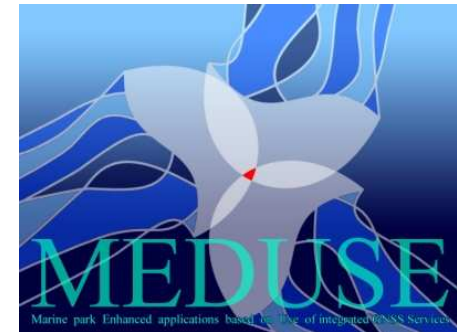# MEDUSE Project

7th European Framework programme
Call: FP7-GALILEO-2011-GSA-1

The MEDUSE Project

Marine park Enhanced applications baseD on Use of integrated GNSS Services
(proposal 277665-2)

Call Identifier: FP7-GALILEO-2011-GSA-1

Activity: Exploiting the full potential (7.4.1)

Area: New and innovative applications and services (7.4.1.7)

Topic: GALILEO.2011.1.7-1 (Use of Galileo and EGNOS services for mass market and in niche sectors)

Project Objectives

- Develop a prototype service infrastructure for park monitoring within restricted access maritime areas (parks, reserves) based on use of EGNOS/GALILEO signals

- Demonstrate a significant set of services and applications that can be enabled by the service infrastructure

- Analyse commercial sustainability of the service infrastructure

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Target market

Main target market

- National/International marine parks and marine protected areas (up to 12 miles from the coast)

Potential side markets

- Touristic ports
- Monitoring of fishing activities (EU trend)
- Non marine parks

Target market numbers

- As of 2010, the world hosts more than 6,800 Marine Protected Areas (MPAs), encompassing 1.17% of the world's oceans.

- MPAs are included on the World Database on Protected Areas (WDPA), which can be accessed via the following online interactive search engine link hosted by UN: http://www.protectedplanet.net/

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Marine Parks in Mediterranean Sea

Most famous Marine Parks in the Mediterranean Sea

Country	Marine Parks
France	Port Cros, Banyuls, Scandola, Lavezzi, Mer d'Iroise
Spain	Islas Medes, Tabarca, Columbretes
Greece	Zakyinthos, Northern Sporades
Tunisia	Zembra
Croatia	Lokrum, Maloston
Italy	Archipelago La Maddalena (PNALM), Procida, Archipelago Toscano, Asinara, Cinque Terre, Circeo

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La Maddalena Park numbers

| Year	Month	DIMENSION (CLASSES)							TOTALS
		Up to 10 mt	10 -> 15	15 -> 20	20 -> 25	25 -> 30	30 -> 35	> 35	
2009	June	467	38	2	5	4	1	13	530
	July	2684	668	227	127	70	32	130	3938
	August	3065	2055	920	446	153	83	222	6944
	September	636	439	122	48	22	13	29	1309
2010	June	1197	1110	326	144	61	46	137	2975
	July	3347	1824	585	298	31	138	141	6364
	August	2405	2280	667	413	141	84	189	6179
2011	May	103	43	5	4	1	1	5	162
	June	958	800	180	98	34	23	31	2101
	July	1744	1480	380	203	76	46	142	4071
	August	3258	3460	919	495	173	93	273	8671

Number of ships per years/months visiting "National Park La Maddalena"

Target users

- **Institutional** – Marine parks managers

- **Private** – Marine parks and restricted marine areas users (leisure boats)

- **Commercial** – Operators acting within restricted areas (e.g. cruise boats)

- **Law Enforcement** – Marine police authorities (Coast Guard, Police, Park Marine Control body)

MEDUSE Service Context
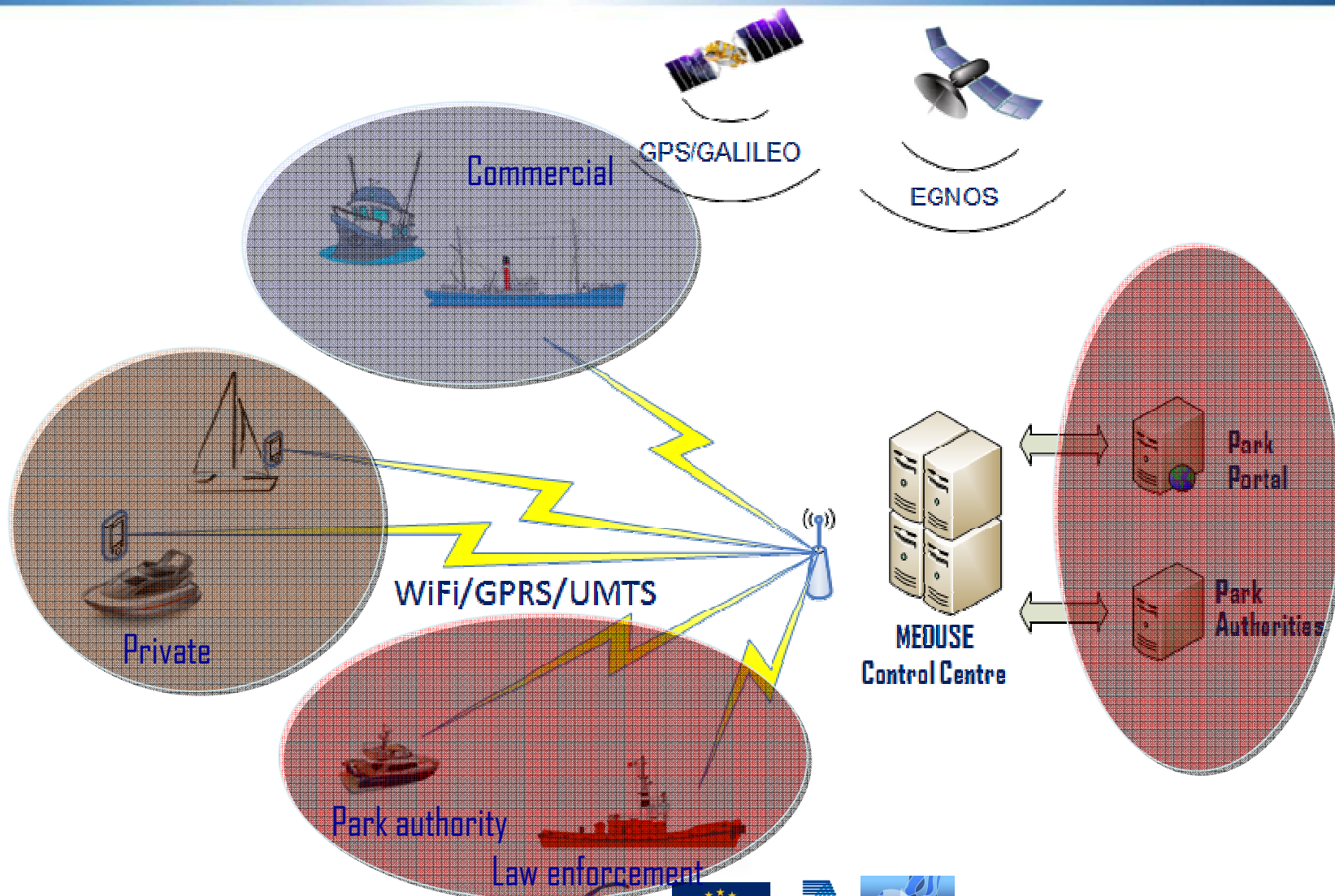
MEDUSE Services (1)

Institutional Users

- Monitoring of restricted areas accesses and access duration, and implementation of a **pay-per use** policy
- Remote control of permits and management of different access levels
- Monitoring violations via the analysis of user traces
- Planning and monitoring the entire itinerary of the "Tourist boat"
- Reception of special (environmental) information / warnings from cooperative users

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MEDUSE Services (2)

Private Users

- Location-based tourist information and services (e.g.: garbage collection at sea, water supply at sea)
- Social networking (find my friends)
- Fishing rules and hints
- Reception of special location based hints from the park
- Link to port services
- Booking and navigation to mooring buoys within coves
- Location based weather alerts and weather routing (e.g. navigation to protected coves).

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MEDUSE Services (3)

Commercial

- Location based weather alerts and weather routing
- Traffic based routing (e.g. dynamic routing based on current fleet traffic patterns)

Law Enforcement

- Monitoring for infringement of navigation rules, such as: speed limits exceeding
- Illegal anchorage (with respect patterns allowed zones and / or w.r.t. minimum distance from the shore).

GNSS QoS Requirements

GNSS Infrastructure QoS requirements for *regulated* applications

Enabled by	GNSS QoS
GPS+EGNOS GALILEO CS	**Accuracy** Better accuracy on position, velocity and time
GPS+EGNOS GALILEO CS	**Integrity** GNSS constellation degradation alert
GALILEO CS	**Availability** Guaranteed high availability of GNSS Service
GALILEO CS	**Authentication** Authentication of positioning signal

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Marine Terminals

MEDUSE State of Art analysis

- GNSS Receiver
- Communication means (VHF, UMTS, WiFi, ...)
- Integration with other equipments (e.g.: AIS, sensors, ...)
- Embedded/updateable service coverage area
- HW robustness (weather proof, anti tampering, ...)
- Power supply autonomy
- OBU Identification
- EU regulations (privacy aspects, legal use of positioning data) and standards

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MEDUSE Marine Terminals

Market entry strategy

- A "commercial" solution enabling the utilisation of a user-owned terminal (e.g. i-phone) with the addition of software applets required for the operation of MEDUSE services

- A "basic" MEDUSE terminal solution constituted by a prototype dedicated to regulated applications

EGNOS Ready (EGNOS SDK)

EGNOS enabled services

Increased accuracy and integrity available with EGNOS is required, for example, to provide the following MEDUSE services:

- Monitor of restricted areas accesses and access duration
- Monitoring violations via the analysis of user traces
- Navigation to mooring buoys within coves
- Detection of speed limit violations
- Illegal anchorage (with respect patterns allowed zones and / or w.r.t. minimum distance from the shore)
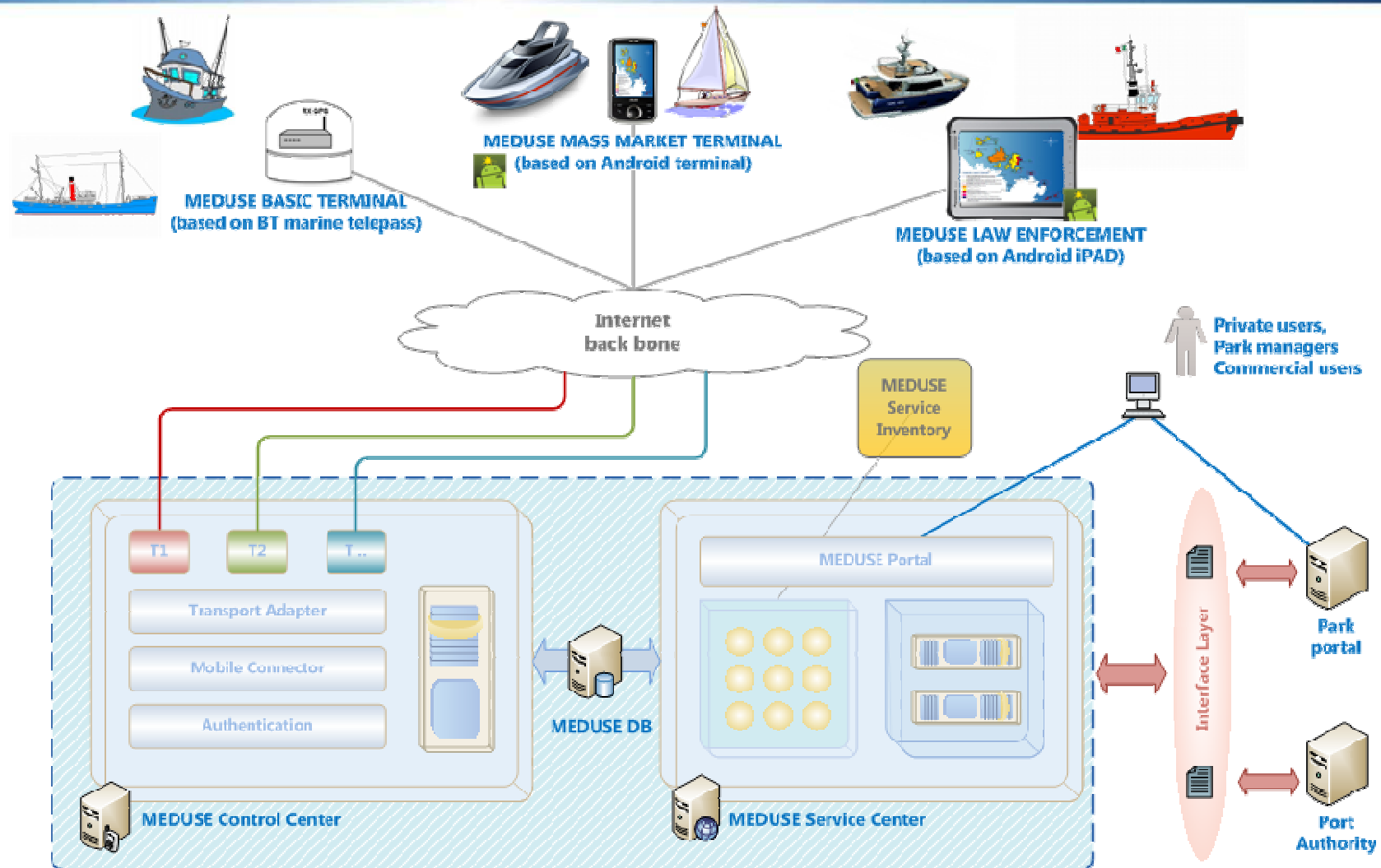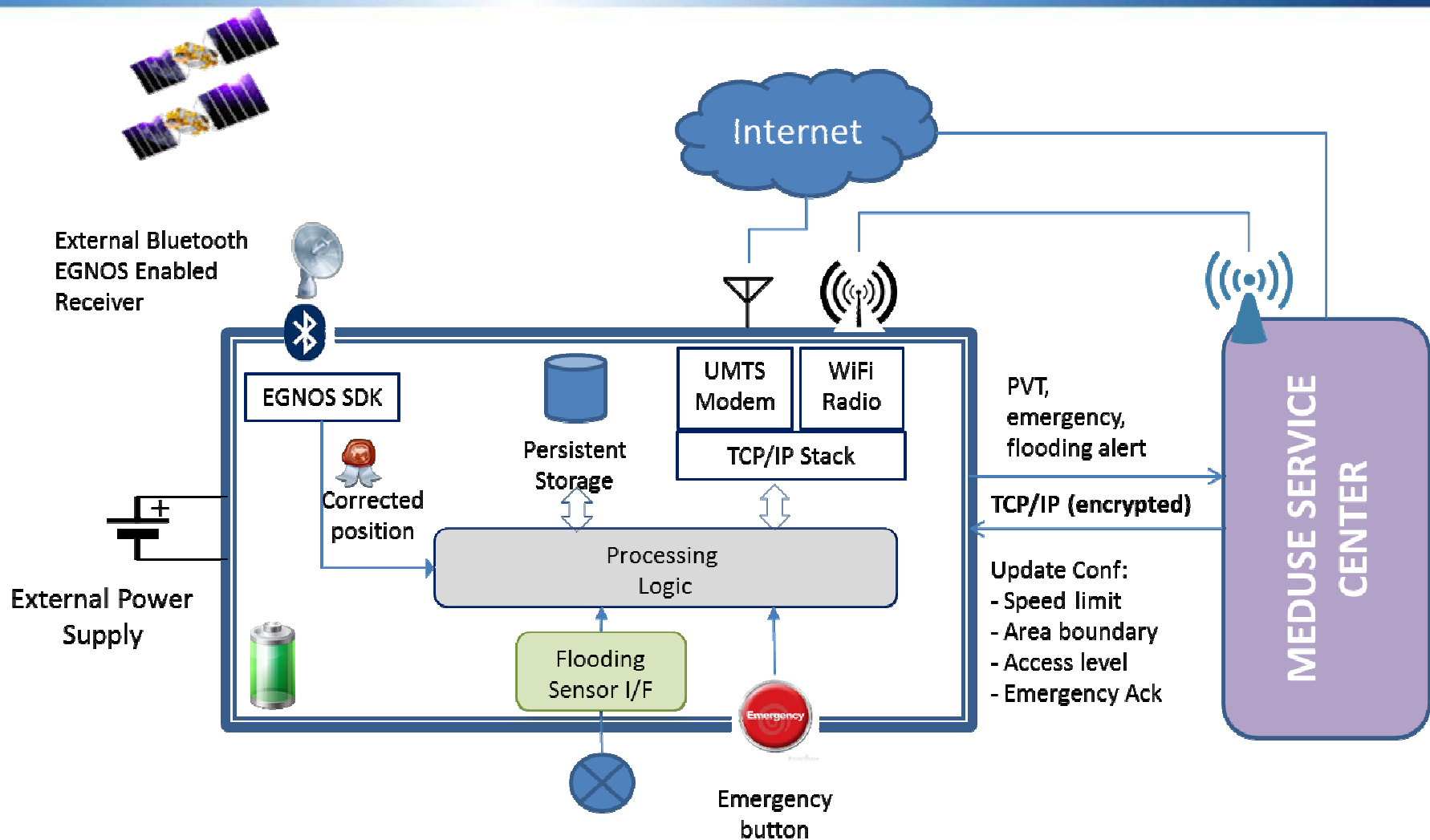- …

MEDUSE Architecture

- **MEDUSE Service Center** including:
  - Control Center (managing communication with MEDUSE terminals)
  - Service Center (providing the MEDUSE services business logic)
  - Web Portal for user access to park managers and end-users

- **MEDUSE Mobile Terminals/Applications**
  - Black box terminal based on Blue Thread Marine Telepass prototype
  - Mass Market application (for private/commercial users) based on Android enabled smartphones
  - Law Enforcement application (for law enforcement/institutional users) based on Android enabled iPAD
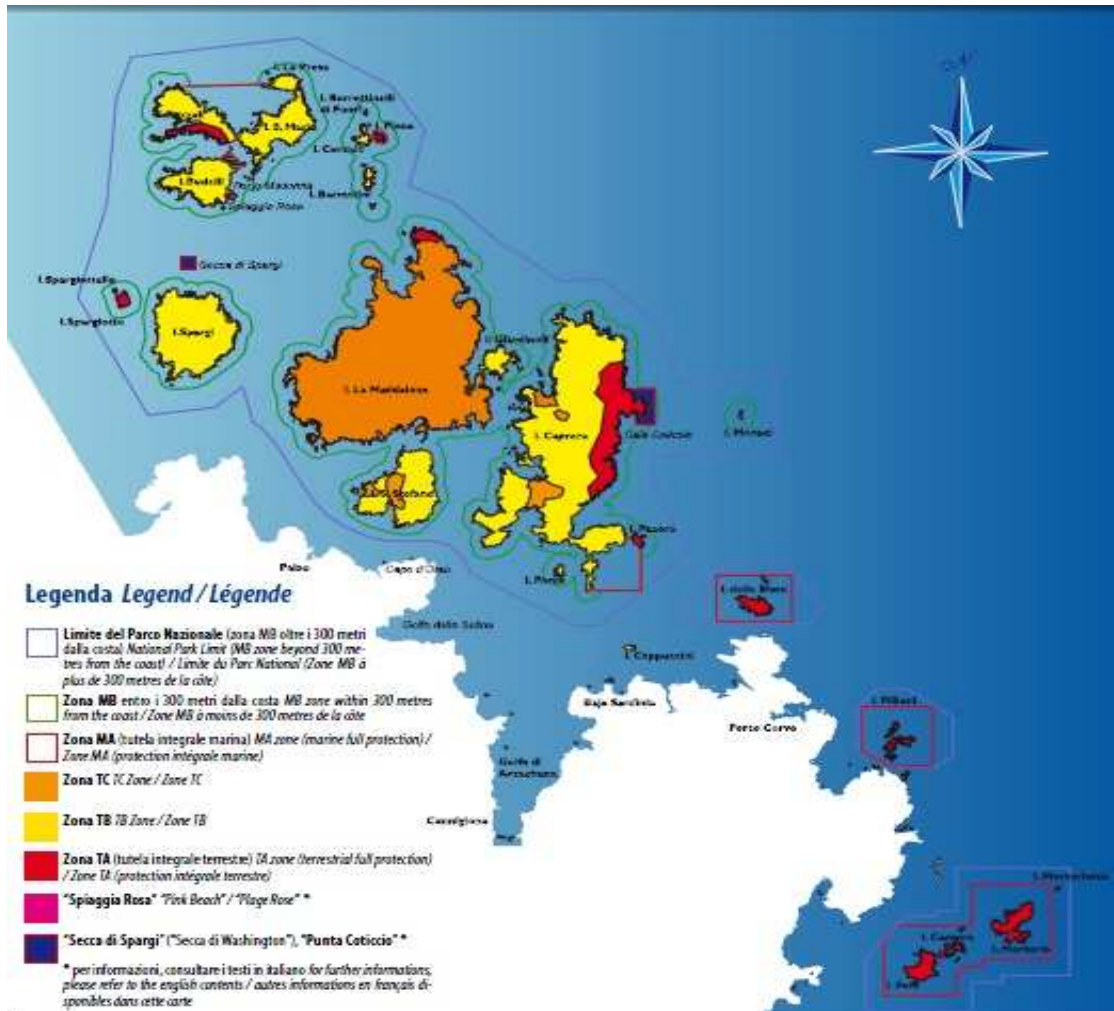
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MEDUSE Architecture at a glance

MEDUSE MASS MARKET TERMINAL
(based on Android terminal)

MEDUSE BASIC TERMINAL
(based on BT marine telepass)

MEDUSE LAW ENFORCEMENT
(based on Android iPAD)

Internet
back bone

Private users,
Park managers
Commercial users

MEDUSE
Service
Inventory

T1   T2   T...

Transport Adapter

Mobile Connector

Authentication

MEDUSE Control Center

MEDUSE DB

MEDUSE Portal

MEDUSE Service Center

Interface Layer

Park portal

Port Authority

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MEDUSE Marine Terminal Architecture

Internet

External Bluetooth
EGNOS Enabled
Receiver

EGNOS SDK

Corrected
position

Persistent
Storage

UMTS
Modem

WiFi
Radio

TCP/IP Stack

PVT,
emergency,
flooding alert

TCP/IP (encrypted)

External Power
Supply

Processing
Logic

MEDUSE SERVICE CENTER

Update Conf:
- Speed limit
- Area boundary
- Access level
- Emergency Ack

Flooding
Sensor I/F

Emergency

Emergency
button

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Demonstration

Place: **Parco Nazionale Arcipelago La Maddalena**

Period: July 2013

Objective: demonstrate a significant set of the MEDUSE services in a operational scenario:

- Institutional services (all)
- Law enforcement (all)
- Private services:
  - Social community (e.g.: find my friends)
  - Location based hints from park managers

Project schedule & milestones

2012   2013

Specification & Design   **Development**   **Integration** **Demonstr.**

T0   +1   +2   +3   +4   +5   +6   +7   +8   +9   +10   +11   +12   +13   +14   +15   +16   +17   +18   +19

KO   **PMR**   **CDR**   **RDR**   **FR**

(Brussels) (teleconference)   (Rome)   (La Maddalena) (Brussels)
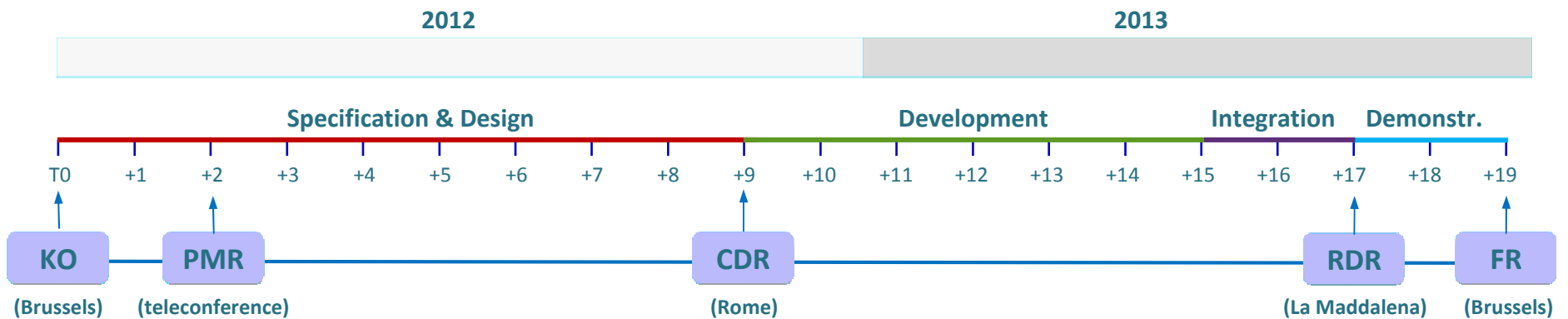
Milestone	Milestone name	WP numbers	Milestone date
KO	Kick-off meeting	WP1	07/02/2012
PMR	Project Management Review	WP1	02/04/2012
CDR	Critical Design Review	WP2	31/10/2012
RDR	Readiness Demonstration Review	WP3,WP4	01/07/2013
FR	Final review	ALL	01/09/2013

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MEDUSE Consortium

Company		Role in MEDUSE
	NEXTANT www.nextant.it	Project Coodinator, System Design, Mass Market Application, MEDUSE Service Center
	Vitrociset Belgium www.vitrocisetbelgium.com	Requirements Engineering and Service Modelling, Law Enforcement application and System Integration
	Blue Thread www.blue-thread.it	State of the art, Marine Terminal and law enforcement application
	La Maddalena Park http://www.lamaddalenapark.it/	End User representative, support requirement engineering and lead demonstration activities
	ANESTI http://www.anesti.it	Market Analysis and Business Plan

Thank You for your attention

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