European Railway Agency

Satellite services for a modern EU railway system

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Overview

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****

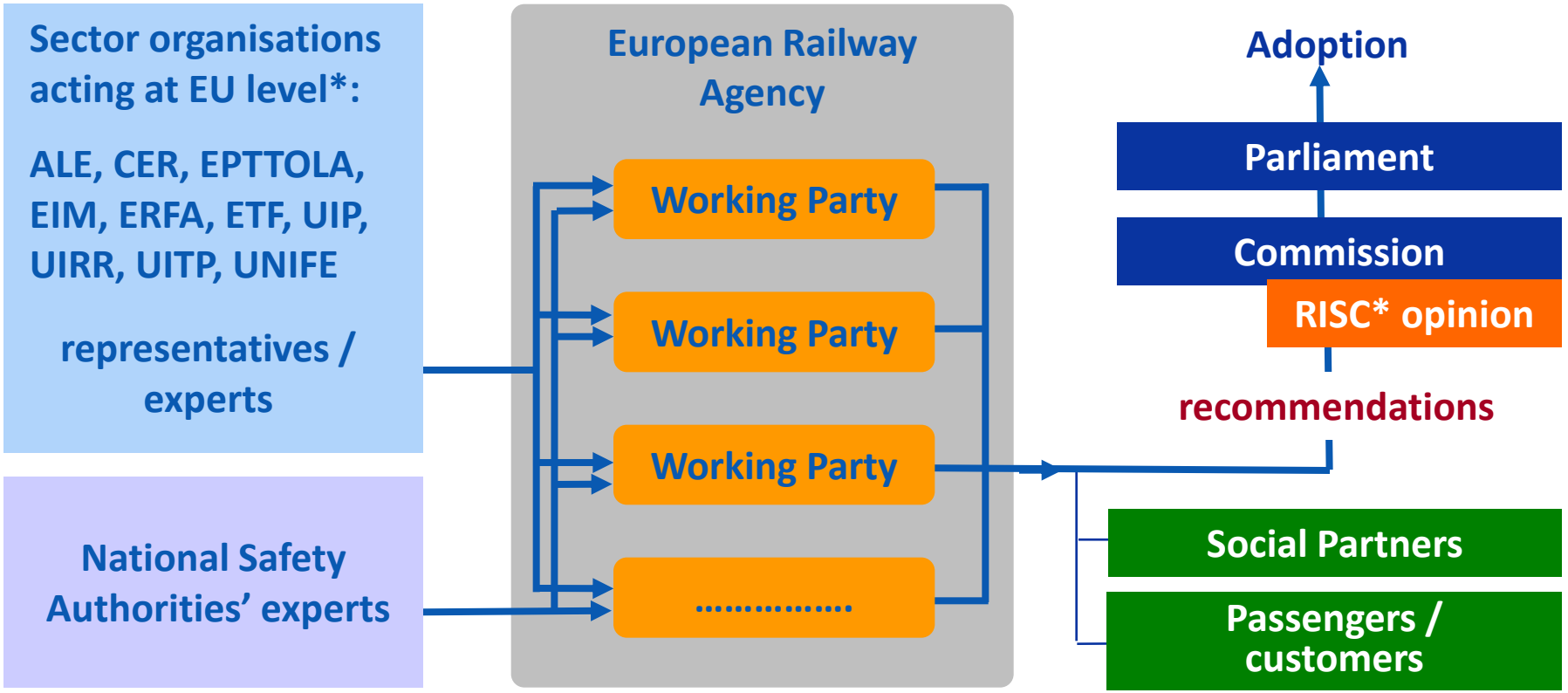
Founded by Regulation (EC) 881/2004

EU objective	ERA contribution
Creation of the Single European Railway Area	• **"the only place where all the actors meet"** • EU harmonised technical rules/procedures • Full Set of TSIs* • Extend the scope of the TSIs
Effective enforcement of EU-legislation across all Member States *MS to implement existing directives and remove inconsistent tools!*	• 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)

Process for production and adoption of ERA recommendations



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

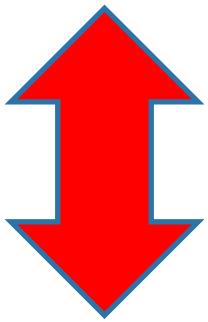
* Railway Interoperability and Safety Committee (Member States)

Challenges for the railways of the future

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
- ✓ …

EU wide coverage of technical systems

parameters

- ✓ …
- ✓ Track gauge
- ✓ Power system
- ✓ …
- ✓ Train localisation
- ✓ Ground – train communication
- ✓ …
- ✓ Operational rules
- ✓ …

railway functions

- ✓ Tracking of wagons and freight
- ✓ Support for safe management of traffic
- ✓ Voice communication between operators
- ✓ 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

Activities

- ✓ **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