Summary Workshop 5
Maximum performance through ETCS

Peter Reinhart, Deutsche Bahn
Daniel Scherrer, SBB
Valenciennes, April 28, 2022

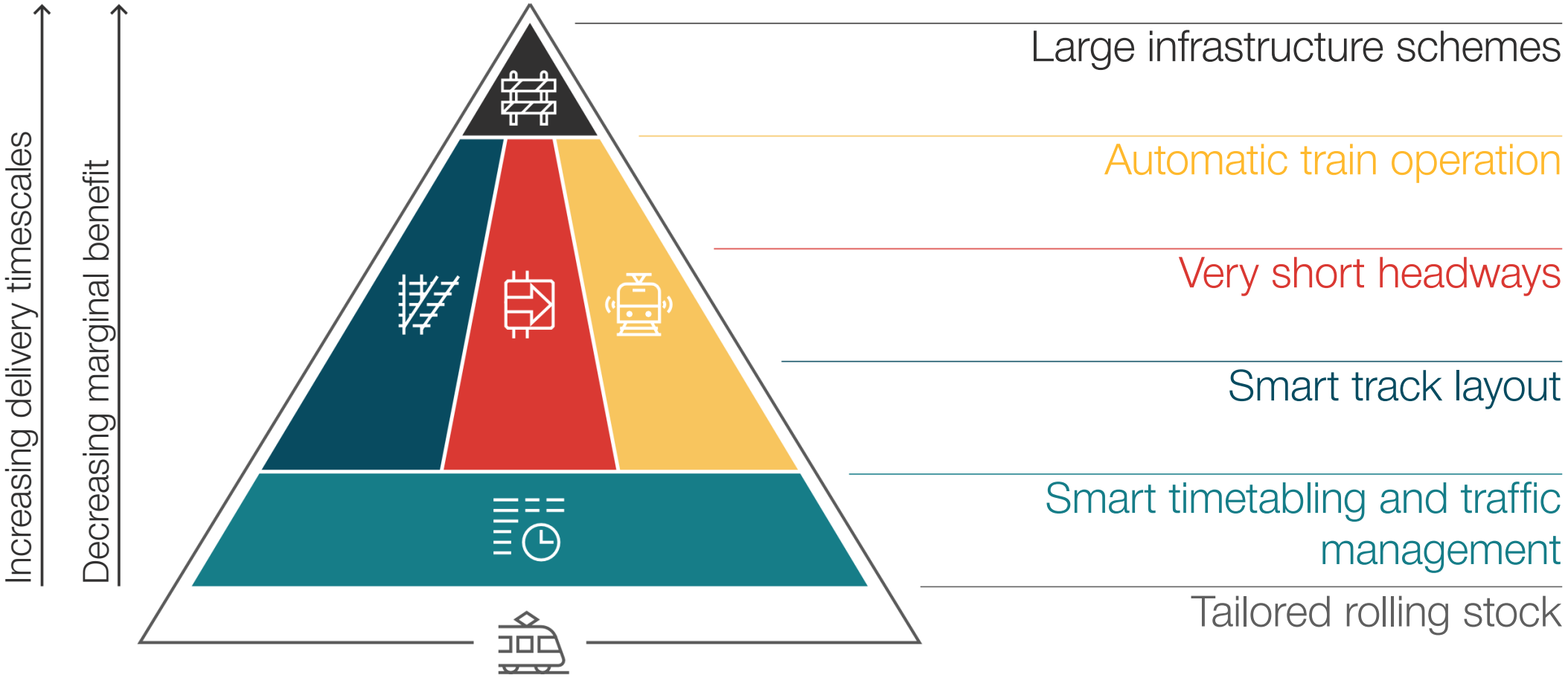
Maximum performance through ETCS: the dark side

- In many cases, adding ETCS to an infrastructure did not lead to more, but less capacity.
- Some reasons:
  - restrictions of remaining class B systems affect ETCS
  - longer system delays
  - more restrictive braking curves
  - procedures (such as start of mission) take longer
  - reduced usable lengths of platforms and tracks

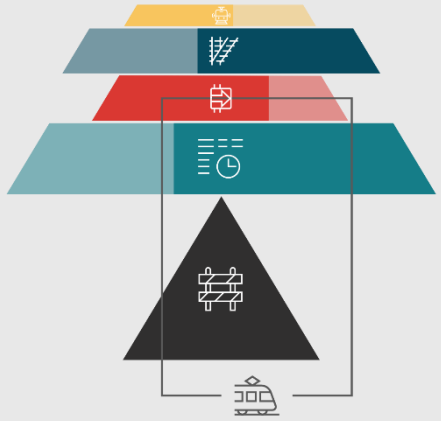
Maximum performance through ETCS: the bright side

- ETCS should not just be put on top of class B systems.
- You must become active to improve capacity, such as
  - short, optimized blocks
  - performance requirements on system delays, braking curves …
  - driving close to the EBI (using ATO, TMS and FRMCS)
- There is some room for improvement in specifications.
- We need to think beyond ETCS and infrastructure.
  We need to think the system as a whole, including
  - vehicles (ATO, braking curves, data for TMS …)
  - operational procedures
  - smart infrastructure design

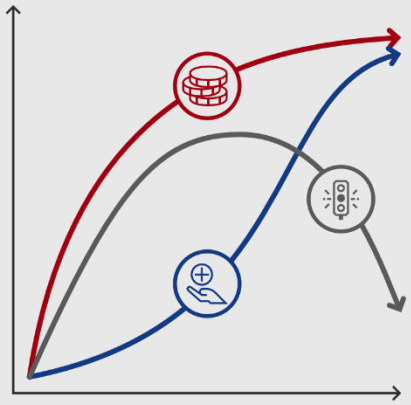
The Planning pyramid. Delivering capacity more quickly and affordably through a whole-system approach



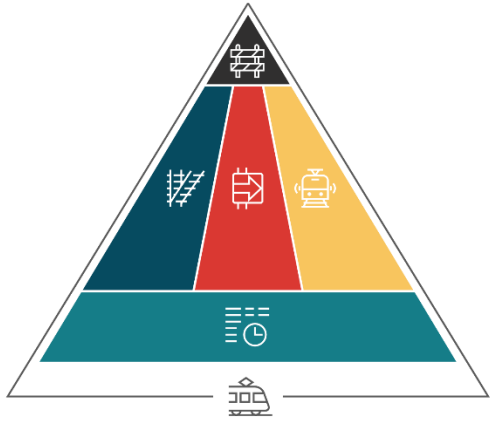
How we plan today. How we should plan in future



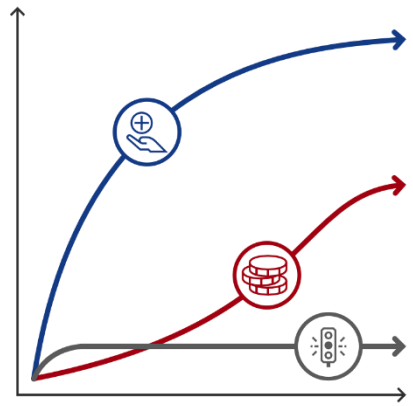
Current planning



System costs
Customer benefits
Unused capacity



Planning pyramid



System costs
Customer benefits
Ununsed capacity

The planning pyramid. Constituents and their impacts

Constituents / *Impact*	Smart time-tabling and TM	Smart track layout	Very short headways	Automatic train operation	Large schemes of infrastructure
Costs					
Timescales					
Construction					
Digitisation needs					
Implementation level at SBB					

Workshop
Output in detail

Maximum performance through ETCS

Why this workshop?

- Huge capacity goals vs. capacity reductions in ETCS projects
- ETCS capacity discussion is usually limited to a few topics (block division, ETCS Level 3, moving block …)
- There are many more ideas. => Get the „full picture“ of what can be done to increase capacity through/related to ETCS
- Do some discussion about topics many are interested in
- Connect similar-minded colleagues.

Maximum performance through ETCS

Topics from session #1

- Improve interoperability train/track
- Decommission Class B systems
- Implement Hybrid Level 3
- Harmonize speed / braking behaviour user needs quality of service
- Including rolling stock, such as dwell times
- improve redundancy
- ATO
- Dynamic timetables, Traffic Management
- System delays
- Increase quality of telecom network, delays
- Optimized signalling design, block division … repeatedly generic designs
- Antagonists to capacity increases, such as enough energy, safety (such as a braking curves, tunnels …); Overcoming legal and financial constrains (such as noise)
- System as a whole (it is not only ETCS)
- Economic value of ETCS / ETCS vs. „infrastructure“
- Start of mission, including shunting/technical movements
- Braking curves – such as: why these safety requirements? Later braking of train drivers => impacts on timetabling
- Positioning, variable safety goals
- Early involvement of manufacturers in performance

Maximum performance through ETCS
Topics from session #2

- perspective: e.g. taxpayer's view
- station/node construction for ETCS (ETCS infrastructure layout), such as restrictions to block division
- (longer) system delays, such as at the control room or brake delays, safety requirements
- (much more) restrictive braking curves (than class B); again: SIL level
- virtual coupling
- added value (in real life!), such as ATO to ETCS, FRMCS … ; resources are limited!
- ETCS is just put on national system (1-to-1 match), no optimization => no capacity increase
- Movement authority => larger planning area
- Optimizing operational procedures (such as removing a faulty ETCS train from the track), such as by automization
- Smart infrastructure
- Capacity losses at level transitions?

Maximum performance through ETCS
Topics from session #3

- Where do we loose time? KPIs for ERTMS performance, greatest benefit of measures.
- More (process) time needed for start of a train, change of directions …
- Timetabling: low hanging fruits, robustness
- Driver profile/behaviour (without ATO)
- Clear requirements for ETCS Levels, with or without Class B / decision-making process; lack of information; getting rid of old class B system / business case (including costs for radio etc.)
- Better predictions/simulations/design standards for capacity
- Phased approach to introduce new functionality
- Intelligent/clever operation of the network (with ERTMS)
- Project configuration, such as very such blocks, release speeds, breaking curves, national values
- Failure resistance (avoid chain reactions)
- Optimization of route setting / traffic management
- Should we use lineside signals (such as in start of mission)
- (reduced) effective length (such as at platforms)
- Shunting

Contact

Daniel Scherrer

SBB Infrastructure

Network and Technology Concepts

daniel.scherrer@sbb.ch

Peter Reinhart

Deutsche Bahn AG

Program Management for Stuttgart Digital Node

peter.reinhart@deutschebahn.com