Storm Surges Congress, Hamburg, Germany
13–17 September 2010
SSC2010-146

HYDROGUARD - Facilities and autonomous technologies for efficient and rational management of means of prevention and fight against coastal hazards

C. Lequette (1), I. Lovric (2), and P-A. Ayral (3)

(1) Egis Eau, Montpellier, France (camille.lequette@egis.fr), (2) Eseco Systems, Lunel, France (ivan.lovric@eseco.fr), (3) ARMINES-LGEI, Alès, France (Pierre-Alain.Ayral@mines-ales.fr)

The project HYDROGUARD (2009-2012) is developed as part of French competitiveness cluster "Managing risk and vulnerability of territories", in partnership with ESECO Systems, EGIS Eau, ARMINES-EMA, C2Innovativ'Systems, and Niscayah. This project received funding from the French Government and the territory of Languedoc-Roussillon.

The purpose of the HYDROGUARD project is to develop a reliable, autonomous and automated system for the monitoring of coastal areas, and more generally to offer local communities an effective way to ensure sustainable management of coastal risks and water resources. The components of the system, composed of especially developed buoys, can be static and located in sensitive areas, or dynamic, in order to move to the operational areas in case of alert.

The buoys allow:
- the monitoring and ongoing management of water bodies (quantity and/or quality),
- to forecast water levels induced by storm surge (including wave setup) and inland flow rates, and then the risk of submergence and/or flooding,
- transmit the alert during emergencies.

The buoys communicate, centralize, make consistent, and deal independently with a variety of data from multiple sources, for instance:
- existing operational forecasting systems (rain, weather, waves, water levels);
- onsite measurements obtained from embedded sensors or existing networks of sensors;
- networks of specialized sensors located in hazardous coastal areas.

The buoys are not used only in case of emergency (floods or storms), but also daily for monitoring and forecasting of water levels and resources, for detecting pollution and predicting their dispersion, or doing many measurements of other relevant indicators. These equipments can be integrated appropriately into strategies for preventing, monitoring and managing the water resources, the shoreline and coastal protection facilities.

In case of alert, the proposed device is the ideal tool to assist first operations, thanks to the various information provided by the sensors. In normal mode, the system collects and transmits regular and real-time information to relevant local stakeholders, in charge of water and coastal management.

End-users of the system are the municipalities and communities, firefighters and equivalents, as well as engineering and industrial within the framework of their missions of prevention, protection, fight against floods, and management of the water resources.
This monitoring system also allows communities to provide to their citizens a dedicated and easily accessible information platform. This platform will keep users informed. The data recorded by the buoys can be made available to agencies interested in monitoring the risk in real time.

A 3D navigation system will be associated with the devices and will show the monitored area using a polygonal model and a simplified visualization interface, and will send relevant information in real time to dedicated agencies.

The pilot site for the risk of submergence by storm surge events is the Thau lagoon, located in the south of France. The study area includes the entire coastline between Sete and Marseillan, as well as the lagoon itself which combines the risk of flooding and submergence.