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ERTMS implementation processes & examples

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TRAKO Fair – ERTMS debate
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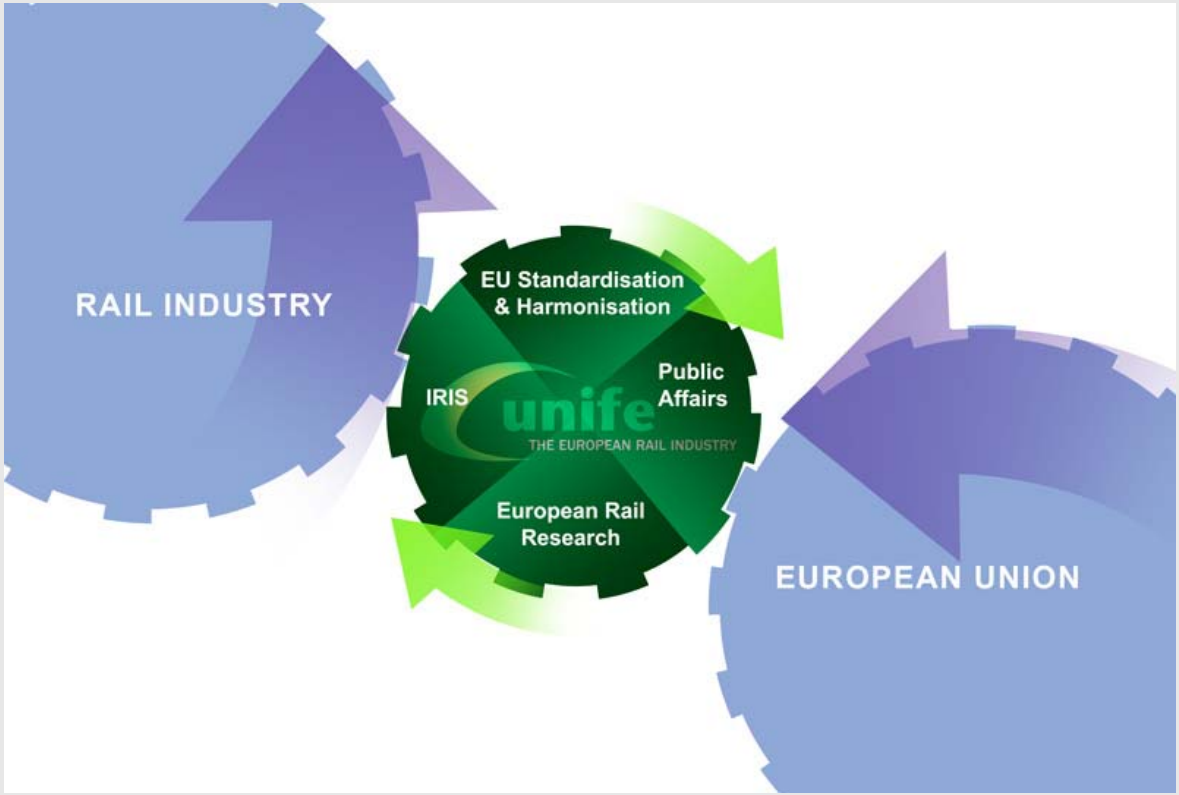

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Interoperability & ERTMS

Interoperability

- More competition on the railway market
- Levels the playing field with road transport

ERTMS

Unique EU Standard

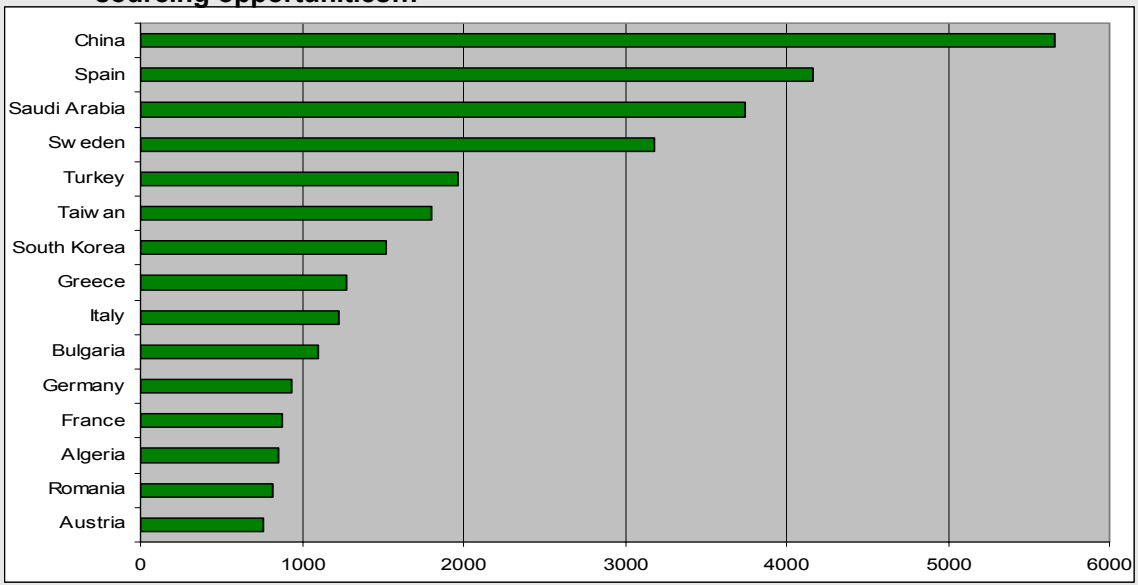
- More versatile rolling stock = Less cost
- Global standard opening worldwide market opportunities for control command

Performance

- Increase capacity and speed by up to 40 %
- Reduce life cycle costs & investments

ERTMS – A worldwide standard

- More than **33,000km** of tracks contracted in the world
- Nearly **50%** of ERTMS investments are made **outside Europe** (3 non-EU countries in the top 5 investors)
- Even on a **national basis ERTMS has its own business case**: traffic capacity, speed, multi-sourcing opportunities…

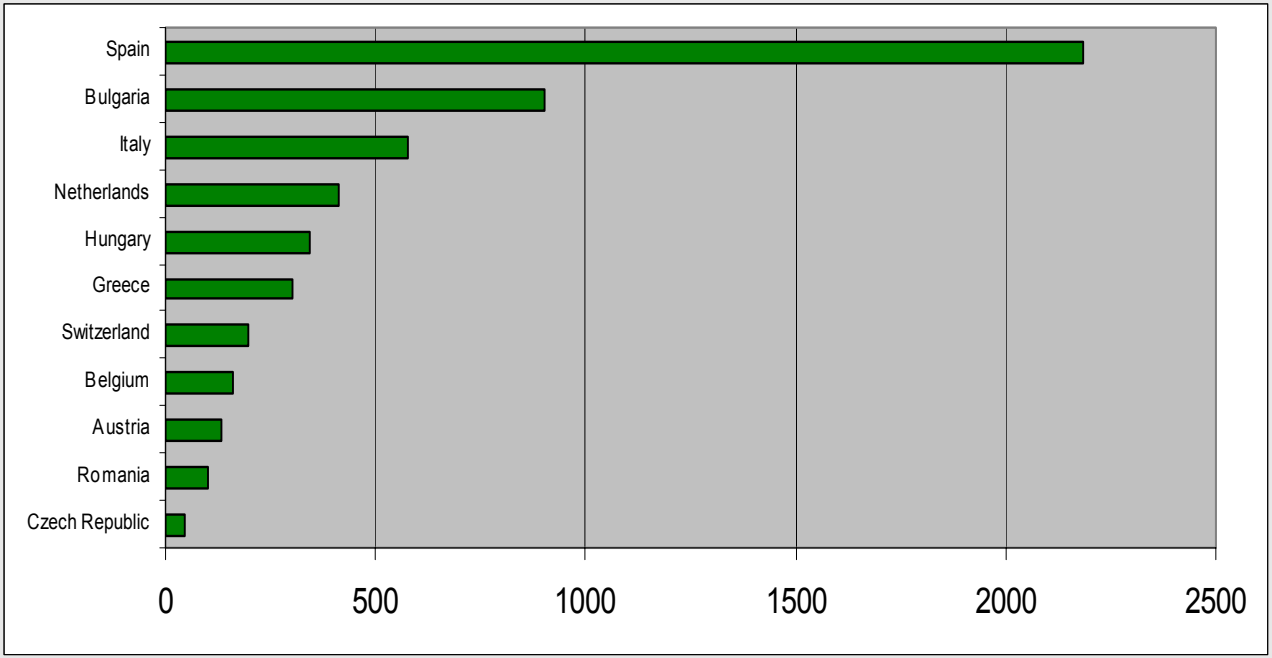


TOP 5

ERTMS investments (tracks km), March 2009 – Source: *UNIFE*

From contracts to reality: European lines into service

- **ERTMS is now a reality: more than 5,000km of tracks in operation in Europe (3,000km outside Europe)**



ERTMS lines into service (tracks km), March 2009 – Source: *UNIFE*

The European Deployment plan – the future European ERTMS network

- **Key challenge for the coming years: successfully manage interoperability on an ever growing ERTMS network**

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Case study: ERTMS in Spain (1/2)

- **The Spanish ETCS network**
  - 2,186km **in operation** (3,800 contracted)
  - ERTMS installed on a **high-speed network** built "from scratch"
  - All 6 ERTMS suppliers involved on trackside/onboard

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- **Key benefits**
  - Record **punctuality rates**: Madrid-Malaga, Madrid-Valladolid, Madrid-Barcelona recorded punctuality rates above 98% (Source: ADIF)
  - "Open" supply market and **multi-sourcing opportunities**
  - ERTMS enabled **modal shift** – e.g. Madrid-Barcelona: after one year of service, 50% market share on what used to be the busiest air route in the world

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Case study: ERTMS in Spain (2/2)

- **Lessons learnt**
  - Do not refrain from using different suppliers
  - Testing and de-bugging must be done mainly in labs to save time and money
    - Limited number of slots for real track testing
    - Tests can be performed on a complete variety of test cases
    - Each test case is easily repeatable
    - Test cases can be automated
  - Tests between suppliers of onboard/trackside are necessary
- **Next steps**
  - Further expansion of the Spanish ETCS network
  - Putting into service Level 2 will further reduce travel times and costs
  - International connections with France and along the ERTMS Corridor D (upgrade of lines to 2.3.0d)








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Case study: ERTMS in Italy (1/2)

- **The Italian ETCS network**
  - 579km **in operation** (1230 km contracted)
  - ERTMS primarily used for High Speed
  - Use of **Level** 2 without fallback system (“pure ETCS”, no lineside signals/legacy systems)

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- **Key benefits**
  - Considerable **cost saving** due to “ERTMS only” installation
  - Lower **maintenance costs** thanks to the use of Level 2 (no lineside signals)
  - Higher performance: worldwide **speed record** in tunnel achieved on Bologna-Florence (362 km/h)

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Case study: ERTMS in Italy (2/2)

- **Lessons learnt**
  - Considerable time spent on testing in the field and on integrating ETCS with GSM-R. For lines already in operation lab tests could have been developed.
  - Use of 'ERTMS only' and level 2 makes the best use of ERTMS' potential in respect to performance and maintenance

- **Next steps**
  - Opening of the Bologna-Florence line (by end 2009)
  - Completion of the High-Speed "T" network with ERTMS
  - International connections through the upgrades of lines to 2.3.0d (Corridor A&B)

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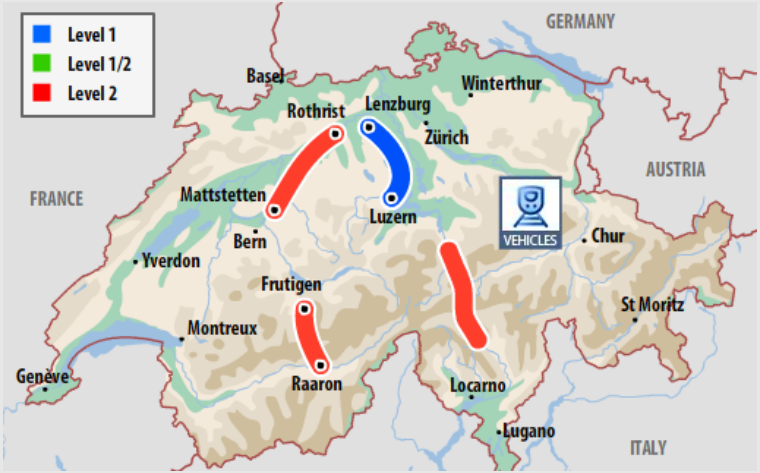
Case study: ERTMS in Switzerland (1/2)



- **The Swiss ETCS network**
  - 196km **in operation** (332km contracted)
  - ERTMS installed on **high-density lines** to increase capacity and **mixed** lines
  - 500 ERTMS trains in operation!

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- **Key benefits**
  - Increased **capacity**: 242 trains/day on Mattstetten-Rothrist, headways < 110 seconds at a speed of 200km/h
  - Reduced **travel times** including on key strategic bottlenecks (e.g. Zurich-Bern)
  - Improving **freight traffic** conditions – e.g. Lötschberg tunnel – intervals of < 3 minutes at speeds of 250km/h (160 trains/day on partly single-track line!)
  - Reduced **maintenance costs** through the use of Level 2

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Case study: ERTMS in Switzerland (2/2)

- **Lessons learnt**
  - Systems integration and compatibility between different suppliers is only to be reached via simulated testing in dedicated labs
  - ERTMS is suitable for all kind of applications – freight, high-speed, conventional, high-density and mixed traffic
  - Line capacity was increased by 15-25% (Source: SBB)

- **Next steps**
  - Program to complete the installation of ETCS on the Swiss network by 2017
  - Testing and implementation of Limited Supervision



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Conclusions and recommendations

- **Experience gained from ERTMS projects in operation shows that:**
  - ERTMS is now a mature technology, suitable for all applications and recording high customer satisfaction:

    "*we only hear complaints on ERTMS from these countries that do not invest*" (EU official, 2008)
  - Level 2 offers the highest potential both in terms of performance and cost savings;
  - Rolling stock should be ordered at an early stage (HSL Zuid…);
  - Think "European" when introducing ERTMS: avoid purely national functions;
  - Prefer in-lab testing to real track testing

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Challenges for the coming years

- **Moving on from a "national" to a truly "European approach"**
  - Reduce costs for all actors (operators & infrastructure managers) by shortening the migration period and removing legacy systems
    - ➡ European ERTMS Deployment plan
  - Further reduce the cost and improve the efficiency of testing procedures & achieve interoperability on the ERTMS corridors
    - ➡ Creation of the ETCS Testing & Implementation Platform (ETIP)
  - Reduce certification costs
    - ➡ Strengthening the power of the European Railway Agency?
    - ➡ Launch "big" rolling stock orders
  - Need for strong cooperation amongst different actors (suppliers, RUs, IMs, NoBos, NSAs, etc.)

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