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MEDUSE

MARINE PARK ENHANCED APPLICATIONS BASED ON USE OF INTEGRATED GNSS SERVICES

PROJECT SUMMARY

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(Marine park enhanced applications based on use of integrated GNSS Services)

Marine parks are areas which deserve an extremely accurate care of the ecosystem and as such are usually subject to severe restrictions applied to their end users, first of all leisure boats and local operators.

In order to limit and control the access to restricted areas, very often parks management organisations force users to request for a permit (e.g. daily or weekly, free of charge or not) without which the boats are not allowed to enter the marine park. In compliance with the different ways for accessing the park, also permits are different (e.g. transit and anchorage, shore fishing, sea fishing, scuba diving…).

The main objectives of the MEDUSE Project can be summarised as follows:

1. To develop a prototype service infrastructure for the delivery of innovative location based and park monitoring support services within restricted access maritime areas (parks, reserves) to the following customer categories:
   I. Institutional – Marine parks and restricted marine areas management organizations;
   II. Private - Marine parks and restricted marine areas users (leisure boats);
   III. Commercial – Commercial operators acting within restricted areas (e.g. cruise boats);
   IV. Law Enforcement – Marine police authorities (Coast Guard, Police, Park Marine Control body).

   The prototype service infrastructure will be designed, developed and integrated into the first 16 months of the project. It will consist, as described in the subsequent sections, by a Service Center and specialized maritime terminals. The set of chosen services will allow demonstrating the overall potentiality of the MEDUSE system offering for the different categories of end users listed above.
2. To demonstrate a significant set of services and applications that shall be enabled by the service infrastructure for all the above listed customer categories. Demonstration is planned by month 16, immediately after the system integration phase. The scope of the demonstration is to show end users the potentiality of the MEDUSE services and to provide a measure of the actual project results.
3. To analyse commercial sustainability of the service infrastructure in order to identify and characterise the critical mass of applications and services that shall bring sustainability and define associated service models towards the different customer categories. The main objective of the business and exploitation plan is to pave the way to the actual commercialization of the system. In particular the exploitation plan will identify the system evolution road map for entering new markets. It will also define the system engineering activities required to make the prototype an industrial product.

Marine parks: statement of the problem

Marine parks are areas which deserve an extremely accurate care of the ecosystem and as such are usually subject to severe restrictions applied to their end users, first of all leisure boats and local operators.

Those restrictions are often different for the various areas depending onto the level of threat that anthropogenic activities may exercise on local environment. As an example, in some areas boat transit may be fully prohibited, in others fishing and anchorage, in others night anchorage, etc.

In order to limit and control the access to restricted areas and the transit speed, very often parks management organisations force users to request for a permit (e.g. daily or weekly, free of charge or not) without which the boats are not allowed to enter the marine park. In compliance with the different ways for accessing the park, also permits are different (e.g. transit and anchorage, shore fishing, sea fishing, scuba diving…).

The controls associated with the above defined levels of access are exercised both by the park management organisation and by the Coast Guard as police authority and safety and security responsible. In addition, Coast Guard has also the responsibility for more "traditional" and non-park related law enforcement controls, such as boat speed monitoring and speed limits control, documentation and safety package control, etc..

The above described control tasks are extremely difficult to exercise, mainly because:

- Park areas are often very wide;
- Control resources are limited;
- The conventional "paper based" permit system does not enable "remote" control and requires controller to approach the boat to be controlled, thus consuming time;
- It is difficult to manage adequately the control of different levels of permit for different activities;
- A marine park is characterized by a very high number of visitors (and as consequence a significant increase of the need of services, assistance and controls) during the summer season.

On the other hand, from the park user perspective, the (often quite expensive) access to park areas is often seen as an unfair fee, as, in practice, the access to park resources is almost never coupled with the delivery of those services (e.g. guidance, mooring, information...) that would enable an efficient exploitation of the visit to the park, while providing economic resources to park authorities for the management of the institutional activities.

In addition, the conventional permit systems usually adopted do not satisfy, often, the end users, because they do neither provide enough flexibility nor fairness w.r.t. the real, effective exploitation of the access to park resources. An example of this concept is when the user buys a permit in advance (e.g. through internet) and the weather does not allow him to enter the park. The same applies often to charter boats which use to buy weekly permits that sometimes cannot be or only partly be used due to weather conditions.

As a consequence, it often happens that **a significant percentage of park users access without respecting the access rules and paying the access fee**.

The situation described above does not allow an efficient management of park resources nor an effective protection of the environment and of the ecosystem, with obvious negative social and economic consequences on the capability for exercising an efficient preservation strategy of the extremely valuable asset constituted by the protected area and, on the other hand, an efficient exploitation and promotion of the park attractions through authorized and controlled tourism.

Concept Solution

The project **MEDUSE** – "**M**arine park **E**nhanced applications base**D** on **U**se of integrated GNSS **Se**rvices" aims at developing an advanced IT infrastructure and providing additional information and value-added services to the park users and specific tools and services to the marine park authorities through a two-way data link by tracking and tracing all private and commercial vessels within marine restricted areas.

This solution allows the substitution of paper-based park access permits with low cost terminals to be mandatorily taken on board, or, alternatively, a software package to be mandatorily installed on tourist own terminals by the park user during the whole visit to the marine park to access the service available through the park portal.

The provision of the added value services is based on an IT infrastructure composed by two main sub-systems:

A. one Control & Service center to be deployed at the Park Authority Premises
B. a bundle of ad-hoc terminals and commercial ones, on which a specific developed application has to be installed, connected to the Control & Service center

A high level picture of the MEDUSE system architecture is presented in the Figure 1:

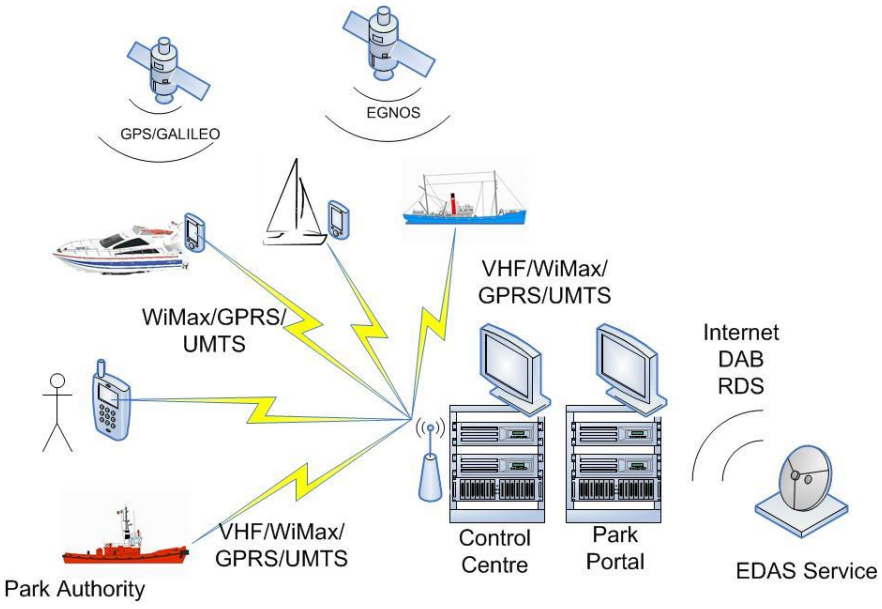

Figure 1: Meduse high level view

The proposed IT architecture will allow the park marine authorities the delivery of the following services (not exhaustive example list):

I. Institutional

i.1 Monitoring of restricted areas accesses and access duration, and implementation of a pay-per use policy;

i.2 Remote control of permits (via terminal interrogation) and management of different access levels (such as entrance, anchorage, fishing, scuba diving...);

i.3 Monitoring violations via the analysis of user traces;

i.4 Planning and monitoring the entire itinerary of the "Tourist boat" fleet, authorized from the Park, for computing the park resource exploitation through the analysis of overall end-user flux with, as a consequence, a significant enhancement of park management capabilities (such as e.g. implementation of limits in the number of concurrent accesses, planning of route and park visiting sites, etc..);

i.5 Reception of special (environmental) information / warnings from cooperative users (e.g. wild fauna detection, violations, waves, oil spill etc.)

II. Private

Touristic services, such as:

ii.1 Location-based tourist information and services (e.g. POI information, navigation to POI, specific service requests and booking);

ii.2 Social network;

ii.3 Fishing rules and hints;

ii.4 Reception of special (environmental) location based hints from park managers (e.g. wild fauna location);

ii.5 Other information related rules and activities available in the park.

Navigation services, such as:

ii.6 Anchorages, danger and prohibitions, special approaches and behavioural rules;

ii.7 Where available, link to port services: (e.g. booking of a dock, to-dock navigation, repair works booking.);

ii.8 Where available, booking and navigation to mooring buoys within coves;

ii.9 Location based weather alerts and weather routing (e.g. navigation to protected coves)

III. Commercial

iii.1 Location based weather alerts and weather routing;

iii.2 Traffic based routing (e.g. dynamic routing based on current fleet traffic patterns)

IV. Law Enforcement

Monitoring for infringement of navigation rules, such as:

iv.1 Speed limits exceeding;

iv.2 Illegal anchorage (with respect patterns allowed zones and / or w.r.t. minimum distance from the shore).

The MEDUSE Consortium

The MEDUSE Project is being developed by a consortium made by the following companies:

Company	Web Site
NEXTANT SpA (Project Coordinator)	**www.nextant.it**
Vitrociset Belgium	**www.vitrociset.be**
BLUE THREAD Srl	**www.blue-thread.it**
ANESTI LTD	**www.anesti.it**
PARCO NAZIONALE ARCIPELAGO DELLA LA MADDALENA	**www.lamaddalenapark.it**

More info can be found in the project web site: http://www.meduse-project.eu