

ERTMS DEPLOYMENT IN THE UK

ADOPTING DIGITAL TECHNOLOGY TO ENHANCE RAIL OPERATIONS



The UK is planning major Digital enhancement and ERTMS investment in Control Period 6 (2019 – 2024) and on-going through Control Period 7 (2024 – 2029) and beyond as part of an ambitious but essential programme to realise and extract the maximum advantage from the adoption of available Digital Technologies to revitalise the performance of the national railway network. In a country with a long history of conventional signalling systems and train operations, the introduction of a major re-signalling programme raises exciting challenges. Whilst ERTMS Level 2 first entered service in March 2011 on the Cambrian line, railway authorities are now pushing for a larger deployment scheme of Level 2 ERTMS Baseline 3, on specific targeted routes which would enhance an already very safe railway, facilitate an increase in capacity, raise the performance on Britain's railway lines and contribute significantly to national economic growth.

Are there plans to introduce ERTMS in the UK?

Yes - the deployment of ERTMS is now an urgent requirement to cope with the continuing high traffic demand being encountered for both passenger and freight transport. In this respect, the key features achievable with ERTMS - higher Safety, higher operational speeds, greater traffic capacity and accompanying cost savings/reductions in both CAPEX and OPEX are seen as vital benefits.

Where is ERTMS deployed in the United Kingdom?

CAMBRIAN PILOT LINE

A single track line of 215km - the Cambrian Line - linking Shrewsbury with Aberystwyth and Pwllheli in Wales came into full service in 2011 operating at Level 2. ERTMS replaced the legacy Radio Electronic Token Block (RETB) signalling system. 24 sets of 2 coach Class 158 DMUs from Arriva Trains Wales were ERTMS fitted for passenger operations, supported by 4 Class 97 Diesel locomotives prepared for freight and other operational duties. The vehicles operating on this route are expected to have an ETCS OBU upgrade shortly.

Two signaller positions were implemented in Machynlleth to control the total route. This route is supported by the deployment of a new GSM-R system, axle counters, new motorised point machines and balises along the track and a single Radio Block Centre (RBC) installed at the control centre in Machynlleth.

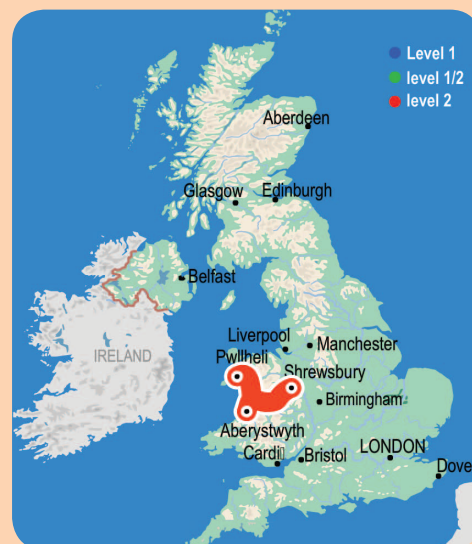
The Cambrian deployment, whilst also being an operational passenger service was viewed as a Pilot installation to learn lessons about the key processes, operational and technical lessons of Level 2 deployment to both UK and ERTMS standards. These lessons will be used to positive effect when further programmes for the introduction and implementation of ERTMS infrastructure and ERTMS cab signalling for the rest of the UK's national network.

ERTMS NATIONAL INTEGRATION FACILITY - ENIF

Network Rail has established a Level 2 equipped pilot line and laboratory test facility at Hertford North to support further ERTMS development and deployment. 6 track miles on the East Coast Main Line diversionary route has been fitted to offer dynamic testing capability. In December 2017 this facility was used in a successful demonstration of Hybrid Level 3 operation in which Network Rail, ProRail and others are collaborating.

THAMESLINK PROJECT

The Thameslink project running North-South through London on old existing tracks has now been completed with ETCS Level 2 and ATO in the central section. A new fleet of 115 new trains equipped with ERTMS Level 2 Baseline 3 have started commercial operation. The expectation is that the frequency of 24 trains per hour through the cores section will be managed. With Thameslink, the UK is implementing ATO over ERTMS. The utilization of ATO over ETCS allows the achievement of a very ambitious timetable in the core network.



CROSSRAIL

Crossrail is a new, high capacity urban railway system introducing 9 new stations, 2 new depots and utilising two new 21km tunnels running under Central London and joining the national "main line" network at each of the portal extremities. CBTC will be deployed in the central tunnel section with a transition to ERTMS or TPWS at the tunnel portals. The target is 24 trains per hour. Services are expected to commence in 2022. A fleet of 115 new trains has been prepared to support this service equipped accordingly with CBTC, ERTMS Level2 Baseline 3 and TPWS systems. Total system testing is proceeding.

FUTURE PLANNED ROUTES FOR DIGITAL TECHNOLOGY

New routes and respective business cases are now under active preparation by Network Rail/Digital Railway personnel with the Department for Transport, for consideration of upgrade with Digital Technologies including ETCS L2 (with ATO), TMS, Stock & Crew and C-DAS during Control Period 6 and 7. Network Rail has now placed 5 Main Line Signalling Framework Agreements to expedite and upgrade the signalling in those areas linked to contracts for TMS solutions. Decisions are being made in association with the respective Network Rail Route Managing Directors demands.

Great West Main Line – London/Paddington to Cardiff via Bristol
East Coast Main Line – London/Kings Cross to Peterborough, Doncaster, Edinburgh
The Trans Pennine Upgrade – Leeds to Manchester respective

A programme to introduce new a High Speed lines in the UK – namely High Speed 2 - to operate from London to Birmingham (140 kms) and onward to Manchester and Leeds is underway with a view of Phase 1 being ready for service by the end of 2033. This line will deploy ETCS Level 2 Baseline 3 in its build. An initial fleet of 54 new trains, ETCS fitted, capable of running at above 280km/hr, will be procured. This new investment will provide much needed additional track capacity that will support the release of capacity on other UK routes.

This listing is not exhaustive and may change as the work for the respective Business Cases progresses.

ETCS RETROFITMENT OF TRAINS

In parallel to the infrastructure development programme, there is concentrated work being undertaken to plan the "retrofitment" programme for the "national" rolling stock - passenger, On-Track plant and freight fleets to ensure operational readiness for access to the operation on and maintenance of ERTMS fitted infrastructure. First in Class contracts have now been placed with three major suppliers for a variety of passenger and freight rolling stock. Testing is expected to be undertaken at the newly fitted Network Rail test track at Melton RIDC from September 2020. Many new fleets have been contracted and will be expected to be supplied either ERTMS capable or ERTMS ready from the day of delivery. Very large new passenger fleets have already been ordered by Train Operating Companies (TOCs) in line with the award of new franchises. Preparations have commenced to address the special requirement of ETCS Retrofitment for the On-Track plant which will be required RFS before any main lines become operational for ERTMS. There are approx. 200 units that will provide and guarantee the essential maintenance of the infrastructure but focus will be on ECML and GWML routes.

Complimentary technology solutions for ERTMS

Complimentary technology solutions are being studied by Network Rail and with other agencies in the UK to support the introductions of ERTMS including:-

- Traffic Management Systems.
- C-DAS.
- Hybrid Level 3.

Summary

The United Kingdom is at a crucial point of national rail network improvement and development. Introducing ERTMS into the network is seen as vital and will directly address the huge capacity demands being encountered across the UK network, will maintain safety and will with the combination of other digital complimentary technology dramatically raise the agility and availability of the network. There is significant competition available for this ERTMS deployment both for the Infrastructure requirement and the On-board solutions which will make for an exciting time of growth in the UK's national rail network for many years to come.

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