«INTRARADAR»

Port of Corfu

INTERREG IIIA Greece-Italy

IMPETUS was the contractor of the Prefecture of Corfu for the INTRARADAR project. The project focused on the provision, installation of hardware/software in the Port of Corfu. In addition, Dr. Nick A. Theofilopoulos, the Director of Research and Development of IMPETUS, was the Coordinator (Project Manager) of the project.

Impetus implemented a system of management of the target of the ships in the wider region around the port of Corfu. Through the implementation of this system it was achieved the control, the safety and the precise briefing of local Authorities with regard to the movement of the passengers and commercial ships, as well as recreation ships in the region.

The need for a continuous and more detailed control in the coastal movement of ships, in order to prevent accidents in the sea and accidents inside the port area, it is developing in the last years through the improvement and extension of complicated systems with big requirements, which involve the ports' installations.

INTRA RADAR was a project which dealt with the Transport, the Communication and the Safety and it forecasted the implementation of infrastructures projects of information systems for the aid of cross-border relations and the safe circulation of goods and individuals, the completion of infrastructure interventions, while improving the offered services, the growth of structures and of the qualitative services for circulation of people and goods, improving also the growth of modern information and communications technologies for the management of services that concern the transport of goods and individuals.

The advantages that resulted from the project's implementation, with the offer of such services, are enormous for the European Citizen, the competitiveness of the ports of the Western Region of Greece are also increased.

The demand from politicians and maritime authorities, to have control over movements of ships in their territorial waters, in order to prevent accidents and marine disasters, is growing increasingly stronger. Coastal states are responsible for traffic separation schemes, routing areas and fish catch areas in their territorial waters. These states demand compulsory compliance by those, who use these waters and have a need to monitor "areas to be avoided".

Just the fact, that the user is monitored and identified from shore, will most probably result in a greater compliance with traffic separation schemes, routing measures and fishing regulations.

It has been argued, that accidents in coastal areas could be avoided, if the ship is identified. This maybe true in some cases, but a shore station, that identified a ship, is limited to advise actions only over VHF. Furthermore, this advice may be misunder-stood because of language problems.
In very busy areas, like harbours, rivers and archipelagos, the need for a high update rate beacon mode AIS is evident. The limitations of the ARPA radar to track ships due to target swapping from a ship to land, beacons, bridges and other ships makes the ARPA capabilities very limited in narrow and congested waters.

impetus engineering s.a.

Today there is a strong feeling among mariners navigating in harbours, rivers and archipelagos, that an broadcast AIS would improve the safety and solve the limitations of the radar because of the following capabilities. A broadcast AIS is able to:

- look behind the bend in a channel or behind an island in an archipelago, to detect the presence of other ships and identify them.
- predict the exact position of a meeting with other ships in a river or in the archipelago to avoid meeting in e.g. a narrow river bend.
- know which port and which harbour a ship is bound for
- know the size and the draft of ships in the vicinity.
- detect a change in a ship's heading almost in real time
- identify a ferry leaving the shore bank in a river.

An AIS, using broadcast techniques and with a high update rate, enhances the possibility of detecting the whereabouts of other ships, even if they are behind a bend in a canal or river or behind an island in an archipelago. The AIS also solves the inherent problem with all radars, by detecting fishing boats and smaller ships, fitted with AIS, in sea-clutter and in heavy rain.
Innovative technologies like ship-to-ship and ship-to-shore AIS have a big potential in improving safety in the maritime field in the future. It also makes it possible to identify, track and supervise ships from shore with a much higher and more sustainable accuracy than with a shore based radar.
On the other hand, the need for navigational assistance from shore on a ship, with ship to ship and ship-to-shore AIS onboard, is surely less, than on a ship only fitted with a radar, when both are affected by sea/rain clutter.

IMPETUS provided an integrated and comprehensive solution for the INTRARADAR project and an experience that was gained from the implementation of other major projects. These made Impetus' offer a credible and responsible solution that combined –state of the art- technologies and solutions.
The system that was delivered by IMPETUS, as a " turn key solution " has the possibility of observing and management:

- Targets Ais-Automatic Identification System (main system)
- Targets RADAR (main system)
- Targets via cameras (auxiliary system)

The all system, however, is articulated in three parts:

- hardware: the radar system and all electronic data
- a fast wide area connection that supports the interconnection between radar and the centre of operation
- software, that directs the system, connected, simultaneously, with preexisting structures but also the proposed and future ones

The set-up of the system is such that in the case of damage of the AIS monitoring system it can continue the monitoring of RADAR targets and reverse.
The architecture of the system, additionally, allows the remote management of the network and its applications.
The aforementioned operations and the characteristics are conditioned by the international case law and regulations (IMO, IALA, ITU etc).

At the Port it has been installed an independent system in specifically shaped space which functions for the monitoring and management of targets in the region of interest. Each system is constituted by two independent work stations through which the user can monitor and manage the ships via AIS, Radar and cameras, which are placed in the roof of the Port's Authority building. Each system is constituted by a System Server which receives the data from the aforementioned sensors and provides the possibility to the user of:

1.Observing AIS and RADAR targets in electronic map
2.Geting information regarding the ships' details: place, speed, course, EDF, MMSI, size, flag etc.
3.Displaying the ships per category (ships, lorries, dangerous charges k.a.)
4.Managing the database of given ships
5.Search of targets by name, MMSI, type (commercial, tanker, passenger ktl.)
6.Procreation of the ships' historical data up to one year retrospectively.
7.Determination of incidents, alarms and notices (eg automatic notice for the entry of passenger ships in predetermined by the user area).

The Project INTRARADAR is a system of telematics that aims at enabling the monitor and management of targets Ais-Automatic Identification System (main system), targets RADAR (main system) and targets via cameras (auxiliary system).
Each union of the aforementioned network it is being realised with the use of protocol TCP/IP even if the distances are small. This provision also allows the remote network management and its applications. We offered a "turn key solution", namely a system that has three sensors for the monitor and the management of ships. The sensors are an AIS basestation, a RADAR system and an IP Camera. There can be connected in this system in total 6 users. The three users work from the work stations that have been installed in the Port and the other three users work through a remote connection. All the users and the sensors are connected with the (CDS) system server with which, they have a bidirectional communication.

AIS Base Station

AIS Base Station receives all the data from all the AIS appliances that are installed in the ships that approach the in VHF region, emitting automatically the relative data in the computers via the AIS Server. Besides it allows the reception and depiction of data from all the stations to the computers that are installed in the same network. The use of information is possible to be graded in order for the AIS administrator to allow concrete users to manage these.

The AIS Base Station is constituted by:

- VHF transceiver
- GPS Receiver
- control Unit
- IP controller
- GPS Aerial and VHF aerial

Radar System
The system has the possibility of receiving via the Scanner, the GPS aerial and the compass, all the information concerning the boats and ships of the region and dispatching them via TCP/IP in the system server in the form of HARP.

The RADAR System is constituted by:

- Scanner Antenna
- GPS Receiver
- control Unit
- IP controller
- Aerials
- Monitor Display
- Compass

IP Camera

As an auxiliary tool of system the camera is connected with a system server and allows the users to watch optically the objectives and the area of the port.

There is installed a network for the interconnection of the AIS Base Station, RADAR and IP cameras with a server as well as a server with workstations. The network is accessible and via internet from remote users.

There had been delivered 5 (UPS) that support the operation of RADAR, Server and Base Station and 3 Workstations. With the use of these systems there is ensured the continuous and unhindered operation of the system in case of a tendency fall or total interruption.

MariWeb ™ Application

The application **MariWeb ™** was created based on the SafeSeaNet eXtensible Markup (XML) interface, using SQL language (Structured Query Language), allowing thus complete access in all the data for easy creation and parametrization of reports from the final user.

The solution **MariWeb ™** is based on a license free software with the use of functional Linux, MySQL data base and Apache Web Server. The Human Machine Interface (HMI) uses PHP (Hypertext Preprocessor). In the case where the final user wants to extend the possibilities of the system, there is optionally offered for the proposed solution, the Software Development Kit (SDK), a tool that allows further application development.

The application **MariWeb ™** is rendered unique, since it is a complete network AIS, which is able to be parameterized completely by the user. Besides it can change also the HMI, so that it has the appearance and the characteristics that the user wishes. The functionalism of the system, as well as the appearance on the user screen can change at every moment easily, while via the SDK it can be interlinked and/or be incorporated in a bigger existing or in a future system of the Authority.

All entering and coming outgoing AIS data are registered with the GPS data, with UTC hour and date under the form of electronic seal.
The basic usefulness of **MariWeb ™** for the operators, is the simple and fast depiction of the information in the screen.
The ***MariWeb™*** Maritime Exchange Vessel Traffic Information System [VTIS] represents the leading edge in VTIS. The ***MariWeb™*** system combines many of the features required by owners and operators of AIS network and includes:

□ An IALA A-124 Recommendation compliant AIS network

□ An IALA A-126 Recommendation compliant AIS network

□ A USCG PAWSS compliant AIS network

□ An Electronic Chart System [ECS]

□ An Archive Management System [AMS]

□ An Event Management [MEM] system

□ A Route Management System [MRM]

□ A customer administration system

□ A contacts database management system

□ A ships database

□ Ships itinerary and voyage tracking and planning system

□ A report generator

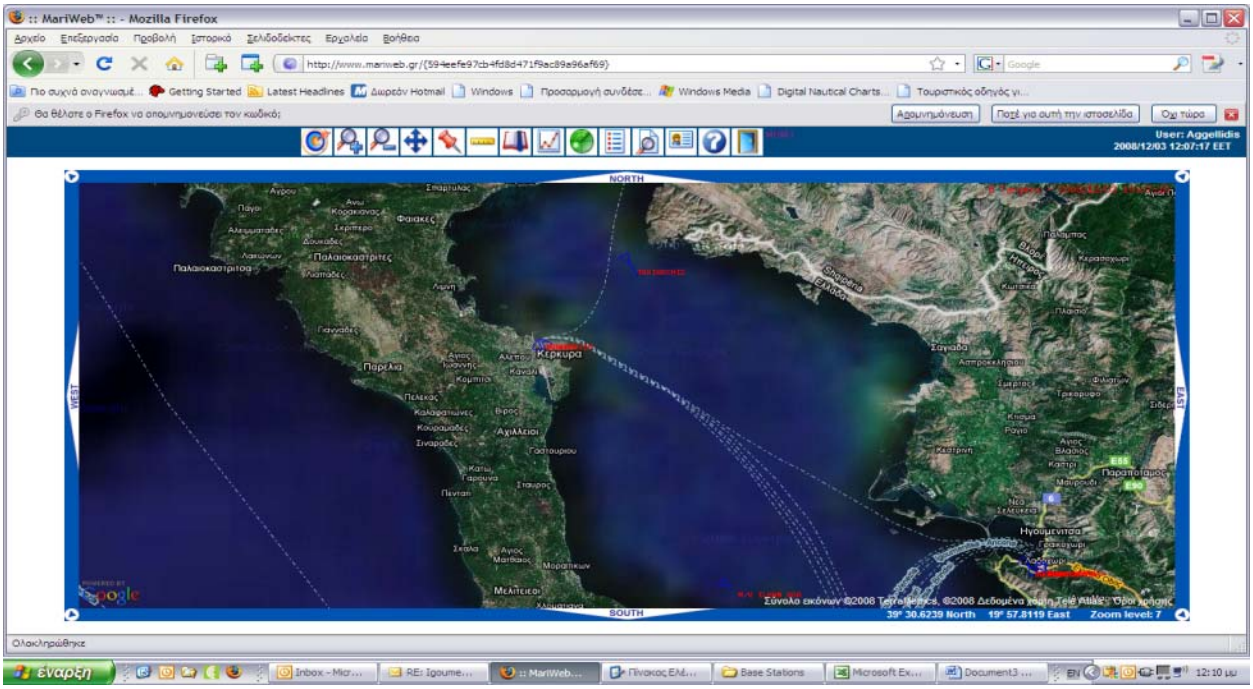
□ A ship movement activity scheduling system

□ A document management system

□ A Network Monitoring System [NMS]

□ An XML data server that allows connection to various legacy systems

□ An integrated fax server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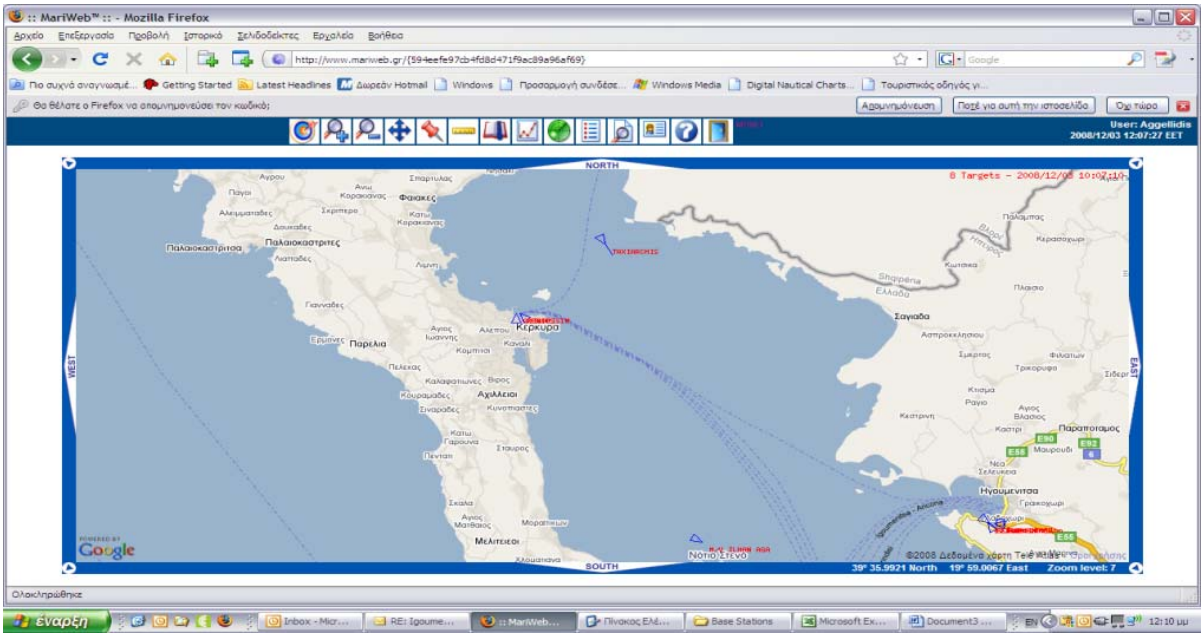
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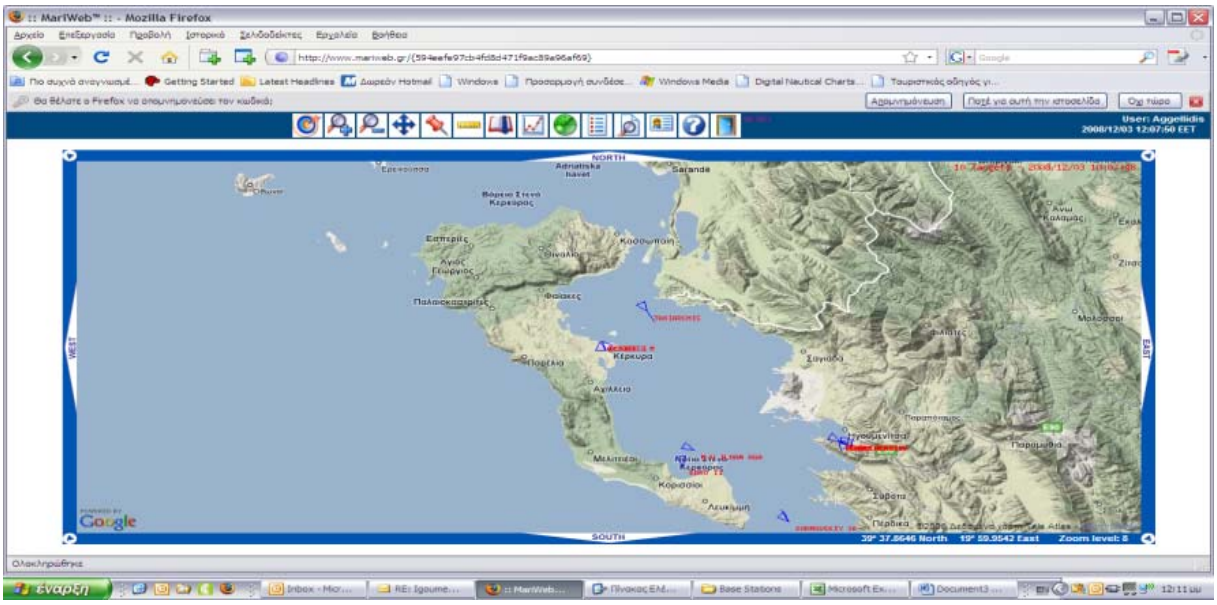

System Diagram