

SWARMS)))



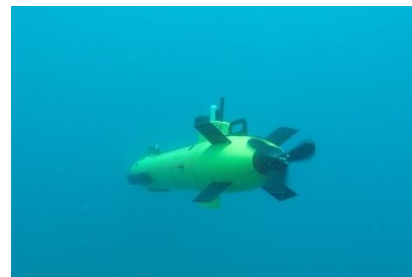
*Smart and Networking Underwater Robots in
Cooperation Meshes*



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 662107-SWARMs-ECSEL-2014-1.

What is SWARMs?

- *Smart and Networking Underwater Robots in Cooperation Meshes* (<http://swarms.eu/>).
- ECSEL-JU funded research project aimed to enhance the cooperation among autonomous maritime vehicles.



What is SWARMs?

- Network infrastructure for wireless connectivity above and under sea level.
- Middleware architecture for interoperability among heterogeneous pieces of hardware.
- Services for information enhancement (context awareness, semantics, mapping).
- Orientation to results and real-world deployments.
 - Testing activities in the Canary Islands.
 - Scheduled demonstrators in Romania and Norway for the next steps.

What is SWARMs?

- Extensive dissemination and exploitation activities.
- Strong background in this application domain.



POLITÉCNICA



BOSCH
Invented for life



THALES



instituto de telecomunicações

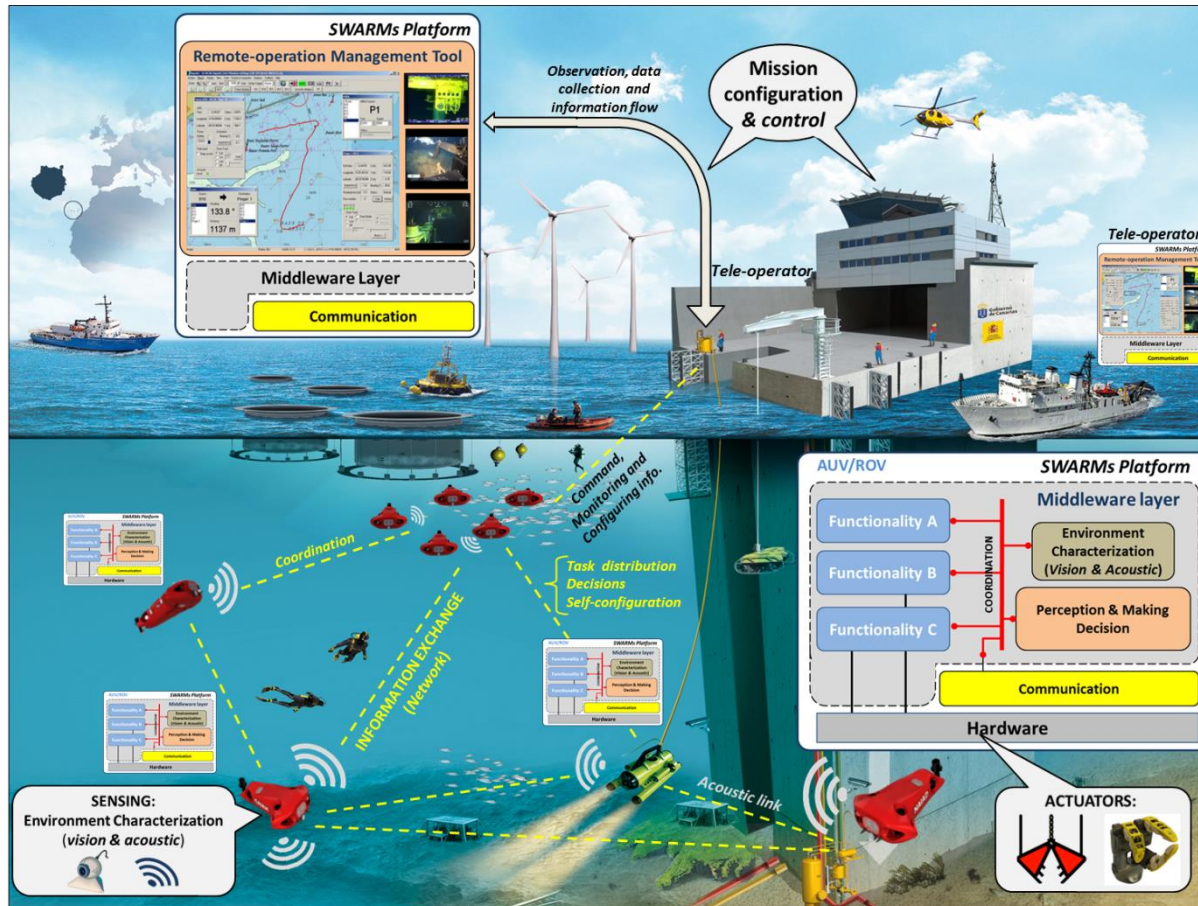


universidade de aveiro



Objectives of SWARMS

- Cooperation among different merged subsystems.

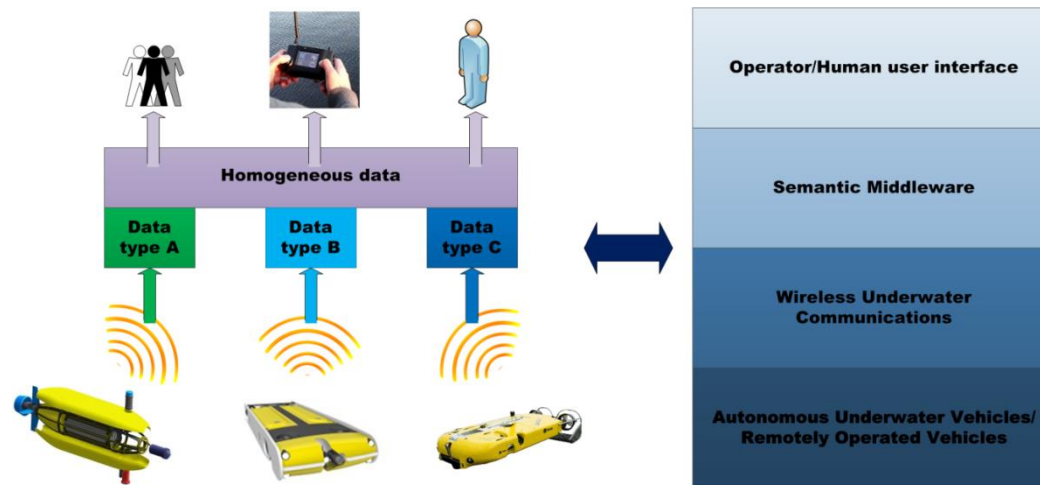


Objectives of SWARMS

- Intelligent environment recognition and sensing system.
- Innovative perception and decision-making system.
- Underwater communication system merged with surface wireless data transmissions.
- Methodology for design, verification and validation of safe autonomous underwater operations.

Objectives of SWARMS

- Semantic middleware to manage interoperability, cooperation and coordination.



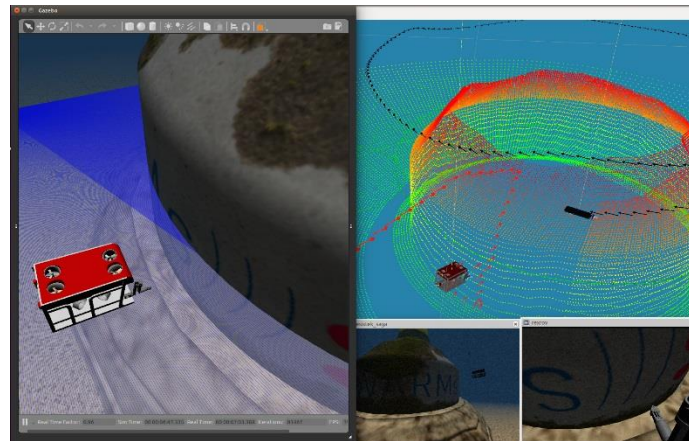
- Decision-making tele-operation assistance tool.
- New functions to improve autonomy of AUVs and ease of use of ROVs.

SWARMS integration activities

- Integration of software and hardware components in the Canary Islands (September, 2016).
 - Middleware from different vendors and programming languages.
 - Development of Robot Operating System components.
 - Integration of SWARMS ontology within middleware.
- Integration of network communications.
 - Acoustic underwater and surface communications.
 - Successful testing of the resulting wireless network.

SWARMs integration activities

- Development of a Robot System Onboard Architecture.
 - Compatibility with DDS solutions in middleware.
- SWARMs vehicles simulation developed with Gazebo and Graphical User Interface.



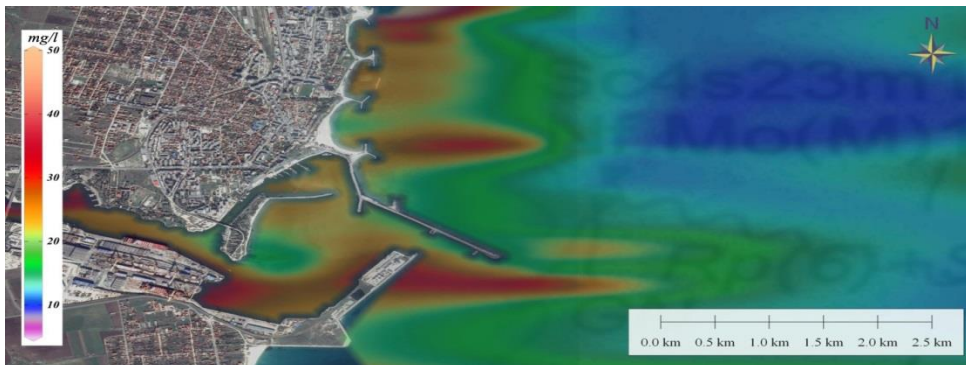
SWARMS integration activities

- Testing of vehicles and systems in the environments where they are expected to work.
 - Testing and deployment of AUVs.
 - Testing and deployment of ROVs.
 - Information retrieval and real-time data.
 - Overall satisfactory performance.



SWARMs future demonstrators

- Next demonstrator is being prepared for July, 2017.
 - Tasks and implementation works to be tested from every Work Package.
- Final demonstrator will take place in the North Sea.
 - Testing facilities of the centre for Autonomous Marine Operations and Systems (AMOS).
 - The complete framework will be tested by following a structure of missions. Scheduled for June, 2018



Project management

- SWARMs project coordinator is **Prof. Dr. José Fernán Martínez Ortega**, from the Technical University of Madrid – UPM.
- Currently looking for partners in Cyber-Physical Systems, robotics and communications.
- Contact:
 - jf.martinez@upm.es (UPM)
 - jose-fernan.martinez@mdh.se (MDH)

EMRA 2017 – Girona, 15th May, 2017

pedro.castillejo@upm.es

Technical University of Madrid

