

# Signal

## The ERTMS Newsletter

### Contents

Contents .....	1
Did you know: ERTMS trackside deployment.....	1
In the spotlight: Interview with Joeri Minne & Yves Werner Managers of ETCS Engineering and Signalling Systems at Infrabel...	6
Latest news.....	10
Latest development: Adoption of the CCS-TSI .....	16
Farewell Mr. Carlo Borghini.....	17
Train accident in Greece.....	17
Contact details.....	18

## Did you know: ERTMS trackside deployment

The current TEN-T Guidelines<sup>1</sup> establish ERTMS as one of the priorities for railway infrastructure development and set out a deadline for its deployment on the Core Network by 2030 and on the Comprehensive Network by 2050.

In January 2017, based on the TEN-T Guidelines, the European Commission adopted the ERTMS European Deployment Plan (EDP)<sup>2</sup> that sets out deadlines for

deploying ERTMS on some sections of the Core Network Corridors (CNC) covering the 2017-2023 period.

The number of kilometres planned for each year in the EDP and the TEN-T Guidelines for the CNC are shown in the figure below.

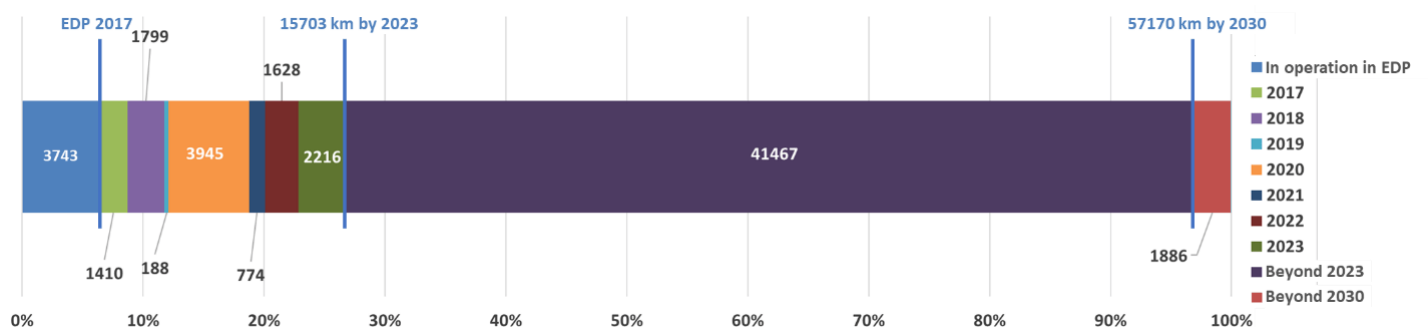


Figure 1 - Indicative number of CNC km per year according to the EDP and the TEN-T Guidelines

<sup>1</sup> Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network.

<sup>2</sup> Commission Implementing Regulation (EU) 2017/6 on the European Rail Traffic Management System European deployment plan on 5 January 2017.

Overall, 52% of the length planned in the EDP by the end of 2022 (i.e. 13 487 km) has been already achieved by end-February 2023. At the same time, 46% (or 7 152 km) of the 15 703 km planned to be put in operation by 2023, according to the EDP, have already been commissioned.

In July 2021, the Connecting Europe Facility (CEF) 2 Regulation extended the CNC by 9 680 km. In total, the length of the CNC, including CEF 2 extensions and excluding sections in the United Kingdom, amounts at present to 59 055 km.

At the end of February 2023<sup>3</sup>, 15% (i.e. 8 600) of the revised CNC network (i.e. 59 055km) was in operation with ETCS<sup>4</sup> and 61% with GSM-R.<sup>5</sup>

The following map presents the current status of the ETCS deployment on the CNC in February 2023. The dotted lines are those added to the CNC by the CEF 2 extension. According to TEN-T Guidelines<sup>6</sup>, the Irish network<sup>7</sup> and lines that do not belong to Rail Baltica in Estonia, Latvia, and Lithuania<sup>8</sup> are exempt from the obligation to fully deploy ERTMS.



Figure 2 - ETCS deployment status in CNC in February 2023

<sup>3</sup> All information related to deployment data are gathered from DMT database. DMT database is based on national implementations plans, official information provided by MS and information gathered from news.

<sup>4</sup> Lines equipped with non-interoperable ETCS baseline (e.g. pre-baseline 2) are not considered as equipped with ETCS in the figures included in this Work Plan.

<sup>5</sup> ETCS and GSM-R constitute at present the two components of ERTMS. All data provided in this report is based on the alignment of the Core Network Corridors and deployment deadlines as set out in the EDP in force.

<sup>6</sup> Regulation (EU) No 1315/2013, article 39. 2 a) "Isolated networks are exempt from (...) full deployment of ERTMS."

<sup>7</sup> Irish network will be equipped with GSM-R. Whilst the Irish network is exempt from mandatory deployment of ERTMS, it is planned that the whole Irish network will be equipped with Level 1 ETCS by 2040. It is not intended to deploy Level 2 or Level 3 on this isolated network.

<sup>8</sup> Rail Baltica sections in Estonia, Latvia and Lithuania will be equipped with ETCS.

It is important to highlight that six years after the publication of the EDP, there are 6 443 km that are delayed. Most of the delayed sections are under construction (80%). Several Member States have already communicated in their

National Implementation Plans (NIPs) a delay for some lines relative to their EDP targets.

The lines delayed (i.e. sections planned in the EDP by 2022 but not in operation yet) are shown in the map below.



Figure 3 - Sections planned in the EDP by 2022 but not in operation yet

Regarding the GSM-R deployment, there are 36 025 km equipped with GSM-R on the CNC (61%) and additional 7 388 km already covered by contracts signed with suppliers (13%). Out of the nine CNC, the most advanced in terms of GSM-R deployment is RALP, with 99% of its length already

equipped, while GSM-R deployment on other corridors ranges between 39% and 93%.

The deployment of GSM-R per corridor is presented in the graph below.

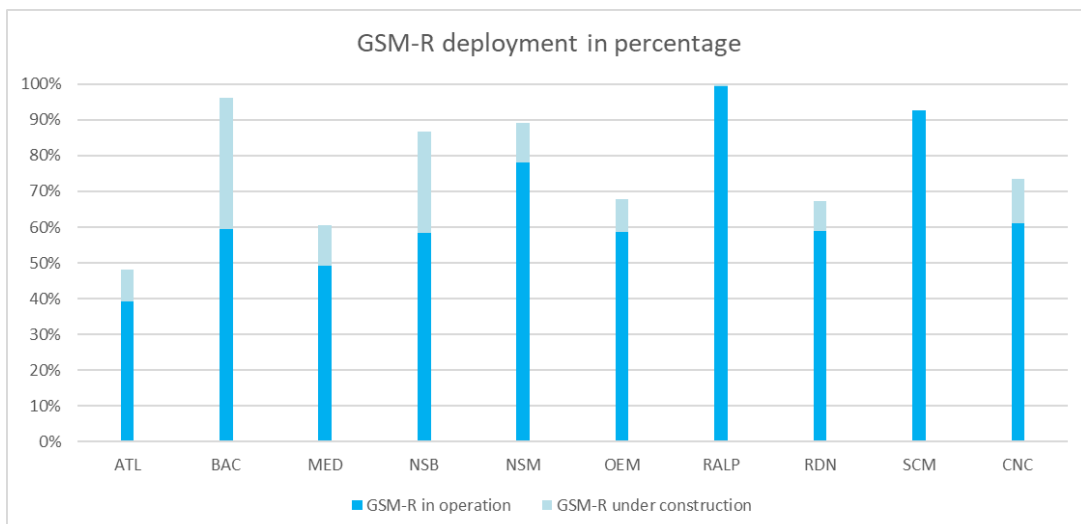


Figure 4 - GSM-R deployment by corridor

## In the short term - 2023

The majority of CNC lines scheduled for 2023 are in operation or under construction.

The following chart indicates the current ETCS status of the CNC sections expected according to the EDP by 2023 (15 703 km).

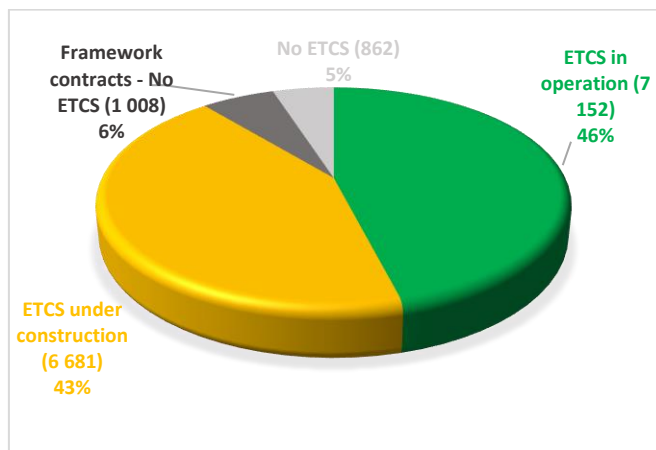


Figure 5 - ETCS current status - 2023 EDP - CNC sections

There are 238 km already in operation that were not foreseen in the EDP to be put in operation before 2023, and an additional 1 210 km in operation on sections belonging to the CEF 2 extension. Sections belonging to the CEF 2 extension are, at present, not included in the current EDP.

Based on the Member States data, 13 992 km on the CNC are planned to be equipped with ETCS by 2023, although only 10 954 km of them are legally required in the EDP by 2023.

The ETCS status on CNC by corridor expressed in terms of number and percentage of km to be equipped by 2023 is compiled below. The CNC with the highest number of km to be equipped by 2023 are highlighted in purple:

KPI	Length to be equipped by 2023 (Km)	Current ETCS in operation (Km)	Current ETCS in operation (%)	ETCS in operation & ETCS under construction (%)	ETCS in operation & Contracts signed (including Framework Contracts) (%)
ATL	1.758,89	1.053,11	60	89	89
BAC	2.100,54	1.284,67	61	86	98
MED	3.134,70	1.705,30	54	97	97
NSB	1.776,45	585,42	33	82	89
NSM	1.565,43	886,28	57	81	100
OEM	2.762,49	939,52	34	93	93
RALP	2.272,89	1.066,65	47	90	99
RDN	2.062,23	605,03	29	99	99
SCM	1.848,95	716,54	39	71	89

Table 1 - ETCS status by corridor – 2023

The CNC with the highest number of km to be deployed by 2023 are MED, RALP and OEM with “ETCS in operation” rates of 54%, 47% and 34%, respectively.

Nevertheless, when taking into account the km of sections in operation and under construction, the rate increases to 99% for RDN, 99% for RALP and 98% for BAC corridors. SCM corridor with 71% has the lowest “ETCS in operation and

ETCS under construction” rate of all corridors. The NSM corridor is the only one in which all their sections planned by 2023 in the EDP are already operational or with projects signed, including the framework contracts<sup>9</sup>.

Regarding ETCS status by country:

- **Spain** is the country with the greatest number of km to be equipped with ETCS (i.e. 2 294.3 Km) by 2023. It has, however, already 62% of them in operation and has gathered great expertise on this system. This should reduce the time needed for the implementation of ERTMS projects that are ongoing.
- **Germany and Poland** are the Member States, which have the second and third highest number of km in operation and under construction. These Member States are also among the countries with the highest number of km to be equipped by 2023. The percentage of km in operation in Germany and Poland with respect to the number of km foreseen by 2023 is only 13% and 34%, respectively.
- There are five countries, i.e. **Belgium, Denmark, Norway, Sweden and Austria**, which have all their lines covered by framework contracts (even though Sweden and Norway have no sections required to be operational by 2023, according to the EDP).
- ETCS was deployed on the whole network of **Luxembourg** at the end of 2017. **The Netherlands** has already finalised the deployment of the sections planned by 2023 as well. **Switzerland** has all its sections either deployed or under construction (only 3% pending).
- **France** has already 70% of the km planned in the EDP by 2023 in operation, and the remaining sections planned by 2023 are under construction.
- **Greece and Romania** have their sections planned by 2023 in the EDP, either in operation or under construction. **Bulgaria, Czechia, Germany, Hungary, Italy, Poland, Slovakia, Slovenia and Spain** have an ETCS deployment progress rate (i.e. ETCS in operation or under construction) well above 80%.
- The ERTMS deployment in **Denmark** is the lowest by far. However, Denmark has two framework contracts covering all of its state-owned network with the aim to finalise the deployment on the entire network by 2030.
- The progress rate for the deployment of ETCS in **Austria** (below 60%) leaves room for acceleration in order to meet the EDP deadlines. However, Austria has two framework contracts covering the entire ETCS Level 2 trackside implementation.
- Additional efforts should be made in **Italy, Poland and Germany** in view of the length of the network to be equipped and the low percentages that are in operation at present (respectively 42%, 34% and 13%).

<sup>9</sup> Framework contracts are contracts covering the deployment of ETCS either on the whole or on significant parts of the network of a given

Member State. This is the case of Austria, Belgium, Denmark, Norway and Sweden.

## In the long term – 2030

The deployment of the CNC lines scheduled for 2030 is gaining momentum.

The following chart indicates the **current ETCS status** of the CNC sections expected by 2030 (57 170 km), including CEF 2 extension and excluding UK sections, and taking into consideration exemptions.

By February 2023, ETCS was deployed on 15% (8 600 km) of the lines of the CNC expected to be equipped by 2030. In addition, 28% is covered by contracts (including framework contracts).

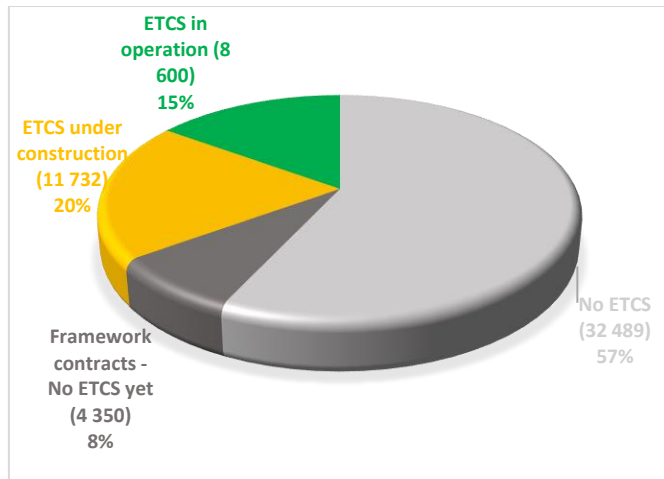


Figure 6 - ETCS current status 2030 - CNC sections

The **ETCS status on CNC by corridor** in terms of number and percentage of km to be equipped by 2030 is compiled below. The CNC with the highest number of km to be equipped by 2030 are highlighted in purple:

KPI	Length to be equipped by 2030 (Km)	Current ETCS in operation (Km)	Current ETCS in operation (%)	ETCS in operation & ETCS under construction (%)	ETCS in operation & Contracts signed (including Framework Contracts) (%)
ATL	11.103,97	1.221,20	11	26	26
BAC	4.912,91	1.404,94	29	40	50
MED	11.325,00	2.170,63	19	42	42
NSB	7.870,64	972,56	12	29	31
NSM	5.025,54	886,28	18	27	34
OEM	6.478,64	966,22	15	50	50
RALP	3.461,79	1.066,65	31	70	76
RDN	5.908,22	605,03	10	47	50
SCM	11.913,85	1.273,73	11	27	54

Table 2 - ETCS status by corridor – 2030

The CNC with the highest deployment rate are RALP (31%) and BAC (29%). The remaining CNC have a deployment rate between 10% and 19%. RDN and OEM have very low rates, although some lines on those CNC had been deployed with a pre-baseline 2, which is not a legal baseline anymore and is thus not taken into consideration for statistical reasons in the table above.

Regarding **ETCS status by country**:

- For the **Member States with the highest number of km to be deployed**, the **ETCS in operation rate is generally low** (9% in France, 3% in Germany, 11% in Italy, 18% in Poland, 22% in Spain, 13% in Sweden). Nevertheless, **when considering the km of sections under construction and in operation**, these percentages increase to 16%, 23%, 43%, 46%, 39%, 25%, respectively. Additional deployment efforts should be made in these Member States, especially in France and Germany, which have the lowest ETCS status rate.
- In **Ireland**, there is no ETCS deployment yet. However, according to the latest Irish deployment plan, the Irish network will be equipped with ETCS Level 1 by 2040.
- **Belgium, Denmark, Norway, Sweden and Austria** have all their railway sections included in framework contracts. Therefore, all their railway sections are considered to be either already in operation or at least covered by a contract.

# In the spotlight: Interview with Joeri Minne & Yves Werner Managers of ETCS Engineering and Signalling Systems at Infrabel

*Infrabel builds, operates and maintains the Belgian rail infrastructure. Its mission is to develop a safe and qualitative railway network for all the trains of tomorrow. Infrabel has set the goal of being one of the safest railway networks in Europe. As a result, since 2009 the European Train Control System (ETCS) is being installed on the national railway network.*

## 1. You have been equipping the Belgian network with ERTMS since 2009. Can you share some insights on this? More specifically, can you see any increase in performance?

In Belgium we first started in 2009 with ETCS deployment on the high-speed lines. In fact, Belgium became one of the first European countries to have a complete network of high-speed lines from border to border in commercial service in ETCS, with links to the Netherlands and Germany.

In 2010, Infrabel and SNCB/NMBS launched an ambitious ETCS Masterplan, representing a total investment of no less than 3.8 billion euro (2 billion euro for the trackside). With this plan approved and financed by the Belgian government, the network will be equipped progressively with ETCS by the end of 2025. This Masterplan is based on ETCS 1 Full Supervision (FS), ETCS 2 FS and ETCS 1 Limited Supervision depending on the interlocking technologies and the line types.

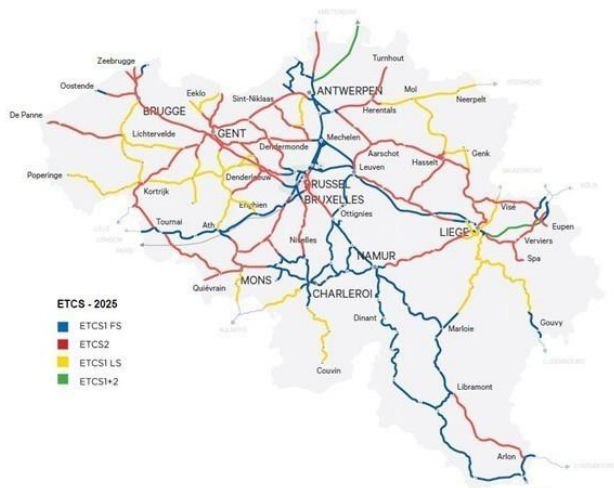


Figure 7 - ETCS Implementation by 2025 – [ERTMS Users Group](#)

After the ETCS deployment on the high-speed lines, in 2012, we prioritised a first implementation of ETCS 1 FS on the conventional network on line 36, which connects Leuven and Brussels (30 km). During the period 2012-2015, we commissioned in ETCS 1 FS all lines included in the Belgian part of the freight Corridor C in order to make a connection with the neighbouring countries.

Notably, before the start of ETCS implementation, we did not have an efficient automatic train protection system installed at each signal. This is the reason for our strong commitment to implement ETCS in Belgium in order to increase safety.

From what we have observed, safety has indeed increased as a result of ERTMS. We have now digital interlockings and control centres across our network. With these systems we can detect a SPAD (Signal Passed at Danger) more easily than before. ETCS has thus reduced instances of SPAD incidents where trains pass a signal indicating it should stop. While SPAD incidents still occur, they typically result in a slight overrun of the signal, but as long as the train stops before reaching the collision point, there is no danger of collision. Trains now stop immediately after encountering a SPAD, and there have been no instances of trains continuing past the point of danger and causing a collision.

## 2. What has been the impact on capacity?

Initially, there were concerns among the team that ETCS implementation may lead to capacity loss. Now, when we look at the impact of ETCS over the whole network, we can state that the implementation is going well. We have not experienced a loss of capacity. However, we have not seen a significant increase in capacity either, even though it is difficult to quantify it. While the main objective of Infrabel is to continue increasing safety as quickly as possible, we are also aiming after 2025 to increase capacity gradually as we implement ETCS 2 further without lineside signalling.

## 3. What have been the lessons learnt from the deployment? Would you have done anything differently, should you be starting now?

We were quick to perform the deployment. Because we were among the first ones, we faced several challenges due to the lack of experience at the time. We used the deployment on line 36 to test the basis and implement theoretical principles in practice, which meant fine-tuning the design two or three times and performing a lot of tests. You can design a route that is ideal for one train, but long Movement Authority (MA) will block the stations sooner, which has an impact on other trains: these will not be able to cross the route or use (parts) of the route in question.

We have learnt that it is important to have a more global view when it comes to deployment and to consider the whole system working together without only focusing on precise engineering aspects and too detailed installation work. Initially, we focused on optimising one line at a time, without taking into account the traffic that passes through the station on other lines, while now we focus on the bigger picture.

Moreover, another challenge was related to the roll-out of ETCS 2. We were still implementing level 1 when we signed a contract with a supplier for ETCS 2 in 2015. The first pilot line ETCS 2 was commissioned three years later, in 2018. The process was lengthy due to the lack of maturity from both supplier's and Infrabel's side. We had to understand how the supplier's system worked and how to design it for our specific network, which resulted in a long learning period. It took two extra years to have a system ready for a large-scale rollout. We put then the first ETCS 2 roll-out line in service in 2020.

We reached the conclusion to complete future projects related to ETCS 2 by ourselves in the long term (after the Masterplan deadline of 2025).

For our ETCS Limited Supervision lines we decided to proceed differently. We bought the hardware from the suppliers and handled the design, testing, and other tasks ourselves. This resulted in a timeframe for the implementation of ETCS limited supervision of about six months per project instead of 1-2 years for ETCS FS. So we can now deploy quickly this level on our network.

Finally, we realised that while ETCS is a "supranational" system, it still has to comply with national rules, therefore suppliers can face challenges due to the country-specific aspects of the projects, especially when it comes to adapting ETCS to work in unison with the existing signalling system.

#### 4. What was your experience with equipping the north-south axis in Brussels with ETCS 1?

A thorough study was necessary considering that this is a high-density node in Belgium with a mix of trains. We had TBL1+<sup>10</sup> installed at that moment and we wanted at least to keep the same capacity as before. We did software simulations and tested in real life. We did a concrete proof of concept with SNCB/NMBS, where we used mixed trains (quick ones and slower ones). We simulated in real time from Brussels-South to Brussels-North station and vice-versa. We measured in practice all time driving in TBL1+ and also in ETCS and we noticed that the outcome was rather positive: we did not lose any capacity. Additionally, we measured the transit time of about 5000 trains between Brussels North and Brussels South both one month before and one month after ETCS implementation in order to make

a comparison. In case of normal operations without delays, the time recorded was the same. In case of heavy traffic at peak hours, we gained some seconds. Considering that the aim was to not lose capacity, we considered it as a very positive outcome. Furthermore, we made some design rules and added some extra balises in order to improve accuracy on the registration of the movement of the trains.

Concerning operational aspects, we took advantage of ongoing works in the tunnels and added the cables and extra balises at the same time. We try to anticipate works and combine them for efficiency reasons and in order to optimise works on those nodes that otherwise would be difficult to get out of service. Technically speaking, we add ETCS infrastructure first in a shadow mode for testing and certification. When this is successful, we turn to the actual commissioning of the system<sup>11</sup>.

#### 5. Are there any plans on decommissioning the current class B systems?

There are currently three different ATP (Automatic Train Protection) systems in Belgium, which are designed in such a way that they can operate together:

- Memor-crocodile, since the 30's
- TBL1, since the 80's
- TBL1+, since 2005

Based on the Royal decree in place in Belgium that foresees the implementation of ETCS by the end of 2025 and the previously mentioned Masterplan, we have to decommission Memor-crocodile – the first Class B system in use - when we install ETCS. The decommissioning of TBL1 is also foreseen by end of 2023 in this Decree.

The current Class B system, TBL1+ - the most recent and secure ATP system with which all main railway nodes are equipped - will be kept in operation until 2025 in parallel with ETCS. After 2025, train traffic with lineside signalling and TBL1+ will not be allowed anymore. It is important to note that the equipment used for TBL1+ is compatible with the ETCS system. The TBL1+ information is included in the Packet 44 available in the ETCS specification. Therefore, it represented a sustainable investment, because changing from TBL1+ to ETCS 1 FS and Limited Supervision often demands only an adaptation in the balise and Lineside Electronic Unit (LEU) configuration.

On a different note, we are aware that other countries focus first on the on-board implementation and then on trackside implementation (e.g. Denmark prioritises onboard implementation to reduce trackside signalling assets). However, we have decided to advance simultaneously on both sides (trackside and onboard) even though this might lead to a more gradual approach. We believe that this choice will contribute to increase safety as quickly as possible.

<sup>10</sup> Belgian Automatic Train Protection system which uses Eurobalises using P44 ETCS solution

<sup>11</sup> [Infrabel on LinkedIn: Opération de nuit : mise en service de l'ETCS 1 - Bruxelles et Schaerbeek](#)

## 6. Have you benefited from governmental financial support?

Infrabel received approximately 2 billion euros to execute the Masterplan of 2011 for a timeframe of 14 years. SNCB/NMBS has also been granted a similar amount to equip ETCS on their existing trains and buy new trains directly equipped with ETCS. On the other hand, freight operators can only apply for funding from the European Commission and we expect that it will be more complicated for them to adhere to the 2025 deadline.

## 7. How has the closing of this ERTMS gap affected the continuous operation with ERTMS?

There might be some lessons learnt from the equipment perspective. When implementing, we sometimes face issues with suppliers and are forced to retrofit certain components. Retrofitting during rollout can be complex and it requires to align with all the baselines of the hardware.

We have also come across some areas for improvement regarding the RBC (Radio Block Centre), which is the ETCS 2 central system. Each baseline takes approximately two years to complete, therefore if we identify an issue or want to make an improvement, it takes two years to implement a new version of the system with the necessary updates and certifications. This is a lengthy process and poses a risk for planning.

Regarding the performance of ETCS, we have stable operations with level 1 and very few problems. However, with ETCS 2, we are still facing issues with onboard units at the moment. We are managing the causes, but there are still many incidents or issues on the first lines due to bugs and other factors.

## 8. What have been the lessons learnt from the equipment? How could the lessons learnt be of use to others aiming at equipping busy lines with ERTMS?

Firstly, we have learnt that a misunderstanding of a contract, especially when it comes to complex contents, can lead to misunderstandings of functions and requirements by suppliers, which can impair rollout and products. Therefore, it is crucial to have a clarification before proceeding with developments to ensure that the objectives are aligned.

Secondly, it is very interesting to look at neighbouring countries and learn from their experiences, instead of inventing new solutions each time. We could reuse their knowledge and gain insights from their perspectives. Creating a Movement Authority (MA) in Belgium should not be different from creating one in France or Germany, as we are all working towards the same objective of ensuring safe train travel.

Thirdly, we need to better align with our colleagues working on the tracks. Even though we have been installing ETCS

since 2009, our colleagues are not always well aware of what the system entails. There's a different lead time before and after ETCS from a signalling point of view, and often occurs that our colleagues are still used to the previous system. A lot of infrastructure changes have now an impact on the ETCS configuration.

Finally, through ETCS 2, we can introduce temporary speed reductions via Radio Block Centre (RBC), which will contribute to save time and be more efficient. In ETCS 1, our teams have to drive from one part to the complete opposite part of the country to recharge/reprogram balises with these temporary speed reductions. Today, all Temporary Speed Restrictions (TSR) design/test is centralised in Brussels due to the complexity of ETCS 1 FS modifications (and to guarantee the same approach/ETCS solution in the whole country). Adding TSR on the conventional net on ETCS borders can be very tricky. Since ETCS knowledge at Infrabel is centralised, it is logic that also the design is centralised. Another mode is currently implemented where for ETCS 1 Limited Supervision we work with 'download' packages so the local signalling people can activate / deactivate TSR by recharging the LEU/Balises.

## 9. How do you see the future of ERTMS deployment in terms of challenges and opportunities?

In Belgium, our goal is to gradually move towards ETCS 2 without lineside signals. The challenge we see is that we have to migrate from GSM-R to Future Railway Mobile Communication System (FMRCS) by 2035. Therefore, we plan to deploy FMRCS on the trackside between 2030 and 2035, which requires a new baseline on board and trackside. The estimated cost is of approximately 100 million euros for trackside and might be even higher for the rail operator. We can focus on reducing costs on the trackside with ETCS Level 3, train localisation on board, etc., but then we may end up increasing the cost at the train side. The main challenge in the next years is to let the baseline onboard evolve. Optimum planning will be necessary, especially if we think about installing digital automatic couplers on wagons.

## 10. How would you address the issue with different ERTMS levels and baselines?

Currently, we are in the process of installing ETCS 2 in baseline 2. The Netherlands, on the other hand, plans to install ETCS 2 with baseline 3 on the line connecting to Belgium. However, there may be a communication issue between RBC baseline 2 and 3. Therefore, we must first migrate our line to baseline 3. Such challenges will become increasingly prevalent in the future. Consequently, managing disparate baseline levels between countries will become increasingly complex. For example, based on information from the EU Agency for Railways, installing FMRCS on the ground would necessitate migrating all trains to baseline 4. This would make baseline 3 trains obsolete and thus make it impossible for them to run on the line,



which would be unacceptable for us. Hence, it is imperative that the new TSI (Technical Specifications for Interoperability) subsets and specifications are compatible to avoid creating an unmanageable situation. I believe this issue requires the attention of the European Commission and of the EU Agency for Railways.

**11. In the following months, a renewed CCS TSI will be adopted including the specifications of the Automatic Train Operation (ATO) system over ETCS. Does Infrabel have ATO deployment plans over ETCS? Which lines will be prioritised to be equipped with ATO over ETCS in Belgium?**

There is a long-term plan (2030-2035) to equip the tunnel between Brussels North and Brussels South with ATO to gain capacity for SNCB/NMBS. However, the business case is not totally clear. We can gain capacity in the junction, but this means that all trains have to be ATO. If we only have 10% of the trains with ATO, we will not see considerable benefits. So again, how much time can we take to equip all onboard units?

The objective of Infrabel is mostly to see how we can be more energy-efficient and how we can couple that with our train operators.

For your information, we are testing a new version of traffic management with the driver advisory system. It is an intermediate step before ATO, where we can give some information to the driver to run at a good speed and avoid coming on the red signals and having to first brake totally and then reaccelerate. We see this as a first step before the ATO migration. The lines that would first qualify for ATO deployment would be those where there is many braking and reacceleration instances.

## Latest news

### Disclaimer

All articles included in this section were sourced from publicly available websites covering the period of January – February 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 – The contract for the construction of the railway project on the Rhododafni - Rio section was signed

Greece, January 2023

During a special ceremony at the entrance of the Panagopoula tunnel in Achaia, the contract for the construction of the railway project in the Rhododafni-Rio section was signed in the presence of the Greek Prime Minister Kyriakos Mitsotakis, the Deputy Minister of Infrastructure and Transport George Karagiannis, and the Managing Director of ERGOSE, Christos Vini. The project has been awarded to the consortium of TERNA S.A. and Mytilineos S.A. The cost of the project amounts to EUR 129.5 million, and the works are expected to last 36 months.

**The project has been co-financed by the European Union through the NSRF 2014-2020, under the Operational Programme "Transport Infrastructure, Environment, and Sustainable Development". The construction of a double railway line and the installation of modern railway electrification and signalling systems with ETCS on the Rhododafni-Rio section will improve safety, increase network capacity, and provide better service and comfort for passengers.**

**The EUR 515.3 million project is part of the broader effort to modernize and overhaul the Greek railway network. It includes 28.8 km of double railway superstructure, 4 railway stops (Rododafni, Selianitika, Kamares, and Agios Vasilios), 3 railway stations (Psathopyrgos, Arachovitika, and Rio), electromechanical installations within the Panagopoula tunnel, a two-way signalling system with remote control and ETCS level 1, an electrification system, and a telecommunications system.**

Regarding the signing of the contract, the President and CEO of ERGOSE, Christos Vini, noted: "Over the past three years, with a steady pace and in full cooperation with the Ministry of Infrastructure and Transport, we have been planning and implementing key projects, committed to the effort for the fastest possible upgrade of the Greek railway. The construction of this project brings us one step closer to our strategic objective of providing our country with a railway network that meets the modern needs of the transportation sector".

Source: <https://www.dimoprasion.gr/ypegrafi-symvasi-gia-tin-kataskevi-tou-sidirodromikou-ergou-sto-tmima-rododafni-rio/>

### Belgium – 58 kilometres of ETCS were installed overnight

January 2023

**In December, Infrabel installed 58 kilometres of ETCS in the Brussels area with a crew of about a hundred people. A total of 320 signals were equipped with ETCS.**

**During the night of December 17-18, 15 Infrabel teams carried out final tests and adjustments for the commissioning of the ETCS beacons in the tracks at various locations, including Schaerbeek, Brussels-North, the railway tunnel, Brussels-Central, and Brussels-South.** These beacons ensure the transmission of information to the trains. The installation took place at night because all train traffic had to be stopped to safely access the tracks and perform the work in complete safety. Replacement buses were provided for passengers and there was a modified train service offered by SNCB.

#### Team Spirit

The infrastructure manager even created a nice video about the project which was posted on LinkedIn. The video shows the employees at work. Approximately 100 people were involved in this coordinated action, and there was a great team spirit, making everything go smoothly.

#### Signalling

**The ETCS signals represent a significant step forward in the digitalization of signalling. The information from the beacons in the tracks is also sent directly to the control centre, affecting the driver. ETCS provides constant and complete safety monitoring of train travel and enforces the maximum permitted speed. If a train driver exceeds the permitted speed or fails to obey signals, the system will immediately activate the emergency brake. The rollout is taking place according to the ETCS Master Plan with the aim of gradually increasing rail safety.**

Source: <http://www.treinbestuurder.be/nieuws/read.php?id=10341>

### Bulgaria – Nearly 250 million BGN for the urban railway of Plovdiv from EU funds

February 2023

Nearly 250 million BGN has been secured from European funds for the implementation of the Plovdiv urban railway

project. For this purpose, a working group has to determine the railway stops on the existing track in the city within a month. The procedure for the purchase of trains is already underway.

This became clear during the project implementation meeting in Plovdiv, attended by Deputy Prime Minister and Minister of Transport and Communications, Hristo Alexiev, Regional Governor Angel Stoev, Mayor Zdravko Dimitrov, Deputy Minister of Transport Krasimir Papukchiyski, Director General of National Railway Infrastructure Company Zlatin Krumov, as well as representatives of municipalities and businesses in the region.

**The implementation of ERTMS signalling and telecommunication system is also planned, which will increase the safety of rail transport and give higher quality services.**

Source: <https://www.mediapool.bg/blizo-250-mln-lv-za-gradskata-zhelezniitsa-na-plovdiv-ot-evrofondovete-news344840.html>

## Czechia – According to the director, ČD will invest approximately CZK 10 billion in vehicles to secure ETCS

January 2023

Czech Railways (ČD) will invest approximately 10 billion crowns in its vehicles due to the introduction of the European signalling system ETCS. According to Michal Krapinec, the General Director of ČD, in an interview with ČTK, the mobile part of ETCS will be installed in over 400 vehicles, and staff will receive training on the new system.

**This year, Krapinec stated, the installation of ETCS will start with electric InterPanter units, control cars, selected types of motor vehicles and units, such as RegioShark, and in motor locomotives. Last spring, a trial operation under ETCS supervision began between Olomouc, Přerov, and Breclav, with other sections gradually being added. Since the New Year, trains have been running exclusively under ETCS operation on the Olomouc-Uničov line.**

Krapinec also mentioned the preliminary statistics of ČD Cargo's freight transport for last year. According to him, the subsidiary of ČD transported approximately 62 million tonnes of goods last year, despite adverse circumstances such as the conflict in Ukraine, the energy crisis, and sharply rising freight input prices. He stated that the biggest contributor to the year-over-year increase was the increased interest in the transport of lignite and fuel, but that ČD Cargo had to search for new routes because of the war in Ukraine.

Between 2021 and 2030, ČD plans to invest up to CZK 100 billion in the renewal of trains, as per the director's statement. For international transport, ČD is acquiring 50 Vectron electric locomotives with a speed of 230 km/hr, and 20 new nine-car ComfortJet trains. In regional transport, ČD is gradually putting into operation new RegioPanter electric units, and diesel units from the Polish manufacturer PESA are in production.

Source: <https://www.elogistika.info/cd-budou-podle-reditele-investovat-kvuli-zabezpeceni-etcs-do-vozu-asi-10-mlrd-kc/>

## Croatia – AŽD successfully continues to conquer European markets

January, 2023

AŽD, whose modern products can be found in 20 countries around the world, has managed to enter the Croatian and Hungarian railway markets. In both cases, Czech signalling, communication, and control technologies will be installed on sections of the key transport backbones of both countries.

In Croatia, AŽD was successful in its bid to supply signalling and telecommunications equipment on the Hrvatski Leskovac-Karlovac railway line and concluded a contract with HŽ Infrastruktura (Croatian Railways) in Karlovac in the presence of Croatian Prime Minister Andrej Plenković and Minister of Transport Oleg Butković. AŽD will act as the main contractor for the deliveries. The contract is valued at 263.5 million CZK HRK and implementation will take 30 months.

**AŽD will also equip the 44 km railway line with a unified European Train Control System (ETCS) level L1, with an extension of one Radioblock Central for ETCS level L2. This railway section is part of the pan-European corridor (Zagreb-Rijeka).**

Source: <https://silnice-zeleznice.cz/zeleznice/spolecnost-azd-uspesne-pokracuje-v-dobvyvani-evropskych-trhu-781>

## Finland – Sweco wins several track maintenance framework contracts from the Finnish Transport Agency

January 2023

Sweco has won several framework contracts for track maintenance from the Finnish Transport Agency.

Sweco will provide the Finnish Transport Agency with planning and expert services for track maintenance from 2023 to 2025. The framework contracts cover all eight tendered tasks, and the assignments received by Sweco and their values will be communicated separately.

### Digirail Expert Services

**This task involves planning and expert services for the Digirail project, including expert services related to ERTMS.**

The contract value is 100 million euros, divided among the framework partners. The contracts have a two-year option.

Source: <https://kuljetuslehti.fi/2023/sweco-voitti-useita-radanpidon-puitesopimuksia-vaylavirastolta/>

## France – The Omneo Premium Hauts-de-France is unveiled

January 2023

The first Omneo Premium Hauts-de-France – train was unveiled on 24 January 2023 at Alstom's Crespin plant in the presence of Jean-Baptiste Eyméoud, CEO of Alstom France, Xavier Bertrand, President of the Hauts-de-France Region, and Jérôme Bodel, Regional Director of SNCF Voyageurs in Hauts-de-France.

The agreement includes the transfer of the Paris-Amiens and Paris-Compiègne-Saint-Quentin-Maubeuge/Cambrai TET (Trains d'Equilibre du Territoire) lines to the Hauts-de-France Region. These lines, also known as Picard Y, are now used by 140,000 passengers daily. The renewal of the Corail train coupons and the BB 22200, pulled by 19 Omneo Premium trains, is imminent. The first Omneo Premium Hauts-de-France multiple unit, number Z 55769/55770, is a 135.37-metre-long multiple unit with 10 modules.

The delivery of the 19 trains will be spread over the years 2023 and 2024, and the commissioning of the first trains will take place quickly, "before the summer of 2023", according to Xavier Bertrand. **These 19 trains represent an investment of 287 million EUR, borne by the state and the Hauts-de-France region. In addition to the Omneo multiple unit set, the first of 33 Regio 2N ERTMS multiple unit sets for the same Picard Y lines was also presented. It should be noted straight away that the Omneo is intended for fast trains and the Regio 2N ERTMS for the Picard Y's bus services. The 135-metre-long trains are single-class, arranged in 3+2 rows (some seats are three-seater) to maximise passenger carrying capacity. ERTMS equipment (which is mandatory on TSIs) will also allow these trains to operate on the Roissy-Picardie line. The first set of railcars will soon enter trial service and delivery of the 33 trains will take place between 2024 and 2025.**

Source: <https://www.mobilitesmagazine.com/post/l-omneo-premium-hauts-de-france-devoile>

## Germany – Stadler: Retrofitting of DB trains

January 2023

**Stadler and DB Netz AG have signed a contract for the retrofitting of up to 80 maintenance and track work vehicles with the Stadler ETCS train protection system GUARDIA (European Train Control System).** With the retrofitting, GUARDIA will be used on a large scale for the first time by Deutsche Bahn in the maintenance sector. Stadler has won a Europe-wide tender for the retrofitting of up to eighty special vehicles of DB Netz AG with the GUARDIA (ETCS Baseline 3.6.0) train control solution developed in-house.

In a first step, the retrofitting will be carried out on eight maintenance and track work vehicles of the 711.1 and 741.X series, which will go into service on the networks of DB Netz AG in Germany and Switzerland from 2024. The order includes an option for up to 72 additional vehicles.

The retrofit is already the second use of GUARDIA on Deutsche Bahn vehicles: the DB Advanced Train Lab of the class BR 605, exhibited during Innotrans 2022, was also equipped with GUARDIA as part of a pilot project together with two locomotives of the type BR 185.2. **With the retrofitting of the maintenance and track work vehicles, the reliable and safe operation of the vehicles is significantly increased, as additional functions are available for operation with ETCS Baseline 3.6.0 compared to older ETCS versions.**

Source: <https://www.bahnberufe.de/2023/01/25/stadler-nachrüstung-von-db-zuegen/>

## Greece – Greek railway: final works on the Athens – Thessaloniki line to be completed by the end of 2023

January 2023

We will need to reach the end of 2023 to see the two ERGOSE contracts concerning signalling and ETCS completed on the main railway artery of the country from Athens to Thessaloniki and from there to Idomeni and Promachona on the border with Bulgaria and North Macedonia.

According to railway sources, the signalling work, contract 717, has progressed further. From Platy to Promachona, the section has been delivered with Administrative Receipt, being the first from all of them. The section from Platy to Domokos is under delivery, while according to the same sources, some sections have already been completed.

In the Domokos-Tithorea section, the signaling works have been completed by another contractor, while the works from Tithorea to Athens are in progress. According to the updated schedule, the projects as a whole should be completed by the end of September. The contractor is the TOMH-ALSTOM scheme.

**At the same time, the contract 635 concerning ETCS continues and, according to the current schedule, should be completed at the end of 2023.** The two contracts essentially come to complete the infrastructure works for the new dual electromotive line Athens-Thessaloniki.

As of last year's Easter, ERGOSE started a third contract regarding signalling in the Thessaloniki-Eidomeni section. This project has been undertaken by the AVAX-ALSTOM scheme and is scheduled for completion in the first half of 2025.

Why are these projects important?

The three contracts above concern electromechanical systems and not construction of a line, infrastructure or something else more "tangible". But the importance of these projects lies in the result they will bring.

The signalling project in full operation will improve rail safety along the entire length of the line and increase network capacity. The signalling is for the railway, as are the traffic lights on the roads.

They essentially "converse" with the train driver about the state of the line in front of him, increasing railway safety.

**With the ETCS system, information is transmitted from the ground system to the train, where a trip computer uses it to calculate the maximum permitted speed, then automatically slows the train down if necessary.**

### Better rail services

With the operation of the two systems, both passenger and freight trains will be able to travel faster and safer. The goal is to reduce the country's main passenger route between Athens and Thessaloniki to 3 hours and 30 minutes.

**Also the completion of signalling and ETCS up to the border will mean the improvement of our country's interconnectivity for international rail routes (which are currently limited to freight).**

This may also mean the launch of international passenger routes to connect Athens and Thessaloniki with neighbouring countries, something that has been happening in the rest of Europe for decades, while with the upgrading of rail transport, trains have been prioritized at the level of the European Union.

Source: <https://ypodomes.com/railway-works-on-the-athens-thessaloniki-northern-borders-artery-are-progressing/>

## Hungary – One of Friday night's InterCity trains was a double-decker train, never before seen in Szeged

January 2023

Due to the fatal accident in Nagykőrös in the evening, the railway company was so confused that it replaced the Szeged InterCity train, which was departing from Budapest at 19:53, with a Stadler KISS type elevated train. If true, a double-decker train has never been to Szeged or even to the county, as these trains were specifically bought for the Budapest suburban lines and can still be seen at Lake Balaton in the summer.

The vehicles have large entry spaces for optimal passenger flow and the manufacturer designed twelve doors per side to ensure rapid passenger exchange. **According to MÁV, the quality of service is enhanced by the exceptionally quiet operation, spacious and bright interiors, and an advanced air conditioning system. The Stadler KISS trains are also equipped with the ETCS L2 train control system, which enables the use of the permitted speed of 160 km/h on lines upgraded with EU funds, depending on track parameters.**

Source: <https://szegeder.hu/helyi/2023-01-28/emeletes-vonattal-adtak-ki-az-egyik-pentek-esti-intercity-t-soha-nem-jart-meg-ilyen-jarmu-szegeden/63d43b3347d3c071264592a5>

## Italy – FS Group, 283 new tenders worth over 25 billion in 2022

January 2023

Milan - The year 2022, which has just ended, was a year with important results for the FS Group's Infrastructure Pole led by RFI, which launched 283 new tenders on the market worth more than EUR 25 billion, of which more than EUR 10 billion for works in the NRLA. Italferr, an FS Group company, played a key role in the realisation of many projects. The FS Group's engineering company has, in fact, supported RFI in the entire project approval process, managing interfaces with territorial and institutional stakeholders, and has overseen the preparation of the technical-economic documentation for all tenders and the verification of final and technical-economic feasibility projects for validation purposes.

The year 2022 also closed with important numbers for Italferr. More than 2,400 orders managed in Italy for a total production value of about EUR 335 million. **For the ERTMS plan, within the scope of the NRRP objectives that envisage the installation of the most advanced train spacing system on 3,400 kilometres of the Italian railway network, Italferr supported RFI in achieving the challenging goal of**

**awarding the two framework agreements within the terms established by the National Recovery and Resilience Plan.**

In addition, during 2022, the company was engaged in the drafting of 25 projects, initiating the first two multidisciplinary technological worksites in Sicily.

Central to this scenario is the digitalisation process. A turning point, that of digital, also for the world of construction sites. **In fact, Italferr, as part of its supervision and works management activities, has launched a series of initiatives to digitise and innovate its processes in order to make them more efficient and effective, also by providing differentiated upgrades for integrated contracts, no-captive contracts rather than technological projects such as ERTMS.**

Source: <https://finanzanow.com/gruppo-fs-283-nuove-gare-per-oltre-25-miliardi-nel-2022/>

## Norway - Alstom to deliver 25 new Coradia Nordic regional trains to Norske tog

February 2023

Alstom has been awarded a new contract worth over EUR 230 million for the delivery of 25 new Coradia Nordic regional trains to the state-owned company Norske tog AS. This is the second order in the EUR 1.8 billion framework agreement that Norske tog signed with Alstom at the end of 2021, which is Norway's largest train procurement contract. The first order of 30 regional trains is in production with deliveries expected to start at the end of 2025.

"We look forward to receiving the 25 new trains from Alstom. It will improve the capacity and offer to the passengers" says Øystein Risan, CEO Norske tog AS.

Coradia Nordic for Norske tog is specially adapted to the needs of the Norwegian rail network and is fully suitable for Norwegian weather conditions. The new trains have a top speed of 200 km/h, providing passengers with an efficient and comfortable journey in a spacious and comfortable environment. Each train set will consist of six carriages.

**Trains will be equipped with Alstom's ERTMS digital signalling system, a pan-European on-board signalling system that continuously ensures the safe movement and correct speed of trains.** The on-board signalling system removes the need for the driver to read signals running along the tracks and provides fail-safe data processing that anticipates driver actions in case of unsafe conditions. **Trains will be able to run on tracks equipped with the traditional Norwegian signalling system and on the new ERTMS-adapted tracks being rolled out now.**

Source: <https://dfly.no/alstom-skal-levere-25-nye-coradia-nordic-regiontoa-til-norske-tog/>

## Poland - ETCS on PKM line with approval for operation

January 2023

Poland's rail network has officially expanded by 18 kilometers with the implementation of the European Train

## **Control System (ETCS). This system has been installed on the Pomeranian Metropolitan Railway (PKM).**

Since the construction of the PKM began, it was known that it would include the European ETCS Level 2 safety system. The PKM line was built to be able to operate under ETCS Level 2 as early as 2015. However, it wasn't until the end of 2022 that the President of the Railway Transport Authority issued a permit for the operation of the "Control - trackside equipment" structural subsystem on railroad lines 248 from km 1,204 to km 18,182 and 253 from km 0,000 to km 1,356, specifically on the PKM line in Gdansk.

Blazej Szumala, Communications and PR Assistant at PKM, stated, "We have been technically ready to accommodate carriers under ETCS for a long time and we view the mentioned permit as a crowning achievement of our efforts."

The PKM representative added, "We are currently finalizing two ongoing investments on the line: electrification, with the construction of the Gdańsk Firoga stop, and the construction of the Kartuzy bypass. During this process, certain elements of the system will be modified. We are also finalizing the necessary documents to run traffic, and once the investment is completed, we hope to be ready to allow the operator to use ETCS."

Source: <https://www.rynek-kolejowy.pl/wiadomosci/etcs-na-linii-pkm-z-dopuszczeniem-do-eksploatacji-111498.html>

## **Romania – Alstom will electrify 66 km of Romania's Cluj-Napoca-Oradea railroad line and build a Level 2 ERTMS system**

January 2023

Alstom and Arcada will modernize a 66-kilometer section of Romania's Cluj-Napoca-Oradea railway line. Alstom will provide digital train control and traffic management solutions, while Arcada will oversee the construction work.

Alstom has been awarded two new contracts for signalling and electrification in Romania as part of modernization work on the first two sub-sections of the Cluj-Napoca-Oradea line. The contracts were signed by the RailWorks consortium, which includes Alstom and Romanian construction firm Arcada, with CFR SA, Romania's state-owned railway infrastructure operator. Alstom will supply state-of-the-art digital train control, traffic management solutions, and electrification infrastructure, and Arcada will perform all civil works. The completion period for each contract is 42 months.

Alstom's digital control center, installed in Cluj-Napoca, will manage traffic on the entire 166-kilometer railway line.

**The two contracts cover the modernization of 66 km of double-track railway line between Cluj-Napoca and Poieni, including 30 km from Cluj-Napoca to Aghireş and 36 km from Aghireş to Poieni. The project involves electrification, infrastructure upgrades, signalling, and telecommunications systems, as well as civil works. Alstom will directly oversee the implementation of the ERTMS Level 2 system, passenger information, and electrification**

**work. The modernization will enable speeds of 160 km/h for passenger trains and 120 km/h for freight trains.**

Alstom will build two traction substations for the electrification work, which is being financed under Romania's National Plan for Reconstruction and Resilience (PNRR).

Source: <https://www.nakolei.pl/alstom-zelektryfikuje-66-km-rumunskiej-linii-kolejowej-kluz-napoca-oradea-i-zabuduje-system-ertms-poziomu-2/>

## **Slovakia – The European Investment Bank may provide a loan of hundreds of millions of euros for the modernization of the railway in Záhorie**

February 2023

The European Investment Bank (EIB) intends to provide Slovakia with a framework investment loan of EUR 194 million for the modernisation and electrification of the railway sections Devínska Nová Ves - Kúty and Devínska Nová Ves - Marchegg.

**This would be the first green loan for Slovakia.**

Although the draft contract for financing part of the project is yet to be approved by the government, the Ministry of Finance of the Slovak Republic has already submitted a draft loan agreement for inter-ministerial comments lasting until 7 March. Approval of the EIB loan and signing of the financing contract would not impact the increase of the national debt.

**The planned investment of the Slovak Railways (ŽSR) for the modernisation and renewal of railway infrastructure to the borders with the Czech Republic and Austria has a total volume of EUR 890 million. It includes electrification of railways, installation of the European Rail Traffic Management System (ERTMS), and reconstruction of stations and stops.** Approximately 60 kilometres of basic railway infrastructure in the Záhorie region within the TEN-T trans-European network will be reconstructed and modernised, with the projected speed of the lines up to 200 kilometres per hour. European Union funds of EUR 671 million and other sources of EUR 25 million will participate in the financing of the project.

Source: <https://theworldnews.net/sk-news/europska-investicna-banka-moze-na-modernizaciu-zeleznice-na-zahori-poskytnut-uver-stoviek-milionov-eur>

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

January 2023

The Spanish Ministry of Transport, Mobility, and Urban Agenda has awarded a contract worth 253,098.42 EUR to the consortium of Meta and Tema Águilas to conduct an informative study of the new railway access to the town of Águilas in Murcia. The study, which has a completion period of fifteen months, aims to improve railway facilities in the town. The study will analyse several alternatives for the railway access to Águilas, including the passenger station, taking into account the new high-speed line between

Murcia and Almería and the existing line 03-322 Murcia Cargas - Águilas between Pulpi and Murcia.

**The planned improvements include the implementation of standard gauge, electrification, ERTMS safety and communication installations, and the elimination of level crossings.** The study will evaluate a sufficient number of viable route alternatives under technical, economic, environmental, and operational criteria, and determine the optimal alternative.

URL: <https://vialibre-ffe.com/noticias.asp?not=37232&cs=inf>

## Sweden – Alstom wins Swedish maintenance contract with VR for a fleet of 30 regional trains

January 2023

A 10-year maintenance contract worth nearly SEK 1 billion has been signed for the maintenance of the Tåg i Bergslagen fleet in Alstom's workshops in Gävle and Västerås.

Alstom, a global leader in smart and sustainable mobility, has won a renewed contract with VR for the maintenance of 30 regional trains in Sweden.

**The new contract will take effect on December 10, 2023.**

**Alstom is the leading supplier in the Swedish railway market, having delivered over 1,000 trains to the Swedish railway. Ongoing projects include metro trains (C30) for Stockholm, new regional trains for Gothenburg, and SJ's**

**upcoming high-speed train (SJ250). Alstom also maintains its 16 local depots, including those in Motala and Västerås specializing in heavy maintenance and renovations. The company is leading the roll-out of ERTMS in Sweden, both onboard and on the tracks, and is supplying the standardised national traffic system to the Swedish Transport Administration. Alstom employs around 2,000 people in Sweden.**

VR Sweden is responsible for operating the Pågatå trains in southern Sweden on behalf of Skånetrafiken and bus services in Helsingborg and Kristianstad. In Östergötland, VR Sverige operates the Östgötapendeln on behalf of Östgötatrafiken. In Stockholm, VR operates buses, trams, and local trains on behalf of SL. With around 3,000 employees, 520 buses, 179 trains, and 68 trams, VR Sweden creates modern transport solutions with a focus on safety. VR Sweden is owned by the Finnish VR Group, which has been operating trains, buses, and trams in Finland for 160 years. Together, they take great environmental responsibility and contribute to reducing the environmental impact of transport and society's carbon footprint.

Source: <https://www.tillverkning-sverige.com/news/63730-alstom-vinner-svenskt-underh%C3%A5llskontrakt-med-vr-f%C3%B6r-en-flotta-p%C3%A5-30-regionalt%C3%A5g>

# Latest development: Adoption of the CCS-TSI

The **CCS TSI has been adopted in the Railway Interoperability and Safety (RISC) Committee** on 30 March 2023 together with the rest of the TSI. The new text voted by the Member States includes several updates that improve the ERTMS system and support its deployment.

The main changes agreed include:

- The **ERTMS game-changers**, which are key to future digitalisation. They build on ERTMS and aim to achieve higher capacity and better performance. They include:
  - Automatic Train Operation (ATO grade of Automation [GoA] 1/2), reducing energy consumption and increasing capacity;
  - Readiness for the future Radio Mobile Communication System (FRMCS), replacing GSM-R and introducing 5G technologies;
  - Braking curve model optimisation, for improvements through the balance between safety and capacity requirements;
  - Provisions to allow for the deployment of ETCS Level 2 with moving block (formerly Level 3), which increases capacity and reduces trackside life cycle costs;
  - Onboard train integrity, complementing the provisions above and providing a significant opportunity for cost reduction in trackside equipment;
  - Further enhancement of safety and efficiency of manoeuvres, through the (supervised) mode of supervised manoeuvres replacing the unsupervised shunting mode.
- The facilitation of the **introduction of digital technologies in rail through modularisation**. It includes work primarily on changes linked to CCS onboard modular architecture to deliver a more flexible and robust system starting with modularity of the European Vital Computer (EVC) interface with Radio and Automatic Train Operation (ATO) and coming later with the modularity of the interface with the vehicle.
- Enhancements to ERTMS **technical and operational harmonisation and alignment with the different digital registers** hosted by the European Railway Agency. This includes
  - requirements to avoid partial fulfilment of products to the CCS TSI;
  - greater harmonisation of operational rules linked to ERTMS implementation;
  - necessary ERTMS data included in RINF (Register of Infrastructure).
- Provisions to ensure **robust maintenance of the CCS TSI technical specifications and products** through:
  - Introduction of error corrections procedures, which are essential to ensure interoperability on increasingly integrated networks. It will have a focus on unacceptable errors in a given area of use of the products;
  - Single set of specifications, to allow for error corrected specifications that include different clearly identified onboard envelopes for functional options.
- Improved request for **National Implementation Plans**, including an obligatory template with additional information on onboard deployment and cross-border sections. This will allow to have a source of detailed ERTMS planning in the complete European network.



## Farewell Mr. Carlo Borghini

We would like to take a moment to express our gratitude to Carlo Borghini for his outstanding work.

During his tenure as Executive Director of the Europe's Rail Joint Undertaking, Mr. Borghini played a crucial role in advancing the development of sustainable, innovative, and user-friendly rail technologies across Europe.

Under Mr. Borghini's leadership, the Europe's Rail Joint Undertaking has made significant progress in promoting cooperation and collaboration among key stakeholders in the rail industry, including manufacturers, operators, and research organisations. His tireless efforts and unwavering

commitment to promoting sustainable mobility have been instrumental in advancing Europe's transportation infrastructure and reducing the region's carbon footprint.

We wish Carlo Borghini the very best of luck in his new role as Assistant Secretary General for Executive Management at the NATO Headquarters in Brussels. We are confident that his experience, knowledge, and leadership will continue to make a positive impact on our global community.

We are grateful for his many contributions to Europe's rail system.

## Train accident in Greece

**On 28 February 2023, a passenger train and a freight train collided in Thessaly, Greece.**

On behalf of the European Commission, Commissioner Adina Vălean expressed her deepest condolences to the people of Greece, particularly to those who lost loved ones, and wished a full and speedy recovery to those who were

injured. Moreover, she thanked the rescue services and medical teams on site who helped the injured. Commissioner Vălean highlighted that the European Commission and the European Railway Agency will closely follow the investigation, which will be carried out by the Greek authorities, in accordance with the EU rules.

## Contact details



For further information on ERTMS,  
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