Satellite services for a modern EU railway system

Roma, April 18th 2013

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What is the European Railway Agency
Main objectives for a modern railway system
Opportunities for space assets
Main challenges
Activities
What does the Agency do for whom?

- **European Railway Agency (ERA)**, Valenciennes (F)
- established **2004/2005**, approx. 155 staff
- core domains: Interoperability, Safety, ERTMS**

**EU objective**

**Creation of the Single European Railway Area**

**Effective enforcement of EU-legislation across all Member States**

**MS to implement existing directives and remove inconsistent tools!**

**ERA contribution**

- “the only place where all the actors meet”
- EU harmonised technical rules/procedures
- Full Set of TSIs*
- Extend the scope of the TSIs

- Driver for transparency, cross acceptance
- Driver for common understanding
- Driver for application through dissemination

* Technical Specification for Interoperability
** European Rail Traffic Management System (the harmonised control-command and signalling system)
European Railway Agency

List established by the Committee in February 2005, amended in October 2009

Social Partners

Commission

RIS*

Opinion

Adoption

Parliament

Working Party

Working Party

Working Party

………………

 Sector organisations acting at EU level*:
 ALE, CER, EPTTOLA, EIM, ERFA, ETF, UIP, UIRR, UITP, UNIFE
 representatives / experts

National Safety Authorities’ experts

* List established by the Committee in February 2005, amended in October 2009

* Railway Interoperability and Safety Committee (Member States)

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Revitalising the rail sector

(environment – reduction of greenhouse gas emissions):

✓ Improvement of efficiency and quality
✓ Removal of bottlenecks (physical and « administrative »)
✓ Reduction of costs

Opening to competition within the rail sector
Why interoperability?

Opening of the railway service market
- Different roles for Infrastructure Managers and Railway Undertakings
- Competition between Railway Undertakings

Opening of the railway products market
- Technical compatibility
- EU wide authorisations
- Competition between suppliers

Interoperability
- Uninterrupted movement of trains
- Maintaining the high safety level of railways
- Harmonisation of parameters
- Standardisation
- Lower costs
How to achieve interoperability

Interoperability

- Harmonisation of parameters
- Track gauge
- Power system
- Train localisation
- Ground – train communication
- Operational rules
- Services for passengers (internet,...)
Opportunities for satellite applications

Non safety related: e.g., freight tracking, information to passengers

ERA is highly interested in safety related applications, such as:

- Train localisation (including odometry – space and speed measurement) and data communication for train protection

**Satellite positioning:**

- Studies and tests performed and in progress
- Strengths and weaknesses
  - Trackside equipment subject to pilfering and vandalism
  - Improvement of odometry performance; train integrity detection
  - Other improvements (e.g., safety at level crossings – LeCross; SafeRail)
  - Geographical constraints (tunnels – need of keeping other systems on-board)

**Goals**

- Cost effective solutions (mainly for non-EU market?)
- Compatibility with the development of the harmonised signalling system ERTMS (critical for EU market and advantageous for global market)
Opportunities for satellite applications

Communication

✓ Satellite communication:
  ✓ Studies and tests performed and in progress
    ✓ Global coverage; applicability for multiple applications
  ✓ Main challenge is managing the different life cycle of equipment for safe management of traffic and communication equipment

✓ Goals
  ✓ Compatibility with the development of the harmonised signalling system ERTMS (critical for EU market and advantageous for global market)
  ✓ Independence between traffic management functions and communication systems: following the evolution of communication without re-design of traffic management functions
  ✓ Migration strategy from the communication system currently used (GSM-R) to new communication systems
  ✓ Interoperability between areas where different communication systems are used
Opportunities for satellite applications

Summarising...

✓ Strong interest of ERA in research related to use of satellite localisation and communication
  ✓ Securing the results achieved with ERTMS with respect to technological development
    ✓ Preventing the need of re-design and the risk of non-interoperability due to evolutions of communication systems
  ✓ Supporting the application of ERTMS in new markets
    ✓ Cost effective solutions for localisation, odometry and communication
Challenges

**Performance**
- Accuracy of satellite localisation; reliability and availability of service
- Capacity of satellite communication systems; which services can be supported by the same system; coverage; quality of service

**Migration**
- Compatibility with current systems
- Capability of supporting EU-wide uninterrupted movement of trains (e.g., switching from a communication provider to another)

**Certification and authorisation**
- Allocation of responsibility for safety critical applications, when services of a “provider” are used (railway companies usually manage and are responsible of all systems they use; changes in the approach are necessary)
- Coordination with the EU law
The European Railway Agency is interested in the cooperation with ESA

- Following and evaluating results of already started activities (e.g., 3InSat)
- Identifying research needs and preparing calls (e.g., on a certification scheme for satellite communication for railways)
- Dissemination of achievements of research and study in the railway sector: making stakeholders aware of opportunities and incorporating space in the standardisation activities for railways
- Dissemination of railway needs in the space sector: orienting the developments in order to support the growth of railway transport ensuring economically viable migration
We make the railway system work better for society