URready4OS News

UNDERWATER ROBOTICS READY FOR OIL SPILLS

OCTOBER 2015

The URready4OS project successfully performs demonstrative experiment.

The project's fleet of vehicles demonstrated the ability to locate a spill, determine its size, and predict its movement in waters off Cartagena (Spain) from 22 to 26 of June.

All the goals set out for this final experiment were fulfilled: the team members involved effectively coordinated and planned missions which were executed by the fleet of five autonomous vehicles in a near-real time scenario. All the protocols and systems previously developed worked together to address a simulated oil spill.

Co-financed by the EU

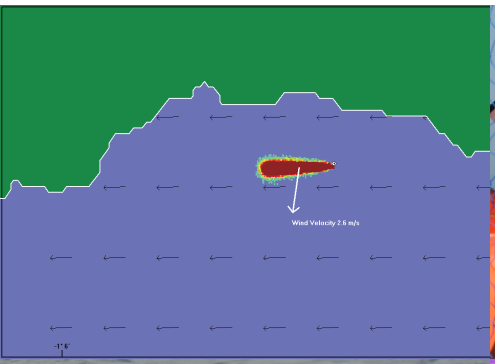
Universidad Politécnica de Cartagena

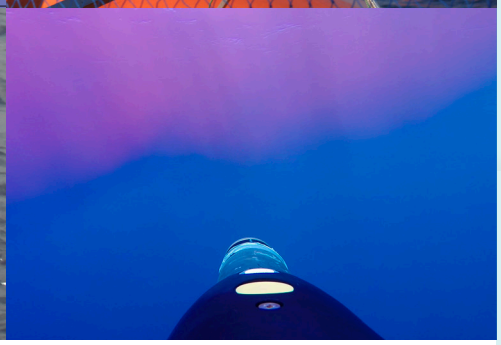
U.PORTO

OCEANOGRAPHY CENTER CYPRUS

The Experiment

The main goal of this final experiment was to verify the validity of the protocols and software developed for a fleet of aerial, surface and underwater autonomous vehicles to identify, quantify and monitor a simulated oil spill made with Rhodamine WT. In the process, the skills developed throughout the project were demonstrated.





The experimental operations were carried out in waters off Cartagena in the Mediterranean Sea, on board the vessel *Clara Campoamor*, provided by Spanish Maritime Safety Agency (SASEMAR).

Five vehicles participated: a Light AUVs (Xplore1) and two X8 UAVs from the University of Porto, the Light AUV Lupis and the USV PlaDyPos from the University of Zagreb, and an IVER2 AUV from the Technical University of Cartagena. In addition, the team from University of Cyprus made numerical predictions of the pollutant cloud evolution which aided in mission planning and adaptation.

In total, a team of 20 people worked together over 7 days to carry out the suite of experiments needed to meet objectives of the project.

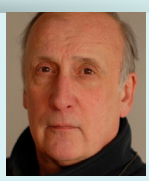
Final project impressions

JAVIER GILABERT
Project Coordinator
Principal Investigator
Technical University of Cartagena

"The main goal of the experiment was to operate together the fleet of vehicles with five vehicles at a time. The second goal was to make a protocol and to use the same command and control software for all of them. Both have been achieved. At this stage, I would say that the whole system is not just a prototype, it's something more developed, close to a final product that safety agencies can use. We would like to expand the fleet of vehicles to be fully operational."

JOSE BRAGA
Researcher
University of Porto

"This last demo has been a good way to get everyone in the same place together, and get a little bit more coordination of operations, and show we are able to communicate underwater and to synchronize all data, putting it in a nice visualization tool for the users.""



ZORAN VUKIC
Principal Investigator
University of Zagreb

"My impression is very good, because we did what we planned to do and with success. This is a project that will go on in the future, because this technology will be used for this and other similar applications."

DAN HAYES
Researcher
University of Cyprus

"I'm very excited to see that we have good results so far. In fact, what we see with the instruments is starting to look very similar what we see with the model, which gives us some confidence going forward. One of the strengths of the project is that this is something I don't think anyone has ever been able to do before: to detect directly pollution with vehicles and feedback that into models."

Let the machine run

After the 10 days set-up experiment in Split –the first time the team worked together-, the main objective in the final experiment in Cartagena was to "let the machine run."

A week-long schedule was created to generate and monitor a simulated oil spill plume. It was essential to partner with SASEMAR to carry out the experiment, in conditions as realistic as possible. After all, the *Clara Campoamor* is the flag ship for combating marine pollution.

The first three days of the week saw teams coordinate on different missions with the vehicles, and the last two days were devoted to show the abilities of the fleet to stakeholders.

One week standard programme

1. Warm-up

Systems were set up and the team organized itself for effective cooperation on board. Therefore, the team spent most of the day tuning the vehicles and carrying out some test missions. On this day there was no spill of Rhodamine.

2. Testing strategies

During the following days, the team put into practice different strategies to locate and monitor a non-toxic Rhodamine WT spill. Several additional tests were needed to create and maintain enough quantity of dye to be detectable by the vehicles. Previously, it was necessary to design a Rhodamine pumping system, which was portable and able to inject dye into the sea for as long as needed.

3. Demonstrating experiment

The experiment consisted of two basic phases starting from an initial oil (Rhodamine WT) spill, with an unknown origin, location and size.

A.-Identification

Each vehicle carried out missions in concentric circles (50 m apart) at different depths for detecting the spill. The result was positive. With that information the model allows us to predict where the spill will go in the future and its expected spatial coverage.

B.-Verify the extension

Once the direction of the spill was identified, new missions were uploaded to the vehicles in order to cross the spill in several directions recording its extent. Real- time data were sent underwater to the surface communication buoy and ship and then plotted on the command and control console (NEPTUS), including an overlay of the modelling outputs.

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The attenders say...

Asta Mackeviciute

REPRESENTER FROM THE DG-ECHO

"The impression is really good because the most important thing I see here happening is that the development and the research is being linked with the authorities, who are the endorsers of the final results of the project. I think there is a reason for the project to be developed further and also to see how these results can be applied in other European seas, not just in the Mediterranean. So, there's a future"

Sarah Hall

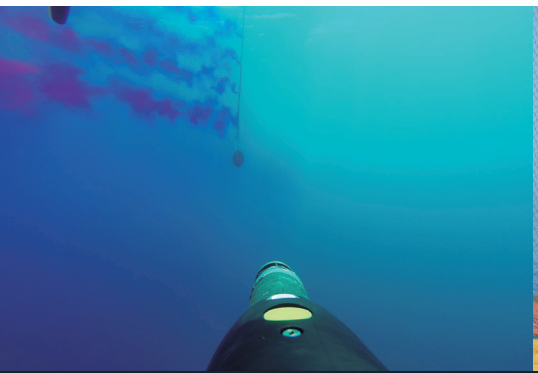
OIL SPILL RESPONSE LTD.

"The most important thing in oil spill responses is not just getting the data, but also getting the data at the right place. So, getting the data from the AUV's and getting it into the laptops and then being able to use them is the most important thing."

LT. Juan José Gallego

LIEUTENANT OF THE SPANISH NAVY

"It's a great, innovative method when it comes to locating a leak, acting and giving an early warning on any accident. It's a very useful and effective tool, with few required resources. With a not too demanding platform you can do a plan and a quite effective operation. At least, it allows you to get an initial contact with what has really happened and know the extent of the problem"



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