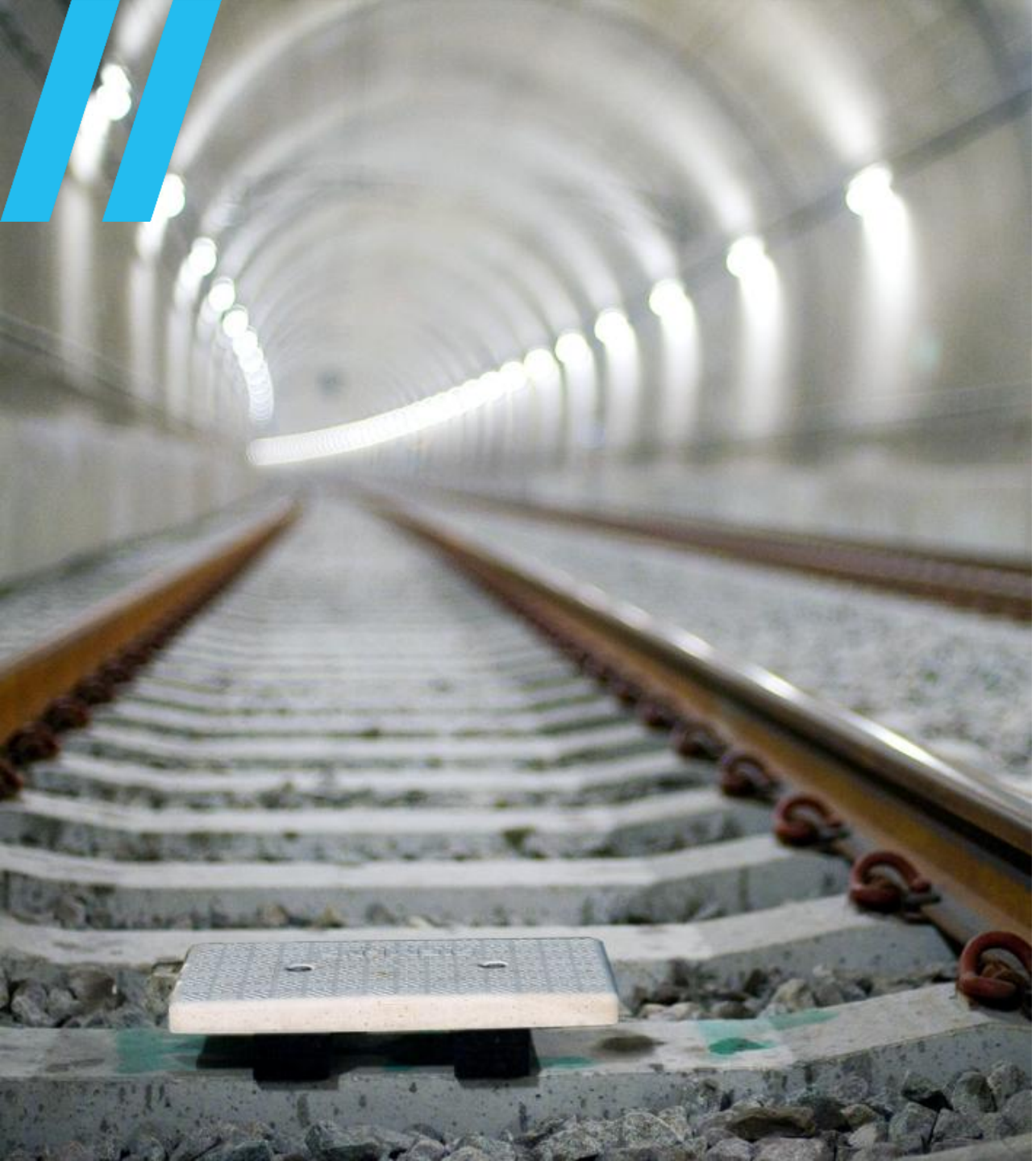


INFRABEL

ERTMS rollout The Belgian approach

Yves Werner

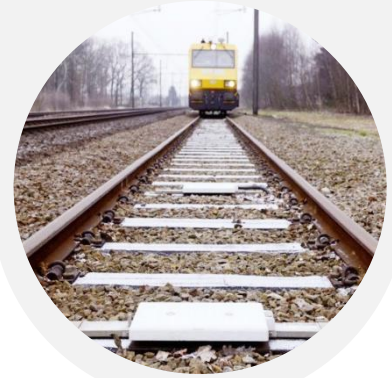
22/04/2026

Urgent need to improve Safety

2011
Parliament decision and budgets to deploy ETCS on trackside and rolling stock

Buizingen 2010

Strategic choices in 2011



- A parallel Migration ETCS on Trackside and Onboard Systems
  ➔ **Dual signalling,** *it means adding ETCS **on top of existing** lineside signalling*
  (So ETCS and NO-ETCS trains can run everywhere during the migration period)
- ETCS L1 in large stations *(with GSM-R capacity knowledge in 2012)*
  ETCS L1 roll-out first *(no ETCS L2 contract before 2015)*
- ETCS L2 needs digital interlocking *(only a partial roll-out was realistic)*
- ETCS L1 Limited Supervision to accelerate the roll-out *(on secondary lines, lower risks)*

Other important choices

- High **standardization** *(same operational / design rules everywhere)*
- **Industrial** roll-out processes, supported by efficient tools
- **One** Signalling Projects department with internal expertise
- **Framework Contracts** *(2 for ETCS L1 and a single for ETCS L2)*
- ETCS mandatory by 2025 added in the **Belgian law** in 2018

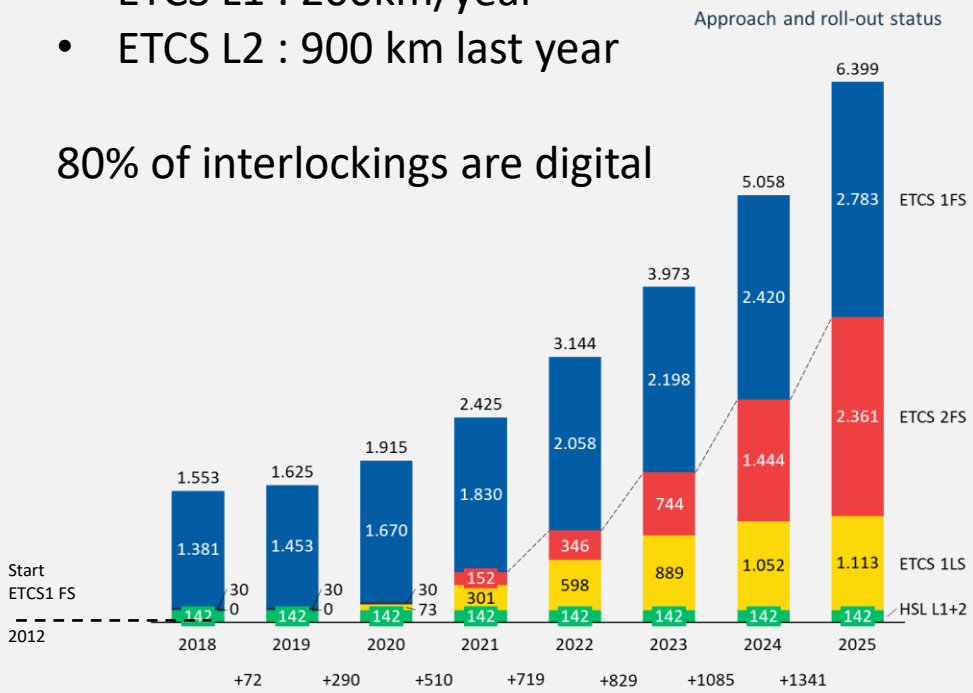
ETCS Masterplan

achieved end 2025

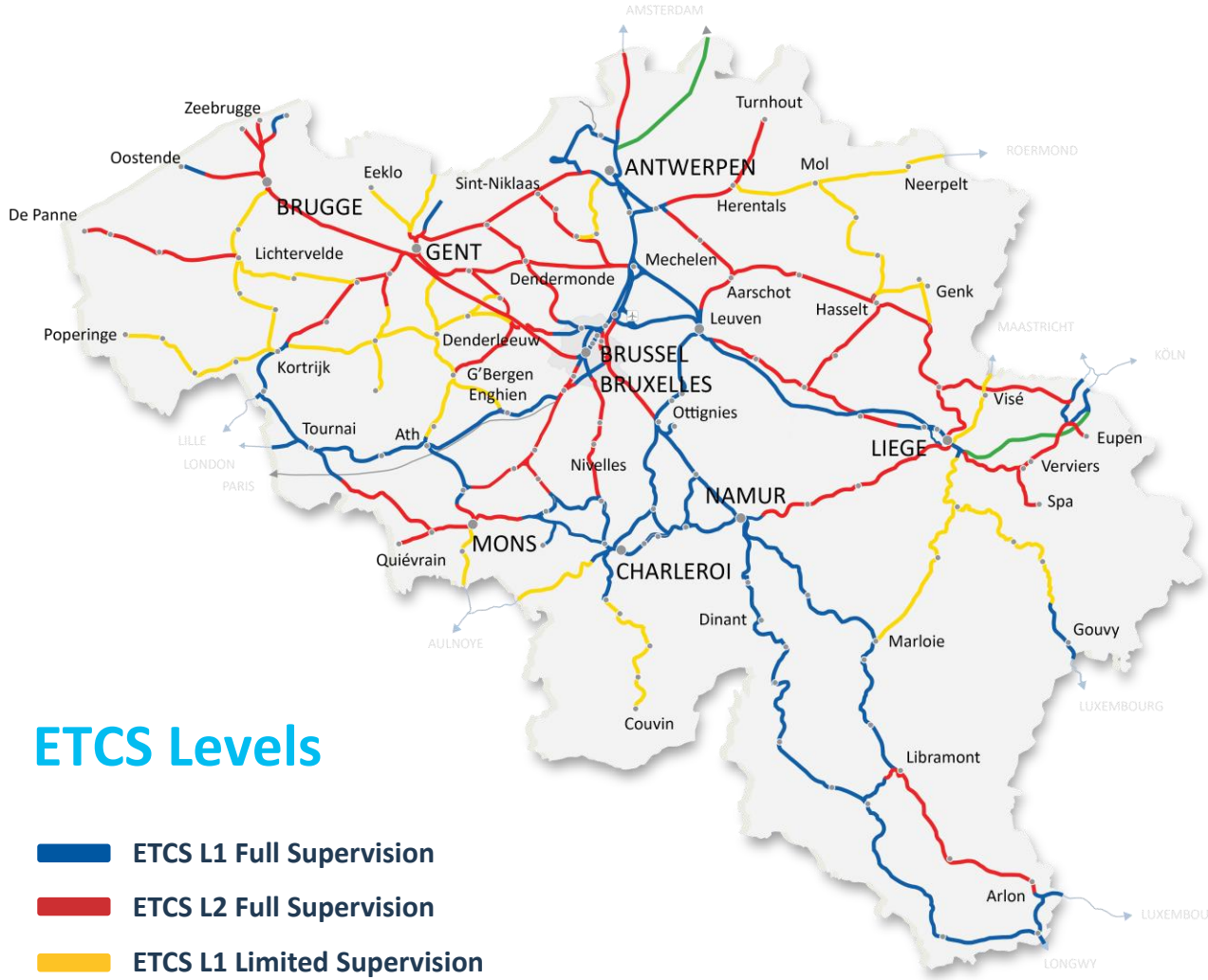
6399 km of tracks* in **13 years**!

- ETCS L1 : 200km/year
- ETCS L2 : 900 km last year

80% of interlockings are digital



* ≈3000 km of lines



ETCS Levels

- **ETCS L1 Full Supervision**
- **ETCS L2 Full Supervision**
- **ETCS L1 Limited Supervision**
- **ETCS L2 Full Supervision with fall back L1**

Benefits of this strategy

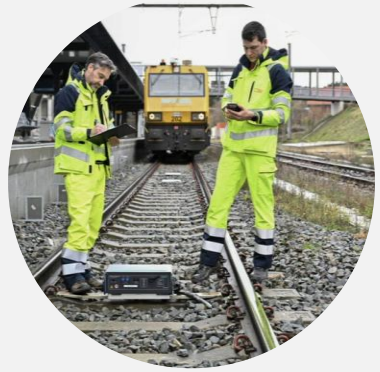
- Faster roll-out of trackside, more flexibility
  (Infrabel could deploy ETCS independently of on-board roll-out by RU's; otherwise we would have had to wait at least 5 to 8 years before commissioning the first ETCS line)
- Immediate benefits of ETCS: Safety/Interoperability/Ergonomics
  (decommissioning of oldest Class-B systems)
- ETCS L1 Limited Supervision project in 6 months *(1-2 years for Full Supervision)*
- Progressive training of the drivers *(drivers not yet trained are still operating on non-ETCS trains)*
- Fallback with lineside signals during ETCS deployment

Weaknesses of this strategy

- Still a lot of assets in trackside *(higher costs for Interlockings)*
- ETCS L1 FS requires more resources *(high workload for ETCS and Interlocking teams)*
- ETCS L1 Limited Supervision not ergonomic for drivers
- Not possible to remove national rules
- Many transitions and complex designs (train diversity : No ETCS, ETCS1_only, pre-baseline 2, baseline 2, baseline 3,...)

Major issues during implementation

- Long timing to develop industrial processes and ETCS systems with all functions *(8 years ➔ lot of re-scheduling)*
- Turnkey projects not realistic on brownfield *(transfer of some activities from suppliers to Infrabel and joint task forces during design)*
- Human Resources *(design, safety, certification)*
- Management of all reworks *(new transitions, Infrastructure changes..)*



ETCS on Rolling Stock (>1500 vehicles)

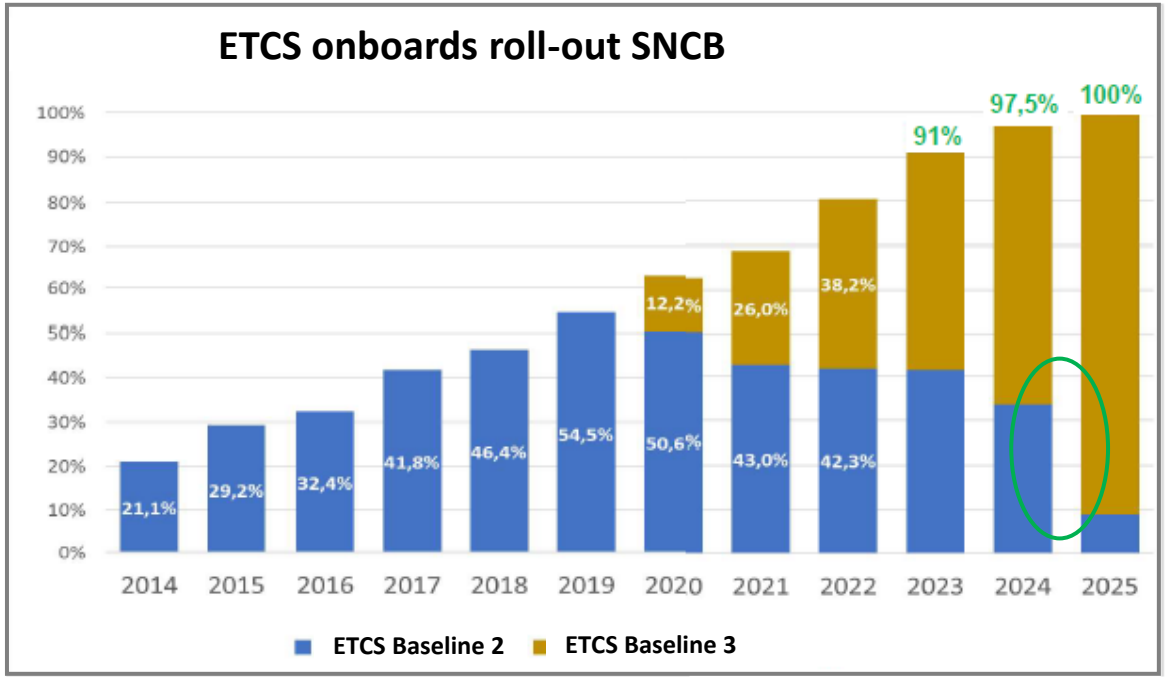
SNCB : 1250 vehicles fitted with ETCS

Infrabel bears no responsibility for ETCS deployment on rolling stock

Acceleration of the migration from Baseline 2 to Baseline 3

1 train with new OBU every day!

- *Suppliers deliver "ETCS onboard kits" to SNCB*
- *SNCB installed & tested ETCS in its own workshops*



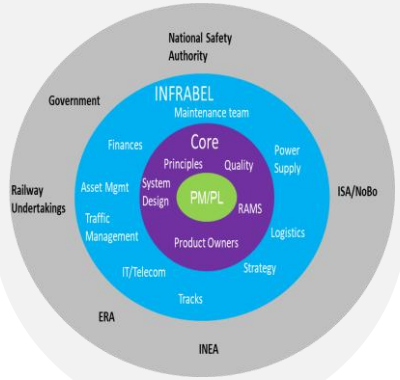
International trains: almost fitted with ETCS

Freight trains : 80% fitted with ETCS

New deadline in the law
12/2025 → 12/2027

Major learnings

- ETCS L2 is the “best choice”, even in large stations
  Lower workload, future oriented (no lineside signals, ATO), Higher capacity
- One signalling projects department managing the national ERTMS deployment, with ETCS expertise is a must
  “Huge” change management to be considered
- Communication with and support from all stakeholders are essential *(RU’s, ISA-No-Bo, NSA, Federal Transport department, other IM’s...)*
- Digitalization through ETCS increases substantially safety but also punctuality and comfort for drivers



Thank you for you attention !

658
GSM-R Radio masts

6.399 km
tracks

48.398
balises
=
1.500 km cables

1.500
Colleagues Infrabel
& TUC RAIL

11.144
Signals equipped

>1 million
Tested Routes

>3.000
Shelters with IT &
Signalling equipment