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Federal Department of the Environment,
Transport, Energy and Communications

Federal Office of Transport



ERTMS-Development FOT-Program «Railway Operation 25»

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Agenda

- ERTMS in Switzerland
- Tasks for future Development
- Organisation and Responsibilities
- International Cooperation
- Conclusion



Status of ERTMS in Switzerland

CH-Network is an integral Part of the interoperable european Rail-Network

Swiss Migration to ERTMS has been completed 2018*

- Connectivity for voice (network) and data (L2) is fully digitalized (*GSM-R*)
- On CH-Network the Class B Systems have been migrated to ETCS L1 LS (*Baseline 3*)
- Eight important Lines are equipped with ETCS L2 (*Baseline 2*)
- 1'300 Vehicles are equipped with ETCS-Onboard (*mostly Baseline 2, few Baseline 3*)

* Few remaining sections
to be completed until 2021

FOT declares Interoperability for ERTMS as key issue



Analysis of current Status «Cab Signaling-L2»

ETCS L2 as System is well performing in daily Operation*

** Mean Distance between Failures MDBF:
Cab Signaling much better than conventional Systems*

However for further developments we have to improve overall conditions

- Key Issue: For Innovation ERTMS has to be treated as an integral System (Wayside + Onboard)
- FOT will take the Task for strategic Decisions about ERTMS
- FOT focus on a sustainable Basis for an industrialized future Rollout
- Focus: Harmonized Operation Processes + modular Concept + replacing End of Life-Products
- Target: Improved Use and higher Capacity in Operation, Reduction of Complexity
- Target: Internationally harmonized and accepted solutions (Interoperability)



Future technical-operational Tasks

Basic Topics – Focus FOT
Innovation – SR4.0

Connectivity - FRMCS*

- Specification FRMCS in TSI CCS (2022)
- FOT-Requirements for Systemoperation and Security
- Higher Performance for ETCS L2 in complex Nodes
- Migration from GSM-R to FRMCS

* FRMCS: Future Railway Mobile Communication System

Technical-operational Basics

- Focus on Specification for «Cab Signaling»
- Prescriptions for Operations (IOP)
- Basics for Braking-Performance (IOP)

Safe Shunting

- Shunting Movements to be supervised
- Train-Integrity for Shunting ensured

Moving Block

- Train-Localisation without Balises
- Train-Integrity instead of Axle-Counter
- Train supervises its safe Moving

New Interlocking

- Digital Interlocking with high Processor-Capacity
- Interoperable Spec. for industrial Rollout

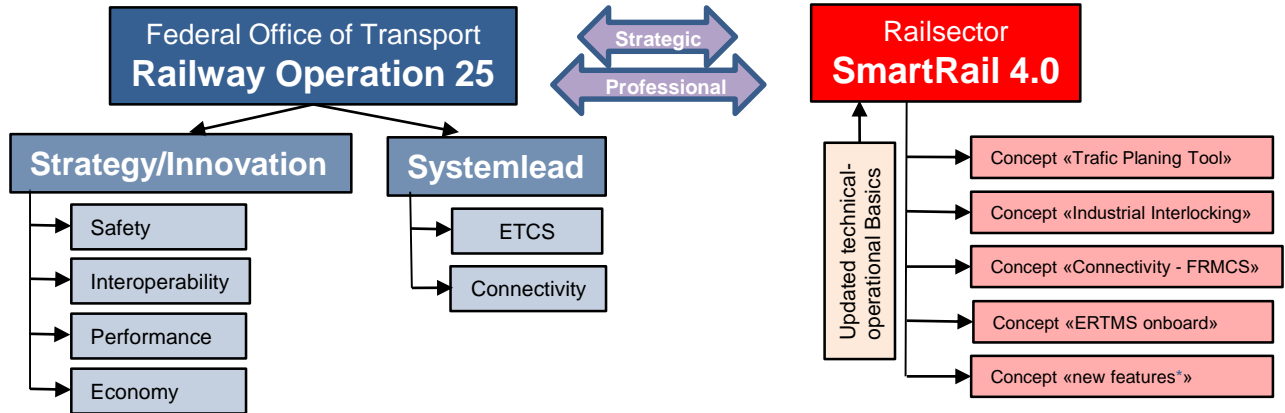
Upgradeable Vehicle onboard-equipment

- Onboard-SW as an integral Part of the System
- New modular Architecture of onboard-equipment
- SW: Safe and efficient Download «over the air»

Organisation & Responsibilities

- Overall Strategy
- Prove of Concept
- Financing
- Decisions
- Monitoring

- Concepts
- Specification
- Interoperability
- Prototyping
- Migration

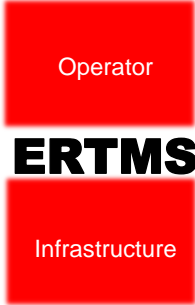


* localisation, train-integrity, ATO



Items in Focus for Railway Sector

- Updated technical-operational Specification
- Data Communication with FRMCS
- Upgradeable and modular Onboard-Units
Precondition for easy remote based SW-Updates
- Implementing Innovation
Connectivity, Modularity, Upgradeability, Train integrity, Localisation, Automatisation (ATO), Architecture of Interlocking (RCA)
- Safer Shunting Operation
Reaction to the increasing number of recorded incidents



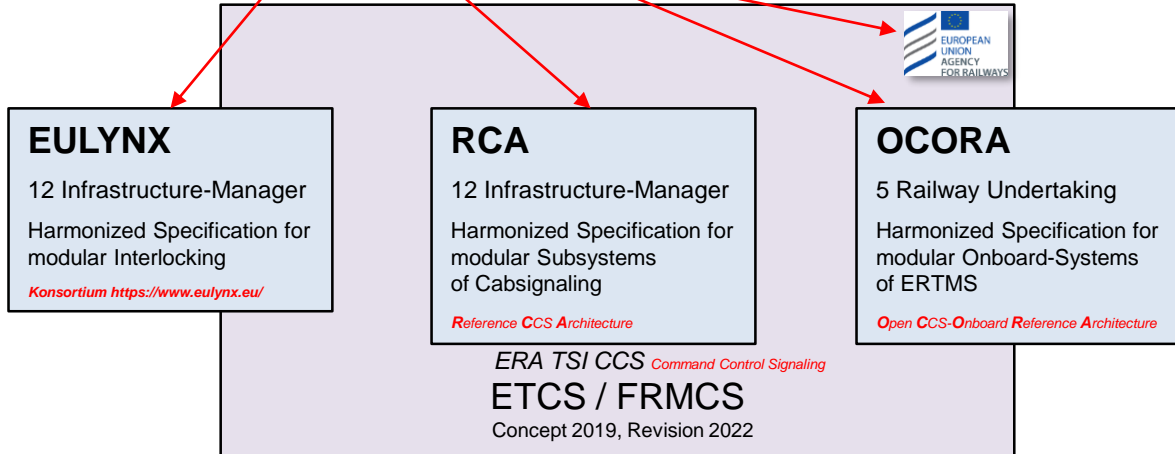
ERA TSI - Specifications



International Cooperation

Three Initiatives of the Railwaysector have the Task to harmonize the Specifications.
Modular, standardized Architecture with defined Interfaces

SBB cooperates actively in all this groups





Conclusion

- Actual ERTMS proves its technical efficiency every day on the CH-Railnetwork
- However an efficient industrial Rollout - based on today's Spec. - is not possible
- Innovative Digitalisation can open new Opportunities for the Railway Sector
- Interoperability is the key Issue to be implemented for Success
- International Cooperation opens the Way to Success
- Target is a complete, modular System-Specification
- Rollout will take Place in modular Steps





Thank you!

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