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The 12th UIC ERTMS World Conference, organised with Infrabel, the Belgian Rail Infrastructure Manager, successfully brought together 700 participants from 30 countries and 22 exhibitors

"ERTMS – Managing long term safety investment in a rapidly changing world": the future of ERTMS is global and its developments must be based on discipline, stability and transparency

(Paris, 4 March 2016) During the two-day conference, the 12th UIC ERTMS World conference, organised by the International Union of Railways (UIC) and Infrabel, the Belgian Rail Infrastructure Manager, brought together all the actors involved in the business of ERTMS from around the world. Many participants came from the EU and the political sphere as well as the railways and the supply industry. Around 700 delegates attended discussions organised around seven sessions. They also participated in technical visits and benefited from the latest industry developments by visiting the exhibition area at Square – Brussels Meeting Centre, conveniently located near Brussels Central Station.

The themes of the sessions included:

- **Managing long term safety investment in a rapidly changing world (opening)**
- **Long term vision on Safety, Security and Testing**
- **Migration**
- **Global Opportunities and Challenges**
- **Telecom**
- **Financing and Asset Management**
- **Operations**
- **Evolution**

Through presentations delivered by speakers and a series of interesting Q/A with the audience, the conference served as an occasion to answer the question "*Will ERTMS meet the challenges of long-term safety requirements in a rapidly changing world?*"

During the Closing Session, speakers summarised the key challenges that ERTMS has to face in the shape of three key words: discipline, stability and transparency.

After this successful 12th UIC ERTMS Conference, participants could say: "Yes, ERTMS will meet the future challenges", as long as it will be able to:

-Stabilise functionalities.
-Manage the short lifetime of digital components versus the far longer lifetime of typical railway components.
-Adapt its functionalities and technological standards to non-European countries, especially in the case of Brownfield Installation.
-Demonstrate the safety and mathematical dimension, master the complexity of the systems; be able to demonstrate in a formal way the safety properties and the functional properties in a given framework of postulates.

-Demonstrate security against all possible cyber attacks, taking into account the probability of an attack as well as its potential consequences, depending on its acceptable or unacceptable dimension; so either eradicate the risk or prove that it is unacceptable.

-Master the costs; we can already observe different ETCS specific applications for different case studies, types of lines or sub networks/very high density lines with fallback ATP systems, regional lines with lack of radio coverage and/or without balises, conventional lines, etc. The system shall be further developed so as to provide suitable solutions to all the current and future demands, whilst maintaining the required internal consistency and to encourage large scale installations and finally benefit from economies of scale.

-Encourage and foster synergy and collaboration between suppliers and stakeholders, especially for managing functional aspects to be able to facilitate the deployment and the maintenance of the ETCS system. Infrastructure managers are not only "service providers" but also "infrastructure managers" responsible for the whole railway system.

The future of ERTMS is influenced by four main dimensions or factors.

1) The geographical dimension

ERTMS should no longer be considered as a European unified system, we have to make the shift to a Global RTMS or GRTMS.

The concept and the products are open and available on the world market. In this respect, emphasis was also placed on the increased requirements concerning interfaces to the existing train management systems and existing signalling systems (such as interlocking); it is essential to maintain coherence and an overall vision of the rail system (with all its interfaces).

2) The functional dimension

The rail operating sector (in Europe or elsewhere) has to clearly define its Functional Requirements, FRS, in the shape of IRS to be managed by UIC, with different sub-parts specially dedicated to the various regions. UIC is already working in this direction, via a project that we call "ERTMS Global".

But train control is not enough. ERTMS will also have to deal more closely with traffic management, regulation of train flow and anticipation of the impact of decisions of train dispatchers with regard to operation, running timetables, energy saving, positioning, etc.

Information gained from ETCS, with the support of artificial intelligence and digitalisation, must support an overall rail system vision and not only block and speed control. Business is the new driver. The terms of transport contracts are related to the type of transport, the wear and tear of infrastructure and costs for the slot, energy consumption, wear and tear of rolling stock, quality level targets and safety level targets. Each train has its own objectives; optimisation takes place through the NASH System.

3) Technological evolutions

The third dimension is technical progress. The functions of ERTMS must be independent from the evolution of the HW platform and radio telecommunication technologies.

The ERTMS radio protocol in turn has to be secured and closer attention must be paid to enhance resilience against cyber attacks, especially when looking at the future communications that will be based on IP (Internet Protocol), with no exceptions.

A current challenge with rapidly increasing importance is integrating cyber security into the requirements of ERTMS in order to protect the system from hackers who try to enter the system. On regional lines, the system also has to ensure full reliability and safety despite the potential lower requirements of radio communications and possible "holes" in the radio coverage.

An exciting evolution is the integration of satellite positioning for the operation at levels 2 or 3, in particular for lines in "hostile" areas (theft, vandalism) or very long and remote regional lines where cost saving allowed by removing beacons (and their maintenance!) is a primary enabler for the installation of the line. In this context it would be beneficial to review Functional Requirements of ETCS level 2 and 3 with Satellite Location (SATLOC).

Considering the growing economic constraints, technological evolution and progress have to strongly focus on the cost aspects, the time for return on investment, the simplification of systems and, more generally, their cost reduction.

4) Methodological aspects

The last aspects to be addressed relate to the methodology used for system development. In order to answer new Functional Requirements as well as for safety or security reasons, the ERTMS system of tomorrow will integrate new complexities, and will therefore need new working methods, new procedures for the validation and the management of changes and evolutions, which are resistant to potential human mistakes and misinterpretations.

There are also specific needs in terms of defining the Functional Requirements at the interfaces between ERTMS and non-ERTMS rail system components (such as the interface between the interlocking and the ERTMS Radio Block Centre).

ERTMS is definitely a complex system and UIC welcomes the decision of the European Commission to reduce its versions and to push for an upgrade of onboard systems to the new release, so as to limit the combinations, reduce installation costs and make future updates easier.

In a speech thanking the organisers and delegates for their participation, Jean-Pierre Loubinoux, UIC Director General, sincerely thanked Infrabel, the Belgian Rail Infrastructure Manager, Mr Luc Lallemand for having wonderfully and successfully hosted the conference and all members of the Infrabel team for their strong commitment to the success of the event, the Organising Committee including the industry representatives as well as the UIC organisation team.

He said: *"UIC organises between 60 and 80 conferences or workshops like this every year. So for me it is an immense pleasure to see the added value of UIC through the number of participants, in quality and quantity, the level of the discussions and the spirit of conviviality among all of us. This 12th ERTMS Conference is a dream come true"*.

Presentations will available soon on the 12th ERTMS Conference website: http://www.ertms-conference2016.com/Presentations

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