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ERTMS on Corridor C/2

27 June 2012

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Agenda

1. What is ERTMS ?
2. Corridor C/2 ERTMS Rollout
3. Fitting ETCS on locomotives

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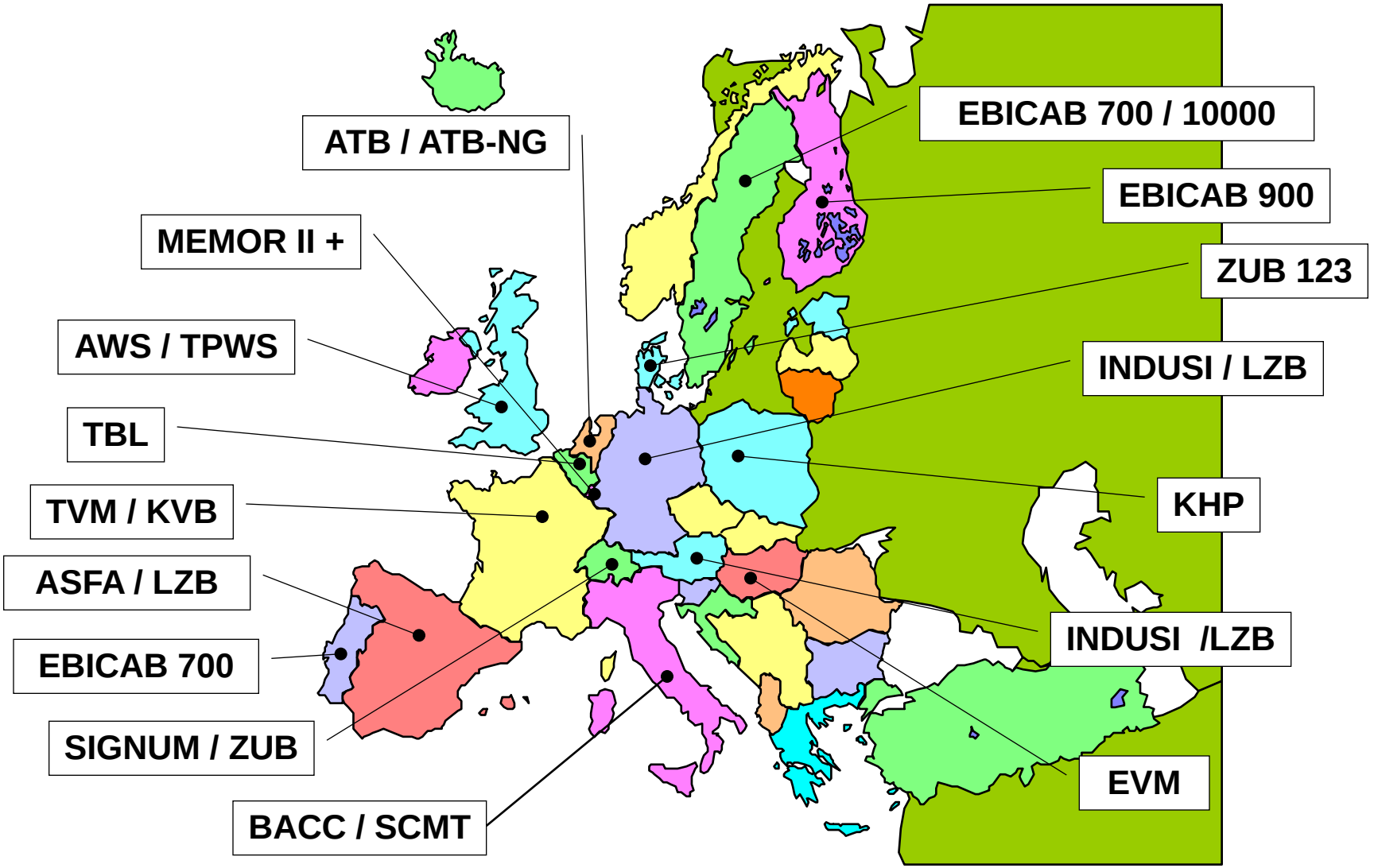
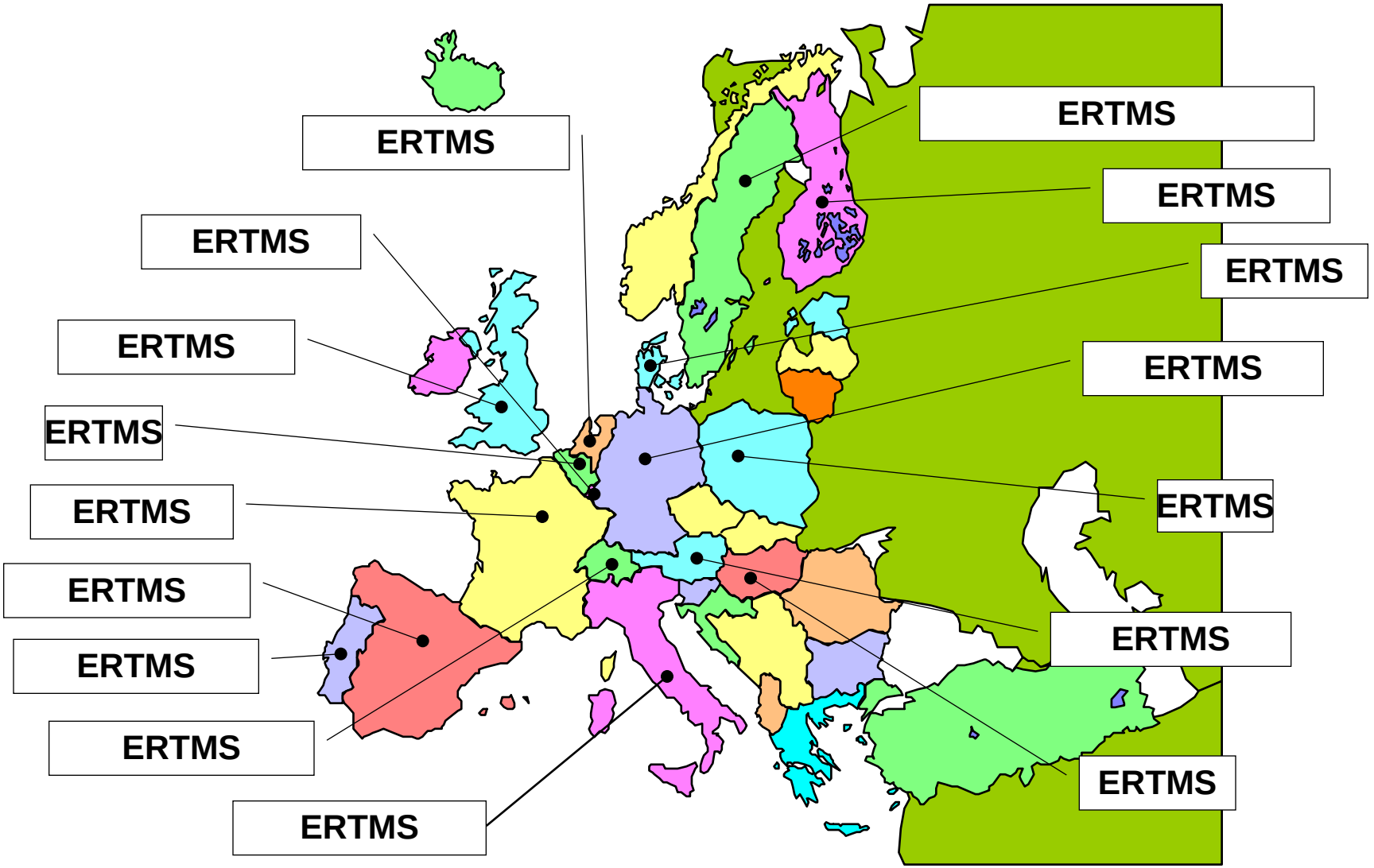
European signalling systems



European signalling system



Glossary

- ERTMS: European Rail Traffic Management System
- ETCS: European Train Control System
- To make it simple: ERTMS = ETCS + GSM-R

History

- Two European Directives launched the ERTMS deployment:
  - in 1996, 96/48 for the high speed network
  - in 2001, 2001/16 for the conventional network
- These directives set a deployment objective of 10 to 12 years,
  - on a start-up core network, including freight corridors,
  - then on the "ETCS Net"
- They called for the application of the CCS TSI for new and renewed lines

- In 2008 the two initial directives were merged into a single one: 2008/57/CE, and two decisions about CCS TSI (2006/679 and 2006/860) were recently merged into 2012/88

History

- On 17 March 2005, the European Commission and the rail industry signed a Memorandum of Understanding (MoU) establishing the basic principles of an EU deployment strategy for ERTMS

- The main objective of that Memorandum of Understanding was to define the contribution of the actors in order to ensure the progressive setting up of an ERTMS equipped network within 10-12 years.

History

- A second MoU was signed on 4 July 2008, with the following specific objectives:
  - To foster coordination and collaboration in order to ensure the compatibility of existing lines. This compatibility shall be based on the SRS version 2.3.0d and the relevant GSM-R specifications
  - To foster coordination and collaboration with a view to ensuring that, by 2012, an error free, tested and legalised baseline 3 of the ETCS specifications is available
  - To clarify which specification baseline is to be used in tenders and as track access conditions
  - To improve the efficiency and the cost effectiveness of the existing testing and certification procedures, for both ETCS and GSM-R
  - To streamline the current procedure of testing and approvals in order to progressively reach a point where all procedures related to testing and approval of ETCS and GSM-R on board units can be completed following a common, unique and efficient procedure
  - To lay down the agreement of the sector on a number of measures aimed at speeding up the deployment of the ETCS

History

- The most recent MoU was signed in Copenhagen on 17 April 2012, with the following specific objectives:
  - To ensure that the ERTMS specifications are maintained/upgraded in a controlled way, by applying the ERA Change Control Management (CCM) process
  - To set up and support an appropriate mechanism to provide to ERA in a timely manner the return of experience of the early implementations of Baseline 3-based projects
  - To streamline the current procedure of testing and authorisation in order to progressively reach a point where all procedures related to testing and authorisation of on-board units can be completed following a common, unique and cost-effective procedure
  - To confirm the commitment of the European Rail sector Associations to bring forward concrete cases where requirements deviating from the TSI would be imposed and/or in cases where national rules or requirements would hamper the objectives above
  - To confirm the agreement of the sector on a number of measures aimed at speeding up the implementation of the ETCS considering economical aspects

Stakeholders

- European Railway Agency (ERA), in charge of ERTMS specifications and TSI definitions
- MoU Steering Committee, chaired by European Coordinator Karel Vinck, composed by:
  - UNIFE
  - CER
  - UIC
  - EIM
  - GSM-R Industry Group
  - ERFA
- ERTMS Users Group

ETCS Levels

- Level 1
  - Based on punctual information delivered by in-track balises
  - Track circuits or axle counters needed to localise the train
  - Infill function possible through advanced balises, euroloops or radio infill
  - In most cases overlaid on legacy lateral signalling systems

ETCS Levels

- Level 2
  - Based on continuous exchange of information through GSM-R
  - Track circuits or axle counters needed to localise the train
  - No lateral systems needed
  - May be overlaid on level 1 equipment

ETCS Levels

- Level 3
  - Based on continuous exchange of information through GSM-R
  - No more need to localise the trains through in-track equipment
  - The train reports its position
  - The train ensures its own integrity
  - No lateral systems needed
  - Allow mobile block operation

  - Not implemented yet, but ERTMS Regional (Sweden) is derived from Level 3 concepts

Some ETCS Modes

- *Full supervision (FS)* : the system ensures the security alone
- *Shunting (SH)* : mode for shunting, low level of control
- *On Sight (OS)* : mode including ceiling speed monitoring and check danger point
- *Staff Responsible (SR)* : allow to pass an out of order signal, no danger point check but ceiling speed monitoring
- *Non leading (NL)* : mode to manage a train with several locomotives
- *STM National (SN)* : to use national systems
- *Limited Supervision:* from stop/go conditions to ceiling speed monitoring (Baseline 3 only)

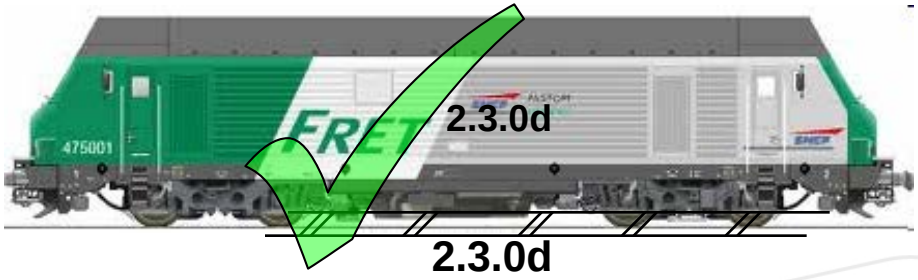
Baselines

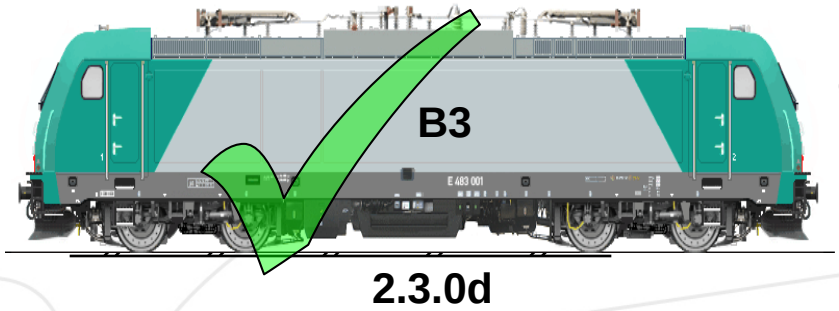
- Baseline 2
  - The only current legal version is 2.3.0d
  - Drawback of this version: the braking curves are not defined
  - Recommendation from the Corridor ERTMS Committee: to use the available definition of Baseline 3 braking curves to implement on-board systems
  - Old 2.2.2X systems are required to be upgraded to 2.3.0d

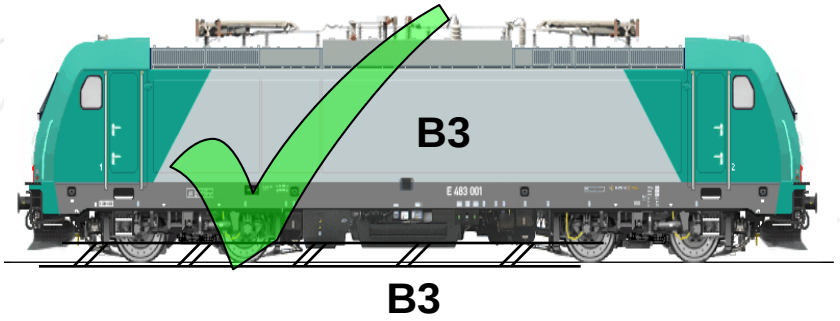
Baselines

- Baseline 3
  - Specifications are expected to be validated and officialised by the end of 2012
  - One of the main upgrades concerns the definition of the braking curves
  - The second main upgrade is the incorporation of L1 Limited Supervision promoted by SBB (technical interoperability, no operational interoperability)
  - Better management of level crossings
  - Improvement of track conditions descriptions
  - Nota: *either in B2 or B3, the subset of functions used for trackside engineering depends on the network: all functions are not used!*

Interoperability 2.3.0d – Baseline 3



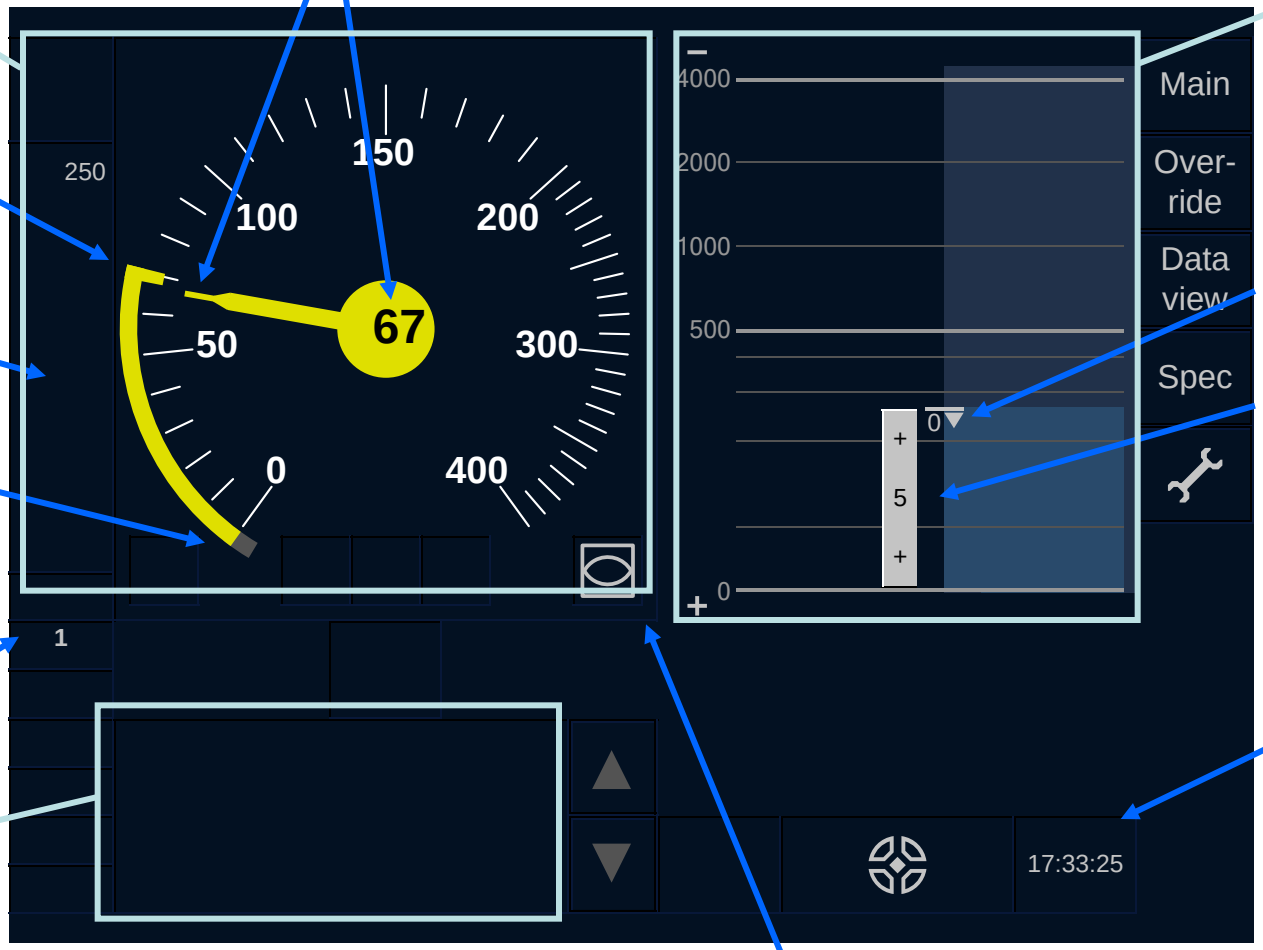




On board components

On board components

Driver Machine Interface: DMI



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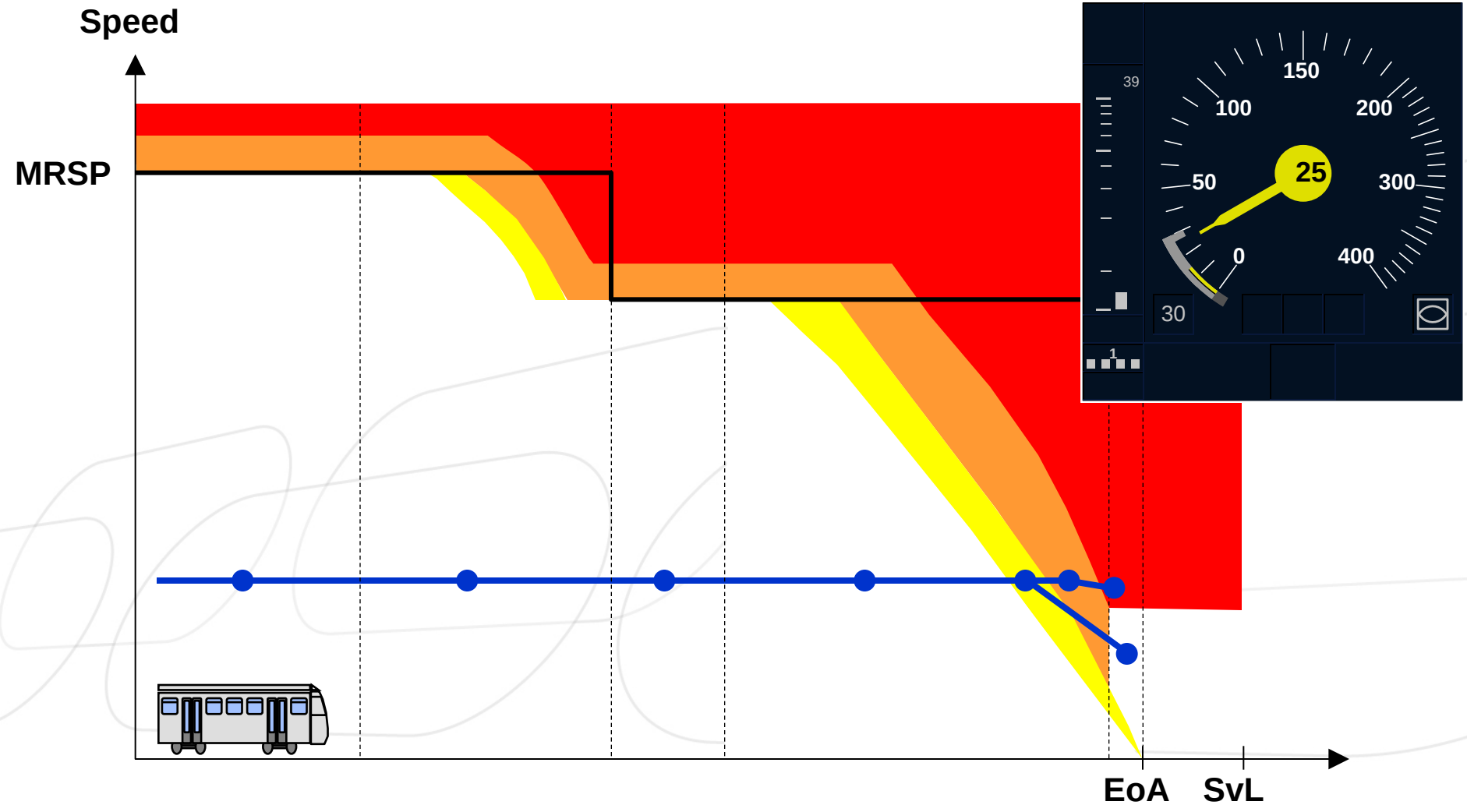
Driving with ETCS



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Fast track your rail freight

ETCS Advantages for drivers

- The most restricted speed limit is always displayed: no longer need to memorize speed sequences
- The permitted speed is dynamically displayed: the driver always know where he is compared to an emergency brake intervention
- Cab-signalling: not dependent on weather conditions
- Harmonisation of operating rules

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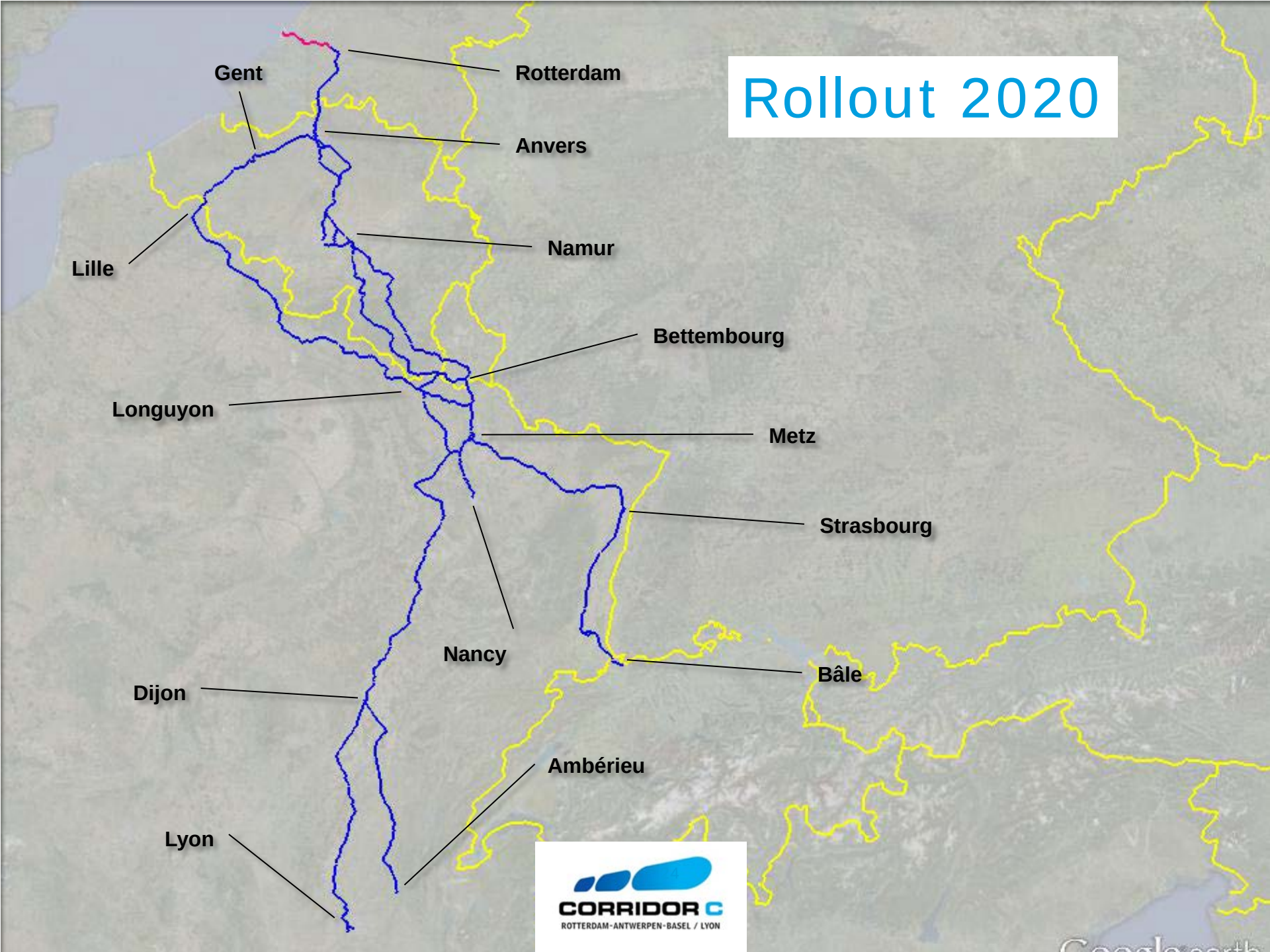
Rollout 2020
Gent
Rotterdam
Anvers
Lille
Namur
Bettembourg
Longuyon
Metz
Strasbourg
Nancy
Bâle
Dijon
Ambérieu
Lyon
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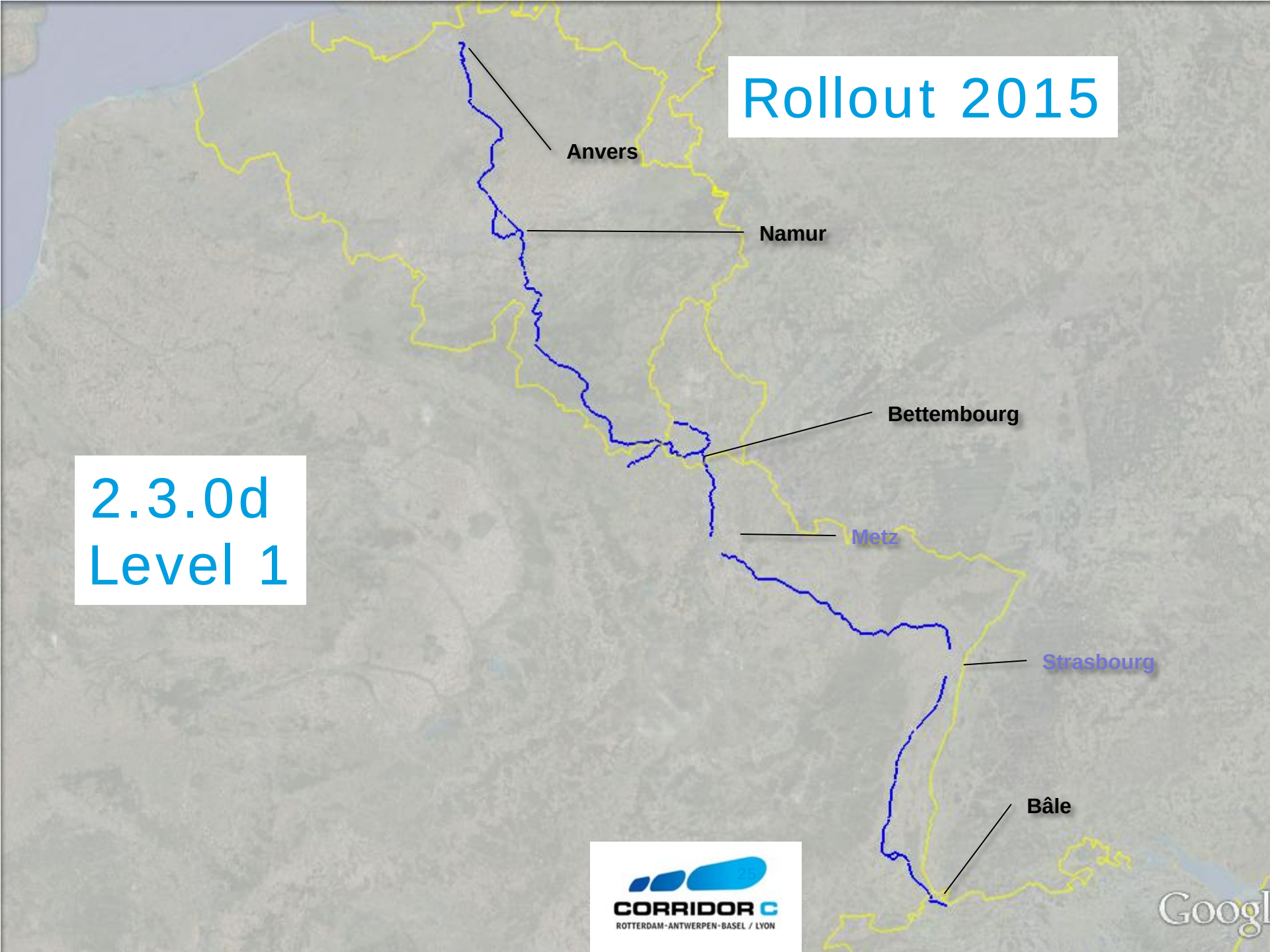
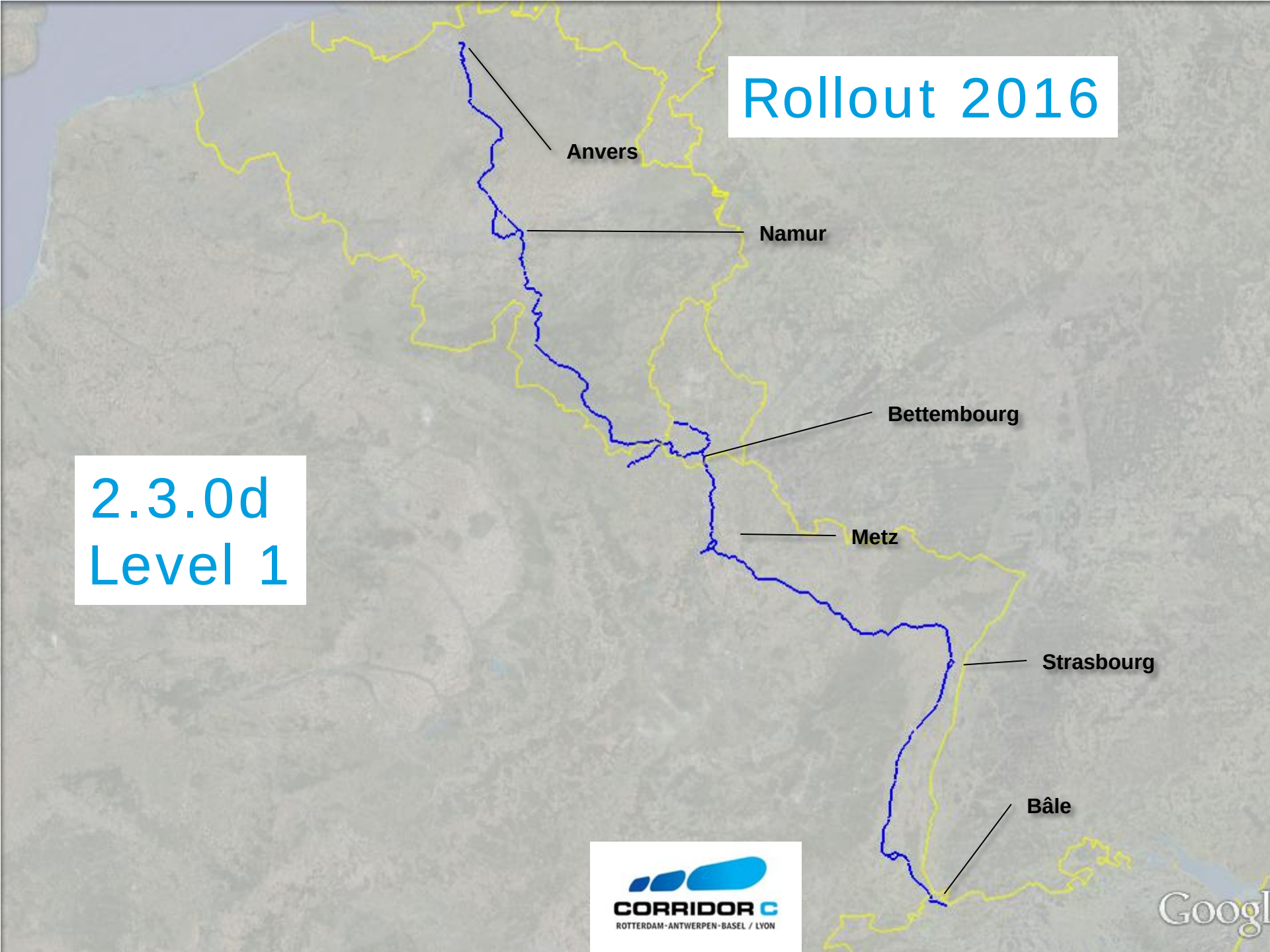

Rollout 2015
Anvers
Namur
Bettembourg
Metz
Strasbourg
Bâle
2.3.0d
Level 1
CORRIDOR C
ROTTERDAM-ANTWERPEN-BASEL / LYON


Rollout 2016
Anvers
Namur
Bettembourg
Metz
Strasbourg
Bâle
2.3.0d
Level 1
CORRIDOR C
ROTTERDAM-ANTWERPEN-BASEL / LYON

Important milestones

- 2017: ETCS mandatory to run on the CFL network (2.3.0d L1)
- 2022: entire Infrabel network equipped with ETCS, either 2.3.0d or B3, L1 or L2, with some sections with L1 LS
- RFF: KVB will be deactivated on routes 10 years after their ETCS fitment -> ETCS becomes mandatory on these routes

Access to Muttenz

- From 2013 fitment with KVB+PZB or ZUB will be mandatory to run between St Louis and Muttenz
- From 2015 the Basel area will be equipped with ETCS B3 L1 LS
- 2.3.0d trains will have to be fitted with KVB+PZB (STM or standalone) to access Muttenz

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Feedback on known problems

- Homologation process
- Associated costs and delays
- ...

Relationship with NSAs

- Cross Acceptance:
  - B-NL-F-L-CH agreement signed in 2008 by the respective NSA's for locomotives and passenger trains.
  - D-B-L agreement signed in 2010 by the respective NSA's for locomotives and passenger trains.

- What is the feeling about their effectiveness ?

Test facilities

- Who manages the homologation process : RUs, ROSCOs or suppliers ?

- Would a test tool with Corridor scenarios be useful ?

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4. What's next?

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What's next ?

- Which ERTMS topics to be covered in the next RU Advisory group?
- Which ERTMS information to be displayed on the Corridor Web site?
- Attendance in the ERTMS Committee meetings

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CFL

ACF

INFRABEL
Right On Track

SBB CFF FFS

ProRail

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