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Safety Division

An update on the Swiss ERTMS Strategy

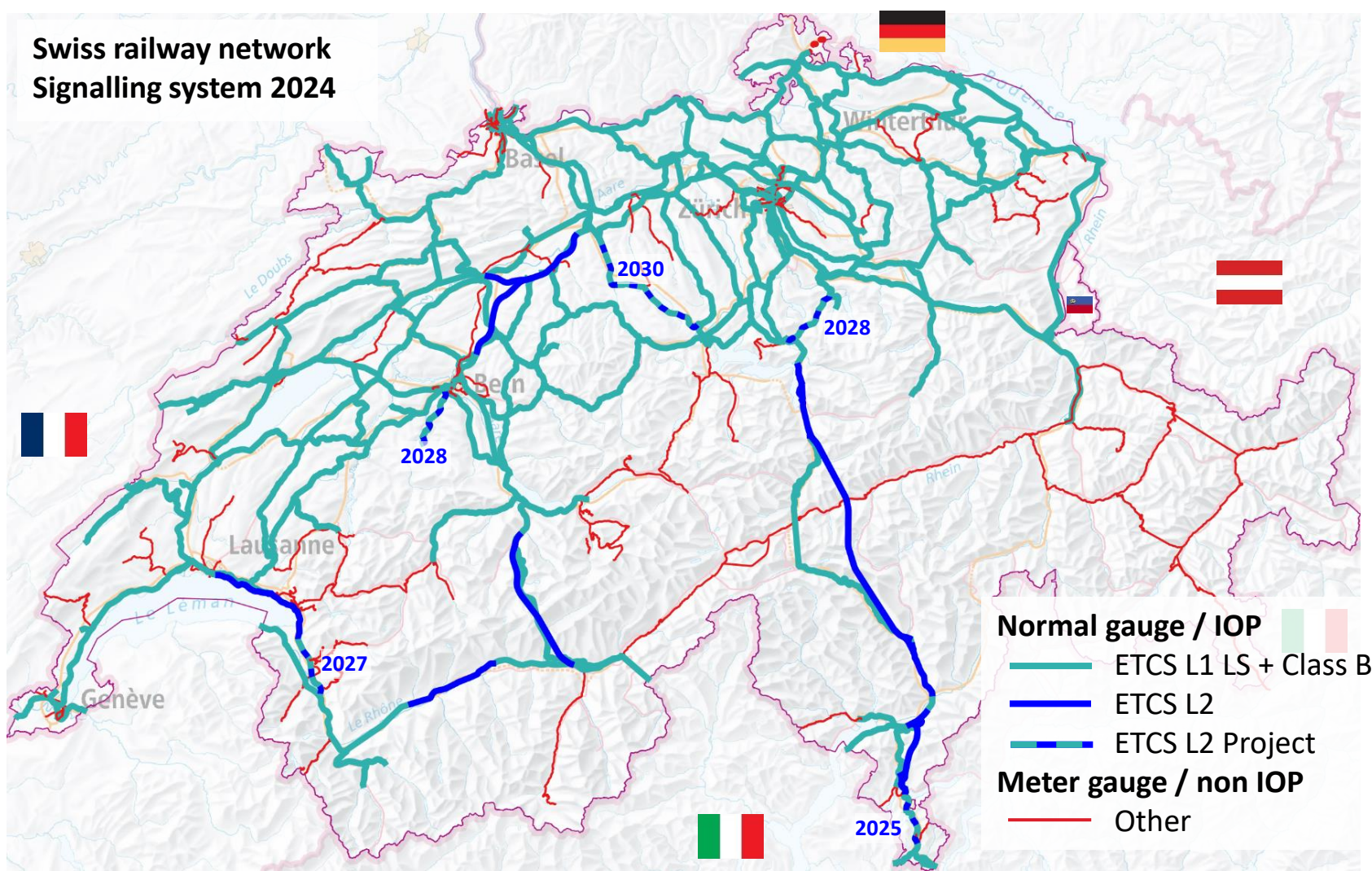
→ Download the strategy at www.bav.admin.ch/ertms

ERTMS 2024 Conference
23-25 April 2024

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Federal Office of Transport

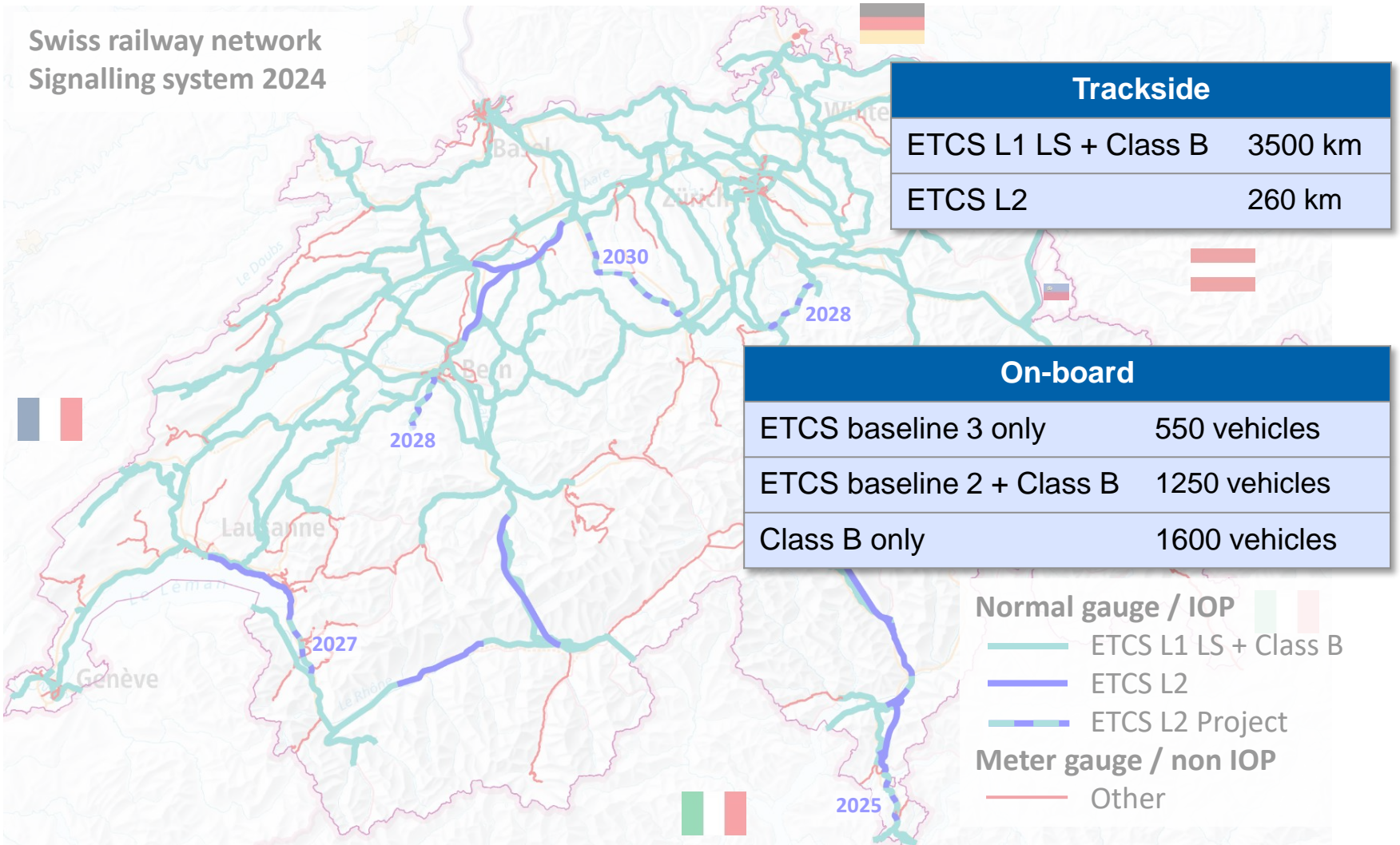
Whole network interoperable since 2018

Swiss railway network
Signalling system 2024



Swiss railway network

Signalling system 2024



Trackside	
ETCS L1 LS + Class B	3500 km
ETCS L2	260 km

On-board	
ETCS baseline 3 only	550 vehicles
ETCS baseline 2 + Class B	1250 vehicles
Class B only	1600 vehicles

- Normal gauge / IOP**
- ETCS L1 LS + Class B
 - ETCS L2
 - ETCS L2 Project
- Meter gauge / non IOP**
- Other



A (not so) short history of ERTMS in Switzerland

2000 ETCS Strategy
Eurobalises instead of ZUB/Signum trackside

2011 ETCS Strategy

- > 2014 all new vehicles with ETCS
- 2018 L1 LS everywhere
- > 2025 L2 rollout

2021 ERTMS Strategy

L2 «where needed»
Vehicle retrofits only with ETCS

2023 ERTMS Strategy

Line	ETCS level	In commercial operation since
Zofingen – Sempach (renewal, pilot)	L2	2002 until 2003
Bern – Olten (new line)	L2	2006
Lötschberg base line (new line)	L2	2007
Gotthard base line (new line)	L2	2016
Lausanne – Villeneuve (renewal)	L2	2017
Sion – Sierre (renewal)	L2	2018
Whole network except L2 lines	L1 LS	2018
Ceneri base line (new line)	L2	2020
...		



General challenges to the signalling systems

A mix of technologies (relay and electronic) coexists even on the same line

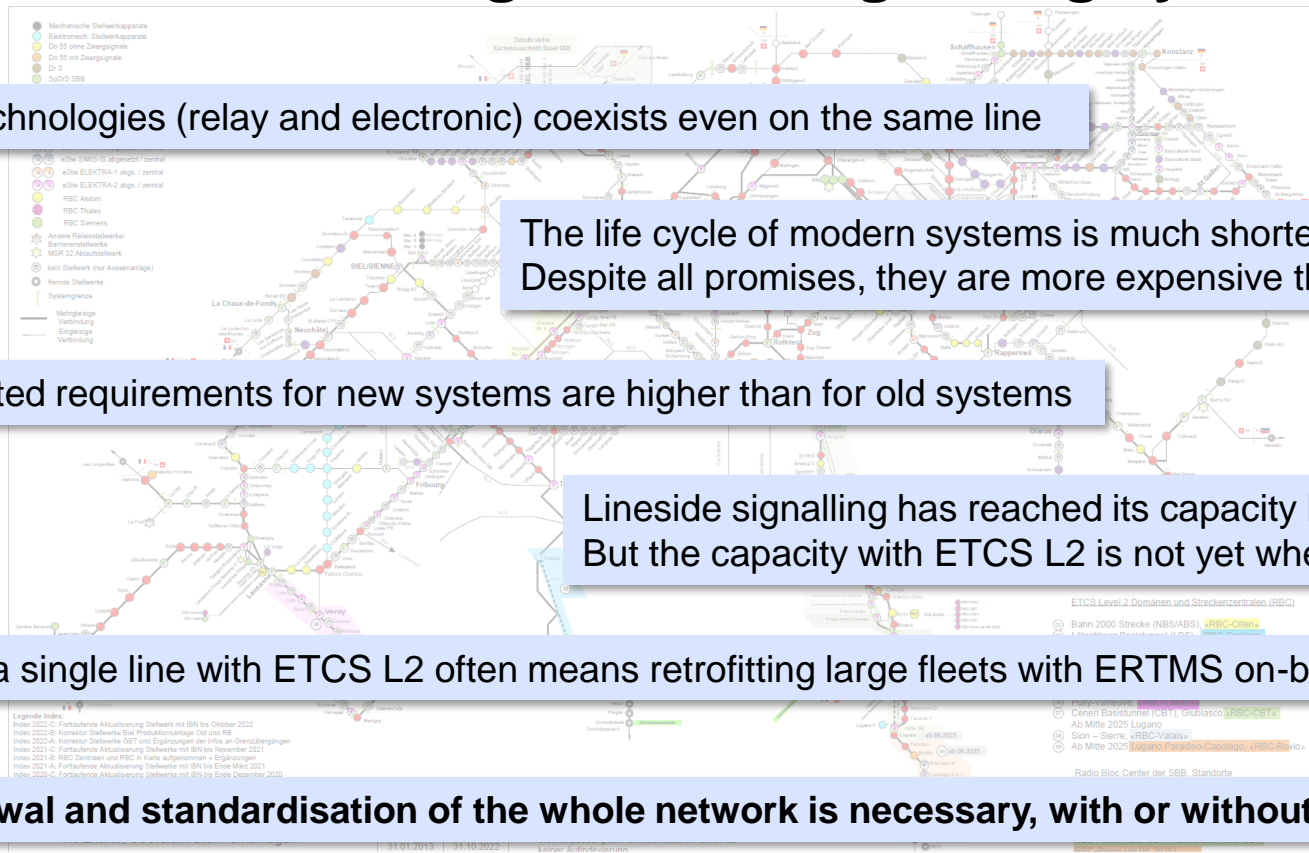
The life cycle of modern systems is much shorter
Despite all promises, they are more expensive than older ones

Safety-related requirements for new systems are higher than for old systems

Lineside signalling has reached its capacity limits
But the capacity with ETCS L2 is not yet where we need it

Equipping a single line with ETCS L2 often means retrofitting large fleets with ERTMS on-board

Renewal and standardisation of the whole network is necessary, with or without ERTMS!





Why so few lines with cab signalling?

Retrofit of rolling stock is complex and expensive

Commonplace
«High costs, low capacity and bad reliability of L2»

IMs waiting for the «coming soon» revolutionary, cheap signalling system

RUs see costs but no benefits

Commonplace
«L2 cannot work in nodes »

For some, L2 is already too old - for others not yet mature

Missing incentive to fit rolling stock

Design/planning of ETCS
L2 is more complex than lineside signalling...

Lacking support in top management



Our ERTMS strategy's approach

The Swiss ERTMS strategy has been discussed with all stakeholders

It postulates that only **homogeneous use of products, digitalisation and migration to cab signalling** can address the challenges of the future. There is **no alternative to ERTMS**

Its centrepiece is a **catalogue** of 29 measures to be addressed by the stakeholders regarding:

- G governance
- I infrastructure
- F on-board
- T technology

ID	Mesure	Délai	Responsable	Directement impliqué	Explication / Modification
I1	Collaboration plus étroite, également au niveau technique, et intégration active de tous les acteurs intéressés.	continu	tous	-	Une inclusion aussi large (tous les acteurs des trains) doit être encouragée. Ceci est de la responsabilité de tous. La mesure et sa responsabilité
I2	Utilisation de la signalisation en cabine pour les nouvelles installations et les renouvellements d'installations existantes. Une signalisation optique ne peut être mise en œuvre que dans des cas exceptionnels et justifiés. Un concept contraignant de déploiement de la signalisation en cabine sur le réseau interopérable principal et complémentaire doit être élaboré d'ici à 2025.	dès 2023	GI	OFT, ETF, industrie, SF ETCS, SF com. train	Le concept de déploiement en cabine est à développer (liste non exhaustive) - L'équipement de péage doit être adapté (liste non exhaustive) des synergies, des équipements existants et nouvelle et technique. - Le concept de déploiement en cabine sur le réseau interopérable principal et complémentaire doit être élaboré d'ici à 2025. - Il y a lieu de prendre en compte le remplacement du G. - La répartition des tâches doit être adaptée aux besoins des chemins de fer. - Le développement de la signalisation en cabine de l'UE ne le soutient pas à long terme. Il en va de même pour la signalisation en cabine.



Updated priorities – highlights

Main principles

- ❑ All projects for renewal and new lines must implement ETCS L2, exceptions may be considered
- ❑ Introduction of ERTMS and renewal of interlockings must aim at the homogeneous use of technology and products
- ❑ All stakeholders must be involved and engage themselves, including RU and operational and train staff

Preparing the migration to ETCS L2

- ❑ Until 2025, all IM must develop dependable ETCS L2 deployment plans along entire lines (long stretches) in coordination with the RU



Updated priorities – highlights

Making ETCS L2 fit for purpose by addressing...

- the technical and operational requirements for ETCS L2 in big nodes
- the excessive costs of retrofitting and maintaining on-board equipment
- harmonisation and simplification of operational procedures, preferably in coordination with the EU

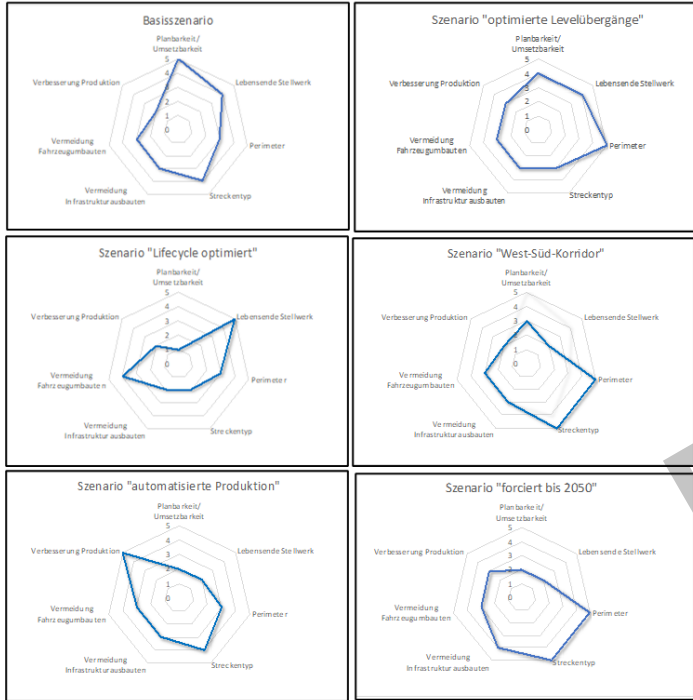
Making ETCS L2 fit for mass deployment

- Optimise and accelerate the planning and design processes of ETCS L2

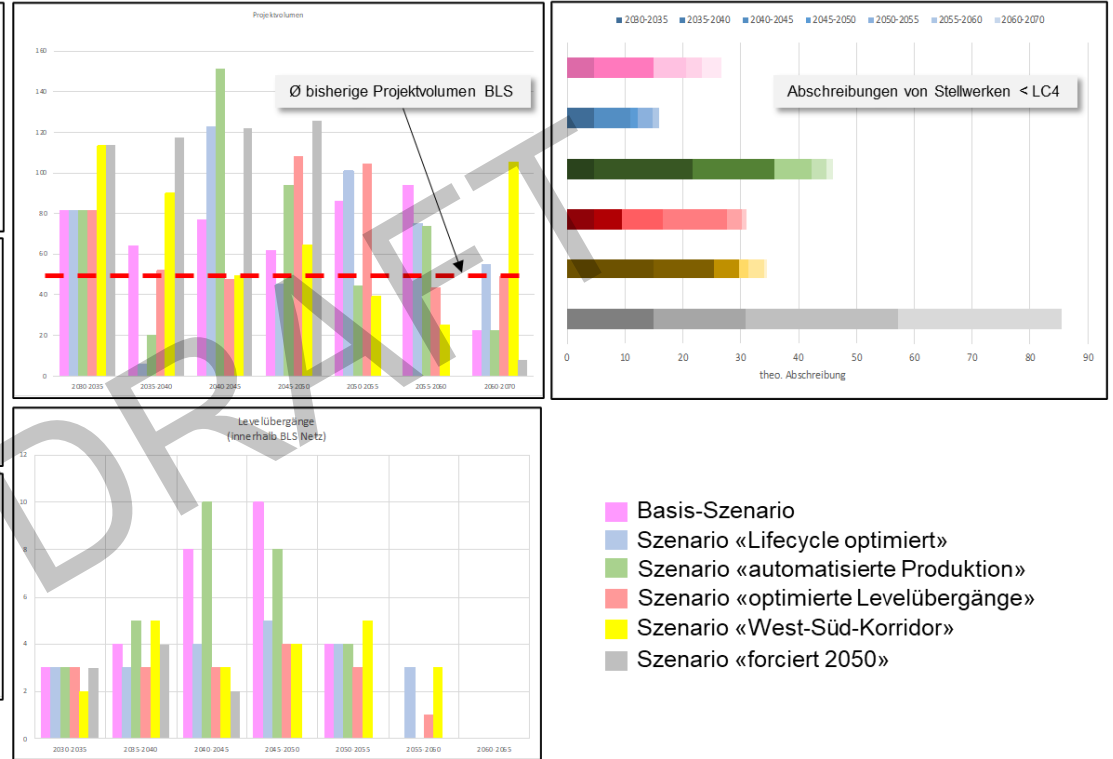


Deployment plans – first considerations of BLS (IM)

Gestaltungskriterien



Bewertungskriterien



- Basis-Szenario
- Szenario «Lifecycle optimiert»
- Szenario «automatisierte Produktion»
- Szenario «optimierte Levelübergänge»
- Szenario «West-Süd-Korridor»
- Szenario «forciert 2050»



How will ERTMS be financed?

Public funds finance about half of the costs of railway transport in Switzerland (passenger and freight)

Thus, renewal of the railway network is subsidised, including trackside signalling

Currently there is no specific funding for ERTMS

Do we need special funding for ERTMS?

Current investigations aim to identify the financial requirement depending on different scenarios for the implementation of ETCS L2 trackside and onboard



First effects of the updated ERTMS strategy

- ✓ Signs that the tightened ERTMS strategy had an impact on the mindsets on all management levels
- ✓ Finally, IM, RU and further stakeholders are starting jointly developing a network wide ETCS L2 deployment plan
- ✓ Migration to ETCS L2 and renewal of signalling systems are now handled jointly
- ✓ All stakeholders acknowledge the need to eliminate the technical “patchwork”



We are confident that the current investigations will demonstrate a way
→ how to **modernise trackside** and **on-board equipment**
→ within **reasonable time** and **at reasonable cost**



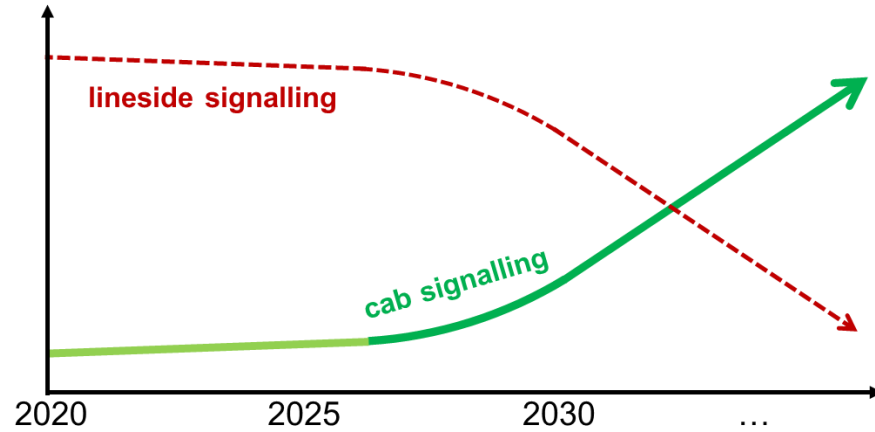
Hopes and wishes to the European railway sector

More focus on the need of RU

- Take measures facilitating lower life cycle costs of ERTMS
- Elaborate cost-efficient solutions for retrofitting ETCS vehicles with FRMCS
- Take into account more frequent software updates and optimise the process for authorization to keep pace

Remove barriers to ERTMS deployment

- Focus on operational efficiency and simplicity
- Focus on the maturity of the specifications instead of new features
- Reduce complexity on the border sections by eliminating Class B



**Let's get real with
mass deployment of
cab signalling !**

Thank you!

→ Download our strategy at www.bav.admin.ch/ertms