



WiMUST

Widely scalable Mobile Underwater Sonar Technology



<http://www.wimust.eu>

THE PROJECT IN A NUTSHELL

ABSTRACT: The WiMUST project targets the development of new cooperative marine robotic systems to drastically improve the efficacy of the methodologies used to perform geophysical and geotechnical acoustic surveys at sea. More specifically WiMUST aims at designing, developing, and testing at sea, the algorithms and methodologies necessary for controlling the geometrical configuration of a team of cooperative marine vehicles and adapting it according to the need of the acoustic survey.

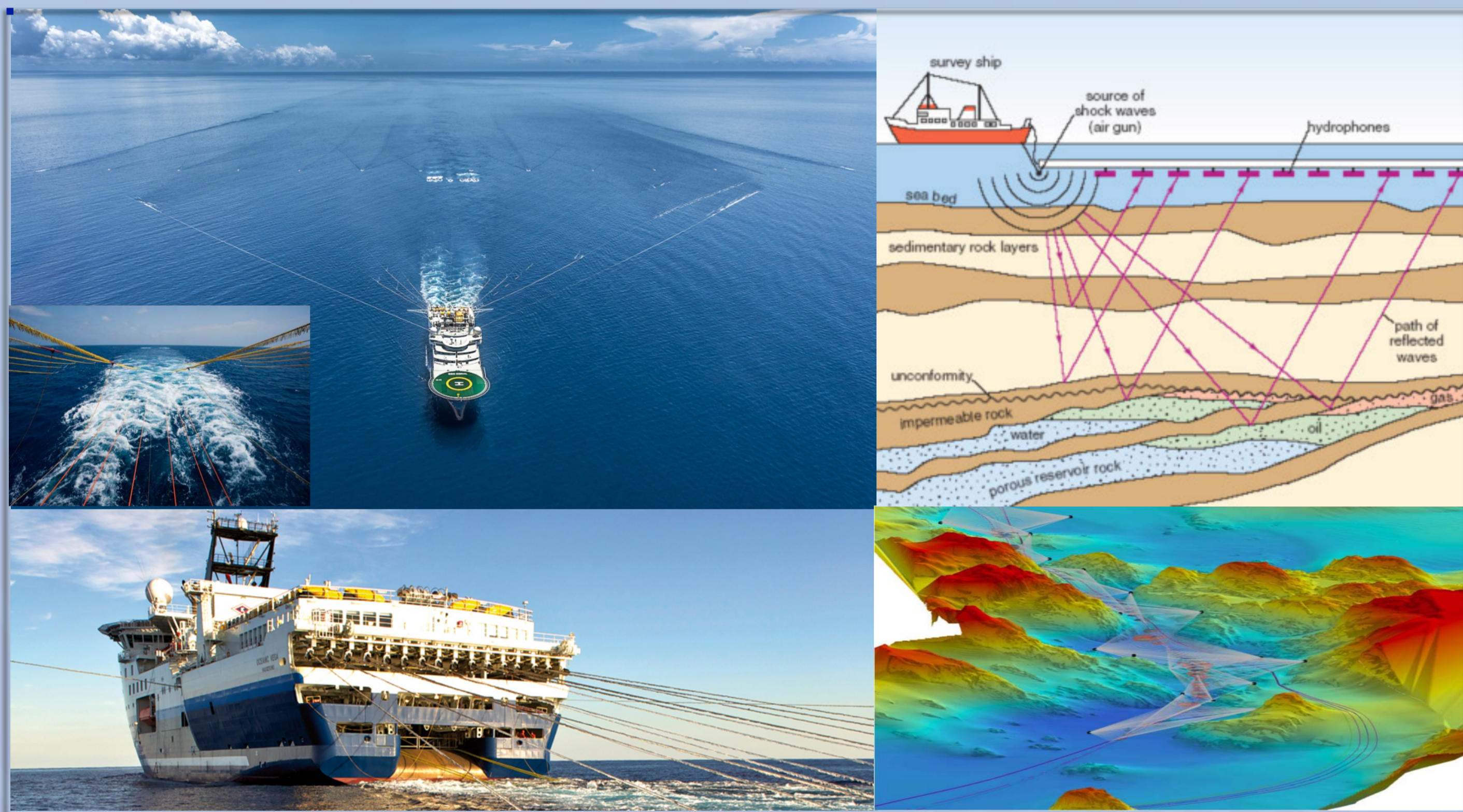
Coordinator: Giovanni Indiveri, ISME, giovanni.indiveri@unisalento.it

USEFUL INFORMATIONS:

- Funding Scheme: EU Horizon 2020
- Total Budget: 3.97M €
- Start Date: Feb 2015
- Duration: 36 months
- Call: Robotics - LEIT ICT-23-2014
- EC Keywords: Robotics for inspection and monitoring.
- Keywords: Robotics for civil tasks; Marine and Underwater Robotics; Distributed Acoustic Sensor Arrays; Underwater Sensor Systems; Seismic Data Acquisition.

MARINE GEOTECHNICAL/GEOPHYSICAL SURVEYING

- **BACKGROUND:** Seabed mapping, seafloor characterization and seismic exploration at sea are essential for underwater construction. They are used to identify possible geo-hazard, steep slope, escarpment or wreck.



- **METHODOLOGY:** The surveys are currently performed with acoustic receivers attached to streamers towed on surface by a vessel. Acoustic data are acquired by illuminating the seabed with strong acoustic waves sent by acoustic source installed on a support ship. Post-processing of the acquired data will reveal the detail of sub bottom structures of interest.

- **APPLICATIONS:** Civil engineering. Oil/Gas industry: oil rigs and pipeline construction; exploration and development of oil/gas reservoirs. Windmill and cable construction.

- **CURRENT LIMITATIONS:** Both the geometry of the complete array of hydrophones and their relative positions with respect to the source are fixed a priori.

THE WiMUST APPROACH

- **GOAL:** To drastically improve the efficacy of the methodologies used to perform geophysical and geotechnical acoustic survey at sea.
- **KEY IDEA:** It is to decouple the acoustic source from the receivers and to impart independent motions to groups of the latter so that they can be acoustically excited from different angles and change their geometry.
- **HOW:** To use a team of cooperative autonomous marine robots equipped with hydrophone streamers, acting as intelligent sensing and communication nodes of a reconfigurable moving acoustic network.

- **ADDED VALUES:** To reconfigure the size and inter-node distances of the acoustic array; quality improvement of acquired data, through a better spatial resolution, reduced distance of the array from sea-bottom and more robust noise rejection capability; to facilitate the operation at sea.
- **CHALLENGES:** To actively control the array's geometry to maximize the information content of the signal acquired; short and long range communication; clock synchronization; cooperative navigation: accurate AUVs formation control; HW integration of acoustic acquisition and navigation systems.

- ≈ 10 Medusa/Folaga AUVs:

