

AN INTEGRATION PERSPECTIVE OF THE TRIDENT PROJECT

J.C. García¹, M. Prats¹, P.J. Sanz¹, D. Ribas², P. Ridao², S. Wirth³, G. Oliver³



1: Universitat Jaume I (UJI); 2: Universitat de Girona (UdG); 3: Universitat de les Illes Balears (UIB)

STRATEGY



- 1) User specifies the survey within the GUI.
- 2) The AUV performs the survey.
- 3) The AUV returns to the ship and a seafloor photo-mosaic reconstruction is done.
- 4) The user specifies the intervention mission, loading the photo-mosaic in the GUI.
- 5) The AUV navigates directly to the target.
- 6) The AUV performs the intervention.
- 7) The AUV returns directly to the ship.

CONSORTIUM

-  **Universitat Jaume I de Castellón (Spain)**
Prof. Pedro J. Sanz
Multisensory Based Manipulation Architecture
-  **Universitat de Girona (Spain)**
Prof. Pere Ridao
Navigation and Mapping
-  **Universitat de les Illes Balears (Spain)**
Prof. Gabriel Oliver
Visual/Acoustic Image Processing
-  **Università di Bologna (Italy)**
Prof. Claudio Melchioni
Mechatronics System and Control
-  **Università di Genova (Italy)**
Prof. Giuseppe Casalino
Floating Manipulation
-  **Instituto Superior Técnico (Portugal)**
Prof. Carlos Silvestre
Single and Multiple Vehicles Control
-  **Heriot Watt University (United Kingdom)**
Prof. Yan Petillot
Vehicles Intelligent Control Architecture
-  **Graal Tech (Italy)**
Dr. Andrea Caffaz
Electromechanical design of the arm

MILESTONES



M1: Cooperative navigation



M2: Fixed base manipulation



M3: Integrated mechatronics



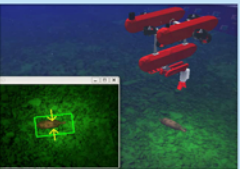
M4: Seafloor mapping




M5: Free floating manipulation



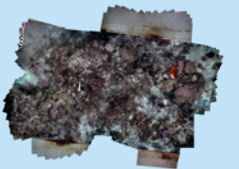
GOALS ACHIEVED




A: Tracking & grasping simulation




B: Blackbox recovery in teleoperation mode




C: Girona500 first survey in water tank



D: Blackbox recovery in autonomous mode

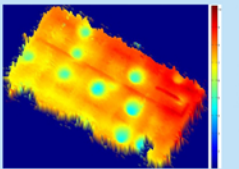


E: Girona500 first navigation at sea

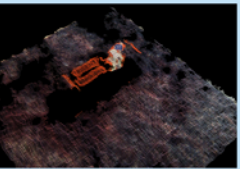


F: Blackbox hooked in real scenario


WORK IN PROGRESS



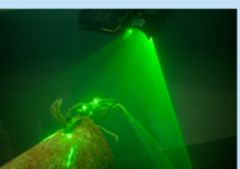
Bathymetry based SLAM



Stereo vision based 3D object modeling




Force and tactile sensor grasping



3D object laser reconstruction

EXPERIMENTS AT SEA: AUTONOMOUS RECOVERY OF A BLACKBOX



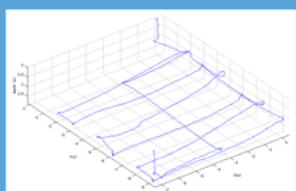
Location: Roses, Girona (Spain)
Date: 17-21 / Oct / 2011

GOAL: Map an area, find a blackbox and recover it.

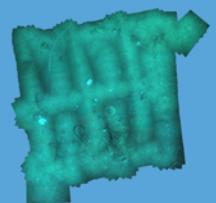
1) Survey:
1.1) Survey visualization with the simulator.

2) Intervention:
2.1) Target detection and tracking.
2.2) AUV station keeping.
2.3) Hooking the target.

UdG :: Navigation System




The AUV survey path




A photo-mosaic is built and loaded in the simulator for a survey visualization (1.1)

UIB :: Vision System

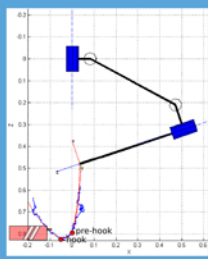



The system detects and tracks the target (2.1)



A message for visual station keeping is sent to the AUV (2.2)

UJI :: Manipulation

The arm hooks the blackbox mock-up (2.3)