HOW EUROPEAN SATELLITE NAVIGATION IS CONTRIBUTING TO A MORE EFFICIENT TRANSPORT:  

**FOCUS ON RAIL**

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This presentation can be interpreted only together with the oral comments accompanying it.
Integrated approach: understanding the market, stimulating the demand, creating a competitive EU offer

**MARKET SEGMENTS**
- Road
- Aviation
- Maritime
- Rail
- LBS
- Agriculture
- Mapping
- Governmental

**DOWNSTREAM VALUE CHAIN**
- Bodies influencing the market
- Navigation Signal Providers
- Chipset, receiver
- Devices
- Content & applications
- Service providers

**Understanding market and users**

**Stimulating the demand**
- Roadmaps for adoption

**Supporting a EU**
- COMPETITIVE OFFER
  - of services and applications

To ensure adoption and return of investment of EGNOS and Galileo: public benefits and & downstream industry and SMEs competitiveness
More efficient transport?
What can we do for a more efficient railway system, especially in regional lines?
67% saving on operational costs!

Two regional lines in Germany (9000 km):
  Cost/benefit ratio 1.3
  NPV = 531 millions euros

A local line in Italy:
  Cost/benefit ratio 1.37
  NPV = 37 millions euros

Expansion to Europe:
  Cost/benefit ratio 1.4
  NPV = 1.2 billions euros

- Prevent the disruption of the service of low density lines (shifting to road cost 0.1 euro per person per km)
- Improve the safety of local lines who are poorly equipped with safety systems
- **Create business opportunities** for European companies to export internationally a cost effective innovative train control system
### EGNSS value proposition for different applications

<table>
<thead>
<tr>
<th>Safety critical</th>
<th>Non Safety Critical</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low density lines</strong></td>
<td>Improve safety and reduce the cost of signalling (requires very few or no line side components)</td>
</tr>
<tr>
<td><strong>Main lines</strong></td>
<td>Reduce the number of physical balises and to improve the precision of the odometry</td>
</tr>
<tr>
<td><strong>Asset management</strong></td>
<td>Improve monitoring of the railway assets both for operators and infrastructure managers</td>
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</table>
| **Cargo monitoring** | Improve availability of the supply chain visibility information to the LSP/LSC:  
  - Georeferenced cargo status monitoring  
  - Corridoring, Geofencing |
| **Passenger information systems** | Improve precision and availability of positioning for on board PIS |
Focus on safety critical: where we want to be how to get there

Where we want to be

A new train control system based on EGNSS, decreasing the cost and improving safety in Europe, supported by a competitive European industry exporting it worldwide

How to get there

Support the industry (UNISIG) for the definition of the requirements and of the architecture of a EGNSS based train control

Partnership with ERA to foster a new evolution of ERTMS including EGNSS and build the enablers (e.g. certification process, on-board receivers, etc.)
R&D efforts continued in H2020: ERSAT

ERSAT project will leverage the achievements of FP7 and pave the way for inclusion of E-GNSS into future evolutions of ERTMS.

Objective → prove the benefits of EGNSS (including EGNOS and Galileo early services) for safety railway application for Low density lines by:

- defining and developing a safe localization of the trains, based on E-GNSS
- demonstrating how this can be successfully included in the evolution of ERTMS
RHINOS aims to overcome the limitations of the railway environment

Key pillar of **RHINOS** (Railway High Integrity Navigation Overlay System) project is the GNSS infrastructure realized for the aviation application with **additional layers** that aim to meet the railway safety standards, given the environmental constraints.

RHINOS will also contribute to the definition of a standard for the Railway High Integrity Navigation Overlay System leveraging on the EU-US Cooperation Agreement on ARAIM.
STARS will help to finalize the requirements on rail GNSS on board systems

The aim of STARS project is to fill the gap between ERTMS needs for safety critical applications and E-GNSS services, through a characterization of the railway environment and of GNSS performances assessment in that environment.

Key objectives of the project are:

- To develop a universal approach to predict the achievable GNSS performance in a railway environment, especially for safety critical applications within ERTMS and to determine the necessary evolution of ETCS to include GNSS services
- To achieve interoperability between equipment of different suppliers
- To allow inclusion of GNSS into ERTMS
A common Roadmap for a new generation of train control based on EGNSS and space technologies
H2020 next funding opportunity for Galileo is approaching

<table>
<thead>
<tr>
<th>Type of Action</th>
<th>Topic</th>
<th>Budget (EUR mln)</th>
<th>Funding rate</th>
<th>Indirect costs</th>
</tr>
</thead>
</table>
| IA             | EGNSS Transport Applications               | 14.50            | 70% (except for non-profit legal entities, where a rate of 100% applies) | 25% of the total eligible costs excluding:  
|                |                                             |                  |              |  
|                |                                             |                  |              | • Subcontracting  
|                |                                             |                  |              | • Costs of resources made available by 3rd parties  
|                |                                             |                  |              | • Financial support to 3rd parties  
| IA             | EGNSS Mass Market Applications             | 9.00             |              |                |
| IA             | EGNSS Professional Applications            | 8.00             |              |                |
| CSA            | EGNSS Awareness raising and capacity building | 1.50            | 100%         |                |

**Total budget:** 33.00

*Opening: 08 November 2016  
Deadline: 01 March 2017*
A unique opportunity for matchmaking and creating new ideas!

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BRINGING SPACE TO EARTH
30 MAY – 03 JUNE 2016,
THE HAGUE, THE NETHERLANDS
Follow with us the next launches of Galileo

- 12 Galileo satellites are today in orbit
- The signal of navigation is already transmitted and the initial operational services will start later this year
- Next launch (2 satellites) on 24th May
- Ariane launch (4 satellites) in November
THANK YOU

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