



e-URready40S *News*

EXPANDED UNDERWATER ROBOTICS READY FOR OIL SPILL

OCTOBER 2017

CARTAGENA TRAINING EXERCISE

The URready40S project increases a trained fleet of autonomous vehicles against oil spills.



Humanitarian Aid
and Civil Protection



Salvamento
Marítimo



GOBIERNO
DE ESPAÑA

MINISTERIO
DE FOMENTO



Irish Coast Guard



Universidad
Politécnica
de Cartagena



U.PORTO



University of
Zagreb



University
of Cyprus



Universitat
de les Illes Balears



SAMS



Training Exercise

Cartagena 2017

The training exercise was held in Cartagena from 5 to 9 June on board the vessel SASEMAR "Clara Campoamor."

The team members involved effectively coordinated and planned missions that were executed by a eight autonomous vehicles fleet in a near-real time scenario.

All the protocols and systems previously developed worked together to address a simulated oil spill.



UNDERWATER VEHICLES SURFACE AERIAL

The exercise involved 6 AUVs from different manufactures; Remus 600, three LAUVs and two Iver2, one USV (PlaDyPos) and one UAV. All of them, working in conjunction in the Mediterranean Sea.

SAMS vehicle -a Remus 600, enable to navigate up to 600 m depth- explored possibilities of expanding the fleet to deeper waters.

A new version of USV PlaDyPos as a support vehicle for the AUVs providing two-way communication, tracking and monitoring of equipment was tested.



LOCATION, SIZE AND EVOLUTION OF AN OIL PLUME OVER TIME

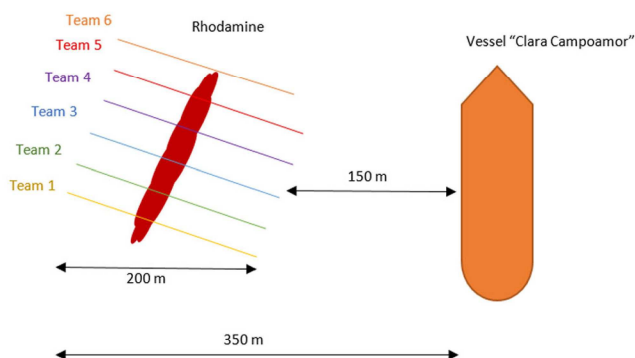
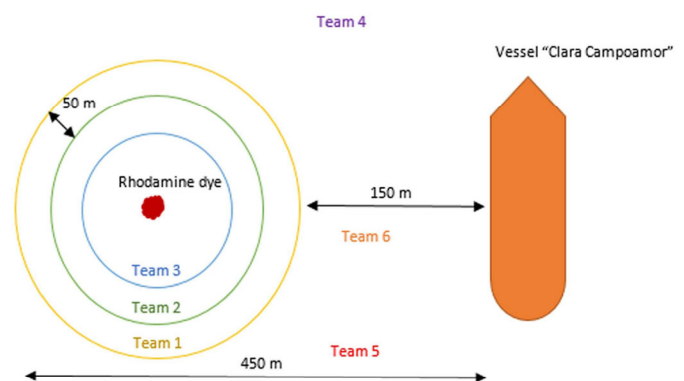
During the exercise a non-toxic dye (Rhodamine WT) was used to simulate an underwater oil spill. The Rhodamine WT was pumped at 15 meters depth. Each mission was designed to locate, characterize and monitor the spill obtaining its direction, size and volume.

THE SPILL'S DIRECTION

An in-water Rhodamine WT spill was used as proxy for oil spill.

It's possible to predict the most likely location of the spill's origin through MEDLISK.

Within the perimeter traced each vehicle carried out missions in concentric circles at different depths as shown in the figure.



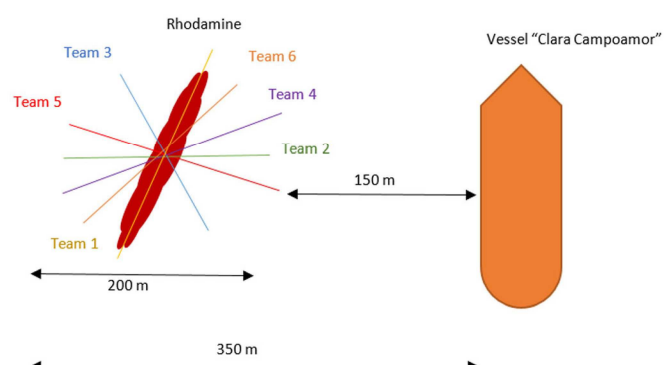
THE SPILL'S SIZE

Once the spill's origin is identified, an imaginary line is traced along the plume and AUVs are programmed to perpendicularly cross this line in equidistant transects.

THE SPILL'S VOLUME

Once the plume is identified, missions were performed in straight lines crossing diagonally the plume from many different angles.

Fluorometric sensors enabled the concentration measurements, while the diagonal transects provided the map of the spill extension.



THE FLEET CAPABILITIES

**Here we designed and use a fleet of
autonomous underwater vehicles
with hydrocarbon sensing payload supported
with unmanned surface and aerial vehicles**



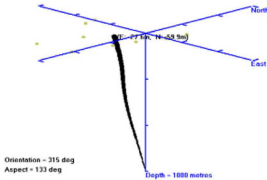
UAVs – enabled for measuring oil in water

USV – expanded the real-time communication with submerged vehicles

UAVs - allowing larger range remote downloading of AUVs recorded data

NEPTUS Command and Control Software – managed the entire fleet

MEDLISK II Trajectory oil spill model forecasted the spill evolution



The Next Training Exercise

The Cork Exercise will test the capability to integrate more new vehicles in the system (two SPARUS designed by Universitat de Girona) but the knowledge transfer to a new Maritime Safety Agency, the Irish Coast Guard. The fleet will be tested in a new environment, the Irish water, in a new vessel. This exercise will give new insights to improve the developed protocols.

CORK
2018

