

The ERTMS Newsletter

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Did you know: ERTMS deployment on-board

To ensure a successful deployment of the ERTMS system, a well-coordinated strategy between trackside and on-board components is crucial. The complete benefits of the ERTMS deployment can only be realized once the entire fleet is equipped accordingly. Therefore, it is necessary to estimate the total number of vehicles that are in operation, and those that should be equipped.

Based on available data up until March 2023, it is projected that a total of 21 744 vehicles will be equipped with an interoperable ETCS version by 2030. Out of this projected number, 7 539 vehicles have already been equipped with ETCS. Additionally, 1 246 vehicles were initially planned to be equipped with ETCS by 2022, but no confirmation has been received regarding their actual commissioning. 4 947 vehicles are currently under contract for ETCS installation, while 8 012 vehicles are planned to be equipped in future, pending the signing of contracts between the supplier and the owner. See [Error! Reference source not found.](#) for a full overview.

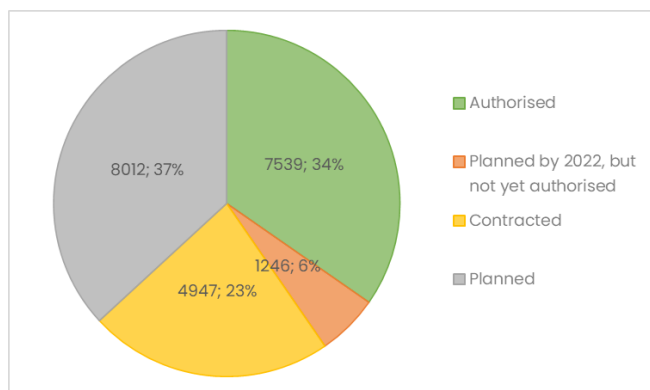


Figure 1 - ETCS on-board deployment status on vehicles expected to be equipped by 2030

On-board deployment in the years to come

As mentioned in the introduction, a total of 21 744 vehicles will be equipped with ETCS by 2030. Taking a closer look, over the next four years (from 2023 to 2026), an average of 1 001 vehicles per year will be equipped with ETCS, totalling 4 004 vehicles. Out of this figure, by 2026, 1 298 new vehicles will be equipped, 2 537 vehicles will be retrofitted, and for the remaining 169 vehicles, the specific update type is unspecified. If we consider the period from 2023 to 2030, the average (all types of deployment) increases to 1 089 vehicles per year (totalling 8 711 vehicles).

Furthermore, there are 4 258 vehicles anticipated to be operational with ETCS in the future years; however, the exact commissioning dates for these vehicles are not specified in the available sources. If these vehicles are indeed operational by 2030, an average of 1 621 vehicles per year will be equipped with an interoperable ETCS version between 2023 and 2030, amounting to a total of 12 969 vehicles.

The 12 969 vehicles that should be equipped with an interoperable version from 2023 to 2030 are comprised of 3 606 new vehicles, 5 317 retrofitted vehicles, 143 OBU updated from pre-baseline 2, and 3 903 vehicles planned

but without information specifying whether they are new, retrofitted, or updated. The increased number of vehicles expected to be equipped with ERTMS compared to the figures indicated in the Work Plan is primarily due to Italy's onboard ERTMS strategy, as **Italy plans to equip 3 800 vehicles by 2028. More can be read about the Italian deployment plan in the next part of the newsletter.**

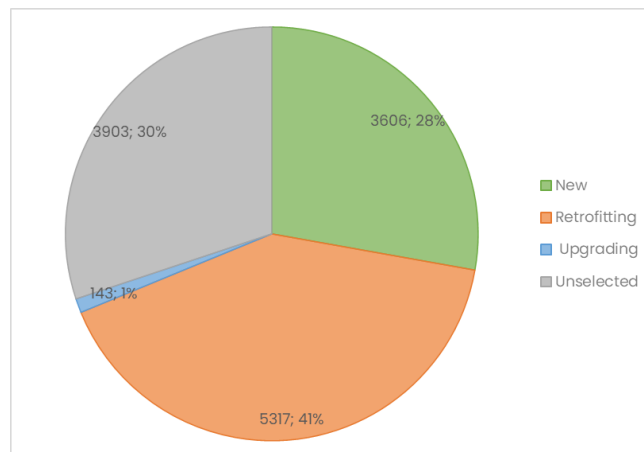


Figure 2: Type of works in vehicles. Period between 2023 – 2030 (including vehicles categorised as "No Date")

Retrofit/upgrade in the coming years

Regarding retrofitting/upgrading, the deployment progress is on track to meet a target of 6 531 vehicles by 2030 as according to our database, 5 460 vehicles are expected to be retrofitted/upgraded from 2023 to 2030. However, concerning the fleet renewal and installation of new rolling stock, the deployment rate is currently below the target. There is also a discrepancy between the number of vehicles that should ideally be renewed between 2023 and 2030 (between 12 323 and 16 437 vehicles) and the forecasted number of new vehicles (3 606 vehicles). Nevertheless, our database indicates that there are 3 929 vehicles planned, although without specifying whether they are new, retrofitted, or upgraded.

The timeframe depicted in Figure 3, covering the period from 2031 to 2040, includes vehicles expected to be operational within that period. Based on the available information, a total of 89 vehicles are anticipated to be in operation during this timeframe. Specifically, Greece plans to equip 26 vehicles by 2032, while Finland plans to have 63 vehicles equipped by 2034. Therefore, a total of 14 287 vehicles will be equipped with ERTMS between 2023 and 2040, including the vehicles categorized as "No Date" in Figure 3.

Furthermore, in addition to the vehicles presented in Figure 3, there are 799 already equipped vehicles that will be transitioning to Baseline 3 in the coming years. Out of these, 483 vehicles are scheduled for migration by 2023, 163 vehicles by 2024, 11 vehicles by 2026, 65 vehicles by 2027, and 77 vehicles have no specific migration date according to the available sources. Among these vehicles, 439 are currently equipped with Baseline 2, while information regarding the current baseline is not available for the

remaining 360 vehicles that are slated for migration to Baseline 3.

Based on the data collected, Italy has the highest number of vehicles planned to be equipped with ETCS in the coming years, with a total of 3 766 vehicles. More information on the Italian deployment plans can be found in the interview below.

Error! Reference source not found.4 presents the planned vehicles to be equipped with ETCS in the respective countries. It is important to note that if a vehicle is intended to operate in multiple countries, it is counted in each concerned country. Hence, the total number of vehicles in **Error! Reference source not found.4** is higher than in **Error! Reference source not found.3**.

No information regarding plans to equip the fleets of Ireland and Lithuania with ETCS has been found in the gathered

sources. Regarding Latvia, the National Implementation Plan (NIP) includes provisions for equipping trains with ETCS; however, it does not specify a specific plan in terms of the number of vehicles planned for ERTMS installation or set any deadlines. As a result, there are no vehicles planned for Ireland, Lithuania, and Latvia in **Error! Reference source not found.4**.

Clustering by type of works in vehicles (see Figure 5), among additional equipped vehicles planned in the coming years (2023-2040), 3 606 will be new vehicles (28%), 5 380 vehicles will be retrofitted (41%) and 143 vehicles (1%) will be upgraded, but the current ETCS Baseline of these vehicles is not specified in the available sources. Regarding the remaining 3 929 vehicles (30%), there is no information on the type of work envisaged.

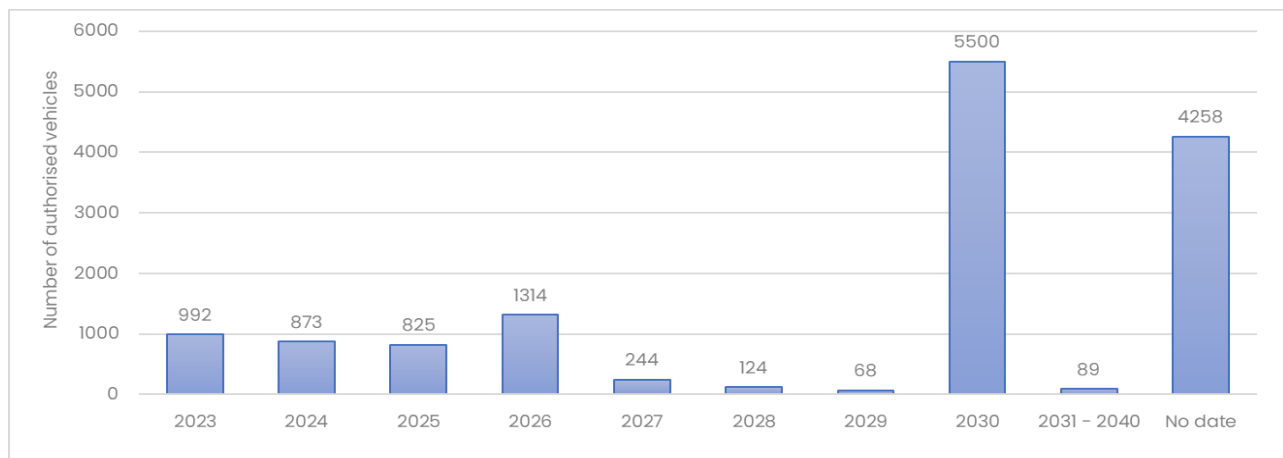


Figure 3 - Number of additional interoperable vehicles planned per year

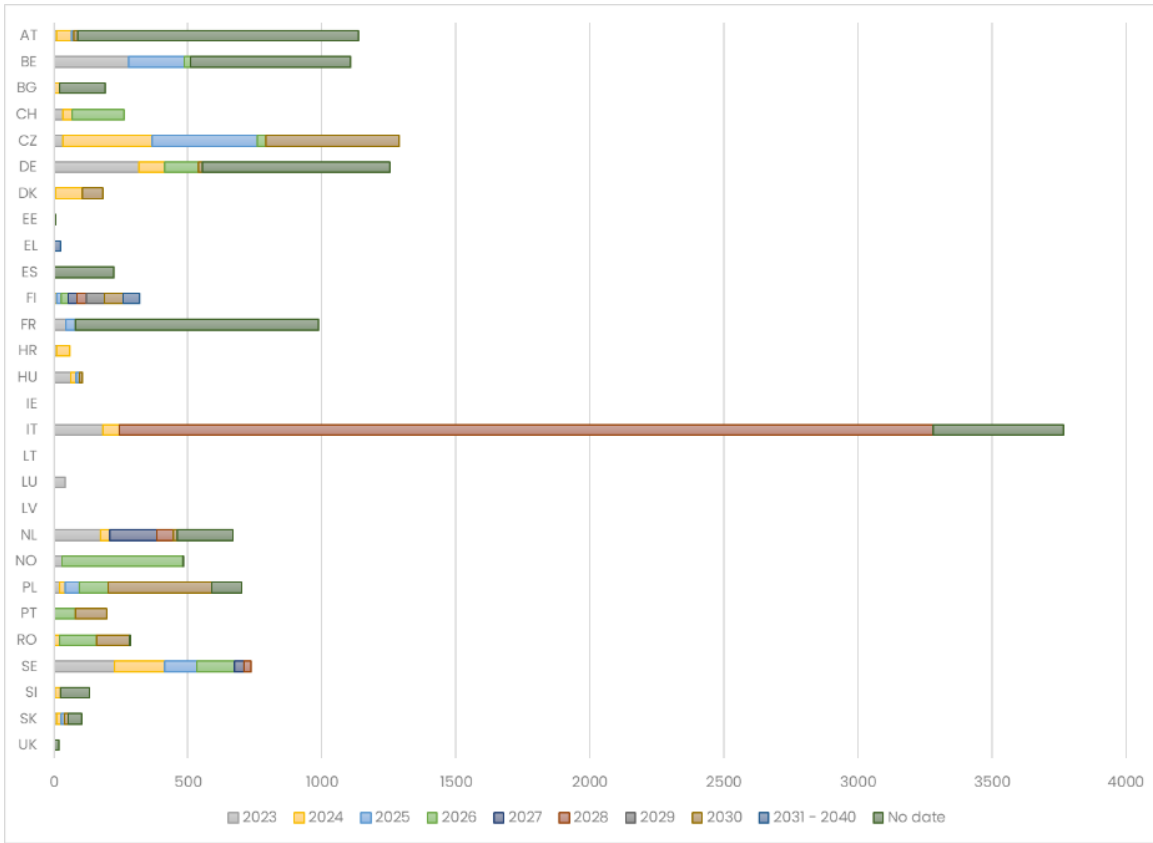


Figure 4: Number of additional interoperable vehicles by year in each Member State

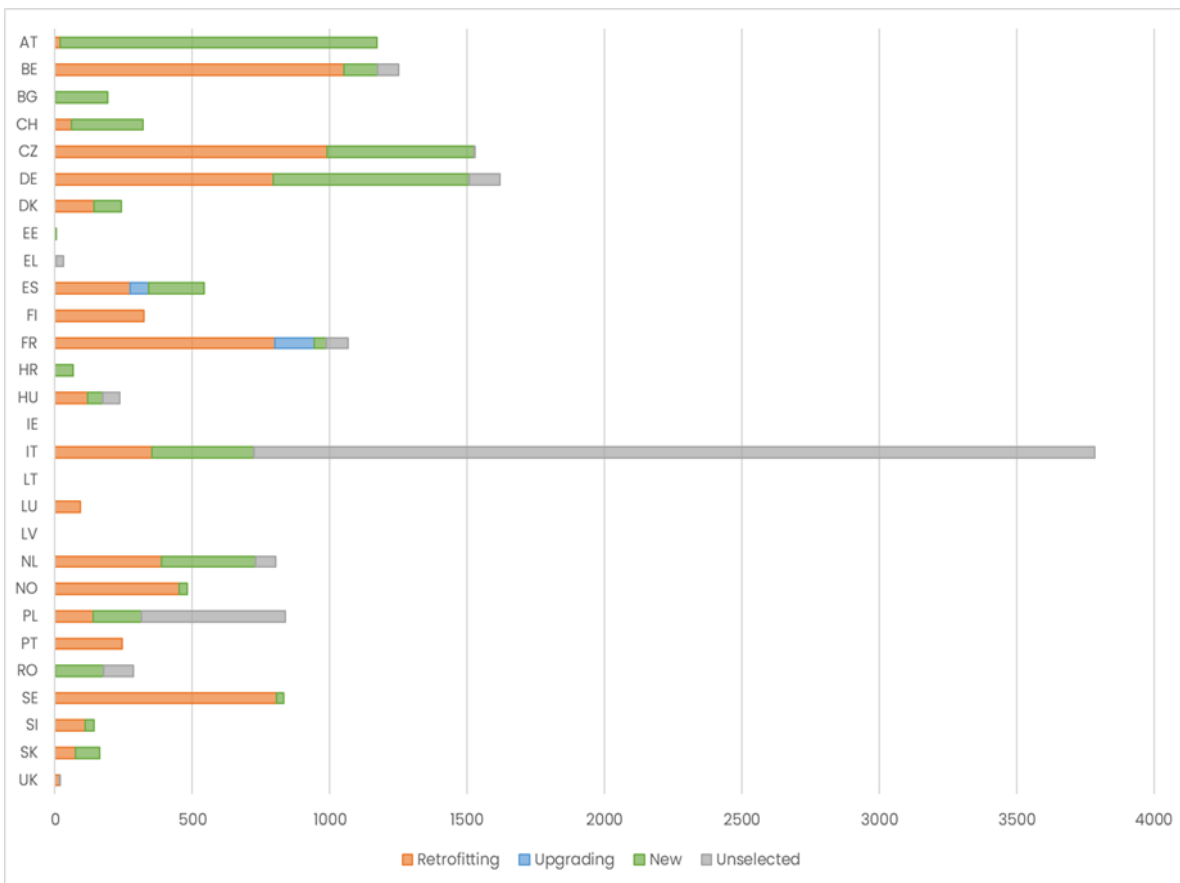


Figure 5: Type of work in vehicles in each Member State

In the spotlight: Interview with Mr. Fabio Senesi – Director at Rete Ferroviaria Italiana (RFI)

Rete Ferroviaria Italiana (RFI) is the Italian railway infrastructure manager, subsidiary of Ferrovie dello Stato (FS), a state-owned holding company. RFI ensures the different areas of the country are connected, safely managing railway travel and keeping infrastructure with its complex network of lines and stations in full working order.

1. ERTMS and ETCS are being implemented in Italy since 2005. How has the implementation progressed over the years?

Since 2005, we have made significant progress in implementing the European Rail Traffic Management System (ERTMS) and the European Train Control System (ETCS) in Italy. We faced a crucial decision back then in 2002: either adopting the French signalling system to enable trains to reach speeds of 300 km/h or becoming the first to utilise the new baseline of ERTMS. We took the bold step of choosing the new ERTMS baseline, conducting a test on the first high-speed line in our country.

In 2005, we opened the first high-speed line Rome - Naples and, in 2006, we were thrilled to receive a special award for the railway research paper of the year at the 7th World Congress on Railway Research (WCRR) in Montréal, as part of the Safety and Security, Train Control Technology section. Encouraged by this success, we embarked on the ERTMS journey to equip our entire high-speed network. The implementation progressed as follows:

- Torino–Milano: 2006
- Bologna–Milano: 2008
- Bologna–Firenze: 2009
- Brescia–Milano: 2016

Over the past 3 years, we have also undertaken the decommissioning of the class B signalling system on the challenging Firenze-Roma line. This accomplishment is significant, as decommissioning is a vital part of our acceleration program. With approximately 300 trains operating on the 250 km of Firenze-Roma section every day, the successful decommissioning of the old system demonstrates our dedication to progress.

We have continued to invest in projects to equip more high-speed lines with ERTMS level 2. Notably, the next investments in Milano–Genova, Palermo–Catania and Napoli–Bari exemplify our ongoing efforts. As a result, all high-speed lines across our network will be equipped with ERTMS level 2.

Furthermore, we are proud to have ensured a competition between railway undertakings as we have two railway companies, Italo and Trenitalia, competing for business using ERTMS level 2. This competition began in 2010, and both companies exclusively rely on level 2 signalling. In addition to the mentioned accomplishments, the Italian trains brand Frecciarossa, operating trains equipped with ETCS, has expanded beyond Italy and now serves Spain and

France. Trenitalia has also ventured into the United Kingdom with ERTMS-equipped trains.

2. What challenges has RFI encountered during the implementation of ERTMS in Italy? How have these challenges been addressed? How will Italy deal with the multitude of ESC tests?

During the implementation of ERTMS in Italy, we encountered several challenges that required careful consideration and effective solutions. One of the significant challenges we faced was the transformation of people's mindset. Transitioning from traditional light signals to a digital network capable of supporting speeds of up to 300 km/h was a substantial shift. It required our workforce to understand the new system and dedicate time to learn its intricacies while simultaneously performing their day-to-day duties.

Another challenge we encountered was related to maintenance. Maintaining a completely different system posed difficulties. Attracting and retaining the right talent especially when it comes to specialised professionals proved to be challenging. Fortunately, in the context of high-speed lines, it was relatively easy as it involved greenfield projects with a fresh start.

However, our current and ongoing challenge lies in transferring this digitalisation to conventional lines where we aim to transform the role and responsibilities of local drivers. The coexistence of the old signalling system and the new ERTMS system presents difficulties that require assistance and guidance for the individuals involved. We understand that people need support as they navigate this transitional period, and we are committed to providing the necessary help and guidance.

Another key factor is the adoption of a multi-technological approach on the new CCS. This approach encompasses various technologies, including ETCS, Digital Interlocking (IXL), Global System for Mobile Communications - Railway (GSM-R), and Train Management System (TMS), among others. We have been applying this comprehensive approach also in our latest investments, benefiting from our extensive experience in high-speed rail.

Finally, the simplification of the ESC Type is currently a significant challenge that we are actively addressing. To consolidate the hazard analysis process, we have established a common table in collaboration with suppliers. Additionally, RFI laboratories have made significant progress in this area. We have dedicated a test track of 6 km near

Bologna where we install ERTMS. These measures collectively contribute to reducing the complexity associated with ESC Type and ensuring a more streamlined and efficient certification process.

3. RFI has developed an accelerated national plan to implement ERTMS on the complete railway network by 2036, not only on high-speed and high-capacity tracks but also on regional tracks linked with decommissioning of class B systems. Can you further elaborate on the implementation plan and on how you plan to achieve this objective? What are the opportunities that you have identified? And how is it being funded?

We have developed an accelerated national plan to implement ERTMS on the complete railway network in Italy by 2036 (see **Error! Reference source not found.** and annex for a higher resolution version), including not only high-speed and high-capacity tracks but also regional tracks. Our National Safety Agency (NSA) is continuously raising safety standards and we believe that the answer to NSA's concerns is ERTMS level 2 introduced in all lines.

In 2018, we conducted a cost-benefit analysis that demonstrated that the accelerated plan would save us approximately 3 billion euros compared to other alternatives. The opportunity presented itself during the pandemic with the introduction of the recovery fund, which provides us with a significant opportunity to finance part of the accelerated plan. We have already awarded and begun work on two major tenders.

The total budget required for implementing ERTMS on the entire 16,000 km network is 13 billion euros. While 3 billion euros will come from the recovery fund (Recovery and Resilience Facility), we still need to secure the additional funding beyond 2026 (remaining € 10 bn). To address this, we propose integrating the ERTMS program into our company's safety strategy. This involves incorporating ERTMS as part of the safety budget, where the infrastructure manager requests a specific amount of money for safety-related initiatives from the Member State on an annual basis. This approach allows us to allocate funds for extraordinary maintenance, address safety concerns such as level crossings, improve safety in various aspects, including manual switches, and introduce features like release speed onboard. By aligning ERTMS implementation with the safety strategy, we can effectively secure the necessary financial resources for its successful deployment. Nevertheless, continuity of investments and budget stability remains a challenge and a crucial part of securing the deployment.

Related to the recovery funds, the government has set KPIs, and by 2026, we aim to have implemented ERTMS on 3,400 km of tracks. However, around 600 km pose a risk due to delays in construction works and the authorisation system acting as a bottleneck.

The groundwork we laid in the past with the introduction of class B and GSM-R technologies benefits our accelerated plan. We already have on-board equipment, such as the Balise Transmission Module (BTM) technology, which allows us to leverage existing technological credits. We are able to reduce the complexity of the onboard units by building upon the class B system and upgrading it accordingly.

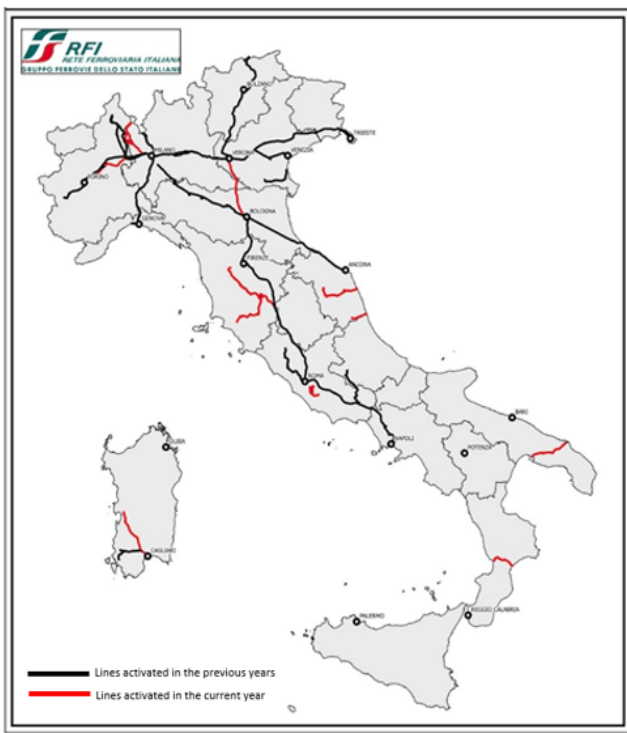
The main challenges to be addressed are material lead time and concerns about speculation.

Regarding the supply market for ETCS, we acknowledge that it is quite oligarchic, with only five or six companies dominating the industry. Recent acquisitions, such as Thales by Hitachi and Bombardier by Alstom, have further consolidated the market. However, we have taken steps to open the market to new entrants, such as Mermec and Progress Rail, who are developing ERTMS technology but have not yet entered into service.

We hope that the EU-Rail Joint Undertaking (System Pillar) for Innovation in the Railway System will enhance interface openness on CCS, allowing for more flexibility and modularity within the system. We strongly highlight the importance of **system version management**. When a new baseline or version of ERTMS is introduced, it may have certain improvements, additional features, or enhanced functionalities compared to the previous version. However, it is essential to ensure compatibility and interoperability between trains equipped with older versions of ERTMS of the system and the new version deployed on the trackside. System version management allows for the smooth transition and coexistence of different ERTMS versions. It enables the migration of trains operating with older system baselines to the new baseline without disrupting the overall railway operations. This approach ensures that the investment in existing onboard equipment is protected while still allowing for the deployment and advancement of the latest ERTMS technology. It also provides an incentive for operators to adopt newer versions of ERTMS, as they can continue operating on tracks with varying system versions, avoiding obsolescence and promoting compatibility across the network. We believe that the absence of system version management has pushed several countries to crystallise their technologies: there is no incentive to buy new technology and the main objective is to protect the assets (trains).

Finally, it would be beneficial if ERA and DG MOVE would provide a Support Vector Machine (SVM) for ERTMS application, similar to the one implemented in the telecommunications industry.

Accelerated plan ERTMS 2023



Accelerated plan ERTMS 2026



Accelerated plan ERTMS 2030



Accelerated plan ERTMS 2035



Figure 6 - ERTMS deployment plans until 2035¹

¹ The conventional line Verona-Fortezza has been contracted in 2019 and is planned to be put in operation by 2026. The conventional line Fortezza–border Italy/Austria has been contracted but not yet in operation and the new line Fortezza–border Italy/Austria is planned by 2028. The line Verona–border Italy/Slovenia is neither contracted nor in operation and it is planned to be commissioned with ERTMS by 2025.

4. RFI has opted for the dual onboard strategy. Can you share some insights on the Italian retrofit strategy for the circulating fleet? How do you want to tackle the challenge of the first in class?

We transitioned from dual trackside (ERTMS + Class B system) to dual on-board strategy, which means to process in parallel:

- The ERTMS trackside deployment.
- The upgrading from Class B to ERTMS + Specific transmission module (STM) of 100 type of vehicle by RFI.
- The decommissioning of Class B.
- The upgrade/retrofit of the whole operating fleets (5000 units in 3800 vehicles).

To make an informed decision, we conducted extensive consultations with railway undertakings. We started from regions like Sicily and Sardinia, where the fleet size is relatively small.

We also drew insights from the Galileo project, which involved a substantial investment in satellite technology. Interestingly, despite the significant resources dedicated to Galileo's infrastructure, there was limited interest in utilising the system. This highlighted the importance of not only focusing on the infrastructure itself but also considering the necessary components for effective utilisation.

In our Italian retrofit strategy, we have carefully considered both synchronization and cost-effectiveness. By taking a comprehensive approach, we aim to ensure that the retrofitting process aligns with the specific requirements of each train type and optimises the use of resources.

5. Could you please provide details on the challenges and implications related to the lack of interoperability when the on-board signalling supplier does not coincide with the vehicle manufacturer? How does this impact the overall costs and time required for carrying out the works? Does RFI have any strategy to mitigate these challenges or see any solutions at European level?

When the onboard signalling supplier and the rolling stock manufacturer are different entities, it presents a significant challenge and has implications for interoperability.

It is worth noting that many train manufacturing companies are also involved in producing CCS systems. However, the lack of collaboration and coordination between the commercial teams of onboard and trackside components, even within the same company, adds to the challenge. In order to overcome these issues, a political industrial strategy is necessary at EU level, bringing together the actors involved in both onboard and trackside components.

We have also faced instances where for example the lack of agreement between Siemens, the rolling stock owner, and Alstom, the CCS supplier, has led to a deadlock in reaching agreements for four types of trains. The proposed costs

from these companies have been deemed unreasonably high, hindering progress in those cases.

Additionally, organisations such as UNISIG and UNIFE need to work together rather than engaging in conflicts. Finding a resolution requires collaboration and coordination between all stakeholders at the European level.

6. How does RFI collaborate with other stakeholders (both national and European level), such as train operators and rolling stock manufacturers, to ensure a smooth and coordinated ERTMS implementation? How is the cooperation and coordination with neighbouring countries?

To ensure a smooth and coordinated implementation of ERTMS, we have established a round table at the national level. This collaborative platform brings together various stakeholders, including train operators and rolling stock manufacturers, with the primary objective of facilitating the circulation of trains on the national railway network.

Concerning international cooperation, we have signed memorandums of understanding (MoUs) with each cross-border country with the aim to foster an integrated approach to ERTMS implementation.

Finally, we are part of the ERTMS user group, which allows us to engage with other stakeholders from different countries and exchange knowledge, experiences, and best practices related to ERTMS implementation.

7. Can you elaborate on any ongoing research, development, or innovation projects related to ERTMS in Italy? How does RFI stay updated with the latest advancements in ERTMS technology?

We actively engage in various research, development, and innovation projects related to ERTMS in Italy. One area where we hold leadership in Europe is the utilisation of satellite technology for ERTMS. We have been involved in satellite applications since 2012, particularly within the framework of the Horizon 2020 innovation program. However, until ERA provides a new Technical Specification for Interoperability (TSI), we are unable to deploy satellite-based ERTMS in Italy.

Ansaldo, now Hitachi, has successfully implemented satellite-based ERTMS in Australia, but its introduction in Italy is still pending. It is unfortunate that the EU, as a continent, is lagging behind in adopting satellite-based ERTMS. The process of translating innovative solutions into regulatory norms has been slow, and this impacts the progress of ERTMS technology.

Furthermore, while 5G technology is already outdated and 6G technology has emerged, the railway industry is still reliant on 2G technology due to the absence of alternative solutions.

8. How does RFI see the migration towards Future Railway Mobile Communication System (FRMCS)?

We are carefully observing the migration towards FRMCS. If ERA releases a new TSI for FRMCS, we can consider incorporating FRMCS requirements in our future tenders. However, if the TSI is not available, we will need to wait for its release before moving forward. Our approach in Italy is to prepare our trains with the minimum prerequisites to easily transition to innovative technologies. In this case, the minimum requirement would be Baseline 3 Level 2. This is the basis to jump tomorrow in the next generation of ERTMS (by a dynamic SVM, etc.).

Once FRMCS becomes available, we will assess its capabilities and determine if its modularisation provides

sufficient flexibility for implementation. Germany holds a strategic position in the European railway landscape, and their engagement and commitment to FRMCS will play a crucial role in its successful adoption and implementation.

9. How could the role of the Commission, ERA or EU-Rail be enhanced in your opinion?

We believe that there is the need to establish a dedicated agency specifically focused on ERTMS at EU level, with the financial power and resources to ensure a coordinated EU approach trackside and on-board and to facilitate cooperation among Member States.

Latest developments

Disclaimer

All articles included in this section were sourced from publicly available websites covering the period of March – May 2023.

Authorship of all articles remains with the individual publishers, in case of quotations the original authors of the individual news items should be quoted as source.

The Deployment Management Team and the European Commission do not take any responsibility for the correctness of the information provided.

European Institutions – ERA and SNCB celebrate 50,000 authorised vehicles in the EU

May 2023

The European Union Railway Agency (ERA) and the Belgian National Railway Company (SNCB) recently celebrated an important milestone in the implementation of the 4th railway package, with the delivery of more than 50,000 vehicle authorisations at European level. This major step forward has created the Single European Railway Area and facilitated cross-border rail traffic.

Since June 2019, the ERA has been responsible for issuing vehicle authorisations valid in all EU Member States, a process that has proven to have a positive impact on cross-border rail traffic and on the implementation of ERTMS. SNCB is the operator of the 50,000th vehicle authorised by ERA.

The implementation of the European Union's technical pillar aims to simplify and streamline the process of authorising new or modified railway vehicles to operate on the EU rail network. The implementation creates a "one-stop shop" IT tool that serves as a single-entry point for all applications, thus reducing the number of multiple and costly applications required for vehicle authorisations and safety certificates for operations beyond a single Member State.

It also ensures the interoperability of European Rail Traffic Management System equipment and reduces the large number of national rules, thus mitigating the risk of lack of transparency and discrimination against new railway undertakings. The authorisation process aims to provide reasonable assurance that all entities involved in the design, manufacture, verification and validation of the vehicle have fulfilled their obligations and responsibilities to ensure the safe operation of the vehicle.

ERA is currently the main authorisation body for railway vehicles in the EU, with a share of almost 60% of all applications. The authorisations issued mainly concern wagons (83%), but also trainsets and coaches (11%), locomotives (6%) and special vehicles (0.2%). Approximately 54% of the authorisations processed by ERA concern railway vehicles operating throughout the EU, 27% concern more than one Member State and 19% concern a single Member State. **The issuing of vehicle authorisations by ERA has a direct impact on cross-border traffic and on the implementation of ERTMS, thus contributing to the creation of a more efficient and harmonious single European railway area.** Source: <https://www.railtech.be/fr/materiel-roulant/2023/05/04/era-et-sncb-celebrent-50-000-vehicules-autorises-dans-lue/>

Belgium - Major contract for Alstom Charleroi to equip 37 SNCB locomotives with a new ETCS control and safety system

April 2023

Alstom is looking for 80 new employees in the engineering field for the Charleroi site.

The Alstom group has won a contract for the design, supply and maintenance over 10 years of ETCS level 2 signalling systems for 37 SNCB HLD77 locomotives. It was announced on Tuesday, without specifying the financial details of the agreement.

The European ETCS system makes it possible to increase the speed, punctuality and traffic of lines while reinforcing safety.

The HLD77 locomotives are mainly used by SNCB for shunting operations. The modernization of this rolling stock will take place during the period 2023-2025.

"With this new contract, Alstom will equip a total of just over 800 vehicles and locomotives of the national operator (SNCB, editor's note) and will strengthen safety on the rails," said Bernard Belvaux, managing director of Alstom Benelux, quoted in a statement. "This is also an important announcement for Belgium, as the Charleroi site will work on this project. We are continuing to grow in Belgium, and we are looking for 80 new employees in the engineering fields for the Charleroi site."

As a global centre of excellence for the Alstom Group, the Charleroi site will be responsible for the engineering of various signalling systems and the supply of on-board equipment for this contract. It will also provide maintenance services over a 10-year period, including spare parts and repair services.

"The award of this contract confirms Alstom's leading position in the railway signalling systems market. In Europe, more than 70% of the trains equipped with a European-made ETCS have chosen an Alstom system", the group boasts.

Source: <https://www.dhnet.be/regions/charleroi/2023/04/22/gros-contrat-pour-alstom-charleroi-qui-va-equiper-37-locomotives-sncb-dun-nouveau-systeme-de-commande-et-de-securite-etcs-QTKNPGKKZCOTD334D6IDZAQHU/>

Bulgaria – Will we soon have European trains? Brussels approved 32 million EUR

May 2023

The European Commission has approved the allocation of EUR32 million in state aid for rail transport in Bulgaria, it emerged at the start of this week's meeting. The funds are coming through the Resilience and Recovery Mechanism and are intended to encourage modal shift from road to rail. The funding is intended to remove technical obstacles to the operational consistency of railways because they transport people and freight in a way that is less damaging to the environment. **The support will take the form of direct free funding for railway companies to finance the consolidation of the European Train Control System ('ETCS') level 2, part of the European Rail Traffic Management System (ERTMS). The scheme will support the deployment of ERTMS, which improves cross-border rail interoperability and enhances rail transport competitiveness. The works are planned to run until 30 April 2026.** Source: <https://novini247.com/novini/shte-imame-li-skoro-evropeyski-vlakove-bryuksel-odobri-32-mln-6362463.html>

Czechia – SŽ will install ETCS signalling on the 100-kilometre line to Germany for CZK 11.8 billion

March 2023

The Railway Administration has announced a tender for the installation of the ETCS signalling system on a more than 100-kilometre section from the state border with Germany to Kralupy nad Vltavou. The contract will cost CZK 11.8 billion. The winner of the tender will develop the project and subsequently ensure the construction and maintenance of the system. The ETCS system controls the train's movement and, if necessary, enables automatic remote stopping of the machine.

The ETCS technology should become the main signalling system on European railways in the future, so it is necessary to equip the lines with it in addition to the carriages. So far, according to last year's data, it is on about 700 kilometres of railways out of 9 000 kilometres of lines in Czechia.

According to the administration, the project includes the installation of complete signalling equipment and ETCS remote control. Traffic on the line, which runs largely on the left bank of the Elbe, will thus be controlled remotely from a central workplace in Prague's Balabenka, where a new control room will be built.

The Railway Administration will also have internal technological equipment for remote control built in individual railway stations. In addition, a camera system and information equipment will be built in them. At the same time, the builders will replace and possibly dismantle individual signals and replace signalling equipment at level crossings. The Administration will also build new buildings to house all the necessary technological equipment. The work will also include the removal of unnecessary parts of the railway.

The Administration will use approximately CZK 323 million from European funds for the installation of signalling equipment on the line from Kralupy nad Vltavou through Dolní Žleb to the state border with Germany. The Administration will receive the main part of the money from the State Fund for Transport Infrastructure.

In 2025, the state wants to start operation exclusively with trains equipped with ETCS signalling on the corridor lines.

Therefore, carriers are gradually equipping their trains and will spend billions of crowns on the installation. According to further plans of the state, the system should be in place by 2030 on approximately 4 800 kilometres of the roughly 9 000 kilometres of railways in Czechia.

Source: <https://www.elogistika.info/sz-nainstaluje-zabezpecovac-etcs-na-stokilometrove-trati-k-nemecku-za-118-mln/>

Finland – Finland's fast track to FRMCS

March 2023

Simon Indola, the Project Manager responsible for implementing FRMCS (Future Railway Mobile Communication System) in Finland, argues that the 'bearer independent and future-proof' FRMCS solution, utilising commercially available Mobile Network Operators (MNOs), represents a significant opportunity for European railways.

Finland's current train control system will reach the end of its lifecycle around 2030. The next logical step is to seamlessly move to the European Railway Traffic Management System (ERTMS) and a modern radio based ETCS (European Train Control System). The current regulations also make it mandatory for Finland, as an EU Member State, to update its systems to be fully compatible with other next-gen European systems.

The train control system now being planned in Finland is a modern radio network based ETCS implementation, targeting Hybrid Level 3 and ATO GoA2 on the whole network. The new radio network based ETCS will help to minimise the duration and impact of disruptions throughout the railway network, enable an infrastructure capacity increase and improve the punctuality, and increase the number of trains on the existing network. This will provide Finland with a sustainable technological development base, amongst other variables. The radio network will be based on the joint European FRMCS.

Attaining proof of concept

According to the latest projections, the first commercial ETCS track is planned to be operational in Finland by the beginning of 2027 and across the entire country by the end of 2040. During 2021, Digirail conducted a study to identify the required radio network capacity as part of Finland's strategy to utilise commercially available Mobile Network Operators (MNOs). The study was designed to understand the communication needs between the train and the track side from the perspective of different stakeholders, representing rolling stock maintenance, passenger information, diagnostics, positioning, automated train operations (ATO), passengers, security and other variables.

Source: <https://www.globalrailwayreview.com/article/140306/finland-fast-track-frmcs/>

France – Matthieu Chabanel's priorities for SNCF Réseau

March 2023

Matthieu Chabanel was heard by the Senate on March 22 for the first time since the beginning of his mandate in September as the head of SNCF Réseau.

The first priority is to increase the performance of the railway infrastructure manager. "We are working towards a return to economic balance in 2024. This is made possible by the State taking over the debt reduction of EUR 35 billion and by our own performance, which must reach EUR 1.5 billion. We are at EUR 940 million per year in 2022, so we are on track," emphasises the CEO.

Performance will also be achieved through the deployment of the European signalling system ERTMS, which already equips the extensions of high-speed lines and is underway for the Paris-Lyon LGV and planned for the Marseille-Ventimiglia link. A more ambitious program should be defined.

Source: <https://www.lettreducheminot.fr/actualites/les-priorites-de-matthieu-chabanel-pour-sncf-reseau/>

Germany – Railway system market to see exponential growth, expected to reach \$30.9 billion by 2027

March 2023

The global railway system market stood at USD 25.1 billion in 2022 and is expected to reach USD 30.9 billion by 2027 and grow at a CAGR of 4.2% over the forecast period (2022 - 2027). Europe is estimated to be the largest market for train safety systems during the forecasted period. European railways are regarded as among the safest in the world and hence form an important market for train safety systems. **The European Rail Traffic Management Systems (ERTMS) signalling and control component, known as the European Train Control System (ETCS), is highly developed.**

Standard trackside equipment and unified controlling equipment located inside the train cab are used to deploy ETCS. In its most modern form, all lineside data is wirelessly transmitted to the driver within the cab, eliminating the need for the driver to monitor lineside signals. This will lay the groundwork for automated train operation (ATO). The growth of the train safety system segment is attributed to stringent government norms and standards for passenger safety in trains.

Source: <https://www.openpr.com/news/2981260/railway-system-market-to-see-exponential-growth-expected>

Greece – Upgrading of SKA-OINI railway network

May 2023

OSE safeguards the safety of the Greek railway: the relevant studies have been completed and the Agency is preparing for a call for tenders with an estimated cost of EUR 200 million for the upgrade (heavy maintenance) of the SKA – Oinoi Railway Line. This is a project that gives added safety value to both the Athens Suburban Railway and the Athens-

Thessaloniki Axis. Therefore, OSE is putting on its rails a project of particular importance that will inextricably complement the central railway axis of the country.

In conclusion, with the commissioning of the above systems, the operation of the trains on the Athens-Thessaloniki axis is completed with full coverage of signalling, telecommand and ETCS.

Source: <https://septrainose.gr/article/15591>

Hungary – Modern AŽD technologies will secure Hungarian rail corridor

May 2023

AŽD has signed a contract with the Hungarian construction company V4SIL (part of the V-Híd holding company) to supply modern technology and the European ETCS level 2 train control system for the Soroksár - Kelebia project.

This is the second major contract on the Hungarian rail network won by the Czech company. The project is divided into two parts. The southern part of the Fülöpszállás - Kelebia section comprises a total of 8 stations and adjacent sections and constitutes the main part of the project. The northern section of the Soroksár - Fülöpszállás line, comprising a total of 10 stations and adjacent sections of the line, has been contracted as an option. Both sections form part of the Budapest-Belgrade European corridor.

AŽD will deliver and install the fully electronic digital equipment for the 44 ESA stations, including the ITZZ line's integrated interlocking devices, LED signalling devices, level crossings, as well as the fixed parts of the ETCS Level 2 system for both sections.

V4SIL (founded by V-Híd and AŽD) will participate in the development, production and installation of the rail traffic control technology in accordance with local regulations and legislation. The cooperation will include the use of Czech know-how and tools in the production of the final equipment in Hungary, as well as the development of software specifically tailored to Hungarian needs.

"We've been trying to get this contract for a long time, and it's very important to us. The 27-month deadline for the project is extremely demanding. The complexity of the whole project is compounded by the need to combine AŽD's systems with the technologies of the Chinese contractor building the Serbian section of the line. The aim is to win more contracts in Hungary. As it is obvious that Hungarians highly value their own contractors, we are following the path of cooperation with national companies", said Zdeněk Chrdle, CEO of AŽD, after the contract was signed.

Source: <https://kurier-kolejowy.pl/aktualnosci/42519/nowoczesne-technologie-a%C5%BDd-zabezpiecza-wegierski-korytarz-kolejowy.html>

Italy – 300 million EUR for ERTMS implementation

Italy, May 2023

The European Commission (EC) is allocating 300 million EUR to Italy for the implementation of ERTMS. As the EC specified, the money will be granted "to railway companies for the acquisition and installation of ERTMS on-board

equipment". Italy plans on implementing the latest version of the system on its rail infrastructure by 2036.

The new scheme will run until 31 December 2026. This new initiative, according to the EC, is necessary to achieve efficient interoperability. Moreover, the Commission says these new funds will incentivise companies to invest in ERTMS deployment since they would likely not do it without public financial support.

ERTMS in Italy

As the Italian infrastructure manager Rete Ferroviaria Italiana (RFI) mentioned, Italian railways were among the first in Europe to be equipped with ERTMS and ETCS. These systems were implemented in Italy already in 2005 with the Rome-Naples line. As of the end of 2022, 878 kilometres of high-speed rail lines are equipped with ERTMS, as RFI stated. The total length of Italian railways, however, is around 20,000 kilometres, meaning that roughly 4 per cent of them are equipped with ERTMS.

For the near future, the EU has set the goal of reaching 1,400 kilometres of Italian railways equipped with ERTMS by the end of 2024. To do this, Hitachi Rail, Alstom, and Ceit have been collaborating with Ferrovie dello Stato Italiane (FS) since March 2022. The companies are working to implement the technology in four regions in the centre and in the south: Lazio, Abruzzo, Umbria, and Sicily.

Recent controversy around ERTMS for rail freight

Recently, the debate surrounding ERTMS implementation in Europe has heated up after the European Rail Freight Association said that it will be difficult to present a business case. This is because, as ERFA underlined, railway undertakings don't see any financial or operational advantages when it comes to implementing the system. This is also highlighted by the fact that over half of the new rail vehicles put into operation between 2015 and 2019 were not equipped with ERTMS onboard units.

Source: <https://www.railfreight.com/policy/2023/05/30/italy-gets-300-million-euros-for-ertms-implementation/?qdpr=accept>

Netherlands - Fast, frequent and reliable to Germany

May 2023

A high-speed Amsterdam-Germany line costs too much and delivers too little, was the verdict in 2001. New research by Goudappel Coffeng and SMA Advies commissioned by the province of Gelderland shows that the link does have potential. By investing step by step, both international and domestic trains benefit.

The final picture consists of running at up to 200 km/h between Amsterdam and Cologne, and then on to Frankfurt at up to 300. This cannot be achieved all at once. **The best approach is to work gradually with the introduction of ERTMS, new rolling stock and infrastructure modifications.** The weak link is currently the Utrecht-Arnhem-Arnhem-Oost section. Initial investments should focus on increasing the speed between Utrecht and Arnhem to a maximum of 160 km/h and addressing the capacity bottleneck on the east side of Arnhem Central Station. **This involves**

introducing ERTMS and removing the remaining level crossings, including the Wolfheze level crossing. It also includes a level crossing in Arnhem, creating more space in the timetable. The costs amount to around EUR200 million.

There are also opportunities in Germany. The ICE now passes through Cologne central station. This requires the train to cross the Rhine and turn around at the station. This creates an extra journey time of about 15 minutes for passengers to Frankfurt. But this station is one of the most important destinations on the ICE corridor. There is another large second station in Cologne: Messe/Deutz. An idea could be to use one hour station in Cologne as a final destination, and to quickly continue to Frankfurt via Messe/Deutz.

Source: <https://www.ovmagazine.nl/nieuws/snel-vaak-en-betrouwbaar-naar-duitsland>

Norway - New digital signalling system (ERTMS)

April 2023

Bane NOR is digitizing the railway with a new signalling system. This will result in fewer delays and more trains running on schedule for passengers and freight.

What are we building and why?

Bane NOR is introducing a new digital signalling system on the railway in Norway. The new system, called ERTMS - European Rail Traffic Management System - is a common standard for Europe that will make it easier to travel between national borders.

Today's signalling systems are safe but based on old technology. Access to expertise and spare parts is a challenge, and the old signalling systems are prone to failure.

Bane NOR will, therefore, renew all signalling systems. This is Norway's largest digitalization project, and it covers the entire country - that is, over 4,000 kilometres of railway and 300 stations.

With ERTMS, we are moving to a data- and communication-based system. In short, we are moving today's light signals from the track and into the trains. This means less equipment on and along the track and reduces the risk of errors.

The new signalling system will be deployed in stages across the entire rail network until 2032.

National signalling plan

The national signal plan is the plan that tells us when the various railway lines will be digitized with the new signalling system, ERTMS. The plan does not capture the latest changes in the timetable and is therefore under revision.

Train lines may be affected at different times, but we are doing what we can to minimize the impact.

Source: <https://www.banenor.no/prosjekter/alle-prosjekter/nytt-digital-signalsystem/>

Poland - Government plans to support purchase of train control equipment with PLN 450 million

April 2023

The Ministry of Infrastructure has prepared a draft regulation providing the basis for financial support to railway operators in the amount of PLN 450 million for the purchase and installation in powered rail vehicles of 180 on-board devices of the ERTMS system, it was announced on Friday on the website of the Government Legislation Centre.

As indicated in the Regulatory Impact Assessment, in the proposed regulation, ERTMS should be understood as the system comprising the on-board equipment of the European Train Control System (ETCS system), and the equipment of the Global System for Railway Traffic Radio (GSM-R system).

The assistance will be provided within the framework of the National Rehabilitation and Resilience Plan and the Centre for EU Transport Projects will be responsible for signing contracts for the project.

The justification for the project recalls an analysis by the Railway Transport Office, which shows that currently only about 10 per cent of all powered railway vehicles used by Polish railway operators are equipped with the ERTMS system.

It added that according to the data presented in the UTK analysis, the demand of the Polish rail transport sector for the purchase and installation of an ERTMS system is very high. According to this analysis, in Poland in 2022, only 526 railway vehicles were equipped with the ETCS system, while the number of all railway vehicles at the disposal of railway operators was 5238 units.

According to the justification, the support will lead to an increase in the potential of Polish companies carrying out rail transport not only at national level, but also at EU level.

Source: <https://stooq.com/n/?f=1548273>

Romania – Romania: Investments of more than RON 2 billion approved for the renewal of railway rolling stock

April 2023

On Thursday 6 April, the Ministry of Transport and Infrastructure (Ministerul Transporturilor și Infrastructurii, MTI), as coordinator of the reforms and investments related to component 4 - Sustainable transport under Pillar 1 - Transition to a green economy of the National Plan for Recovery and Resilience (NRRP), announced the signing of three financing contracts with the Railway Reform Authority as the beneficiary for the renewal of environmentally friendly railway rolling stock.

The signed projects contribute to the achievement of the objectives and milestones set by MTI as part of Investment 2 - rolling stock related to component 4 - Sustainable transport - and include the renewal of environmentally friendly rolling stock with:

- 16 hydrogen-electric multiple units (H-EMU);
- 16 new 4-axle electric locomotives with ERTMS systems;

-20 RE-IR-2 electric multiple units for interregional long-distance transport.

The new zero-emission vehicles with in-vehicle ERTMS, which will be purchased under the three financing contracts, will be used for passenger transport in order to better exploit the transport potential and increase the modal shift from road to rail. The renewal of the rolling stock fleet for public rail passenger transport in Romania is aimed at the acquisition of modern rolling stock that will provide passengers with optimal travel conditions on the national rail network, both in terms of comfort and increased mobility, by introducing new services that take into account the dynamics of the public rail passenger transport market in Romania and that, together with the development and modernization of the rail infrastructure, can contribute significantly to economic growth and improving the quality of life. The total value of the investments foreseen in the three contracts signed with the Railway Reform Authority amounts to more than RON 2 billion (EUR 400 million) with national co-financing, of which the value of European funds related to the NRRP is more than RON 1.5 billion (EUR 300 million) each.

The activities envisaged in the projects can be carried out until 30 December 2026. Further information and news on the above projects can be found in the official announcements of the Railway Reform Authority (Autorității pentru Reformă Feroviară, ARF).

Source: <https://www.lok-report.de/news/europa/item/40446-rumaenien-investitionen-von-ueber-2-mrd-ron-fuer-die-erneuerung-des-eisenbahnrollmaterials-genehmigt.html>

Slovakia – New GSM-R infrastructure on the Slovak section of the Rhine-Danube corridor

March 2023

Železnice Slovenskej republiky (ŽSR), the railroad infrastructure operator in Slovakia, has announced the winner of a tender for GSM-R mobile radio infrastructure on the Varin - Košice - Čierna nad Tisou - Ukraine border section, designed to support the operation of the European Train Control System ETCS Level 2. This most important railroad line in the country is part of the international Rhine-Danube corridor connecting Western and Eastern Europe.

Thanks to the GSM-R mobile communication system, financed by the Connecting Europe Facility, another milestone will be set in Slovak rail communication. The goal of this modernization project is to connect the west and east of Slovakia by means of high-quality rail infrastructure in accordance with TEN-T interoperability requirements and Slovak and EU transport policy.

The GSM-R system will provide mobile telecommunications and data transmission for rail operations and for the introduction of ERTMS, the European Rail Traffic Management System, on the Varin - Kosice - Čierna nad Tisou rail infrastructure section. This is the main rail corridor in the Slovak Republic, connecting Western and Eastern Europe.

A digital rail network will be created, which will benefit rail operators and passengers. For example, a modern

communications system will enable the railroad to provide better information to passengers, and reliable radio coverage will increase safety for drivers, maintenance crews, and passengers.

A consortium of Kontron Transportation s.r.o., AŽD Praha s.r.o. and Elektrizace železnic Praha a.s. will work on the project. Kontron Transportation is the leader of the consortium. "We are looking forward to good cooperation with our partners and customers and to contributing to the modernization of another important section of the line," says Bernd Eder, Chief Operating Officer, Kontron Transportation.

Kontron Transportation will develop, design, integrate and implement all components together with the consortium partners. Implementation work will begin in the first quarter of 2023 and will take about two years.

Source: <https://kurier-kolejowy.pl/aktualnosci/42137/nowa-infrastruktura-gsm-r-na-slowackim-odcinku-korytarza-ren-dunaj.html>

Spain – Contract for the drafting of the informative study for the new railway access to Águilas.

January 2023

EU funds will finance the purchase of the signalling system that will lead to more sustainable transport.

The Board of Directors of Renfe Mercancías has approved the tender for 13.5 million EUR, for the ERTMS Baseline 3 system and fleet parts, to be implemented in 28 locomotives of the S/253 series that are currently part of the company's rolling stock.

The ERTMS signalling system facilitates interoperability between different networks, unifying signalling and railway safety systems in Europe. This system makes it possible to improve traffic safety and the management of rail traffic, in this case freight traffic.

In order to undertake this project, Renfe Mercancías has carried out a public procurement process with the aim of finding a supplier to provide the technical and material know-how required for the installation of this system. Renfe's freight company has drawn up a negotiated file without advertising with the company Alstom Transporte, which, due to technological links, is the one that can carry out this work.

Once the supplier has been awarded, Renfe Mercancías will monitor the manufacture and installation of the system, as well as the necessary controls to ensure its correct operation and commissioning on schedule.

The supply, installation and commissioning of the ERTMS on the 28 locomotives of the 253 series must be completed before 31 December 2025.

The investment for the supply of the system is part of the government's Next Generation Recovery, Transformation and Resilience Plan, funded by the European Union, which will subsidise its acquisition. This subsidy corresponds to support for sustainable transport and is also in line with

Renfe Mercancías' commitment to its main customers to improve productivity and service quality.

Source: https://www.elplural.com/economia/empresas/renfe-implantara-sistema-ertms-28-locomotoras-mercancias-importe-maximo-135-millones-euros_308484102

Sweden – First locomotive with ETCS on the Öresund Bridge

April 2023

The Vectron locomotive has received approval for operation along the Scandinavian corridor (Austria-Germany-Denmark-Sweden-Norway). Now both freight and passenger trains may travel along the entire corridor without changing locomotives.

The first to take advantage of this is the Swedish rail operator Snälltåget, which has leased three Vectron locomotives from European Locomotive Leasing for cross-border passenger service in Sweden, Denmark, Germany, and Austria.

Manufactured in the Siemens plant in Munich (Germany) the Vectron is the first locomotive equipped with the ETCS train control system that is allowed to operate across the 16 km long Öresund connection (bridge and tunnel) between Sweden and Denmark.

Source: <https://www.transportjournal.com/fr/home/news/artikeldetail/first-locomotive-with-etcs-on-the-oeresund-bridge.html>

Switzerland - Towards FRMCS in Switzerland

March 2023

Swiss Federal Railways (SBB) colleagues Massimiliano Rizzato, International Telecom Standardisation Manager, and Michael Hopf, System Engineer for FRMCS, explore the case for FRMCS rollout across Switzerland's rail network and explained the challenges that will come with migration and implementation.

SBB uses GSM-R as the mobile telecommunication standard for voice and data. There is full GSM-R coverage on the main lines, with redundancy on the ETCS lines. To provide service in some rural areas, SBB currently collaborates with a national mobile public provider. The service is based on 3G, with ongoing migration to 4G, due to SBB's partner's plans for 3G switch-off at the end of 2025. Some systems, such as Passenger Information Systems, are based on public providers' network services and dedicated antennas on rolling stock for communication purposes.

In general, the use cases that support FRMCS adoption are the 'usual' railway use cases: voice communication, railway emergency call and ETCS. Then there are additional ones, such as shunting communication (for which SBB also uses with GSM-R). Furthermore, replacement of obsolescent telecom technology, introduction of new operational processes, like ATO/ATS with high GoA levels (e.g., driverless trains) and optimisation of costs and railway network schedules, all urgently push towards a railway telecom infrastructure that can be future proofed, expandable, flexible, cost effective and guarantee the support of broadband communication. SBB acknowledges that this can start with FRMCS, which will support new

generation mobile communications based on 5G and its successors and can also support other wireless communication technologies. One of the most important points in favour of FRMCS is that it will not be bound to a single generation of radio technologies or dedicated radio technologies.

Source: <https://www.globalrailwayreview.com/article/140316/towards-fmcs-switzerland/>

Western Balkans – Serbia: One-year high-speed line Belgrade - Novi Sad

March 2023

In the presence of Serbian Prime Minister Ana Brnabić, 19 March 2023 marked the first anniversary of the opening of the Belgrade-*Novi Sad* high-speed railway, which was used by almost three million passengers last year.

The railway line is equipped with modern signalling and telecommunication systems (ETCS Level 2), the highest safety level, and all railway crossings with road traffic on the entire high-speed line are constructed, so that there are now no road crossings. Between Stara Pazova and Novi Sad, the stations were rebuilt and redesigned. Indjija and Petrovaradin stations remained in their previous locations and were rebuilt. The new Sremski Karlovci station is located only a few hundred metres from the existing station, and the new Beška station was also built on the new site. The Karlovački Vinogradi level crossing was rebuilt and continued to serve the connection of the "Prosjanice" industrial area with the addition of another track. The first phase of works for the reconstruction and design of the Novi Sad railway station was also completed.

Source: <https://www.lok-report.de/news/europa/item/39916-serbien-ein-jahr-hochgeschwindigkeitsstrecke-beograd-novi-sad.html>

Focus on: ETCS trackside deployment in Belgium passes 50% mark

An additional 127 kilometres of Belgian tracks have recently been equipped with the European Train Control System (ETCS), surpassing the halfway mark in terms of the proportion of tracks equipped with ETCS. The objective is to have ETCS installed across the entirety of Belgium's rail infrastructure by the conclusion of 2025.

With the recent rollout, 54 percent of tracks in Belgium, covering a total distance of 3,462 kilometres, are now equipped with the ETCS system. A team of approximately a hundred workers was mobilized on June 3 and 4 for the latest installation project, solidifying Belgium's position as the European Union country with the second-highest proportion of equipped network, following Luxembourg. Previously, ETCS level 2 was successfully implemented on the 122-kilometer stretch between Liège and Namur in March after three years of preparations. This time,

significant signalling works were carried out by Infrabel on the Brussels-Midi and Halle section.

Across various locations such as Brussels-Midi, Halle, Boondael, Holleken, Petite Île, Anderlecht, and Forest, 15 teams from Infrabel completed final adjustments and tests for the installation of 650 ETCS beacons along the tracks. Specifically, out of the 127 kilometres of main tracks equipped with the ETCS system, 66 kilometres are located in the rail grids of Brussels-Midi station, 18 kilometres between Brussels-Midi and Lembeek, and 43 kilometres between Forest and Holleken, as well as between Halle and Boondael. In total, 300 signals have been equipped with ETCS, and 3,200 possible routes have undergone testing. For the interested readers, the team interviewed Jouri Minne and Yves Werner from Infrabel on the ETCS deployment in Belgium for the last [Signal newsletter](#).



UITROL ETCS DÉPLOIEMENT DU SYSTÈME ETCS



	km in dienst en service	km einde Masterplan prévu par Masterplan	% al uitgerust déjà équipé
ETCS1 FS	2.186	2.783	79%
ETCS2 FS	468	2.361	20%
ETCS1 LS	666	1.113	60%
ETCS1+2 FS	142	142	100%
Tota(a)	3.462	6.399	54%



Figure 7: ETCS deployment in Belgium

Look ahead: Q3 Signal Newsletter on the CCS-TSI revision and ERA webinar on the new changes

In our previous edition of the Signal Newsletter, we offered a brief glimpse into the anticipated modifications to the CCS TSI (Control-Command and Signalling Technical Specification for Interoperability). Since then, the Railway Interoperability and Safety Committee (RISC) has voted in favour of adopting the new CCS TSI. As the text is currently undergoing translations, it is expected to be officially

published over the summer. Recognising the significant impact this will have on European railways, the “Signal” Team will dedicate the forthcoming “Signal” Newsletter entirely to the revised CCS TSI. In the meantime, readers who are interested can access the ERA webinar on the CCS TSI by following the provided [link](#).

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