

ERTMS/ETCS Update

"Managing long term safety investment
in a rapidly changing world"

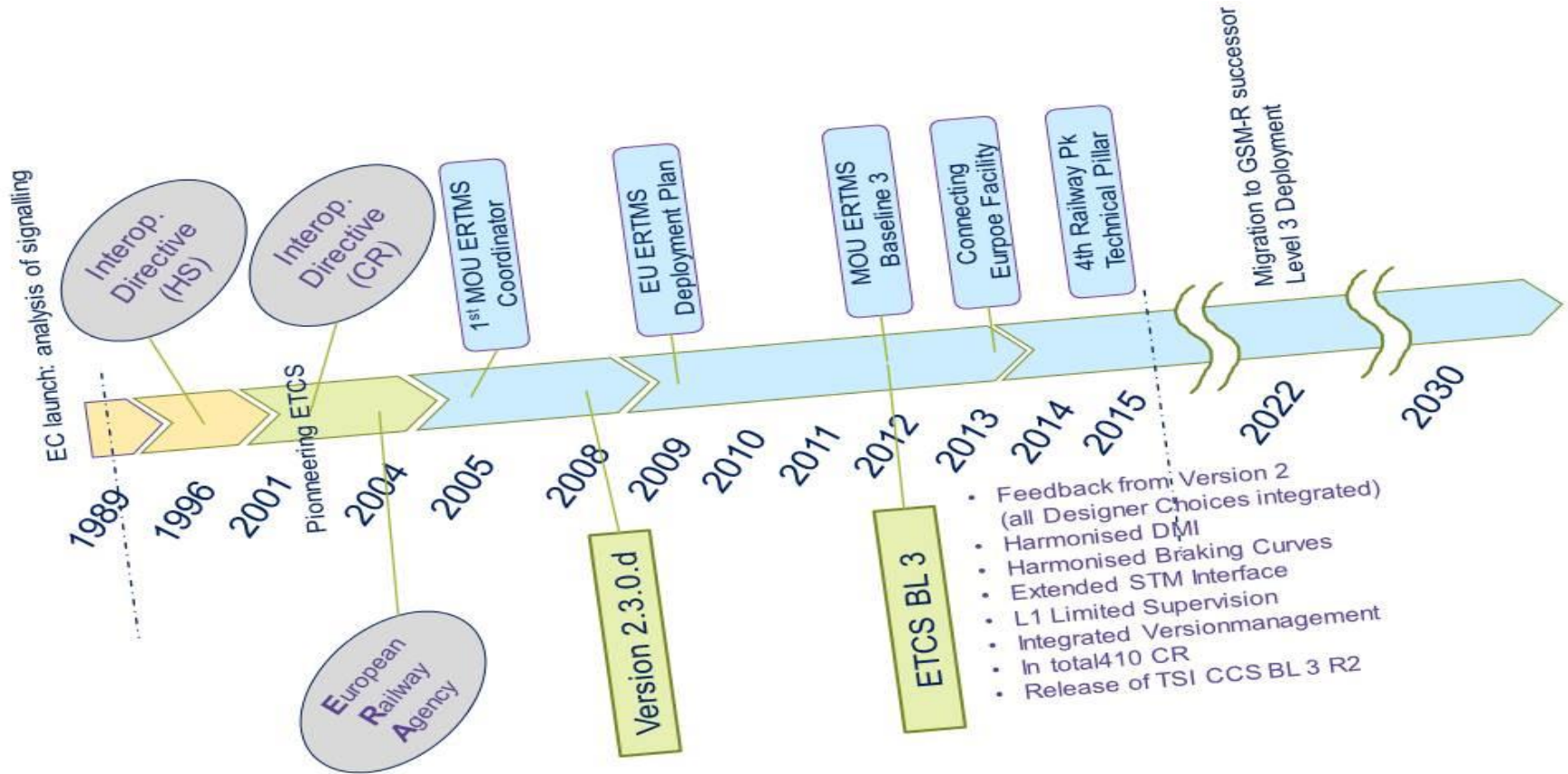
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Thales Transportation Systems

12TH UIC ERTMS WORLD CONFERENCE, BRUSSELS 2016



- **ERMTS/ETCS a global project of European Origin**
- **ETCS Objectives as seen from essential Stakeholders**
- **Deployment and Applications, in Europe and worldwide**
- **Practitioners' Feedback and Acceptance**
- **Perspectives and Preview**

> 25 years ERTMS



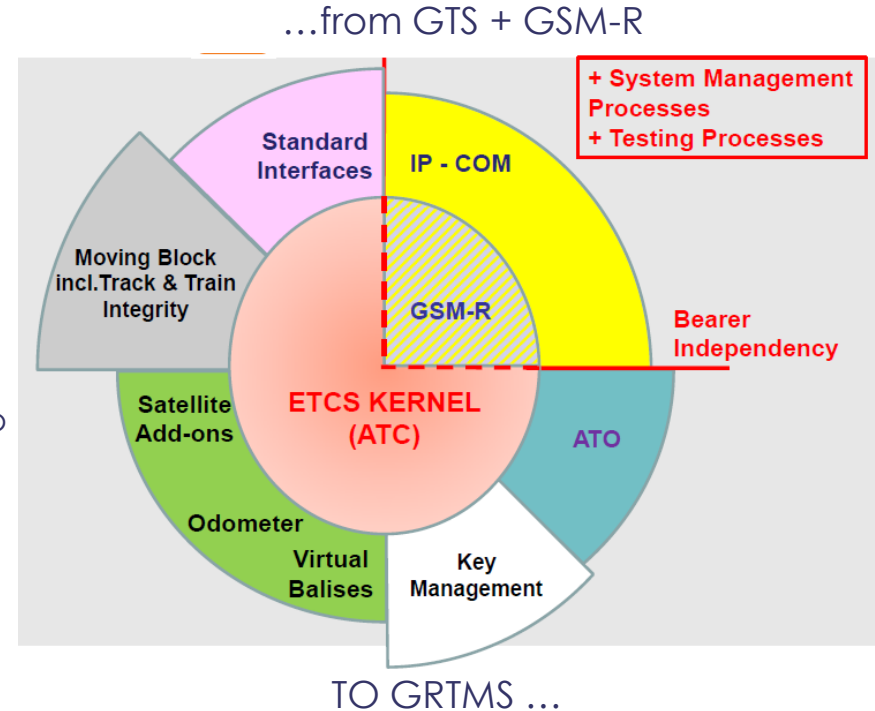
UNIFE positions - ERTMS from an Industry Perspective

What we aim at

- Maintain a single, interoperable, worldwide applicable ERTMS core
- Control and limit the overall development and implementation efforts for ERTMS
- Increase its geographical & segment coverage

How we pursue it

- By enriching ERTMS around a stable core with compatible add-on functionalities
- By developing and promoting the global leadership of ERTMS solutions
- By improving the cost-benefit ration of ERTMS applications (incl. streamlining and simplification)
- Key contributions to improve the business case (fewer infrastructure, lower LCC, added value like ATO or energy saving mode, etc.)



ERTMS/ETCS Applications



Main Lines Conventional / High Speed

- Many European Railways (in 2016: Gotthard Tunnel Switzerland)
- China, Saudi Arabia, Turkey, North Africa, etc.



Transit / Suburban:

- e.g. Madrid, Mexico, Brazil, Sydney, Auckland, Kuala Lumpur



Freight:

- Saudi Arabia, UAE, India, Netherlands

Open Standard

Significantly larger footprint as any other (proprietary) train control system !

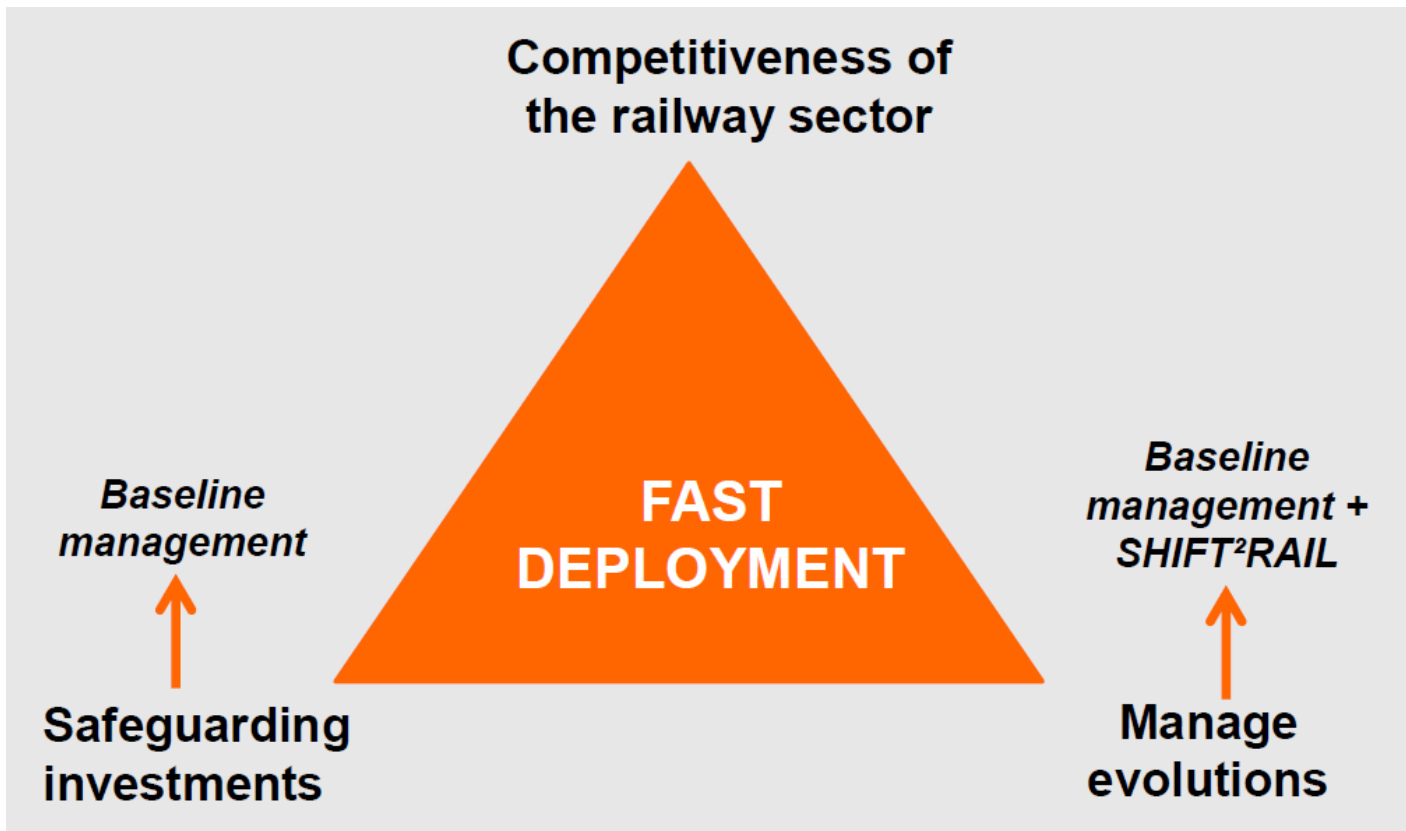
Multivendor
Multi-buyer

Competing with PTC / CTCS and legacy

■ ERTMS / ETCS
in **46** countries

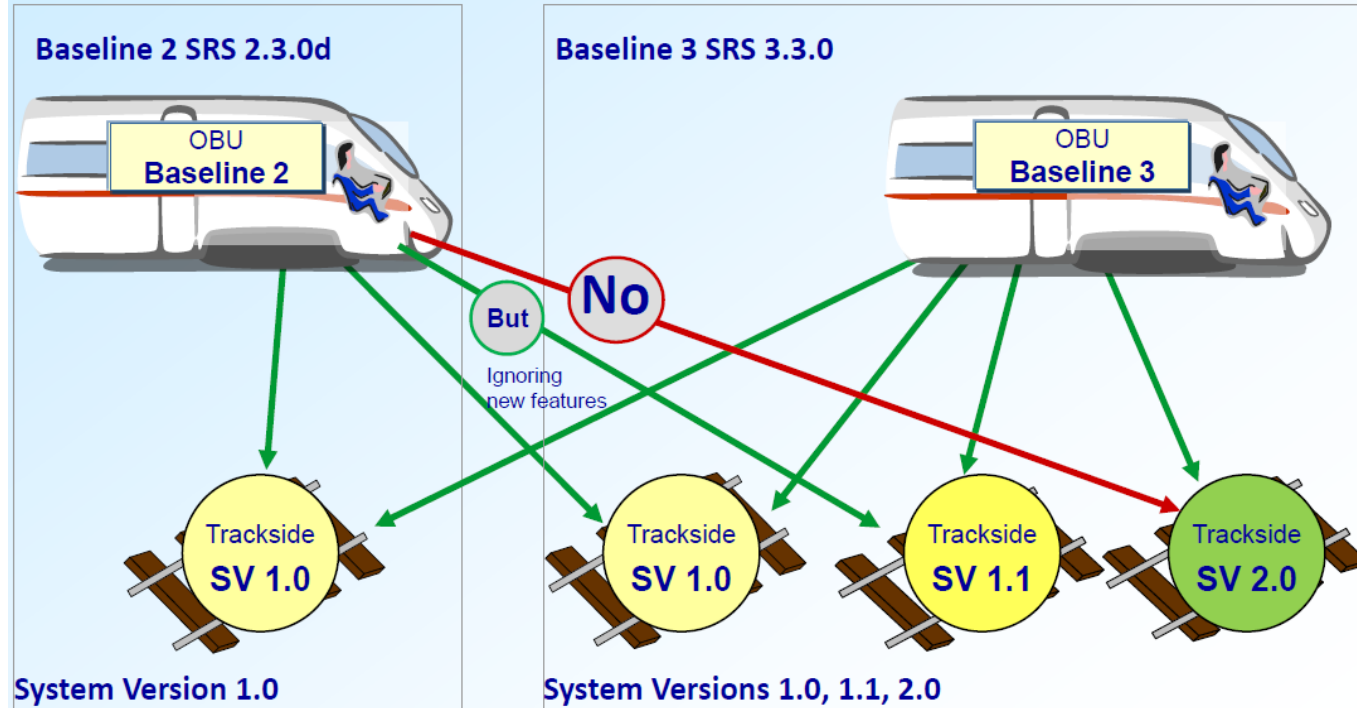
■ Track km in total:
88369

■ ERTMS / ETCS:
Fleet Vehicles: **11211**



ERTMS/ETCS Evolution and Compatibility

TSI CCS Baseline 3, Release 2 marks a major milestone !



Practitioners' Feedback (a)

Specification

- Significant clarifications, especially in the interaction trackside - on-board and between the suppliers
- Interfaces to interlocking's, neighbouring RBCs
- Start-up and Exit scenarios, fall-back levels
- Rapid detailing and increments; e.g. ÖBB/SBB: 2-3 tenders, plus feedback from the respective project implementations

Rollout

- Quality of data
- Planning coherence
- Geodesic precisions
- Capacity in real
- Usage intensity
- High certification effort/cost
- Intercity – Urban and Freight
- Green Mobility, Multimodality
- Cyber Security awareness



Invest/LCC

- CAPEX/OPEX
- Integration cost of class B systems
- Embedding/docking with (existing) signalling and operational control
- Capacity requirements
- Competitive landscape
- Obsolescence management

Operational

- Balise mounting and -protection
- Maintenance, Repair
- Braking Curve iterations
- Climatic influences
- Extensions- / refurbishments
- System outage handling
- Series maturity

ERTMS/ETCS – towards “Digital Railways”

Foundations

- The set of documents and guidelines are well advanced and accepted within of the technical pillar of the 4th railway package since last quarter of 2015. It is broad consensus that with Baseline 3 all relevant operational situations of railways (in Europe and worldwide) can be properly addressed.
- The pertaining supervision/control mandate is well placed with the European Railway Agency ERA

Achievements vs Objectives

- The European system of obligations and motivations primarily works on the latter point; large national players may (still) be braking
- Specifically fleet migration needs to be economically justified in order to invest
- National habits do not always help to tear down bureaucratic hurdles

Market Evolutions

- Despite all the friction: ERTMS has become an indispensable part of the railway transport mode
- Even without the EU spectrum of logistic and subsidizing instruments does ERTMS very well and evolves within international competition in Europe and beyond.
- We saw a first wave of level 1, now deploy level 2, prepare for level 3 to decrease LCC and increase capacity

Efficiency and Economics

- ERTMS with its open specification and the systems supplied by a number of qualified suppliers constitutes a real Multivendor – Multibuyer Market.
- Few Hi-Tech Innovations of European origin have such worldwide positive impact. We should do our best for ERTMS to live long and prosper.

Thales at your Service



THANK YOU