

Galileo Information Day: CELESTE

Maritime and fluvial applications

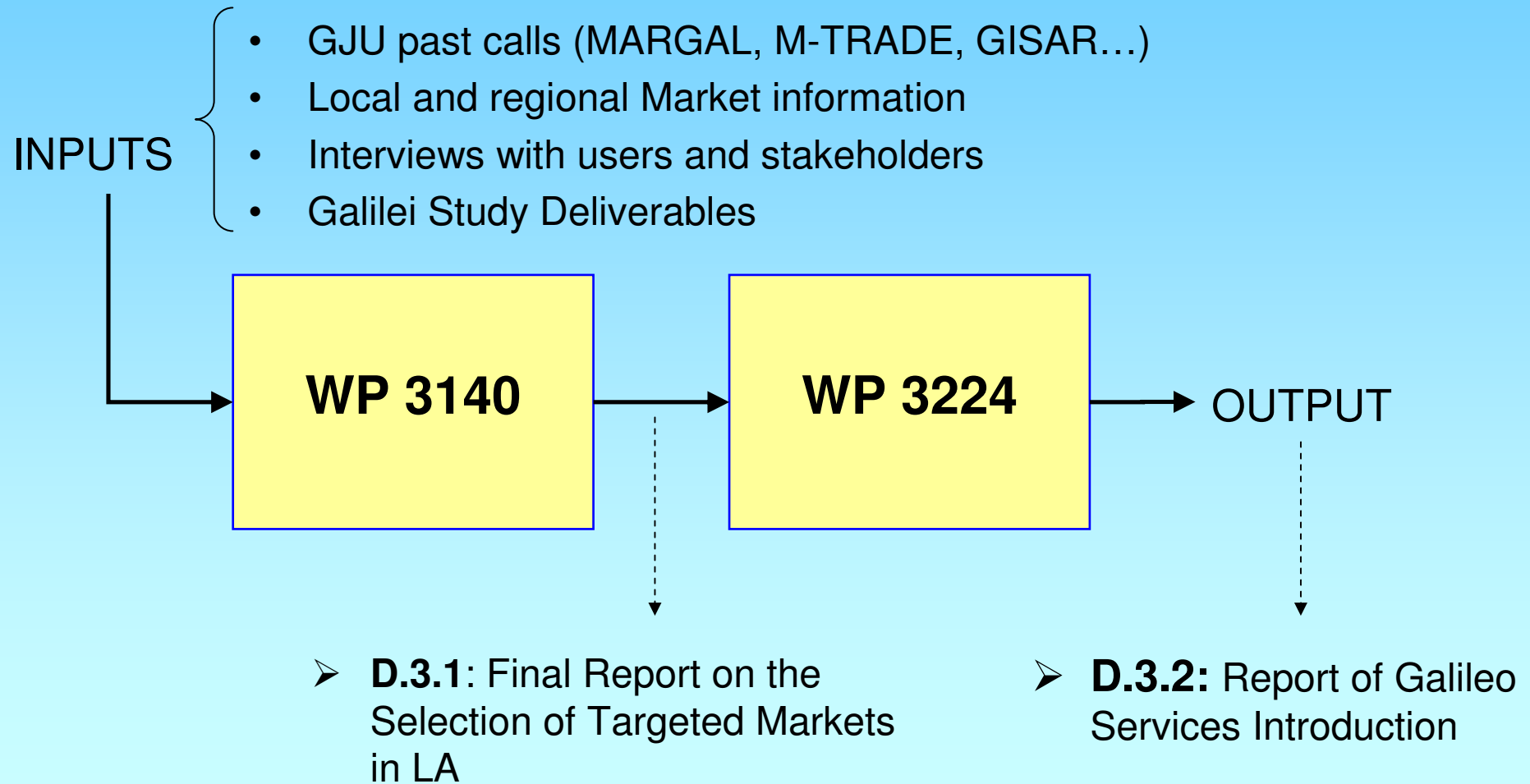
Agenda

1. Overview
2. Description of the WTM UC Scenario in LA
3. Selection of targeted markets for Galileo in Latin America
4. Report of Galileo Services and Action Plan for WTM applications
5. Conclusions

Objetives

- Provide an assessment of the current situation of the Waterway/Maritime sector and its potential for a Galileo Implementation in the Latin American region.
- Identification of major applications and definition of a rough strategy for the sector.
- Assessment of these applications against technical and non-technical enablers to the implementation of services that would be made available through the Galileo infrastructure

Strategy



WP 3140

- **Activities**

- Review of the input documents and extrapolation to Latin American market
- Description of the WTM domain in Latin America, identifying the main actors and decision makers having a role in this domain
- Survey of the major past and running projects and studies dealing with various aspects of the Maritime utilization of GNSS Europe and LA
- Identification of the new applications in the LA WTM domain that could arise as a result of the Galileo introduction

- **Outputs**

- Contribution to the D.3.1 - Final Report of the Selection of targeted markets for Galileo in Latin America.

WP 3224

- **Activities**

- Review of the input documents (*Annex 4 to D.3.1- Selection of targeted Markets – Maritime, M-TRADE, GISAR*);
- Assessment of the identified applications in WP3140 against technical and non-technical enablers
- Analysis of the added value data that impact in the potential usage of GNSS in the LA WTM domain
- Analysis of the application/service provision architecture in the LA WTM domain

- **Outputs**

- Contribution to D.3.2 – Report of Galileo Services Introduction (*INDRA-CELESTE-3224-TN-001-B*)
- Contribution to D.3.2.5 – Action Plan for each selected market

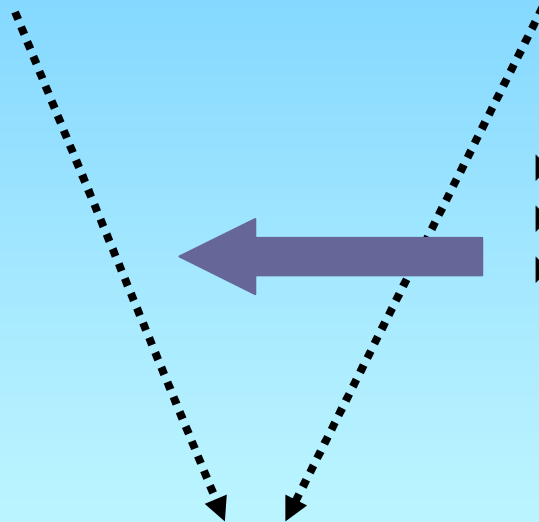
Roadmap for selecting Priority Applications

WTM UC scenario

- ▶ **Actors**
- ▶ **Decision Makers**
- ▶ **Standard**
- ▶ **Rules**
- ▶ **Business relations**
- ▶ **Needs of position info**
- ▶ **Use of GNSS and ICT**



Candidate Applications



- ▶ **Meetings**
- ▶ **Desktop research**
- ▶ **Analysis Criteria**
 - Galileo added value and differentiators
 - Market interest
 - Necessity at continental level
 - Influence of the regulatory frameworks

Priority Applications

WTM UC Scenario (Key points)

- Market very significant (most used transport mode for freight transport)
- Maritime transport especially important for Latin America economies
- Galileo benefits for the User Community: increased accuracy and integrity, certified services and high availability.

WTM UC Scenario (Users & Stakeholders)

Group	Role/Description	Actors	LA local entities
Authorities and Institutions	Responsible for the regulatory and standardisation process Responsible for the management, operation and coordination of the transport	Standardization and Regulatory Institutions, Ministries, Public authorities, Port authority Harbour Master, Food and Veterinary Office	Secretaría de Transporte, Subsecretaría de Vías Navegables, Prefectura Naval, Secretaría de Pesca, Armada, Cancillería, Administración General de Puertos,
Transport Organisers	Intermediary between Consignor and Consignee	(Freight) Forwarder Agent Shipping Agent <i>Freight Integrator</i>	Multimar, Turner International, Blue Star, Williams, Delfino, Navegación Atlántica, Hamburg Sud, Cosco, Mundial, Heinlein, Ultramar S.A., Robinson, Transplata, Nabsa,
Infrastructure Operator	Operational co-ordinator of a transport mean, checks and manages the traffic on the way	Inland Waterways Operator Port Authority	Puerto de Buenos Aires. Puerto de Montevideo ...
Terminal Operator	It is the entity managing the structure necessary for load/unload of goods in the port. It is responsible for planning port appointment and operations.: loading and unloading of cargo, cargo handling or cargo storage	Deep sea Terminal Inland Terminal	Terminales Río de La Plata S.A. (T1+T2,T3) Terminal 4 S.A., Bs. As. Container Terminal Service S.A., (T5, Terminal Bs. As. S.A.(T6),
Transport Operator	Managing the modes of transport, it is responsible for safe and efficient moving of the cargo/people from one place to another	Ship operator Shipping Line (Ship Owner)	Alianca, Angromar, APL, Blue Star Line, Braztrans, Cma-Cgm, Columbus, Cosco, Costa Container, Croatia Line, CSAV,
Transport chain end-user	User at shipping origin and destination respectively	Consignees Consignors	

WTM UC Scenario (GNSS applications)

- Several national applications have been found for GPS-based maritime applications, for example:
 - Fishing activities.
 - SISESAT (Perú). Satellite Tracking System
 - Secretaría de Pesca Argentina (Argentina).
 - SAR: Brazilian SISTRAM
 - Intelligent buoys in Uruguay

WTM UC Scenario (Initial conclusions)

- No supranational actors in LA
- There is an interest in Galileo, but several obstacles are identified by the LA User Community :
 - Activity not seen as critical.
 - GPS performances are considered enough.
 - Uncertainty about Galileo added value and business model.
 - Lack of budget for these purposes.
 - Lack of information in governments and private companies about Galileo.

Candidate WTM applications

Safety Critical Applications	Liability Critical Applications	Others
<ul style="list-style-type: none"> • Dangerous Goods Maritime Transportation • Emergency Services 	<ul style="list-style-type: none"> • Perishable Goods Maritime Transportation • High Value Goods Maritime Transportation • Fishery • Inland waterways navigation • Dynamic Position of Off-shore Platforms/Vessels • Seaport management • Harbour operations 	<ul style="list-style-type: none"> • Normal Goods Maritime Transportation • Survey and marine engineering • Automatic piloting of barges

Selected Priority Applications

1. Dangerous Goods Transportation
2. Fishery
3. Emergency Services

Rationale for the selection of the priority applications:

- Galileo added value and differentiators
- Market interest
- Necessity at continental level
- Influence of the regulatory frameworks

Service enablers: safety critical applications

Technical enablers		Non-technical enablers	
GNSS	<ul style="list-style-type: none"> • Position integrity • Position availability/continuity • Position accuracy • Signal guarantees • Interoperability with GPS 	Legal	<ul style="list-style-type: none"> • Standardization of equipment. • Harmonization in legislation between different countries. • Certification of OBU data.
Non GNSS	<ul style="list-style-type: none"> • Communications reliability • Global coverage • System interoperability between borders • Scalability • Traceability • Robustness • Mapping • Complementary sensors • Power consumption – self-powered OBU 	Financial	<ul style="list-style-type: none"> • Reduced cost. • Cost efficiency (multiple use of OBU) • Coordination between industry and user community • Compatibility with other systems
		Social	<ul style="list-style-type: none"> • Pollution reduction • Accident avoidance/increase of safety • Improved coordination of rescue teams

Service enablers: liability critical applications

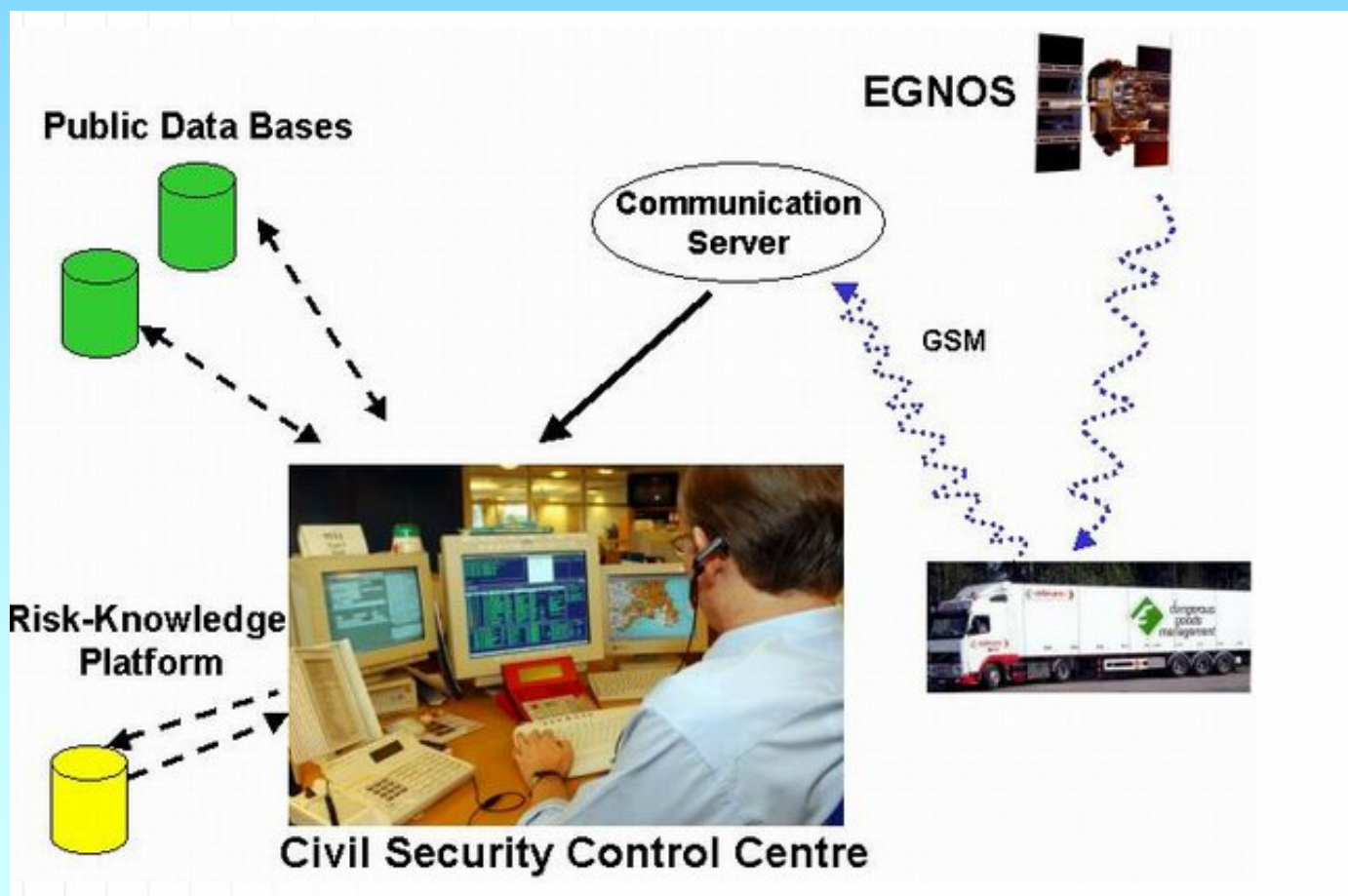
Technical enablers		Non-technical enablers	
GNSS	<ul style="list-style-type: none"> •Position availability/continuity •Position integrity •Position accuracy •Signal guarantees •Interoperability with GPS •Velocity 	Legal	<ul style="list-style-type: none"> •Standardization of equipment. •Harmonization in legislation between different countries. •Certification of OBU data. •Reduction in claims (where and when irregularity occurs, reducing claims)
Non GNSS	<ul style="list-style-type: none"> •Communications reliability •Global coverage •System interoperability between borders •Scalability •Traceability •Robustness •Mapping •Complementary sensors •Power consumption – self-powered OBU 	Financial	<ul style="list-style-type: none"> •Cost efficiency (multiple use of OBU) •Coordination between industry and user community •Compatibility with other systems •Time saving for tracking and tracing (shipment status information, reducing communication time) •Reduction in lead time (better information of bottlenecks, alert notification, customs clearance times) •Reduction in communication costs (reduction telephone costs, re-use of existing information) •Reduction in storage time/ capacity needs •Customer service impact (Expedite management)

Dangerous Goods Transportation (I)

- Reliable positioning service needed to meet stringent regulations (**availability and integrity** are key factors)
- RFID or other sensors can complement Galileo services (tamper detection, ...)
- Authorities and companies present interest in Galileo added-value.
- Potential social benefits
 - Pollution reduction
 - Accident avoidance/ increase of safety
- Potential commercial benefits:
 - Reduction of costs

Dangerous Goods Transportation (II)

Architecture for the transport of dangerous goods based on EGNOS
(taken from the MITRA project)



Fishery (I)

Fishery applications with interest in GNSS solutions:

1. Commercial applications, for example:
 - Fishery fleet Management;
 - Optimisation of fish commerce
 - Provision of Fishery-related data
 - Added-value information (meteo, remote sensing data, etc.)
2. Safety enhancement for Fishery vessels, for example:
 - Aid to navigation for Fishery vessels.
3. Support to fishery monitoring and control, for example:
 - Fishery monitoring;
 - Territorial control enforcement;
 - Automatic geo-fencing via satellite to monitor restricted areas;
 - Helping to locate traps and nets.

Fishery (II)

- Position requirements of fishery services are also focused on availability and integrity, but accuracy have also to be taken into account for cases of searching traps and nets.
- Important legal consequences in case of entering in a forbidden zone, so high availability and integrity of the signal are required for developing a reliable application.
- Potential legal interest
 - Forgotten zones control
- Potential commercial benefits
 - Fishery fleet management

Fishery (III) - Architecture

- **Mobile Unit**
 - Installed on the vessel to be remotely localised and tracked.
 - Combines GNSS with a wireless communication device, as for example GSM, CDMA, radio and satellite-based communications.
- **Communication network**
 - From the vessel to a Control Centre, but it should also consider the possibility of direct connections between vessels.
- **Control Centre**
 - It handles the communication to/from the mobile unit.
- **Fishery Service Provider**
 - It processes the information according to the specific application and delivers it to users and stakeholders.
 - Provision of information/services is done either via dedicated End-user application and/or via a Web interface.

Search and Rescue (I)

SAR/Galileo will provide substantial benefits to the SAR service:

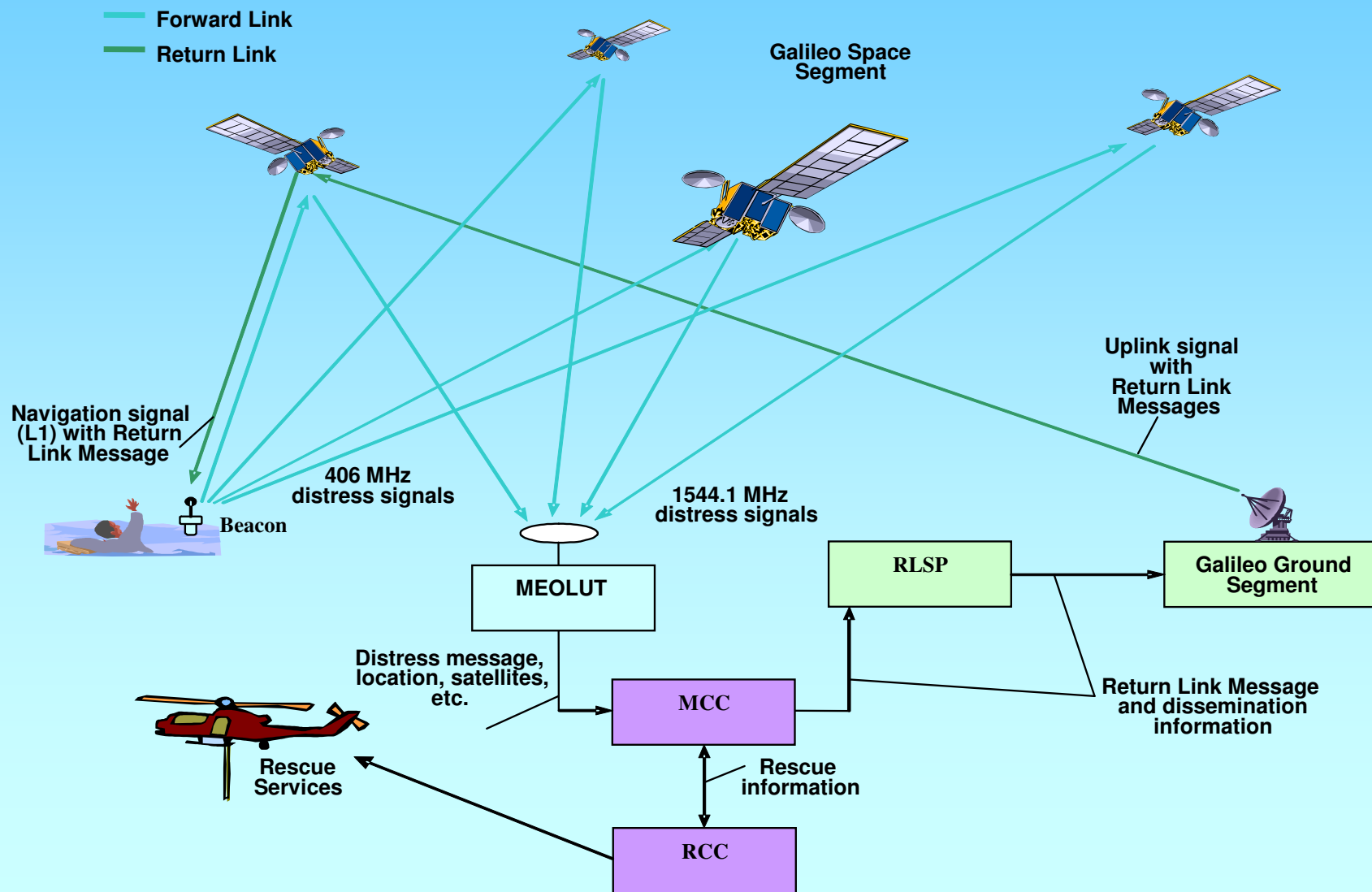
- **Full Earth coverage**, including polar regions, all the time.
- **High availability** thanks to the high number of Galileo satellites that will form the constellation.
- **Quasi-instantaneous detection**: SAR/Galileo will be able to recover an error-free beacon message within less than 5 minutes, with a probability higher than 99%.
- **Accurate localisation**: Future emergency beacons will be located with an error of less than 15 meters, much lower than current beacons providing position information (maximum error ranging from approximately 100 m up to 1.2 km, 95% of the time).
- **High capacity**: SAR/Galileo will be able to provide service to up to 450 activated beacons worldwide.
- **Return Link Service**: Future emergency beacons will be able to receive Return Link Messages with the confirmation that their message was correctly received and that the rescue operation has been launched.
- **Inter-operability with other SAR systems**: It will be able to receive distress signals transmitted not only by SAR/Galileo satellites but also by other systems, such as the US-proposed DASS

Search and Rescue (II)

The roles of the different components are:

- **Galileo Space Segment:** to relay distress signals transmitted by type-approved beacons to ground stations,
- **Intergovernmental SAR Satellite System (ISSS):** to process beacon signals in order to recover the transmitted message and determine the beacon location;.
- **Rescue Coordination Centres (RCCs):** to launch and coordinate rescue operations.
- **Return Link Service Provider (RLSP):** to coordinate the requests of Return Link Messages and interface with the Galileo Ground Segment. It might be implemented as an extension/integral part of the ISSS, or as an independent centre.
- **Galileo Ground Segment:** to uplink the Return Link Messages to the appropriate satellites for dissemination.

Search and Rescue (III)



Final conclusions

Short-term recommendations

- Architectures/technological solutions viewpoint
 - The establishment of worldwide **standardization processes**.
 - Use of **web technology**, to allow easy and user-friendly access to services to all kind of users.
 - **RFID** introduction in the Dangerous Goods Transportation, for security/safety monitoring and identification of goods.
 - Compactness, robustness and costs of the **mobile equipment**.
- Service provision scheme and user-related aspects
 - **LA User awareness** and knowledge is a key driver.
 - **LA Institutions and Authorities** shall be informed of Galileo benefits.

Final conclusions

Medium-long term recommendations

- **Suitable legislations** to take profit of Galileo possibilities in Latin America area.
 - International rules governing intrusion into national or protected waters
- **Dangerous Goods Transportation**, necessary information sharing among actors is needed.

Thank you