



**SPRES / OIL SPILL
PREVENTION AND
RESPONSE AT
LOCAL SCALES**

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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ACTIVITIES

AVEIRO LAGOON

A high-resolution operational oceanographic platform is available for Aveiro Lagoon (RDFS-SPRES: <http://ariel.lnec.pt/spres/>). In addition to the hydrodynamic forecast, this platform provides oil spill forecasts for 6 pre-defined locations, which were chosen due to be more prone for accidents (navigational routes, harbour structures, hydrocarbons product terminal).

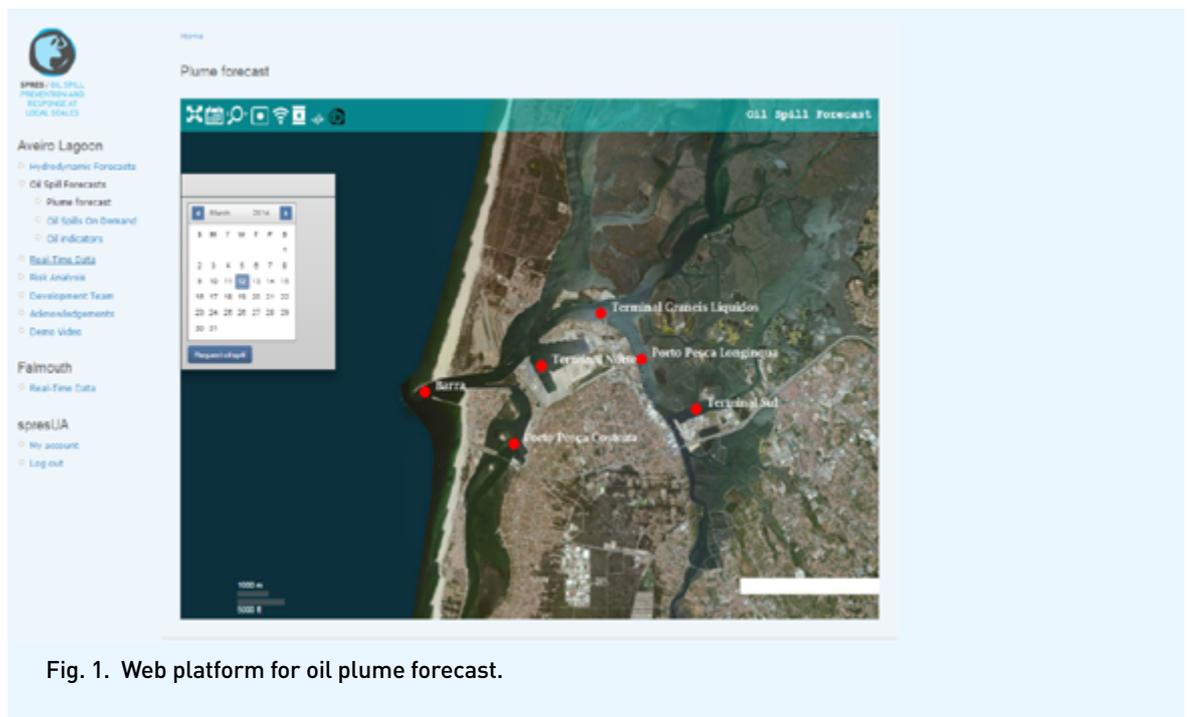


Fig. 1. Web platform for oil plume forecast.

The platform allows the user to choose the location, from the 6 predefined ones, and day of the spill. Results are shown in WebGIS as a set of frames with the oils slick evolution in time. These maps provide very important information for the emergency services.

The platform also provides an “oil spill on-demand” option, where the end-user chooses the location of a spill, within the lagoon, and visualise the plume drift for 48h. For the oil spill on-demand option, the end user chooses the spill location, date and time and spilled oil quantity. The objective is to visualise the plume drift according to forecast hydrodynamic conditions.

As part of the SPRES project, the Ria de Aveiro has two on-line measuring stations located at Barra and Costa Nova, which register water elevation, temperature and salinity among others. The access to these observations is provided within the WEbGIS platform, where the user can visualise the observed data and compare it with the hydrodynamic model forecast. The user can verify the quality of the model forecast, on a daily basis.



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SANTANDER BAY

A web platform made up of two components: (1) An operational system (HR-OOS) and (2) an oil spill risk assessment system (HR-OSRAS) is available for Santander Bay (<http://spres.ihcantabria.es/>). The HR-OOS provides decision makers with short-term (within 48 hours) oil spill trajectory forecasting.

Daily boundary conditions and meteorological forcing are obtained from the European network MYOCEAN (<http://www.myocean.eu/>) and from the Spanish met office, AEMET, respectively. The engine of the OOS is the COAWST modelling system. Oil spill transport and fate simulations are carried out by TESEO model. A web service that manages the operational system allows the user to run hypothetical as well as real oil spill trajectories using the daily forecast of wind and high resolution ocean variables (sea level, ocean currents, salinity and temperature) carried out by COAWST (see Fig. 2).

The risk component of the web app, the HR-OSRAS system, will allow end users to make oil spill risk valuations combining hazard and vulnerability maps. The probability that a given hypothetical or real oil spill reaches sensitivity areas of the estuary is calculated using pre-run scenarios and a vulnerability assessment based on the physical, biological and socio-economic resources of the Santander Bay. The use of this tool will improve the local preparedness against oil spills, helping in the establishment of local oil spill protection and clean up measures.

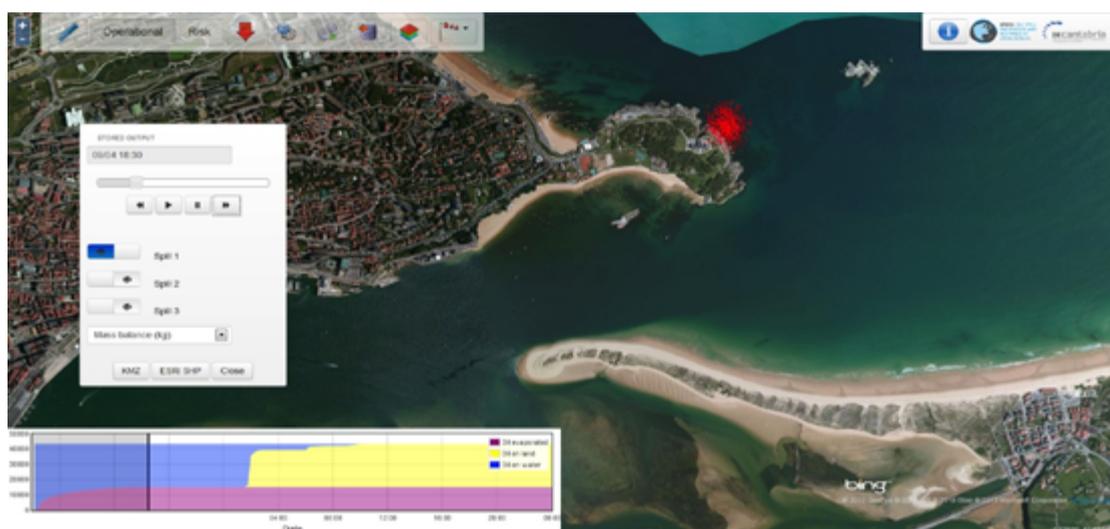


Fig. 2. Snapshot of a hypothetical oil spill simulation in Santander Bay.



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BELFAST LOUGH

A high Resolution (46 m) Operational Oceanographic System in Belfast Lough is near completion, and is composed of two components: (1) the HR operational oceanographic module, based on a bespoke Delft-3D hydrodynamic model, and (2) the HR oil spill forecast module, based on the oil spill model, TESEO. The system receives daily ocean and meteorological forcings from the European initiative “MyOcean” and the UK Meteorological Office, and provides two-day forecasts of sea level, currents, salinity and temperature based on numerical modelling. This web application allows end users to easily access the forecast and to launch the oil spill model to estimate the oil spill trajectories and fate both in case of pollution threat and for training purposes. In addition, new instrumentation has been installed on Pile 8 within the Inner Lough, and plans are to embed a data-feed from these instruments showing live plots of temperature, salinity, sea level and meteorological readings.

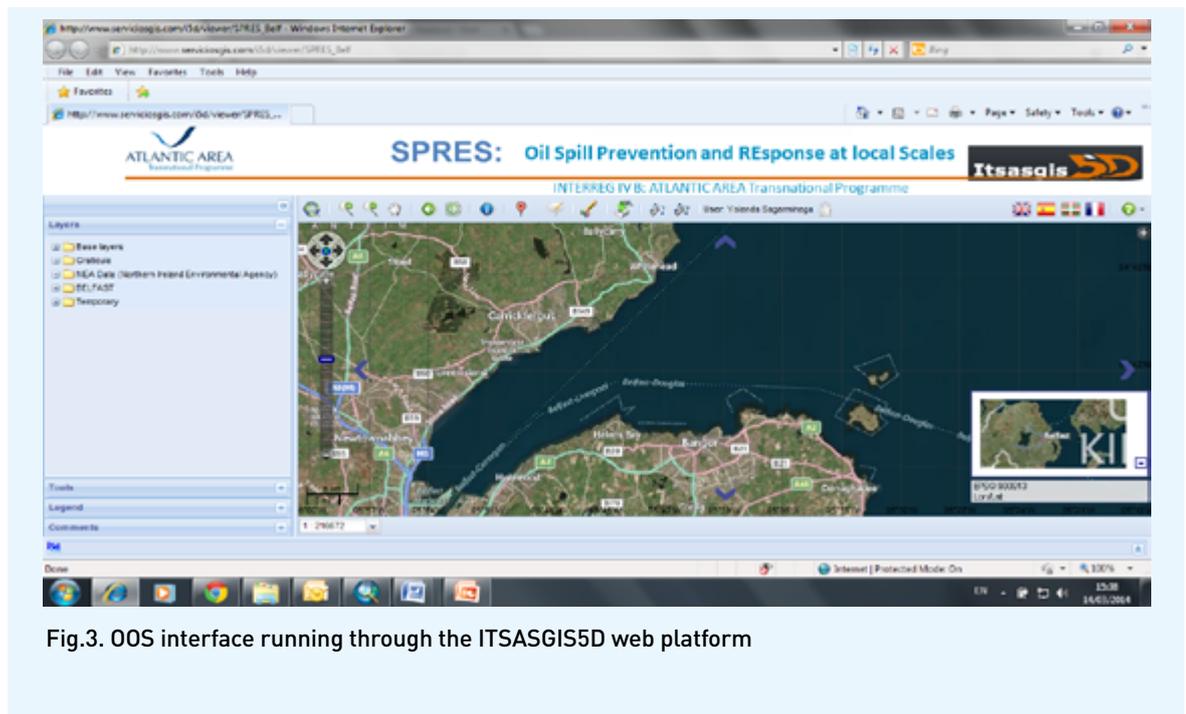


Fig.3. OOS interface running through the ITSASGIS5D web platform

FALMOUTH PORT

Operational Oceanographic System (OOS) based of Delft3D code was implemented in this study area. Currently, daily forecasts of currents, salinity and water temperature in this area are available at a web portal. The system receives daily meteorological and ocean forcings from European and UK’s organizations and provides 36 hours forecasts. Data such as Falmouth bathymetry data and tide gauge information was sent to technical partners for input into the models. Real time data on wind, water elevation and currents (between others parameters) are also available through the website.



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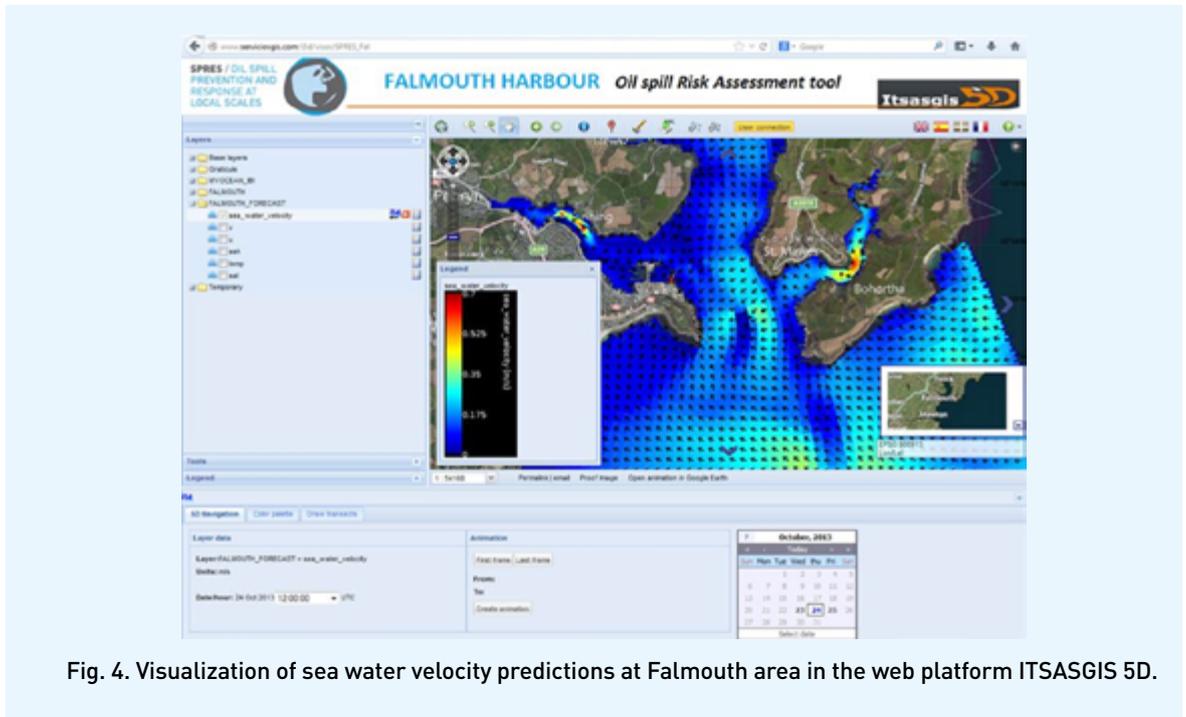


Fig. 4. Visualization of sea water velocity predictions at Falmouth area in the web platform ITSAGIS 5D.

RISK ASSESSMENT SYSTEMS

As part of the web platforms developed in each site, risk assessment systems are currently being implemented. This risk assessment system will allow user to make an assessment using pre-run cases (previously defined as oil spill scenarios) and the assessed vulnerability carried out for each site, given a hypothetical oil spill in a given location. These systems will be the basis for proposing protection and clean up plans. Fig 5 shows an example of a vulnerability map.

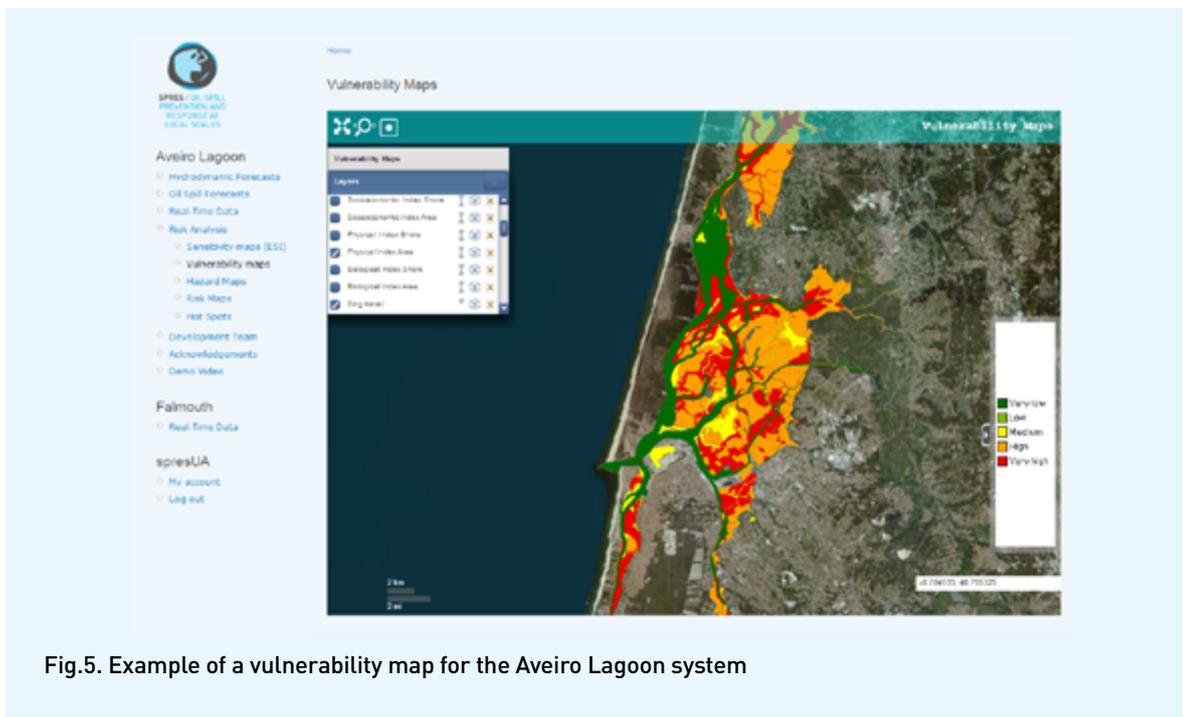


Fig.5. Example of a vulnerability map for the Aveiro Lagoon system



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PROTECTION AND CLEANUP PLANS

As it has been previously done for Santander Bay and Aveiro Lagoon in March 2013, shore surveys were completed in Falmouth Harbour - Falmouth estuary and Belfast Lough to identify the different shoreline types and ecological sensitivity. This data will be used to define protection feasibility and appropriate clean-up techniques. Meetings with Harbour representatives were organised for each site by the responsible partner and allowed to improve knowledge of oil spill preventive measures defined in local contingency plans, measures in place and to visit to some of the existing oil pollution stockpiles.

The work has started with partners to select areas for protection study, based on oil slick drift modeling results for selected scenarios. Drift modeling results are now available and will make possible both predicting where the oil is supposed to wash ashore, and assessing the extent of the pollution Vs. time, accordingly with the duration of the drift. The models used in a statistical approach such as in SPRES –i.e. by running a series of scenarios (based on a crossing of prevalent meteorological and oceanographic conditions) from a few sites identified as potential sources of spill - will give the oiling occurrence probability for different estuarine areas, and, thus, forecast which part of the shorelines are the most likely to be impacted. A threat ranking (from 'hot' to 'cold') of the estuary by discriminating sections, depending if their probability to be affected during that time period is high or low. So, the estuarine shoreline can be divided into ranked sectors and, consequently, operationally prioritized according to their threat/sensitivity rank.



Belfast Harbour fixed protection booms



Fine sand low tide terrace and cobble beach along Belfast harbour North-West coastline

Fig.6 Example of substrate types and constraints for response



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COMMUNICATION

TRANSNATIONAL MEETING IN BELFAST, UK

The 4th transnational partner's meeting and the 1st SPRES Site Seminar took place in Belfast, UK in September 2013.



Fig. 7 Presentations of project SPRES at site seminar in Belfast

It was held at the historical Belfast Harbour Commissioners' Office. The day-long event for local stakeholders comprised of a morning plenary session, introducing the SPRES project and each of the different activities and how they are being applied to Belfast Lough, followed by an afternoon workshop in which delegates were invited to comment on the information requirements and formats needed in the event of an oil spill, with discussions stimulated by two scenarios. A total of 54 delegates attended the event, representing a broad range of stakeholders, such as harbour authorities, local government, fishermen, key infrastructure, and non-governmental organisations. The results of discussions held at the seminar have been used to direct development of the SPRES tools.



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TRANSNATIONAL MEETING IN AVEIRO, PORTUGAL

The 5th transnational partner's meeting and the 2nd SPRES Site Seminar took place in Aveiro, Portugal. Hosted by the University of Aveiro, the meeting's highlight was the presentation of the SPRES web platforms. These were considered innovative and useful contributions from stakeholders and partners were received.

The platform has shown potential to be used as a tool to define prevention strategies, based in the development of training programs and terrain exercises (quarterly), since the simulations outputs would help to organize oil spill exercises.



Fig.8 Partners get together for the 5th TM in Aveiro



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TRANSNATIONAL MEETING IN FALMOUTH, UK

The 6th transnational partner's meeting and the 3rd SPRES Site Seminar took place in Falmouth, UK and was hosted by Falmouth Harbour Commissioners. The harbour board regularly train and practice pollution response techniques. Particularly in the framework of the SPRES project, a live exercise related to laying moorings and booms in a dynamic harbour environment was undertaken and shown in May 2014 during the 6th Transnational partner's meeting, where key stakeholders were invited.



Fig. 9. the image shows FHC's vessel the 'Pendennis' assisting the MCA vessel during a boom deployment exercise.



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SPRES VIDEO

Based on the partners' contributions towards the envisaged scope and content of the SPRES Activity 7 film, Falmouth Harbour Commissioners have developed a template script for the contributing partners. Various filming for this film commenced in summer 2013, including filming at Belfast and Falmouth Harbour. Further filming sessions have been scheduled and arranged with partners and it will shortly be available.

SPRES PARTICIPATES IN BELFAST HARBOUR OIL SPILL EXERCISE

AFBI were invited to participation in Belfast Harbour's oil spill exercise on 28/08/2013. This involved the release of 200 oranges, simulating an oil spill, off Oil Berth 4 within the Port. The SPRES models were used in real time to predict the trajectory of the spill and this was then used to help support booming and recovery decisions. This exercise involved the wider Belfast Lough Integrated Oil Spill Group (BIOISG), Northern Ireland Environment Agency and the Maritime Coastguard Agency (MCA).

SPRES WEB PAGE – for additional information, please visit our web page

www.spresproject.eu

UPCOMING EVENTS

As part of the dissemination strategy, SPRES project will provide currents forecast for Santander 2014 ISAF Sailing World Championship 08-21 September 2014. This will certainly result in a wider transfer of knowledge and results generated by the project. 1.000 sailing teams will be making use of this service.

The Final Conference and Site Seminar will take place in Santander in October 2014 and will be hosted by the Environmental Hydraulics Institute – IH Cantabria.