Rail Interoperability – Where are We and Future Challenges

UIC 3rd World Conference on Rail Transport Telecom

Josef Doppelbauer, Executive Director

EUROPEAN
UNION
AGENCY
FOR RAILWAYS

	Rail Pax	Rail Freight	Automotive	Aviation	Maritime
Traffic pattern	mostly national	international significant		international	international
National regulations	yes (move to European)	yes (move to European)	minor restrictions	international	international
National products*	yes	yes	no**	no	no
National operating rules	yes	yes	no	no	no
Global supply chain	partly	partly	yes	yes	yes

* Vehicles/Rolling Stock and Control Command Systems   ** except for Road Pricing

handover
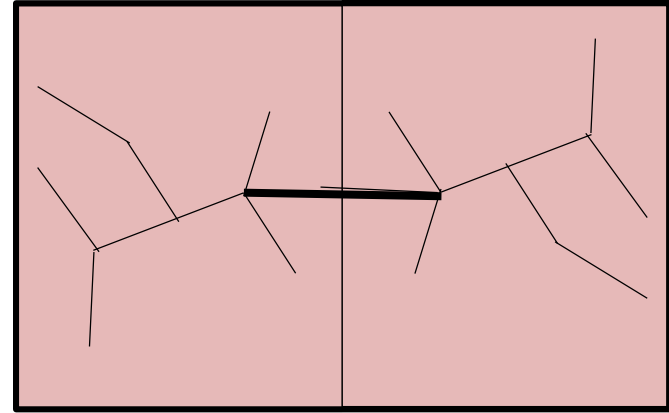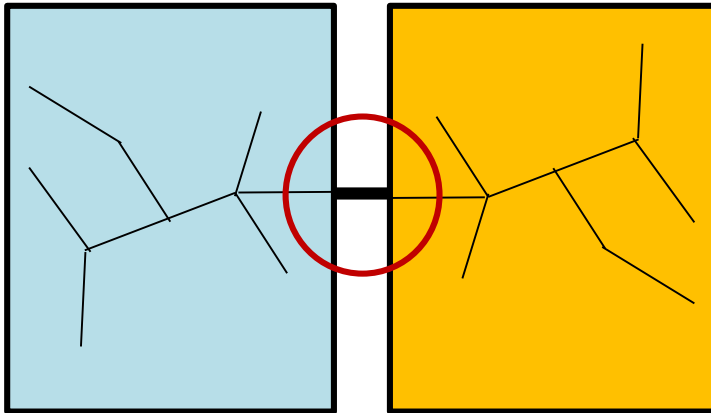
National network A National network B

National rules A National rules B

National monopoly operator A National monopoly operator B
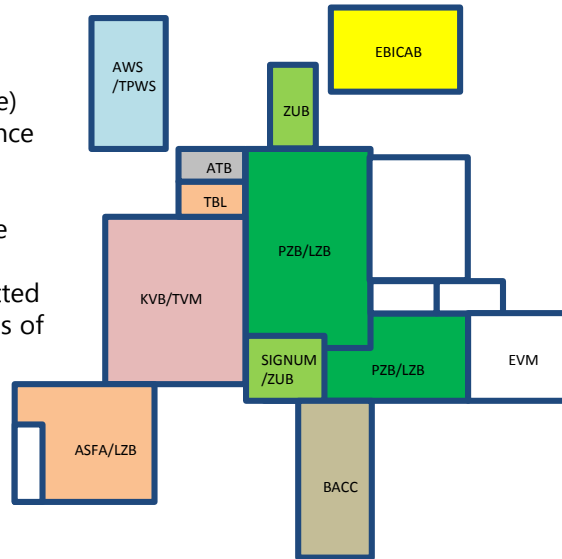
Single Rail Area (European network)

Harmonised specification

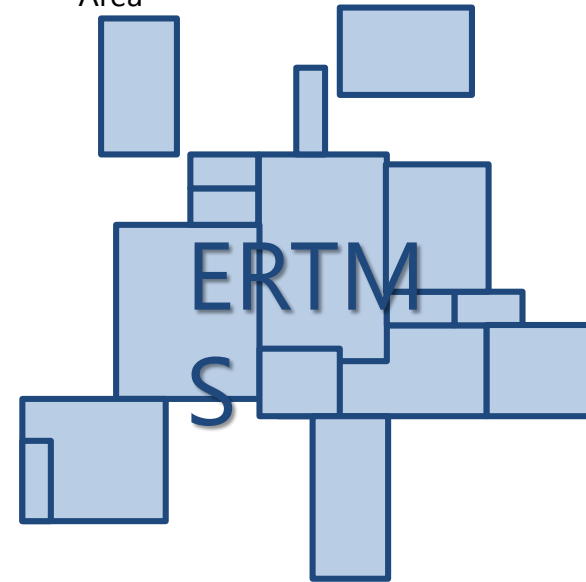Operators work seamlessly across borders (in competition)

one set of rules (= network)

Fragmented national railway systems

- National supplier oligopolies (captive)
  - obsolescence
- Cross-border:
  - change of locomotive
  - multiple systems fitted
- Limitations in terms of functionality and safety

Single European Railway Area

Clarity on goals is needed

"Seamless train operation without borders (caused by signalling) at best economic conditions"

Need to define the **target state** and intermediate states

Evolution of Railway Communication – Threat or Opportunity?

GSM-R will be in operation up to 2030 and beyond
› The system is successful, packet switching for ETCS is introduced, interferences can be managed
› Does this situation create long term stability or does this block innovation and/or cost reduction?

ERA investigates the current and future needs

Definition of GSM-R successor, introduction and migration has to be planned
› Functionality, performance, technology, radio spectrum
› Potential migration scenarios and the economic impact

Shift2Rail

ERA leads the coordination forum with users and contributors (UIC, ETSI, UNISIG, S2R)

The main challenges:
› Is additional radio spectrum needed and can it be made available?
› What technology can offer sustainability and flexibility?
› What is the optimal migration scenario and window?

UIC
ETSI

ERA to define solutions and recommendations to legislator and stakeholders
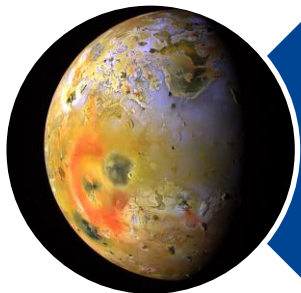
Largest deployment of any
rail telecommunication system
(roll out in EU and worldwide)

Pillar for Interoperability and Safety related
applications

Industry continues to supply GSM-R products
including new functionalities (e.g. interferences
handling, Driver Advisory Systems and Packet
Switched solutions for capacity enhancement)

- Several technical options being considered

- Challenge is to achieve interoperability while offering flexibility for future developments, requiring a smart onboard and trackside architecture to allow evolution with minimum impact on the systems

- Different timelines for migration from one country to another will make the transition period quite long and challenging, but interoperability has to be preserved

- Radio Spectrum will be a key issue both at EU and worldwide level

Current situation

Unwanted future situation

GSM-R
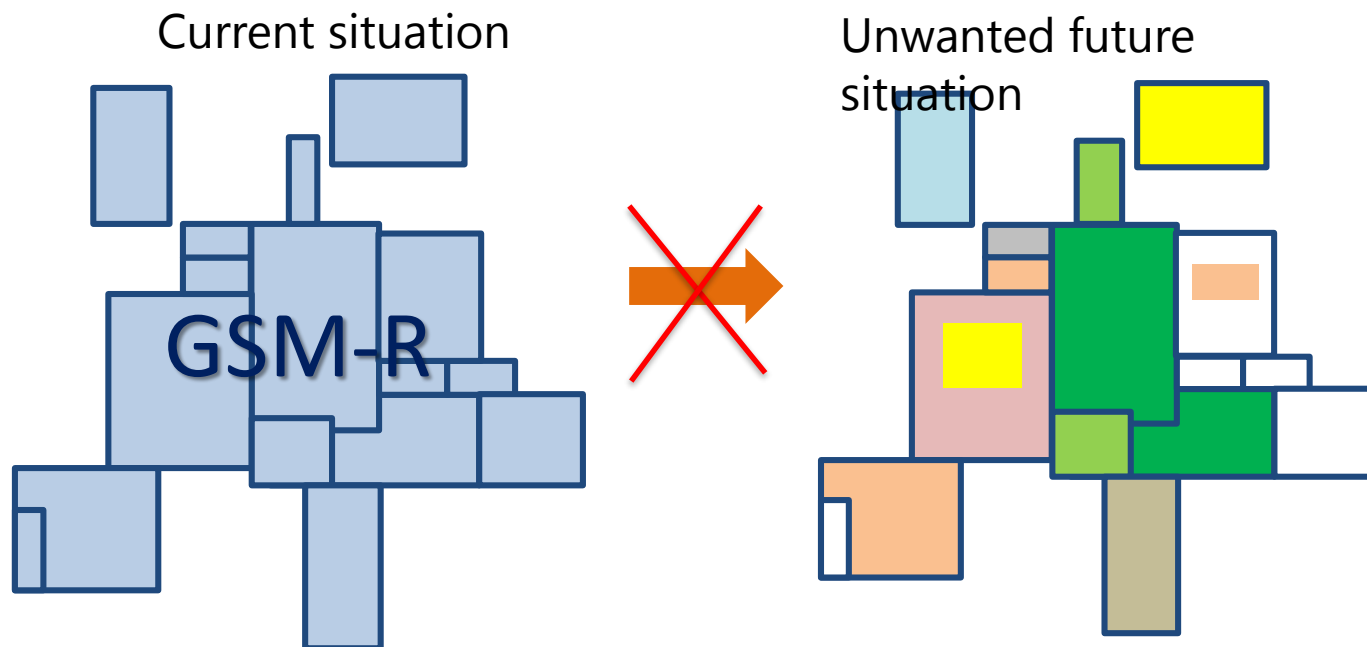
Risk of fragmentation

Different frequencies, multiple radio technologies in national or regional areas

Uncoordinated introduction, border crossing issues
New applications (ATO) should have no impact

The Role of the Agency on the Way from GSM-R to FRMCS

- Leading a Radio Coordination Working Group involving all railway stakeholders: CER, EIM, UIC, ETSI, S2R (to synchronise their deliverables, to foster synergies and to draw conclusions)

- Actively involved in spectrum matters at European Communication Committee, supporting EC (DG MOVE and DG Connect) in organising joint RSIC-RSC meetings

- Preparing the changes to the CCS TSI to adapt EU legislation. Note: the Agency will provide more information on this topic in session 6 on day 2 "The EU legal framework evolution"

The European Railway Industry is Under Threat

Outside World (Automotive, Digital, …)

Other Modes → European Rail Supply Industry ← Outside Europe
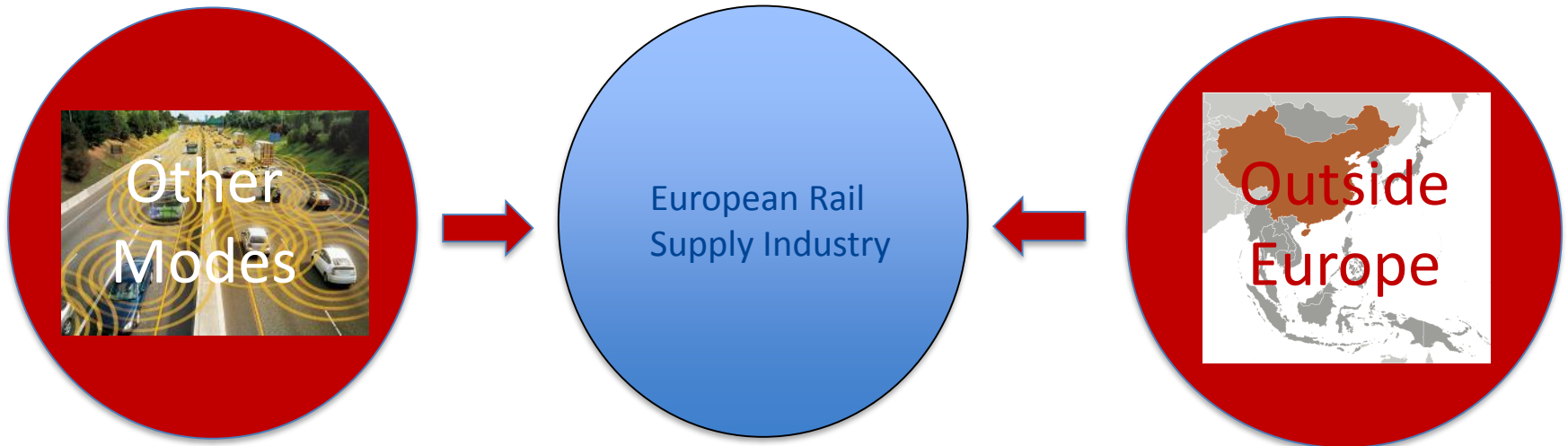
› Rail is a **"living" network**

› The rail network provides mobility services (for passengers and goods)

› Any network consists of

  › Network elements (carriages, trains)

  › Infrastructure

Operations & Maintenance

Tertiary Infrastructure:
Control Command/Signalling

Secondary Infrastructure:
Energy and Communication

Primary infrastructure:
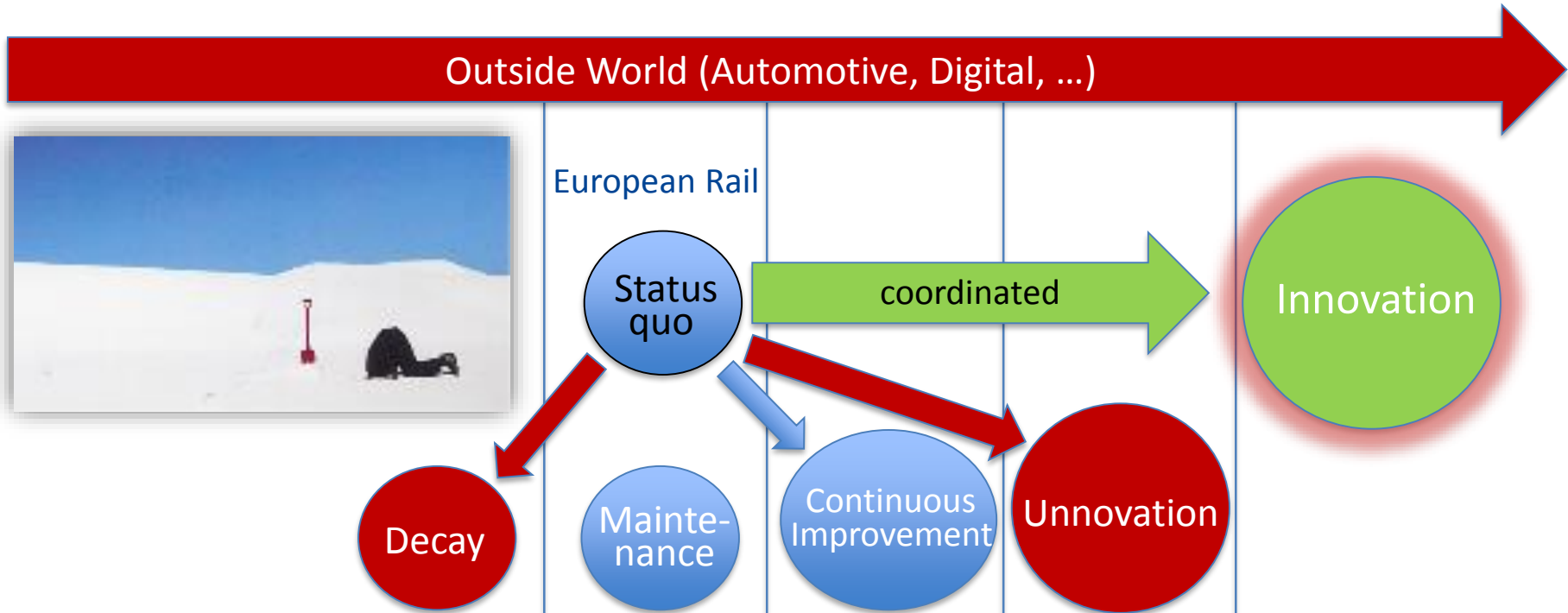Tracks, Tunnels, Bridges, Stations, etc.

Innovation in a network can be **LOCAL** to network elements, or the **MIGRATION of the NETWORK** to a new status

Migrateability

Upgradeability

The European Railway System Needs to Innovate!

Outside World (Automotive, Digital, …)

European Rail

Status quo → coordinated → Innovation

Decay

Mainte-nance

Continuous Improvement

Unnovation

Aspect				
Novelty	-			+++	+++
Scalability	-			-	+++
Better	-		+	-	+++
Faster	-		+	-	+++
Cheaper	-		+	-	+++
More customised	-		+	++	+++

Transport is the Backbone of the Economy – Rail is the Backbone of Transport

Shared, seamless, sustainable Transport

Innovation Steps

(continuous and/or disruptive)

Mobility and Logistics Services

Enablers

- Safety
- Reliability
- Resilience
- Connectivity
- Affordability
- Upgradeability
- Cost
- Market share
- ....

Customer Driven

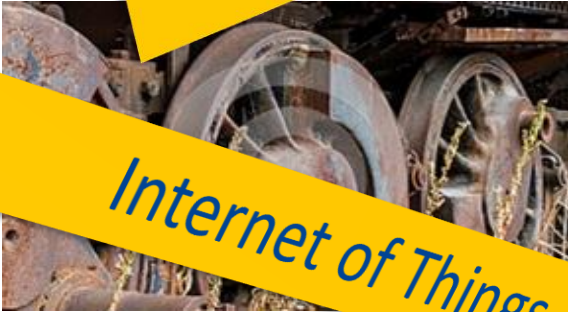**Single European Railway Area**

Innovation & digital technologies

EU-wide regulation & processes

Cooperation & competitive operation

Technical harmonisation, in particular ERTMS

Market Orientation

Global Reference

Technology (digital, automation, ...)

Making the railway system work better for society.

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