Will ERTMS ever reach critical mass in Europe?

Although the EU only agreed a revised ERTMS deployment for Europe in 2017, the timetable for implementing ETCS is suffering delays, mainly due to infrastructure projects running late and retrofitting of train fleets proceeding at snail pace. As **David Briginshaw** reports, the EU is now looking for ways to accelerate the programme including a huge injection of funding.

Photo: DB/Frank Kniestedt

SWEDEN is the latest European country to announce a delay to its ERTMS roll-out programme (p10). National infrastructure manager Trafikverket says it wants to give train operators more time to withdraw old trains, equip existing trains with ERTMS and purchase new ERTMS-equipped trains. Trafikverket also cites the complexity of installing ERTMS at major stations and hubs and coordinating its work with neighbouring Danish infrastructure manager Banedanmark.

Unfortunately Sweden's experience is all too common, and does not bode well for the European Union's (EU) revised European Deployment Plan for ERTMS which was agreed in 2017. "We are already behind schedule," says Ms Elisabeth Werner, director of land transport with DG Move, who was speaking at the European Agency for Railways' (ERA) CCRCC 2019 ERTMS conference in Valenciennes in October. "Some 5700km have been delivered compared with a target of 7700km."

The Deployment Plan really refers to the installation of ETCS, the signalling and train control element of ERTMS, as the roll-out of GSM-R, the telecommunications element, has been a great success and has been deployed on more than 140,000km in Europe.

Mr Matthias Reute, who took over as European ERTMS coordinator in January 2019, says most of the delays do not exceed two to three years, and the majority of the pending lines are under construction. "Furthermore, in a number of cases the works have finished but the line is not in operation for various reasons," Reute told delegates in Valenciennes.

"Nobody is questioning the rationale for ERTMS deployment anymore," Reute says. "It was not the case even a couple of years ago. Now, it is no longer a question of 'if' but rather 'when and how'."

While this is real progress - ERTMS conferences used to be lively affairs with much heated debate between the protagonists and those vehemently

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opposed to the platform - there is still a lot of foot dragging and a range of attitudes to it in Europe, as Reute explains. "Several early movers for nationwide deployment delay it, which undermines the business case for retrofitting rolling stock," Reute says. "Others are on track and intend to decommission class B systems but rolling stock in neighbouring countries is not ready. There are also ERTMS ghost lines, where lines are equipped but not used.

"It seems that some member states are deploying ERTMS just because it is required by Brussels but without the deeper conviction that it makes any sense or without having a vision of the ultimate objective. But they might be good pupils and even deploy ERTMS on the core network by 2030. Other member states are doing the absolute minimum and without a sudden policy change, there is no chance they will deploy ERTMS on the core network by 2030. Some member states realise the potential to deploy ERTMS nationwide and have announced ambitious plans. These countries realise that equipping just a corridor does not bring sufficient benefits."

According to Werner, fully executed national deployment plans are vitally important to delivering the wider deployment of ERTMS, but she says national plans must take note of the European and corridor dimensions in their planning and execution. "Luxembourg, Belgium, Denmark and Sweden are all in the process of moving to full network deployment," Werner says. "Germany and Italy have ambitious plans. Alongside the full network deployment already achieved in Switzerland, this means that significant networks and international corridors will be equipped in the coming years.

"ERTMS will only demonstrate its full value when it reaches a critical mass, when it reduces costs for infrastructure managers and when for operators it is a replacement system rather than an additional cost. We must redouble our efforts. We expect the commitments made in the deployment plan to be kept."

Nevertheless, as Mr Josef Doppelbauer, ERA's executive director, observed, there is still more track-km of ERTMS deployed outside than in Europe.

Justification

One of the challenges for railway managers in justifying investment in ERTMS is to produce a compelling business case. "A study conducted by DG Move and finalised in mid-2019 demonstrates that there is a business case for ERTMS deployment on all core network corridors at the system level, but not necessarily for each section of the network or each operator," Reute says. "There are big savings for infrastructure managers if they go for ETCS Level 2 or Level 3."

Mr Ian Conlon, policy officer with DG Move, pointed out that ERTMS deployment on all nine corridors have on average an overall internal rate of return of 9.6% ranging from 6.8% on the Mediterranean corridor to 13.4% on the North Sea - Baltic corridor. "By 2023, we should be in touching distance of ERTMS deployment on the Rotterdam -

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Milan corridor," Conlon says. "We will then have a different perspective of ERTMS."

Reute says the best transition deployment strategy is a dual onboard strategy, which means the fleet has to be equipped with ETCS Baseline 3 Release 2.

Decommissioning of Class B conventional trackside signalling systems will bring about significant maintenance savings for infrastructure managers, especially when ETCS Level 2 or the future Level 3 is installed as they eliminate the need for lineside signals and cabling. "Getting rid of Class B systems must be done in a coordinated way with a sufficient transitional period," he says. "In some cases, there is not enough coordination between trackside and onboard deployment, also across borders.

"We need a deadline for decommissioning Class B systems in Europe - using two systems for decades does not make any sense. It is to some extent an insult to European taxpayers."

RFI: ahead of the game for ERTMS deployment

ITALIAN Rail Network (RFI) started to install a digital signalling system in 2001. Mr Fabio Senesi, director of RFI's technical department, says it took this path because "ERTMS wasn't mature enough to install" at that time. "This means our fleet is 90% ready for ETCS," he told IRJ in Valenciennes.

ETCS Level 2 Baseline 3 is now installed on 738km of high-speed lines in Italy without a fall-back signalling system. These high-speed lines are used by around 300 trains per day travelling at a maximum speed of 300km/h at five-minute headways with the potential to reduce this to three minutes.

RFI has ambitious plans to introduce ETCS Level 3 high density in the major cities and satellite positioning starting in 2021, followed by ATO in 2022, and FRMCS from 2025 onwards.

RFI has considered three scenarios for the installation of ERTMS nationally:

- on the TEN-T corridors with 10,755km equipped and Class B signalling decommissioned by 2050
- equipping the rest of the network after the TEN-T corridors on 15,911km by 2060, and
- an accelerated programme to equip both the TEN-T corridors and the conventional network and decommission the Class B signalling by 2035.

Senesi says the accelerated programme has the best cost:benefit ratio. "We want a law to be passed in Italy so that we can remove the old signalling and go straight to ERTMS," he told IRJ. "We don't want ERTMS overlaid on the traditional signalling because it is complicated and expensive. We would never use ERTMS while the old system is still there, but we would have to maintain ERTMS in case it is used. We need to speed up."

Senesi points out that the Czech Republic received 85% funding for ERTMS because it is an EU Cohesion Fund country. "We need the EU to increase the proportion of funding above 50% up to 70 to 80% to fit the onboard ETCS."

Currently, 13 national networks in Europe have plans to remove their Class B signalling systems, while eight networks including Britain and France do not. Germany has yet to decide what it intends to do.

While infrastructure managers are the main beneficiaries of ETCS deployment, with lower operating and maintenance costs, operators face very high upfront costs for retrofitting locomotives and trains, and the older the vehicle, the higher the cost. This is now recognised, as Reute explains. "Operators, especially freight and international passenger, cannot be left alone with retrofitting. There is a need for tangible public intervention, as the benefits of ERTMS might come many years later while the costs are incurred now."

There is a huge task ahead as 15,665km of ETCS needs to be deployed in Europe by 2023 compared with 5733km as of September 2019 and a target of 49,000km by 2030. In addition, between 27,500 and 37,000 rail vehicles need to be equipped with ETCS by 2030 to achieve the dual on-board strategy along the corridors and to meet known national deployment plans. This means that between 65% and 90% of the European fleet must be equipped by 2030.

Renewals and retrofits

Reute says a large part is expected to be equipped through the renewal of between 16,000 and 21,000 vehicles, leaving between 9000 and 13,000 existing vehicles to be retrofitted. "Between 2019 and 2030, this translates to 750-1100 vehicles to be retrofitted and 1300-1750 vehicles to renew per year," Reute says. However, he says there needs to be a sharp increase in retrofitting in the next five years.

Mr Henrik Hololei, director general of DG Move, says that to deliver a digital control-command and signalling system (CCS), there needs to be a genuine European system building on ERTMS. "Only a small part of the CCS value chain uses standardised European products, essentially ERTMS," he told delegates in Valenciennes. "Elsewhere national systems still dominate. This is inefficient, not interoperable and does not provide the best available safety solutions. This is not giving us the benefits of one of the EU's greatest assets, the single market."

Hololei says DG Move has been working with ERA and Shift2Rail, and consulting through the ERTMS stakeholders platform, to draw up a