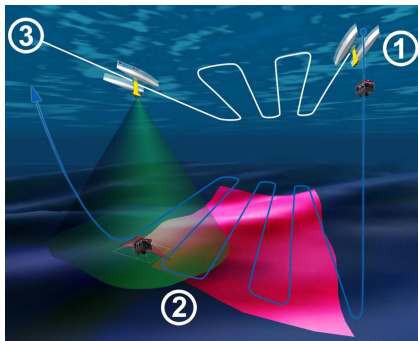


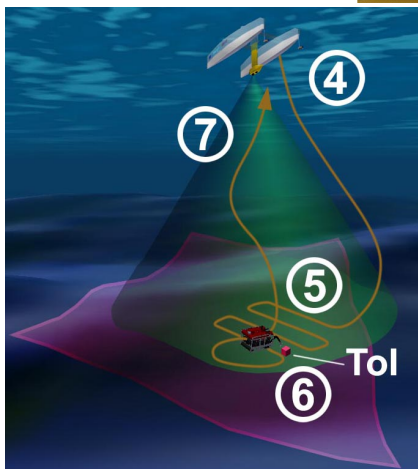
THE PROJECT



PHASE I (Survey):

- 1) Launching.
- 2) Survey.
- 3) Recovery.

Target selection
& intervention
specification



PHASE II

(Intervention):

- 4) Launching.
- 5) Approaching.
- 6) Intervention.
- 7) Recovery.

THE OBJECTIVES

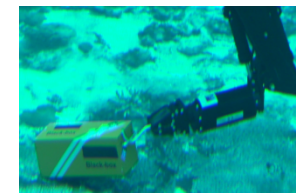
- Cooperative navigation techniques to achieve robust, high accuracy navigation (localization) of all the vehicles involved in the robotic team.
- Innovative mapping algorithms to robustly build consistent multimodal maps of the seafloor.
- Guidance and control algorithms for the team vehicles alone but also to cooperatively guide and control both vehicles in formation.
- Embedded knowledge representation framework and the highlevel reasoning agents required.
- Advanced acoustic/optical image processing algorithms to allow for feature detection and tracking.
- A redundant robotic arm endowed with a dexterous hand as an enabling technology for multipurpose manipulation underwater.
- Innovative strategies for the coordinated control of the joint AUV-Manipulator system.
- The mechatronics as well as the perception/action capabilities needed to face the autonomous docking of the I-AUV to the ASC.
- A multisensory control architecture, including a knowledge-based approach, to guarantee the suitable manipulation actions for enabling a multipurpose intervention system.

Project coordinator: Prof. Pedro J. Sanz
Website: www.irs.uji.es/trident
Email: sanzp@icc.uji.es
Facebook: /trident-project
Twitter: @IRSlab @ViCOROB

THE RESULTS



UWSim, an UnderWater SIMulator for marine robotics research and development, which has been used as a tool for testing and integrating perception and control algorithms before running them on the real robots. More info: <http://www.irs.uji.es/uwsim/>



The different parts of the I-AUV were tested in the CIRS water tank: navigation, vision and manipulation. Furthermore, the I-AUV performed an autonomous search and recover mission of a flight data recorder mockup, placed at an unknown position into the water tank.



In the harbour experiments (Oct. 2011), the I-AUV performed both survey and intervention phases autonomously. When the target was found in the image, the vehicle switched to visual station keeping and the manipulation started. The procedure is as following: 1) the image is processed and the target identified and tracked, 2) the grasping module decides the best position for the I-AUV, 3) the I-AUV adopts the requested pose, 4) the task is performed. Tracking is performed continuously while the grasping takes place.

The Consortium



Universitat Jaume I de Castellón (Spain)

Dr. Pedro J. Sanz
Multisensory Based Manipulation Architecture



Universitat de Girona (Spain)

Dr. Pere Ridao
Navigation and Mapping



Universitat de les Illes Balears (Spain)

Dr. Gabriel Oliver
Visual/Acoustic Image Processing



Università di Bologna (Italy)

Dr. Claudio Melchiorri
Mechatronics System and Control



Università di Genova (Italy)

Prof. Giuseppe Casalino
Floating Manipulation



Instituto Superior Técnico (Portugal)

Dr. Carlos Silvestre
Single and Multiple Vehicles Control



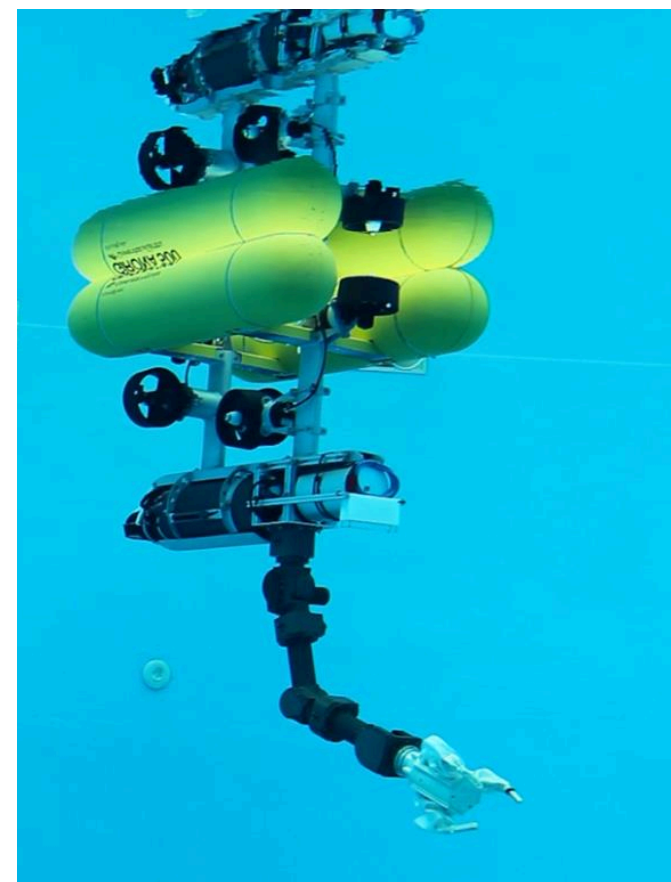
Heriot Watt University (United Kingdom)

Dr. Yvan Petillot
Vehicles Intelligent Control Architecture



Graal Tech (Italy)

MSc. Andrea Caffaz
Electromechanical design of the arm



EU FP-7, ICT Challenge 2: Cognitive
Systems, Interaction, Robotics Collaborative
Project (STREP).

Grant agreement No: ICT-248497

This project proposes a new methodology to
provide multipurpose dexterous
manipulation capabilities for intervention
operations in unknown, unstructured and
underwater environments.