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Factsheets

A UNIQUE SIGNALLING SYSTEM FOR EUROPE

THE LONG JOURNEY TO AN INTEROPERABLE RAILWAY SYSTEM

As early as the 1990s, the European Rail Industry, with the backing of the EU Institutions, embarked into the creation of a common signalling system for Europe. Over time, ERTMS emerged as one of the most successful European industrial projects and is now on its way to making rail transport a more competitive transport mode.

Why is the concept of interoperability of railway systems important for Europe?

Today, rail transportation, as the lowest CO2-emmission mode of transport, emerges as a key alternative to road and air transport, both in terms of passenger and freight. Consequently, improving its competitiveness became a priority for European decision-makers as it is necessary to reduce CO2 emissions and help fight climate change.

Rail transport, however, suffers from several factors arising from its own historical development and its inherent nature that hamper the competitiveness of the sector by making cross-border traffic complex and difficult to manage. Among these, for example, the differences in gauges, electrification systems or administrative procedures, that make it difficult for trains to run internationally while increasing operation costs. As a result, the competitiveness of rail transport is hampered while other modes of transport such as road and air do not face similar barriers.

What are the problems met in terms of signalling?

The existence of more than 20 signalling systems in Europe is a major obstacle to international rail transport. Indeed, each country and/or supplier tended to develop its own signalling system in the past, which resulted in a variety of systems in Europe – and sometimes even in one single country. Needless to say, all these systems were not interoperable.

Each train used by a national rail company has to be equipped with at least one system (sometimes more) just to be able to run safely within that one country, not to mention pan-European corridors. This is costly and significantly increases the technical and operational complexity of train sets.

For example, Thalys trains running between Paris, Brussels, Cologne and Amsterdam have to be equipped with 7 different types of train control systems. Various factors, including the constraints of having different onboard systems present and the "non-standard" character of train sets produced in a small series for a specific route, push up the costs of each train set by as much as 60%. Additionally, the driver's cab must have a screen for each respective signalling system, which has an impact not only on costs but also on the ergonomics of the Driver Machine Interface.

How can ERTMS provide an answer?

As a unique signalling system for Europe, ERTMS has been designed to be fully interoperable across the EU. This means that any train equipped with ERTMS may run on any line, as long as the trackside equipment is also fitted with ERTMS.

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What is the exact meaning of "interoperability" when ERTMS comes into play?

The meaning of "interoperability" is two-fold:

- On the one hand, interoperability refers to a geographical interoperability between countries and projects: a train fitted with ERTMS may run on any other ERTMS-equipped line;
- On the other hand, it also refers to a technical notion of "interoperability between suppliers": a train fitted by a given supplier will be able to run on any other trackside infrastructure installed by another supplier. This opens the supply market and increases competition within the industry.

How does ERTMS ensure that interoperability is reached?

The ERTMS specifications are developed by the European Rail Agency (ERA) - which acts as "system authority" for ERTMS – jointly with the suppliers (gathered in UNISIG) and the railway organisations. Once adopted, the technical specifications, which are publicly available, have to be enforced by the suppliers and railway undertakings, thereby ensuring a uniform implementation across Europe.

The current version of the specification is known as "2.3.0d", whilst the next version, which will include additional functionalities, will be called "baseline 3".

Are there already examples of cross-border lines using ERTMS?

Yes. The Vienna-Budapest line is running with ERTMS since 2003. In June 2009, a new ERTMS (Level 2) High Speed Line was opened in Belgium between Liege and the German border, whilst the Thalys is running with ERTMS from Amsterdam (Netherlands) to Antwerp (Belgium).

In the future, cross-border connections will multiply as investments are gradually being coordinated on the ERTMS corridors with the support of the European Commission. A dedicated European deployment plan was adopted in July 2009 to ensure that EU countries equip their network in the same timeframe – this plan covers more than 25,000 km of pan-European corridors and specific railway lines which will have to be equipped with ERTMS by 2020.

Can ERTMS alone ensure that interoperability is reached?

No – as explained above, there are additional possible hindrances to interoperability. While the differences in tracks gauges or electrification systems are all overcome through technology (gauge-changing bogies, multi-system propulsion, etc.), operational requirements and rules need further harmonisation to facilitate cross-border traffic – a complex issue on which the ERA and the European institutions are continuously working.

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