



SPRES (OIL SPILL PREVENTION AND RESPONSE AT LOCAL SCALES) is one of the 10 Projects approved under the Third Call for Projects of the Atlantic Area-Transnational Cooperation Programme 2007-2013.

The main aim of the project is to generate both operational forecasting systems and planning tools, at the local scale (estuaries and ports) by developing a set of high resolution operational oceanographic systems in several estuaries or ports located in the Atlantic Area (Aveiro Lagoon, Santander Bay, Falmouth Harbour and Belfast Lough), and establishing local oil spill response plans for these areas based on risk assessment.

SPRES also aims to embed the project results firmly in regional development activities through the involvement of stakeholders in a large range of activities. The stakeholders will therefore be involved in the planning and delivery of the project aims, as well as promoting the project results to the wider industrial and public sector communities.



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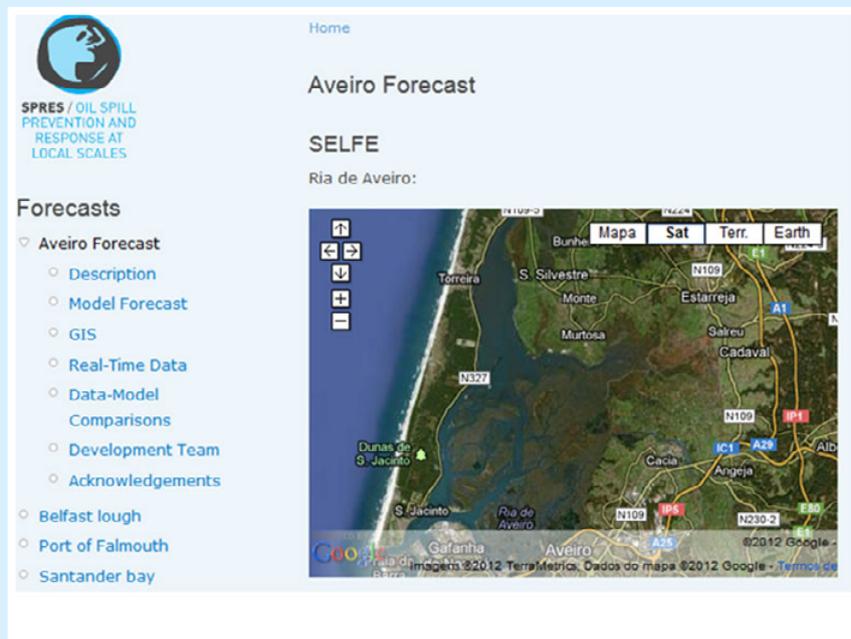


## 2012 ACTIVITIES

### OPERATIONAL OCEANOGRAPHIC SYSTEMS (OOS)

#### AVEIRO LAGOON

A high-resolution operational oceanographic system is under development for Aveiro lagoon (RDFS-SPRES: <http://ariel.lnec.pt/spres/>). This user-friendly web-based platform integrates both short term model predictions and real time data (obtained in the scope of the monitoring network installed in frame of SPRES) in a webGIS environment. The forecasting system is based in a three-dimensional (3D) application of the hydrodynamic model SELFE3D with a spatial resolution varying from 8 km in the coastal area to 2 m in the narrow channels inside the lagoon. The ocean initial and boundary conditions for water levels, water temperature and salinity are provided by MyOcean (<http://www.myocean.eu/>), the meteorological forcing is predicted by the Weather Research and Forecasting (WRF) regional model developed by University of Aveiro (<http://climetua.fis.ua.pt>), while the Portuguese Environment Agency (SNIRH) data is used for the river boundaries forcing. With this application the end users will have easy access to local forecasts of sea levels and 3D currents, water temperature and salinity, which can be used together with the 3D VOILS oil spill model to predict and visualize oil spill plumes in case of oil spill accident.

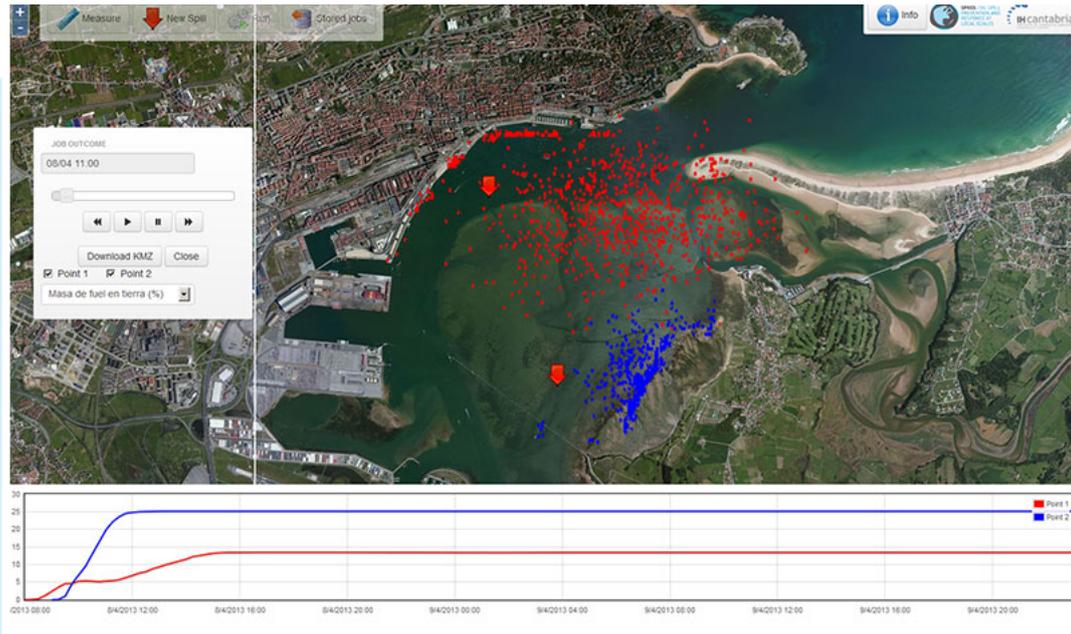


Aveiro lagoon user-friendly web-based platfor



## SANTANDER BAY

A high resolution (20 m) forecasting system is being developed for Santander Bay. The system receives daily meteorological and ocean forcings from European and Spanish organizations and provides three day forecasts of sea level, currents, salinity and temperature based on numerical modeling. The OOS is being implemented into a web application that will allow end users to easily access the forecast and, in case of pollution threat, launch an oil spill transport model to estimate the oil spill trajectories and fate.



High Resolution Tidal Current Data Collected for First Time in Belfast Lough



## BELFAST LOUGH

Seabed-mounted “Aquadopp” Acoustic Doppler Current Profilers (ADCPs) were deployed at two locations within Belfast Harbour (Inner Belfast Lough) to gather high resolution tidal current data over this busy sea area. Tidal current data is lacking in Belfast Lough but is critical for adequate calibration, or “fine-tuning”, of a high resolution 3D hydrodynamic model of Belfast Lough, which is a key deliverable of the SPRES project. The ADCPs were left in situ for a period of one month (February to March 2013) to capture both spring and neap tidal current data, and gave a successful 100% data return. In addition, through a data sharing agreement, the SPRES project has also accessed another ADCP dataset from the Outer Belfast Lough (Copeland Islands, through Queen’s University Belfast). The Belfast Harbour survey was undertaken as a joint effort between AFBI, local company “Applied Renewables Research (ARR Ltd.)” and the Department of Agriculture and Rural Development (DARD), who generously made their Fisheries Protection Vessel Banrion Uladh available for the instrument deployment and recovery. Finally, through another data sharing agreement with the Environmental Consultancy firm “RPS”, the SPRES project has been allowed access to high resolution bathymetric data for the docks area of Belfast Harbour, in exchange for access by RPS to the new ADCP dataset to help their own modelling efforts for Harbour development. Such data have been very important in developing the hydrodynamic model in this part of the lough, which is a critical area for potential oil spills.



Dr. Adam Mellor (AFBI) assisting with retrieval of ADCP aboard the Banrion Uladh,



The ADCP mounted on a steel frame with acoustic release (netting to prevent sinkage into soft sediments)



View of Belfast Docks site of ADCP deployment



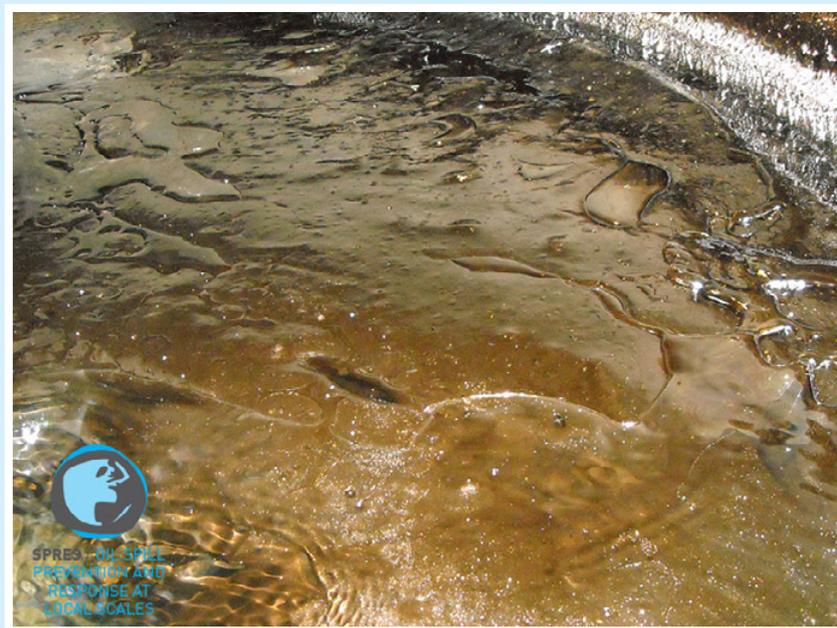
## FALMOUTH

Falmouth Harbour Commissioners operates PISCES II oil spill modelling software (commercially distributed by Transas Marine Ltd). The model requires currents and/or wind to be inputted. These variables are critical to the model outputs and therefore accuracy is of great importance. However, the results of these predictions for the Fal estuary are not accurate and, therefore, the implementation of a high-resolution hydrodynamic model is needed in this study area for a more precise oil spill modelling. For this reason, in the frame of SPRES, the hydrodynamic model SELFE3D is being implemented. The preliminary configuration of the high-resolution model is 2D, and test cases are being tried, imposing the sea surface elevation of MyOcean IBI model output in the open boundary. In the following months a 3D configuration will be developed. Local weather forecast model data was requested to the UK's National Weather Service, Met Office, with the aim to use them as the atmospheric forcing to feed SELFE3D. PISCES will not be improved in its process representation, but enhancements on the input/output structure will be implemented to take advantage of the higher resolution currents field to be obtained from SELFE3D. PISCES, now includes the option to export oil spill trajectories to Google earth format. It is envisaged that, for Falmouth Harbour, two Operational Systems are going to be setup: (1) SELFE3D hydrodynamic model-PISCES oil spill model; (2) SELFE3D hydrodynamic model-VOILS oil spill model.



## EXPERIMENTAL TEST AT CEDRE

Following the second transnational meeting in Brest, environmental conditions and oils to be weathered in the flume were defined according to the data obtained for each site. The objective of these tests was to provide modelers with realistic data in order to calibrate their models. As regards the heavy oil (IFO 220), 7 tests were scheduled considering three levels for each parameter (energy, salinity and temperature): a minimum, a maximum and an average. In addition to the central point, 6 tests had to be conducted considering an extreme (minimum or maximum) for each of the 3 other parameters. As regards the diesel oil, only two tests considering the minimum and maximum of energy had to be performed. By the end of February, 5 tests were completed for the IFO 220 and one for the diesel oil. The last two experiments should be conducted in April.



IFO 220 weathering



## RISK ASSESSMENT SYSTEM

### AZTI

A web GIS-based planning tool for risk assessment analysis is being developed to be applied in each of the case study sites. Given a hypothetical oil spill in a given location, this tool will allow end users to make risk valuations combining oil spill hazard maps and vulnerability maps. The use of this tool will improve the local preparedness against oil spills, helping in the establishment of oil spill protection and clean up measures.

Currently, existing methodologies to estimate vulnerability maps - considering physical, biological and economic aspects- are being adapted to estuarine environments. Furthermore, several approaches to compute hazard maps in terms of probability are being investigated.

### WEB PAGE

We are happy to present the new SPRES webpage, which offers information on the results obtained within this Interreg project. On [www.spresproject.eu](http://www.spresproject.eu) you will be able to access the most relevant information necessary for coastal managers, port authorities and oil companies on how to proceed in the event of an oil spill. All the tools developed within SPRES will be available here once they have been finalized and validated by the different partners.

Related events, site visits and complementary information can also be found.



## 2012 EVENTS

### SANTANDER BAY SURVEY

The 27th of March, 2012, a survey of the Santander Bay was carried out. This was framed in the SPRES project, activities 3 and 6. The objectives of the visit were to know the characteristics of the Bay and the available oil spill response resources on the site. Attendants from IH Cantabria, CEDRE and AZTI-Tecnalia were hosted by the Spanish Maritime Search and Rescue Organization (SASEMAR). The MRCC Santander (Maritime Rescue Coordination Center) and the Strategic Base were visited. The Bay survey was carried out on SASEMAR's boat E/S Salvamar Deneb.



Santander bay survey : shellfish picking on tidal flat

### SPRES KICK OFF MEETING

SPRES's kick off meeting took place on March 28th, 2012 in Santander (Spain). The meeting was held at the Instituto de Hidráulica Ambiental de la Universidad de Cantabria (IH Cantabria). Representatives of all partner organizations attended the meeting. During the morning session, after a general presentation of the project, the site coordinators presented the main characteristics of each study site and the Activity leaders introduced the general guidelines of each activity. After lunch, the Cantabrian Coastal Ocean Basin, the physical modeling facilities at IH Cantabria were visited.



## 2ND TRANSNATIONAL MEETING AT BREST

The second transnational meeting of the European project SPRES took place in Brest(France) on 18 and 19th of September 2012. The meeting was held at Cedre (Centre of Documentation, Research and Experimentation on Accidental Water Pollution). Representatives of all partner organizations attended this meeting. The first day was dedicated to thematic meetings, focusing mainly on the development of high resolution operational models and the production of local scales data needed (sea level, currents, temperature, salinity...). The different existing models already in use in each country were presented and their capabilities discussed. This meeting was also an opportunity for Cedre to allow the participants to discover the flume tank facility and determine the experimental tests to be performed. These tests on oil weathering will be used for models calibration with local conditions and type of oil at risk in the 4 sites studied. The second day was dedicated to the project development by the review of each activity progress and concluded by the lead partner presenting the future actions, milestones, chronogram, administrative and financial issues. Following this meeting, a model developer from LNEC spent few days at Cedre to study oil weathering processes in the flume tank.



Visit of Cedre's flume tank facility



### 3ND TRANSNATIONAL MEETING AT LISBON

The third transnational meeting of the European project SPRES took place in Lisbon (Portugal) on 4 and 5th of March 2013. The meeting was held at LNEC (Laboratório Nacional de Engenharia Civil). Representatives of all partner organizations attended this meeting. The first day was dedicated to the Site development meetings as well as the meetings for the update of the work developed in each of the activities, supported by the presentations of the Site and activity leaders. In the second day, the work was concentrated in reviewing and advancing the work on the risk assessment methods, the definition of the characteristics for each operational and oil spill systems at each site. Finally, the work for the next six months was prepared and the meeting closed with the conclusions by the project leader, IHC.



The SPRES team at the end of the Lisbon TM meeting



## UPCOMING EVENTS

4nd TRANSNATIONAL MEETING AT BELFAST

AFBI

SITE SEMINAR AT BELFAST

AFBI



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