

PROMED – INTEGRATED INFORMATION SYSTEM FOR MONITORING ENVIRONMENTAL EMERGENCIES OF HIGH PROBABILITY OF OCCURRENCE IN THE MEDITERRANEAN



Detection of Oil-Spills

The Integrated Information System for Monitoring Environmental Emergencies of High Probability of Occurrence in the Mediterranean (PROMED) was an international cooperation project, partly financed by EU DG XI in the framework of the Life Programme. Its primary objective consisted of the creation of a complete system for early detection of oil-spills, monitoring of their evolution and provision of support to responsible Public Authorities during clean-up operations.



The project was building demonstrators in European countries (Greece and Spain) by integrating existing remote sensing techniques (based on Synthetic Aperture Radar Imagery), communication tools, Geographic Information Systems, Data Bases and multimedia tools.

The demonstrators provided automatic detection of oil-spills, based on intensive research work realized in previous efforts and projects within the international scientific community. The demonstrator

was being tested and verified in two Mediterranean regions, the Cretan Sea (Crete Region) and the Mediterranean Coast of Spain.

Project Objectives

The objectives of the PROMED project were the following:

- integration existing remote sensing, communication and software intensive technologies, as well as existing public infrastructure into a fully operational system;
- sea monitoring; detection of oil spills due to human activities;
- issue warning to public authorities for clean-up operations;
- provision of decision support to the said authorities after an oil spill incident (during clean-up operations);
- investigation of the cost effectiveness of chosen techniques and solutions in the selected geographic regions, which presented different weather conditions, sea current patterns and coastlines.

Basic technologies used

PROMED created a platform integrating the following techniques:

Remote sensing techniques

Remote sensing techniques were the principal components of the PROMED technology. In the case of oil-spills, detection by SAR was based on the dampening effect oil has on capillary and short ocean surface waves. Main sources were the ERS-1 & 2 data as well as other non-European satellite data as soon as they become operational.

Geographical Information Systems

Geographical Information Systems (GIS) were a principal tool for presentation purposes and decision support. In particular, PROMED was interested in simulating the evolution of oil in order to support agencies conducting clean up (and monitoring these) operations.

Databases

In order to support public authorities in their clean-up operations, various types of data (images, maps, statistical data etc.) mainly related to the demonstration areas were stored in databases. Examples of useful data included:

- Archived data from previous oil pollution events (images, photos, maps, damages etc);
- Detailed sea maps (bathymetry, sea currents, coastlines, coast types etc.);
- Thematic maps (sea, coast and land use, fishing and sea cultivation, areas of ecologic importance, protected areas, archaeological sites, under-water flora, tourist regions);

- Chemical products used in clean-up operations associated with oil type and oil-spill characteristics (dimension, depth etc.).

Telecommunication services

The early detection of oil-spills depended on the timely delivery of satellite imagery at near real time (i.e. within few hours from the satellite passing). This required fast data communication links (up to 2Mbits/s) from the satellite ground stations to the system operations site.

System characteristics

The system contained the following features:

- SAR remote sensing data collection and processing.
- Automatic oil slick detection in the radar imagery.
- Emergency assessment. The extent of the emergency assessed and the resulting information function as a basis for action planning.
- Emergency information for local and central pollution authorities, fishery authorities and the public in near-by coastal areas.
- Emergency management support, including the forecast of spill direction and the continuous monitoring of the oil spill evolution.