Minimising the impact on the train service when resignalling an existing route with ERTMS, using its existing rolling stock

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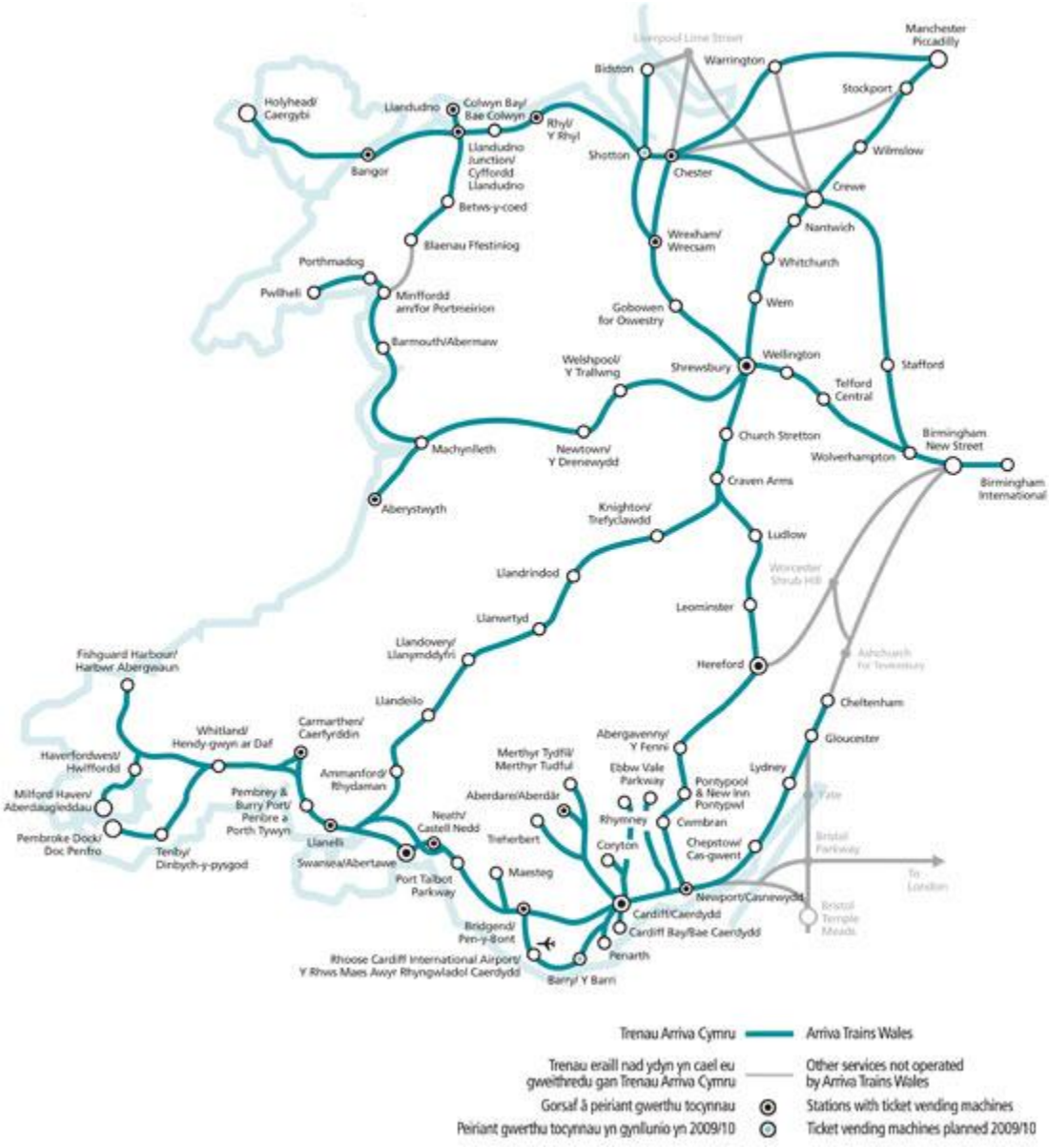
The Cambrian line

- UK's pilot site for ERTMS Level 2.
- Shrewsbury-Aberystwyth ('Cambrian main line' - TEN) and Machynlleth-Pwllheli ('Cambrian Coast'). Built in 1860s
- Single line: Electric token until 1988, then RETB (Radio electronic token) + hydro-pneumatic points
- Trains: ATW class-158 (2-car 140kph DMU), built 1990 by BR - plus 3 Network Rail diesel locos for special trains



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Cambrian ERTMS project

- Authorised by UK government 2003
- 218 route-km
- Contract awarded to Ansaldo-STS 2006
- Joint project team Network Rail/Ansaldo/Arriva Trains Wales
- Harlech-Pwllheli commissioned into public use in October 2010, the remainder in March 2011
- Train performance quite poor so far – we expect 95% of trains to be < 5 minutes late, but ERTMS faults mean we are achieving only 62%
- 5 Category ‘A’ SPADs in the first 5 months

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What have been the problems? - (i) Trains

- Making alterations to 20-year-old trains causes faults!
- Driver-Machine Interface (DMI) screen goes blank
- Balise Transmission Module (BTM) failures
- Odometry faults
- DMI ‘washed out’ by sunlight (very small cabs), but too bright at night
- Displayed release speed can confuse
- Some icons on the DMI are too small/too similar
- Drivers too ready to assume Movement Authorities are loop-to-loop

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What have been the problems? - (ii) Infrastructure

- Point motors and axle counters
- Radio Block Centre (RBC) becomes ‘confused’ by
  - Linespeed changes which are ‘too frequent’
  - 2 trains in the same platform both seeking Movement Authorities
  - Crossing trains at loops ‘too quickly’
  - Trains shunting from the running line into the depot
- GSM-R reception not always good
- Mixture of mile hr $^{-1}$ and km hr $^{-1}$
- Lack of incorporation of automatic level crossings into ERTMS (only the CCTV level crossings are included)
- Degraded-mode maximum speed
- 2 different certifications – Interoperable and non-TEN

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Minimising the impact of ERTMS on the train service

- Decision not to have only a part of the class-158 fleet ERTMS-fitted
- Loop entry/exit speeds increased, to compensate for ERTMS's more cautious braking
- Pre-public-service test runs all done at night (after last public train)
- Strong insistence by ATW that public service must not commence until reliability was satisfactory
- Initially commissioned only 35 (of 218) km - to enable:
  - identification of technical problems
  - unrushed driver familiarisation
- Commissioning did not include (most) point conversions – to allow easier return to RETB, if needs be
- Commissioning outside the summer months (Cambrian demand is very seasonal), so that teething faults affected fewer passengers

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Have there been benefits from ERTMS on the Cambrian?

For the UK

- Learning how ERTMS can work in a UK context (and learning that ERTMS is not as well-developed technically as we would like!)
- Excellent experience of the problems of trying to convert an existing railway
- Realisation that a single-line railway was perhaps not the best place to conduct a trial

For ATW on the Cambrian line

- Our very simple railway has been converted to something much more complex (and expensive!)
- So far, the results suggest we should have kept what we previously had…
- …but we like to be helpful to the rest of the UK!

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Nevertheless, we are determined to make Cambrian ERTMS a success!

…Please come to visit us!

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