including 16x8x5m water tank. Underground room with view to the water tank. Electronic and mechanical workshops and researcher laboratories.

SEXTANT BOAT:
7 meters boat with cabin. Big stern platform. Equipped for working near the coast for a crew of 8 people.

CENTRE D'INVESTIGACIÓ EN ROBÒTICA SUBMARINA
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