

“IMPAST”

A Vessel Detection System to improve and support monitoring and control of fisheries activities

Both in European and international waters, there is a need for control measures to ensure that agreed management measures are respected. Monitoring the fisheries, i.e. the operation of the fishing fleet, is an important aspect of fisheries control. Furthermore, to be effective, the information needs to be made available as soon as possible, preferably in real time, and the information must be compatible with systems presently used by fisheries authorities. Satellite surveillance systems have a potential for being coupled with existing vessel monitoring systems in a way that could significantly improve the efficiency of the fisheries control.

All European Union vessels above 15 metres in length are fitted with a Vessel Monitoring System (VMS). This system relies on satellite navigation and communication technologies. A “blue box” installed on board the vessel transmits the GPS-derived vessel position by satellite to the Fisheries Monitoring Centre (FMC - responsible for the monitoring and control of the fisheries fleet) in the flag state which then communicates the information to the state or regional fisheries body in whose waters the vessel is fishing. This allows the authorities to determine the position of all vessels fitted with VMS within a certain area at a certain time and enables fishermen to demonstrate their compliance with regulations on days at sea, closed areas or closed seasons.

However, some of the fishermen claim that the system only monitors the behaviour of those who obey the rules. It does not check those whose system is switched off or malfunctioning. In addition, it cannot identify vessels from non-EU countries which do not have the system fitted.

For this reason, the Vessel Detection System (VDS) was proposed in order to

- determine the number of fishing vessels and their position in a given area;
- cross-check the positions of the fishing vessels detected by VDS with position reports from VMS – which is foreseen to become the prime use of the VDS system in an operational context; and
- signal the possible presence of fishing vessels from which no position reports have been received through VMS.

This VDS relies on polar-orbiting satellites carrying Synthetic Aperture Radar (SAR) instruments which can detect vessels at sea under all conditions – day and night and through clouds.

In this context, the primary objective of the **IMPAST** FP5-funded project was to **demonstrate a prototype operational service for the integration of detected vessel positions into the workflow of the European FMCs.**

The project successfully grouped the resources and efforts of project partners in the satellite data use domain with those of FMCs and their technical services providers and a number of technical solution providers. System specifications and implementation were based on

Project acronym:

IMPAST

Full title of Project:

Improving fisheries monitoring through integrating passive and active satellite-based technologies

EU contract number:

Q5RS-CT-2001-02266

Web-site:

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**“THE IMPAST PROJECT HAS
BENEFITED THE
IMPLEMENTATION OF NEW
COUNCIL AND
COMMISSION
REGULATIONS FOR THE
IMPLEMENTATION OF VDS
PILOT PROJECTS IN THE
MEMBER STATES”**

the direct feedback of FMC end-user requirements.

The system developed under IMPAST consists of inputs from satellite SAR imagery that are subsequently processed into detected target positions that are, in turn, fed into a matching module for correlation against VMS records (or records from other sources). The VMS data are input from FMCs whose fleet is active in the imaged area of interest. The system outputs are the detected targets (VDS records) and the result of matching with VMS records. The intended use of the system is the **support to monitoring and control tasks in the respective FMCs through the provision of information on target positions for which matching VMS records exist or not, and on VMS records for which no matching target is detected.**

The system implementation of the prototype VDS addresses the necessary hardware and software issues that would be required for a VDS system to operate in an automatic fashion in order to provide output results in Near Real Time (NRT). The Joint Research Centre (JRC) of the European Commission, coordinator of IMPAST, based the project upon Open Source components that are extended with scripts and functions based

in Open Source application programming interface (API). Both a dedicated satellite communication module for large image file transfer and standard internet protocol have been implemented and tested, including secure exchange of VDS output and VMS records, which allows the system to be used in various arrangements of exclusive or collaborative use by FMCs. It extends the delivery of VDS outputs into the possibility to visualise and analyse in a web-based mapping application that also integrates access to the SAR imagery.

The IMPAST project has benefited the implementation of new Council and Commission regulations for the implementation of VDS pilot projects in the Member States, in particular Ireland and Italy. VDS was successfully demonstrated in the North-East Atlantic, Baltic, Barents and North Seas, Western Waters and the Mediterranean. It is a powerful new tool to check for non-compliance with fishing regulations and thereby help reduce to mitigate the risks from illegal fishing.