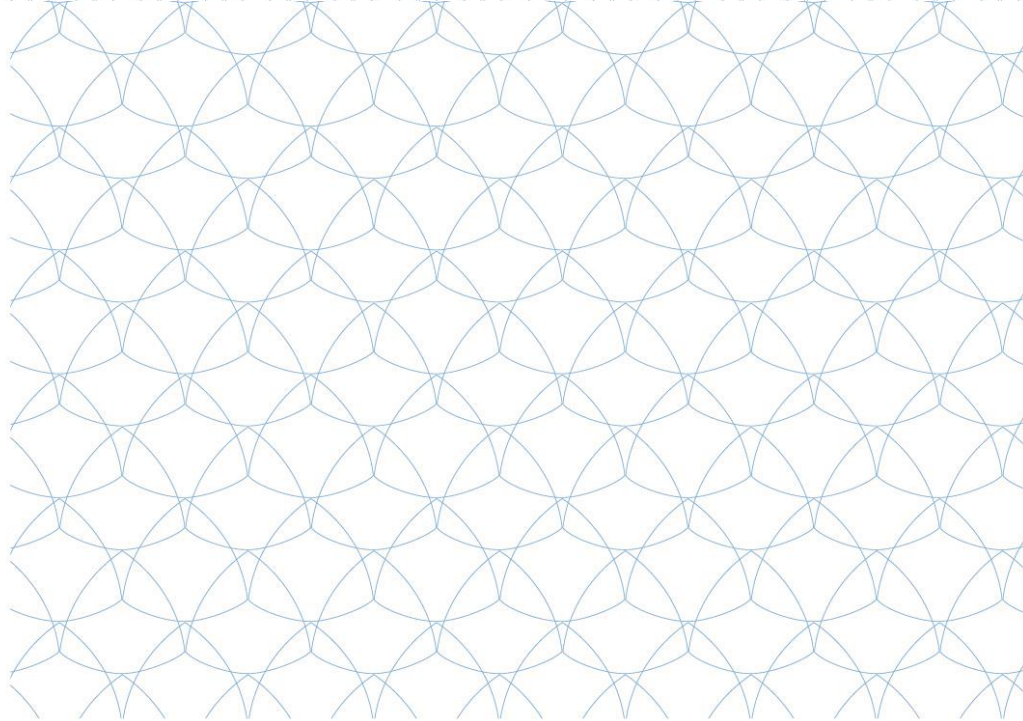




**EXCELLABUST**  
EXCELLING LABUST IN MARINE ROBOTICS



# Staff exchange 1

## *Report*

Feb – Mar 2016

Filip Mandić @University of Girona



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During February and March 2016, Filip Mandić was a guest researcher in the Underwater Vision and Robotics Research Centre (CIRS) at the University of Girona (UdG). Around 20 employees are working at the facility which is located in Scientific and Technological Park of the UdG. Their team is composed of: pre-doctoral researchers, engineers, technicians, postdoctoral fellows and permanent staff. They are one of the leading teams in the research and development of Autonomous Underwater Vehicles for accurate seafloor mapping and light intervention. With more than 20 years of experience, they offer research, engineering and field operations experience to companies and institutions. Also, the team is part of the Institute of Computer Vision and Robotics (ViCOROB) and member of TECNIO network of Excellence in Catalonia region.



*Figure 1. Scientific and Technological Park of the UdG.*

Filip Mandić was working in the field of surface and underwater marine robotics. Specifically, developing algorithms for improving underwater vehicle localization. In February, work on simulation and implementation of algorithms, proposed by research plan written prior to staff exchange, was conducted. All the work was supervised by Dr. Marc Carreras. CIRS lab members, especially Dr. Narcis Palomeras, were very helpful with the introduction of the software and hardware architectures they use in their everyday work. Facilities available at the research centre, like water tank, have proven to be very useful during development and implementation phase. It was possible to quickly test all the hardware and software modifications before setting to open sea for algorithm validation.

Experiments at sea, during which proposed algorithm was tested, were conducted on three separate occasions during March 2016, in Sant Feliu de Guíxols, Spain. The experimental setup consisted of two autonomous underwater vehicles: Girona 500 and Sparus II. Both vehicles were developed at the Underwater Robotics Laboratory of the University of Girona, Spain. Data sets, which show that proposed algorithm for steering beacon vehicle in single range navigation scenario is working in real life-conditions. That was achieved despite acoustic communication constraints and disturbances usually present in real-life conditions. Acquired and analysed results will be presented as a joint conference paper "Mobile beacon control algorithm for maximizing observability in single range navigation" [1].

Major results accomplished during and shortly after staff exchange are:

- Algorithm for improving observability in single range navigation implemented on SPARUS2 and GIORNA 500 vehicles.
- Algorithm tested on sea trials and experiments for data gathering conducted.
- Analysed results will be presented as a joint conference paper “Mobile beacon control algorithm for maximizing observability in single range navigation”



*Figure 2. At the sea trials.*

[1] Filip Mandic, Nikola Miskovic, Narcis Palomeras, Marc Carreras. Mobile beacon control algorithm for maximizing observability in single range navigation. 10th IFAC Conference on Control Applications in Marine Systems CAMS 2016, Trondheim, Norway