



MTTS

Multimodal Tracking and Tracing Service centre



Background, results and conclusions



MTTS project & partners



West Consulting BV (NL)



ARGOSS BV (NL)



Pilotfish AB (SE)



Ursa Minor BV (NL)



Project Overview

ARGOSS BV (NL)

- ARGOSS is a consulting company monitoring, analysing and forecasting environmental conditions with a focus on providing innovative meteorological and oceanographic solutions to the offshore, coastal and harbour sectors, and urban management authorities.
- ARGOSS is specialised in using earth observation data from satellites and have expertise and experience in processing radar, optical and acoustics measurements, numerical modelling, algorithm development, calibration & validation and assimilation of measurements into models.
- ARGOSS provides services in the local, regional, and global arena for marine environmental information, air quality analysis and forecasting (high-resolution meteorological and atmospheric chemistry) using modelling, remote sensing and in situ data.
- www.argoss.nl



Project Overview

Pilotfish AB (SE)

- Pilotfish systems optimize and manage complex wireless data communication to and from mobile entities (springs from an advanced technology research project by Chalmers and Ericsson);
- Worked with a large number of industrial companies, developing advanced systems using wireless communication;
- Specializes in wireless gateway solutions;
- www.pilotfish.se / www.pilotfish.net .



Project Overview

Ursa Minor BV (NL)

- Ursa Minor is an innovative all round system integrator for location based solutions, focusing on safety and the new services of Galileo and EGNOS.
- Ursa Minor is specialised in requirements analysis, space systems design, communication and navigation hardware, and software development.
- Ursa Minor provides world wide location based safety solutions, focusing on:
 - Provision of Safety Information and Return Link Messages via Galileo and EGNOS
 - More efficient user safety equipment using the advanced functions of Galileo and EGNOS
 - Increasing the efficiency of an emergency responds
 - Independent position authentication of vessels worldwide
- www.ursaminor.nl



Project Overview

West Consulting BV (NL)

- Software engineering project activities;
- Worked for ESA since 1989:
 - PSS-05 / ECSS-40/80.
- Life cycle service management;
- Secure managed hosting;
- MTTs project coordinator;
- www.west.nl .



Project Overview

MTTS project rationale

- A well-known fact is that all emergency alerts are to a great extent false and not rated. For the marine sector this is 91% or more [ref. Cospas-Sarsat].
- Aim of the MTTS project is to combine new and existing technology and data and consequently be able to create an end to end service serving the consumer leisure vessel owners and the professional RCC institutions and agencies.



Project Overview

MTTS centre goals

- Facilitate the RCC in providing SAR info details to the RLSP;
- Provide a common interface to the RCC for various forms of distress calls;
- Rate the incoming distress calls;
- Track changes in distress situations;
- Efficiently coordinate emergencies activities;
- Inform the public on environmental conditions.



Project Overview

MTTS consortium members

- ARGOSS provides geo-informatics knowledge and experience;
- Pilotfish provides land- and sea-based tracking and tracing knowledge and experience;
- Ursa Minor provides systems engineering experience and SAR/Galileo knowledge and experience;
- West Consulting provides system architecture and ICT knowledge and experience and will act as project coordinator.



Aims and technology application

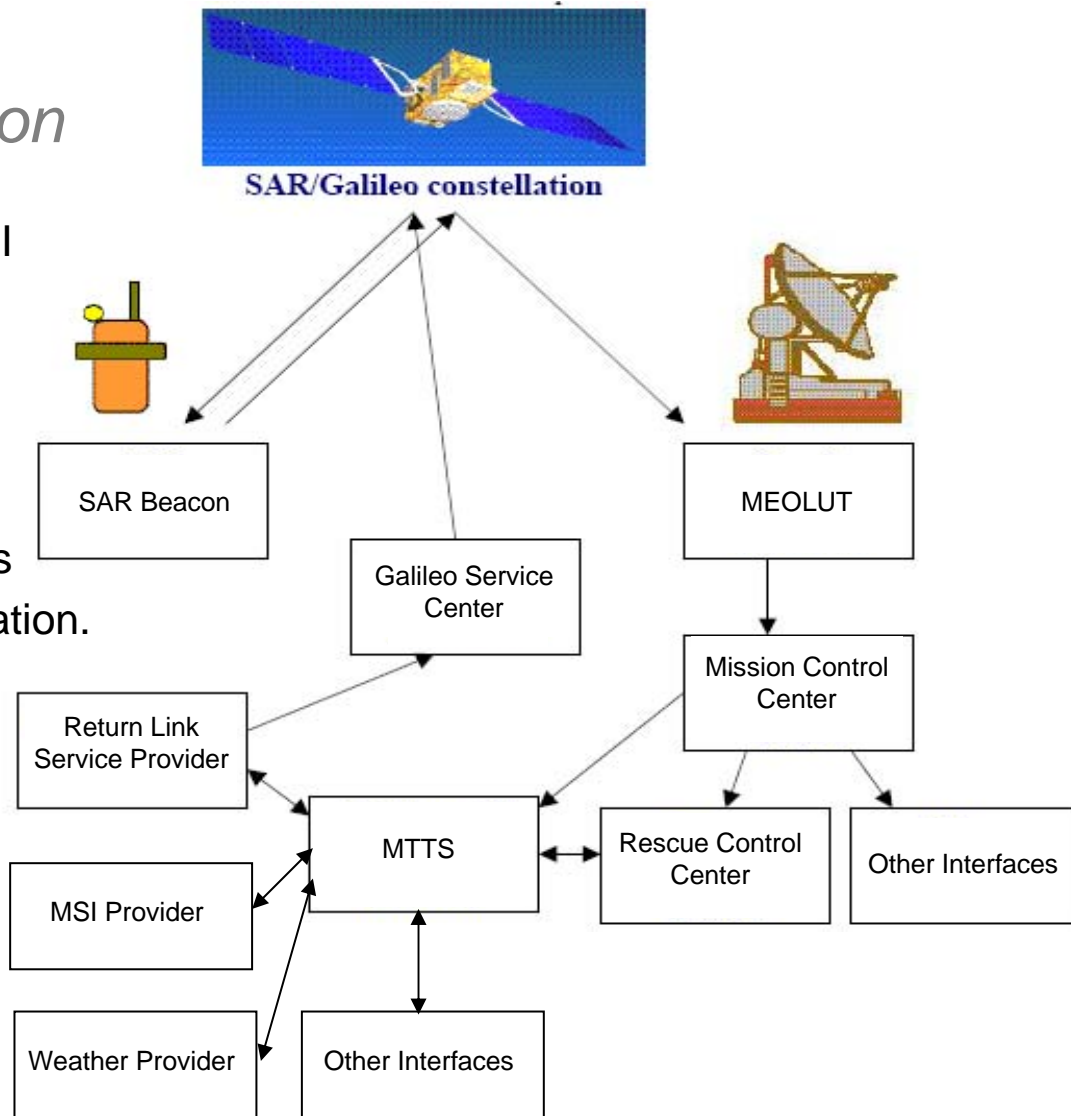
The aim of the MTTTS project was to exploit the unique capabilities offered by the future Galileo constellation by designing, constructing and demonstrating a marine safety information system providing location based services to both leisure vessel users and marine rescue control centres (RCCs).

The integrated system design combines existing web services technology for system development and the application of market available hardware and backbone for the user systems. Environmental data provision is taken from existing services. New technology applying future Galileo capabilities such as a two-way communications link between marine vessel users and emergency services have been emulated in MTTTS.

Goals and expectations

Stakeholder consultation

- Integrated, location based MSI from multiple sources;
- Two-way comms with Galileo between leisure vessels and RCCs;
- Potential value added services based on the provided information.





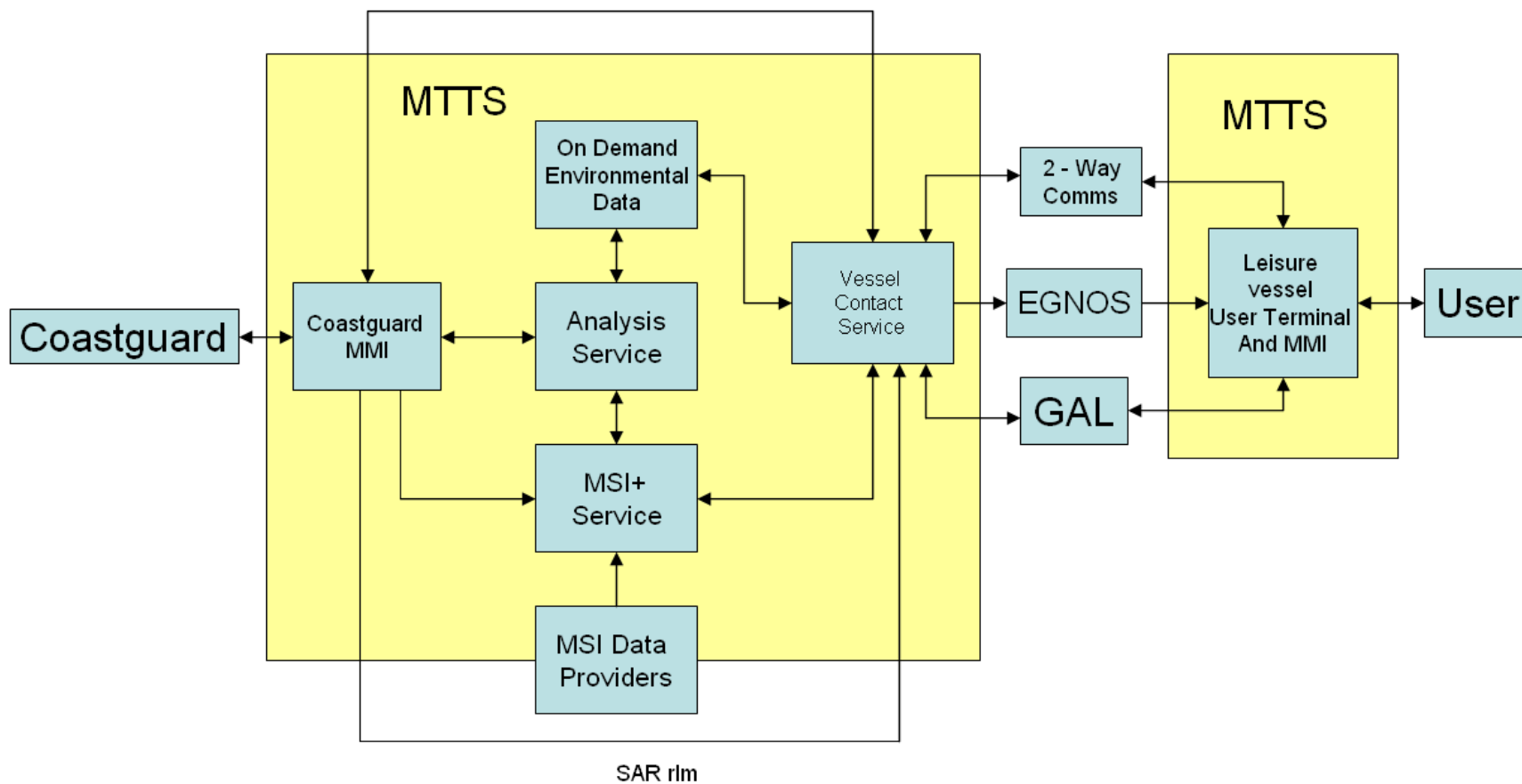
Goals and expectations

MTTS mission

- Prevention:
 - *Disseminate MSI;*
 - *Provide custom weather reports.*
- Improve performance:
 - *Provide the possibility of 2-way communication with vessel in distress;*
 - *Collect the most relevant parameters for the alert;*
 - *Present the alert to the RCC in the most effective way.*

MTTS System Overview

Block diagram





MTTS System Overview

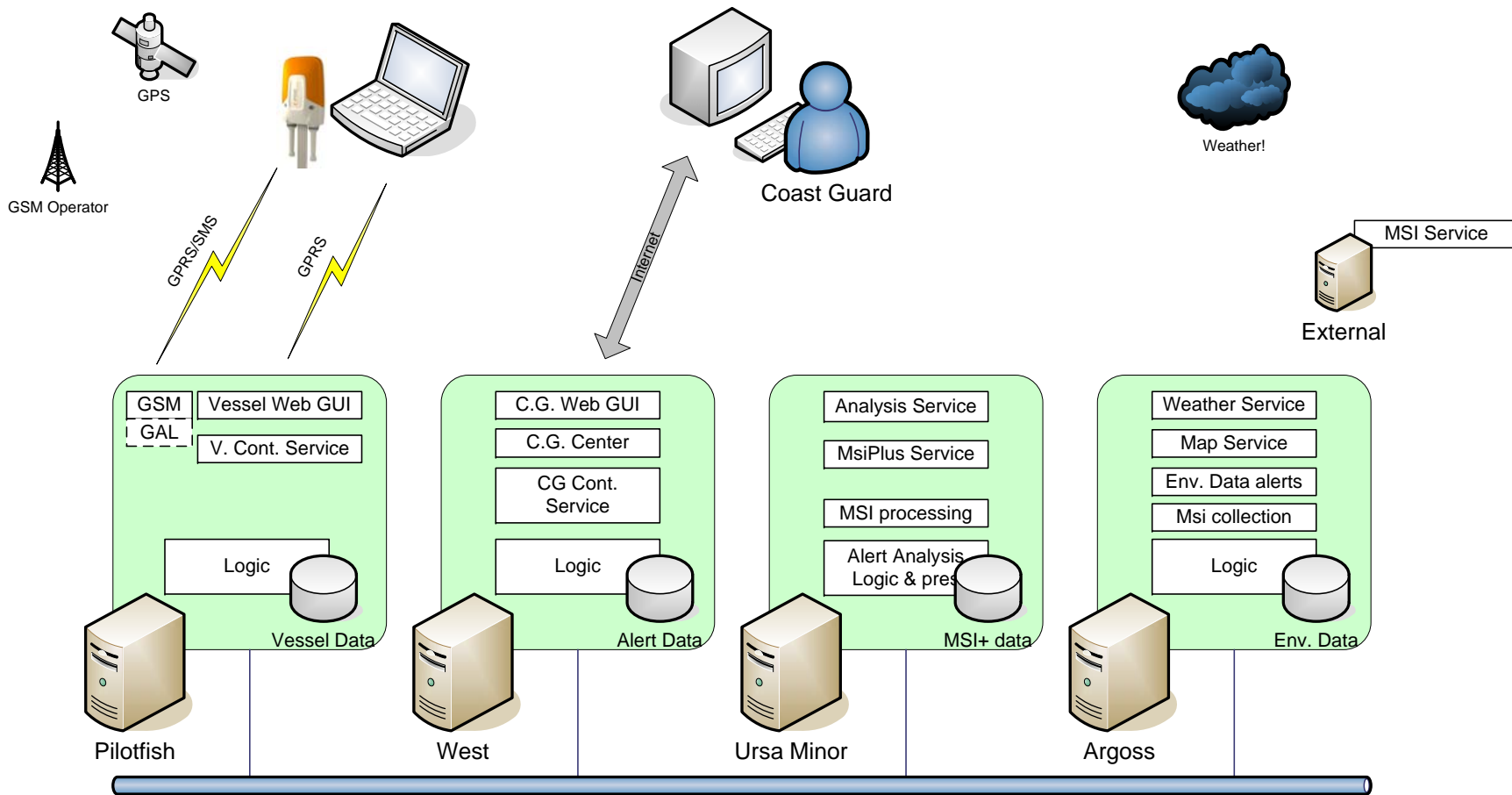
Open standards and technologies

- **Web Feature Service (WFS):** serving the alert information with PostGIS data store;
- **Web Map Service (WMS):** Serving the map data;
- **Web Services** (and associated technologies WSDL and SOAP): Communication between the subsystems;
- **Network Common Data Form (NetCDF):** Exchange of environmental conditions and drift prediction data;
- **MapBuilder and OpenLayers toolkits:** man-machine interfaces, using AJAX technology for a rich and interactive user experience;
- **Java and Perl:** Custom software components.



MTTS System Overview

Physical architecture



MTTS System Overview

Leisure vessel user interface

Trip information	
Onboard contact:	Hein Zelle
Phone:	+31 (0)527-242299
Onshore contact:	Jonathan Anderson
Phone:	+46 709 10 45 19
Home port:	Gothenburg
Destination port:	Göteborg
Number of people onboard:	32
Vessel type:	LAW_ENFORCEMENT_VESSEL

Vessel information	
Vessel Name:	S/Y Pilotfish
Call sign:	I
IMO number:	
IMO number:	
Vessel Weight:	0.0 N
Vessel Length:	0.0 m
Vessel Width:	0.0 m
Vessel Draught:	0.0 m
Vessel Height:	0.0 m



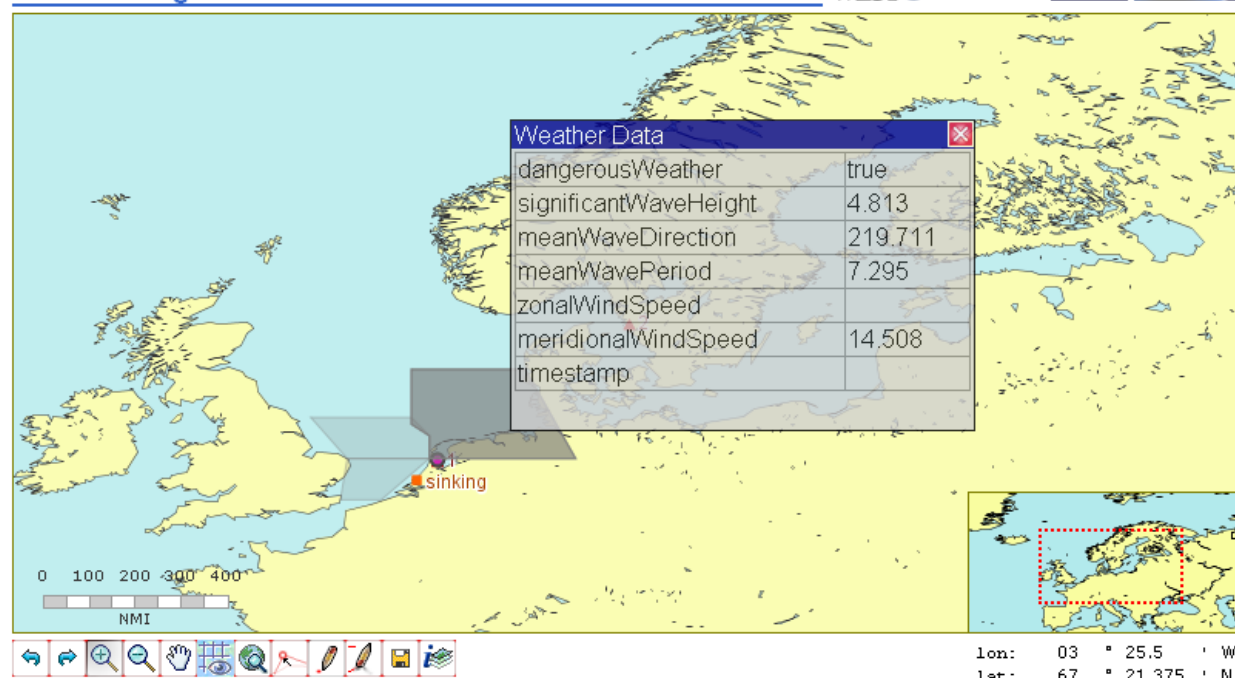
Alert data										
Distress type: Please ensure that the distress types you select are correct!										
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SINKING	LISTING	DANGER_OF_CAPSIZING	COLLISION	DISABLED_AND_DRIFT	FIRE_EXPLOSION	MEDICAL_ASSISTANCE_REQUIRED	DISABLED	PEOPLE_OVERBOARD	GROUNDING	FLOODING
Distress data										
Vessel data										
<input type="button" value="Submit"/>										

Graphical information		
Layer options		
<input type="button" value="Update current"/>	<input type="button" value="Update wind"/>	<input type="button" value="Update wave"/>
Update wind layer when MSI+ updates?		

MTTS System Overview

Coastguard user interface

MTTS Coastguard User Interface



Map layers

- Alerts**
 - ▲ Alert Active alert with high priority
 - Alert Active alert with normal priority
 - Alert Active alert with low priority
 - Alert Inactive alert

Basemap

- Water
- Land

On-demand data

Wind

- 10— Wind speed (m/s)
- Wind direction

Wave

- 6— Wave height (m)
- Wave direction

Current

- 0.2— Current speed (m/s)
- Current direction

lon: 03 ° 25.5 ' W
lat: 67 ° 21.375 ' N



MTTS System Overview

MTTS implemented services

- **On-demand Data Service:** graphical wind, wave and current information superimposed on the user map;
- **MSI+ Service:** Collects and distributes:
 - *Geotagged shipping forecasts;*
 - *Geotagged Maritime Safety Information (MSI).*
- **Analysis service:**
 - *Fast preliminary alert prioritisation for multiple alert situations;*
 - *Use Galileo SAR RLM for efficient 2 way communication between an RCC and a distressed vessel.*



Demonstration

- **Interfaces:**
 - *Vessel interface;*
 - *Coastguard interface.*
- **Three demo scenarios:**
 - *Scenario 1: Vessel owner requests on-demand data;*
 - *Scenario 2: Alerts*
 - *Scenario 2a: C-Pod alert;*
 - *Scenario 2b: EPIRB alert;*
 - *Scenario 3: Vessel owner enables push data.*

Demonstrations can be arranged by contacting the project communications manager on the project website www.mtts.info



Demonstration

**Scenario 1:
Vessel owner
requests on-demand
data**

- Select route
- On-demand environmental data
 - user requests environmental data via the portal by pressing a submit button
 - the system uses the C-Pod location to extract position based data
 - the results are presented as a pop-up window, table or graph
- On-demand MSI+ data
 - user requests MSI+ via the portal by pressing a submit button
 - the system uses the C-Pod location to extract position based data
 - the results are presented as text, possibly connected to objects on map



Demonstration

Scenario 2a: C-Pod alert

- C-Pod alert analysis
 - the user pushes a button on the C-Pod simulating a distress alarm, could also be a water alarm
 - the portal receives the alarm and retrieves the position of the C-Pod
 - the alert is sent to the CG alert interface
 - the CG interface communicates a new alert
 - the alert is analysed
- The vessel is contacted and the siren sound as a confirmation of alert received [operational acknowledge]
- The user has the opportunity to cancel the alert via a C-Pod button
- Additional vessel data is collected (draft, number of persons on-board, type of distress, contact information, environmental data, nearest port)
- An analysis of validity is performed
 - the results are presented on the CG interface



Demonstration

Scenario 2b: EPIRB alert

- EPIRB alert analysis
 - the user initiates the EPIRB alarm
 - the Coastguard receives the alarm and enters the EPIRB alarm string into the CG interface
 - the alert is analysed
- The user has the opportunity to cancel the alert via a C-Pod button
- Additional vessel data is collected (draft, number of persons on-board, type of distress, contact information, environmental data, nearest port)
- An analysis of validity is performed
 - the results are presented on the CG interface



Demonstration

**Scenario 3:
Vessel owner
enables push data**

- MSI+ and environmental data dissemination
 - the user enables push data by marking a check box in the portal
 - the system uses the C-Pod location to extract position based data continuously
 - if new data are available, the portal plays a sound



The MTTTS concept has been validated by demonstration that:

- The Galileo SAR RLM and MSI safety messages used in an integrated system is beneficial and enhances marine safety;
- This user focused design has considered the use of multiple communications modes complementary to existing marine safety systems and future Galileo capabilities;
- It is feasible to integrate MSI from multiple sources and deliver the information in a coherent local based service;
- Multi-modal two-way communications including Galileo capability between leisure vessels and RCCs is beneficial and is likely to improve the performance of RCCs;
- Value added information services providing detailed wind, wave and current data based on the provided information for enhanced situational awareness and efficient emergency communication is essential.



Expected Way Forward

- Especially for the leisure market the development of MTTTS is promising. The consortium will certainly look for ways to continue development;
- The market potential is being explored and feedback from user groups will be part of future work of the consortium which could lead to a partial commercialisation of the system;
- RCCs hold the key to a fully operational MTTTS concept. It is necessary to hold trials to investigate the benefits. This will require equipping a representative group of vessels and the adoption of the MTTTS concept by RCCs for evaluation;
- MTTTS has been identified as a means to save lives. To meet SAR demands additional functionality must be integrated. R&D work is needed and must be demonstrated;
- The consortium will seek to find additional funding from the EU and other sources to support:
 - *Further R&D work;*
 - *Field trials;*
 - *Impact of legislation;*
 - *Commercialization.*



Conclusion

- MTTTS offers a strong case for the important differentiators of Galileo: SAR, RLM and potentially Maritime Safety Information;
- MTTTS demonstrates that by the application of technology integrated end-to-end solutions can be developed exploiting R&D developments at individual companies to create innovative systems;
- RCCs are willing to participate but are bound by legislation and national policies. Nationally and across Europe we need to understand their problems better and investigate how, where and by what means MTTTS can be integrated into their operational mandates;
- MTTTS can save lives.