



As part of the [ARGOMARINE](#) (Automatic Oil spill Recognition and Geopositioning integrated in a Marine Monitoring Network) Consortium, CMRE featured its "Area Access Surveillance Technologies" during the final event of the Project (2009-2012).

CMRE is providing the ears to the 100 eyes of the mythological giant Argo, and presented how they work at the conclusive demo on 19 November 2012 and at the [final conference "New Strategies and Technologies for the Safety of Navigation in the Mediterranean Sea"](#) held on 21 November on Elba Island.

The systems consists in underwater monitoring technologies, aimed to perform vessel detection and localization. These technologies include using hydrophones and algorithms for tracking small boats.

CMRE contribution to the Project is mainly concentrated in two main activities:

1. Autonomous sensing technologies which exploit marine robotics system for real time

in situ measurements

The CMRE Autonomous Underwater Vehicle (AUV) eFolaga has been used in the project as part of the Consortium integrated system. The AUV carries an electronic nose that sniffs oil spill through water sampling, provided by the project partner CNR (Italian National Research Council).

CMRE developed also a MOOS-IVP (Mission Oriented Operating Suite – Interval Programming) back seat driver for the integration with the ARGOMARINE MIS and for data communications.

2. A passive acoustic monitoring system for the detection, localization and classification of surface vessels in a peculiar and confined area of interest (e.g., marine parks)

CMRE has designed and developed an advanced measurement underwater acoustic system, and the algorithms of data processing, analysis and fusion, which, applied to the acquired acoustic data, allow the automatic detection, localization, tracking and classification of vessels passing in a given area of interest.

The system is aimed to perform vessel detection and localization through algorithms optimized for small and mid-sized boats, and based on data either from a single underwater sensor station of four hydrophones, or from data fusion between two hydrophone volumetric arrays.

In order to track and identify possible sources of pollution in marine park areas, maritime traffic needs in fact to be carefully monitored. Nowadays, the presence of large ships can be accurately monitored either by radar or via AIS system, while small vessels, in particular inflatable boats, which have very weak radar signature, may be easily missed by usual monitoring systems. Continuous passive underwater acoustic monitoring of vessels from a network of distributed underwater sensor stations is envisaged to be a valuable approach as an additional, complementary tool with respect to other remote sensing systems such as SAR or radar. Results from both activities have been optimized in the integration with the ARGOMARINE MIS, through an investigation of the most appropriate strategies for the environment characterization.

The CMRE Scientist in Charge for the ARGOMARINE project is Dr Stefano Fioravanti, Head of the Portable Sensor Section.

The ARGOMARINE Project

The ARGOMARINE (Automatic Oil spill Recognition and Geopositioning integrated in a Marine Monitoring Network) project is an European project developed within the EU 7th Framework Programme and lead by the National Park of the Tuscan Archipelago.

The scope of the ARGOMARINE project is to create and test an integrated system, called Marine Information System (MIS), for monitoring of the marine traffic and pollution events due to carriers/commercial ships as well as recreational boats through environmental-sensitive sea

areas as the National Park of the Tuscan Archipelago and the National Marine Park of Zakynthos.

The MIS will be used to monitor ship traffic and marine operations in areas with intense ship traffic and high risk of pollution as well as, for effective interventions in case of maritime accidents. This monitoring will be implemented by means of electronic, ge positioning, and tools for transmitting ship navigation data through a high speed communication network. Environmental data from different sensors (SAR, hyperspectral sensor, thermal sensors, electronic noses, acoustic sensors) on satellites, aircraft, vessels, in situ anchored buoys and AUVs will be collected in test areas, and sent by telemetric links to a central server where all the data are integrated by use of web mapping technology.