



Capacity for Rail

Innovations for Increasing Track Performance and Capacity  
Paris, 15<sup>th</sup> March 2017



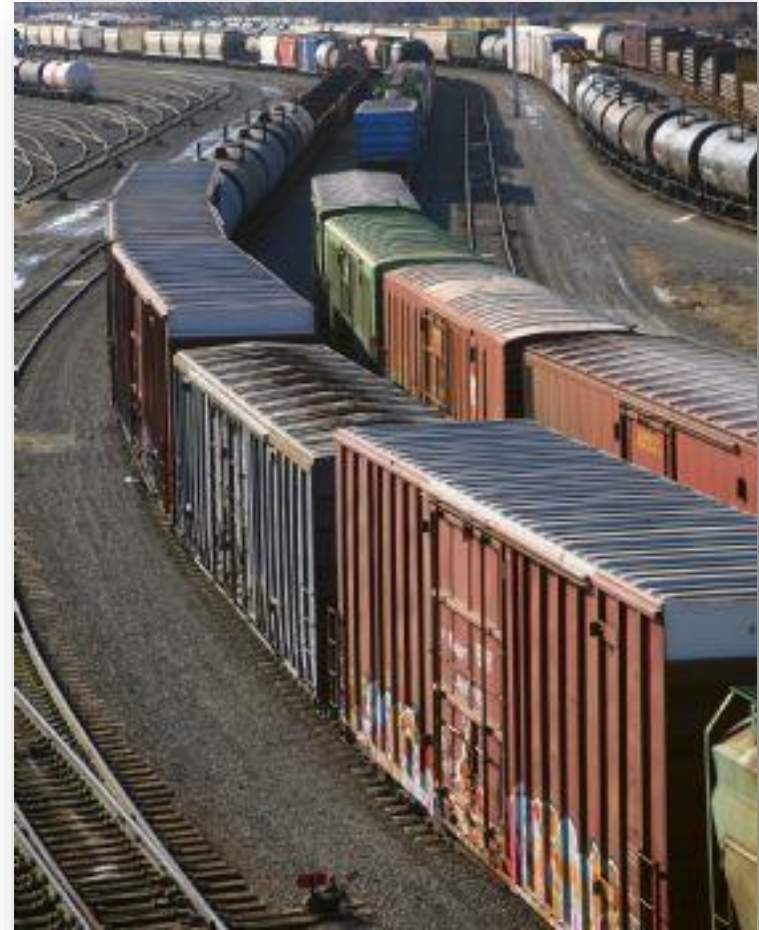
## C4R Context

- In 2011, the White Paper on European Transport assigned ambitious challenges to the transport system, in terms of development, durability and competitiveness.
  - In this context, the railway system has a major role to play in this transport system of tomorrow.
  - But, the railway sector has to take a leap forward. Efforts must therefore be focused on increasing the attractiveness of rail system.
- 
- ✓ C4R project is part of the global European R&D effort to face the challenges reflected in the EU White Paper.
  - ✓ The main objective of C4R is to pave the way for this step change, to demonstrate it is possible to migrate to the requested level of performance and to provide directions, guidelines and roadmaps for the continuation of research and development towards this objective.

# Objectives of C4R



*How to obtain an affordable, adaptable, automated, resilient and high capacity railway for 2030 and 2050?*

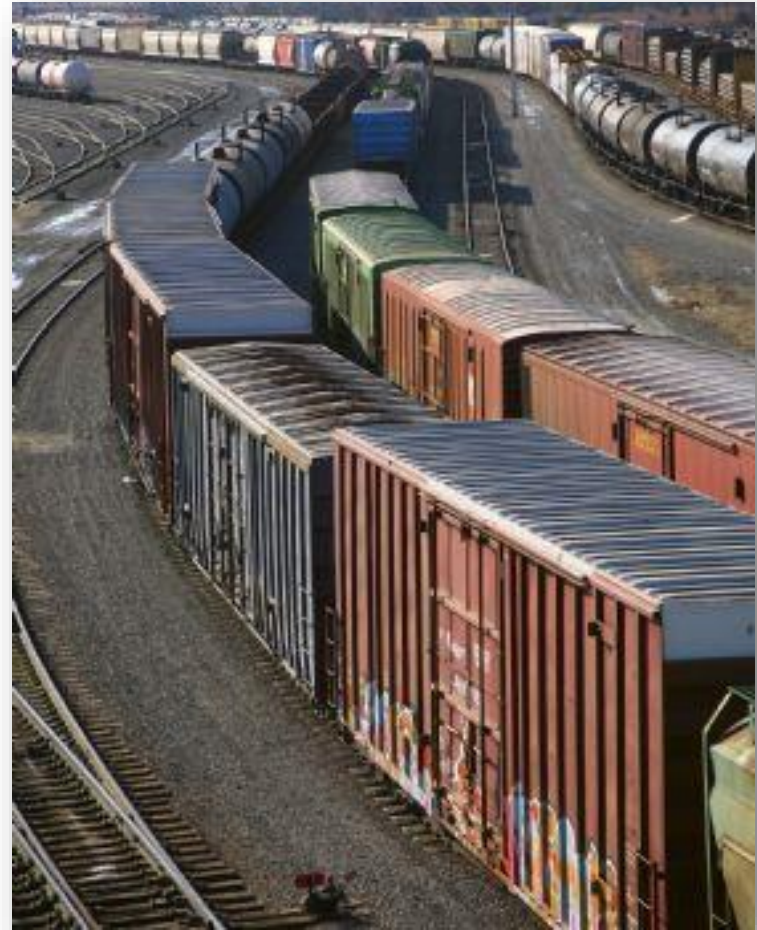


# Objectives of C4R

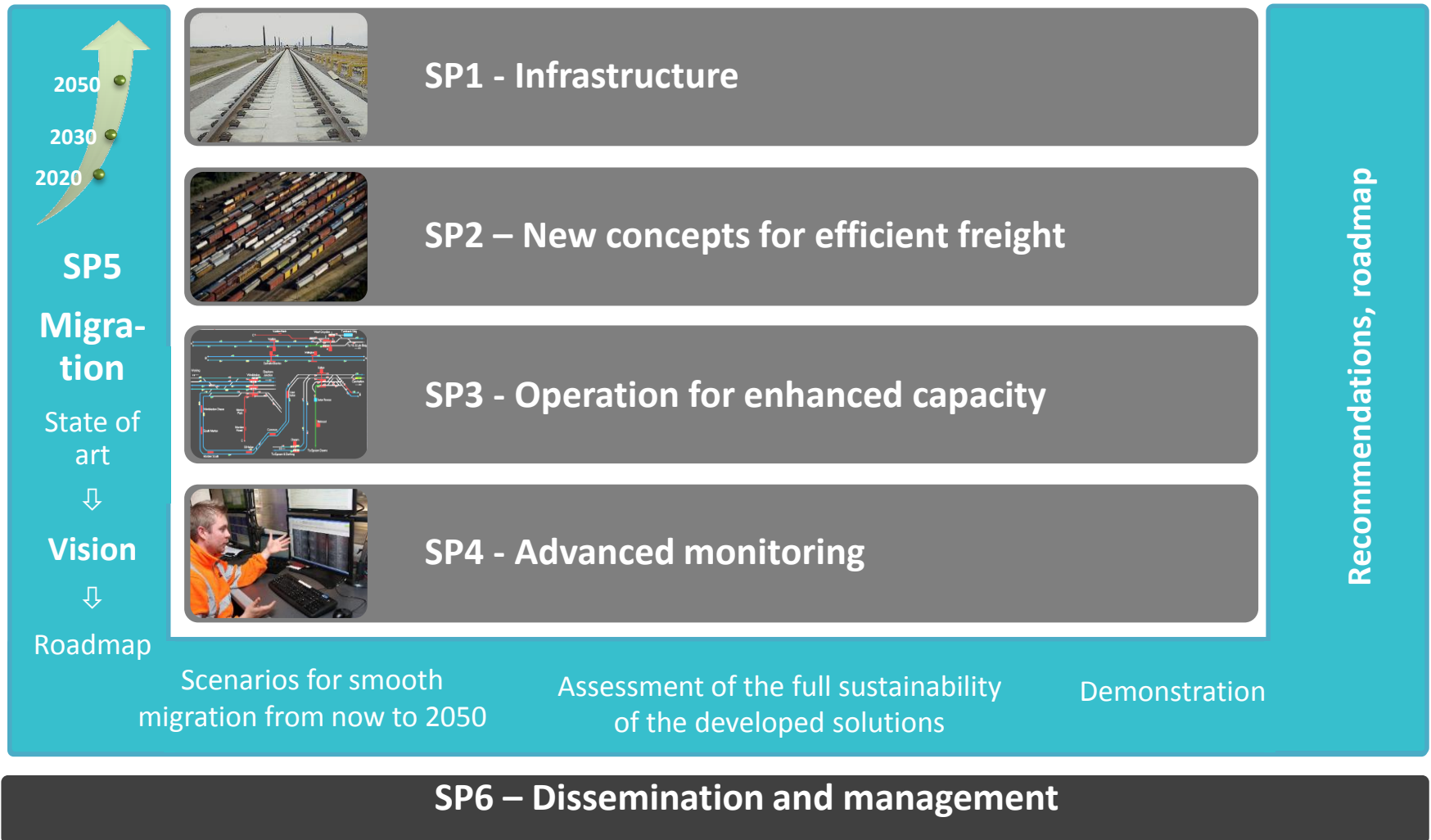


The overall objective of CAPACITY4RAIL is **to set up a vision and bring the railway system towards a resilient, affordable, adaptable, automated and high-capacity railway for 2030/2050**, through major step changes in:

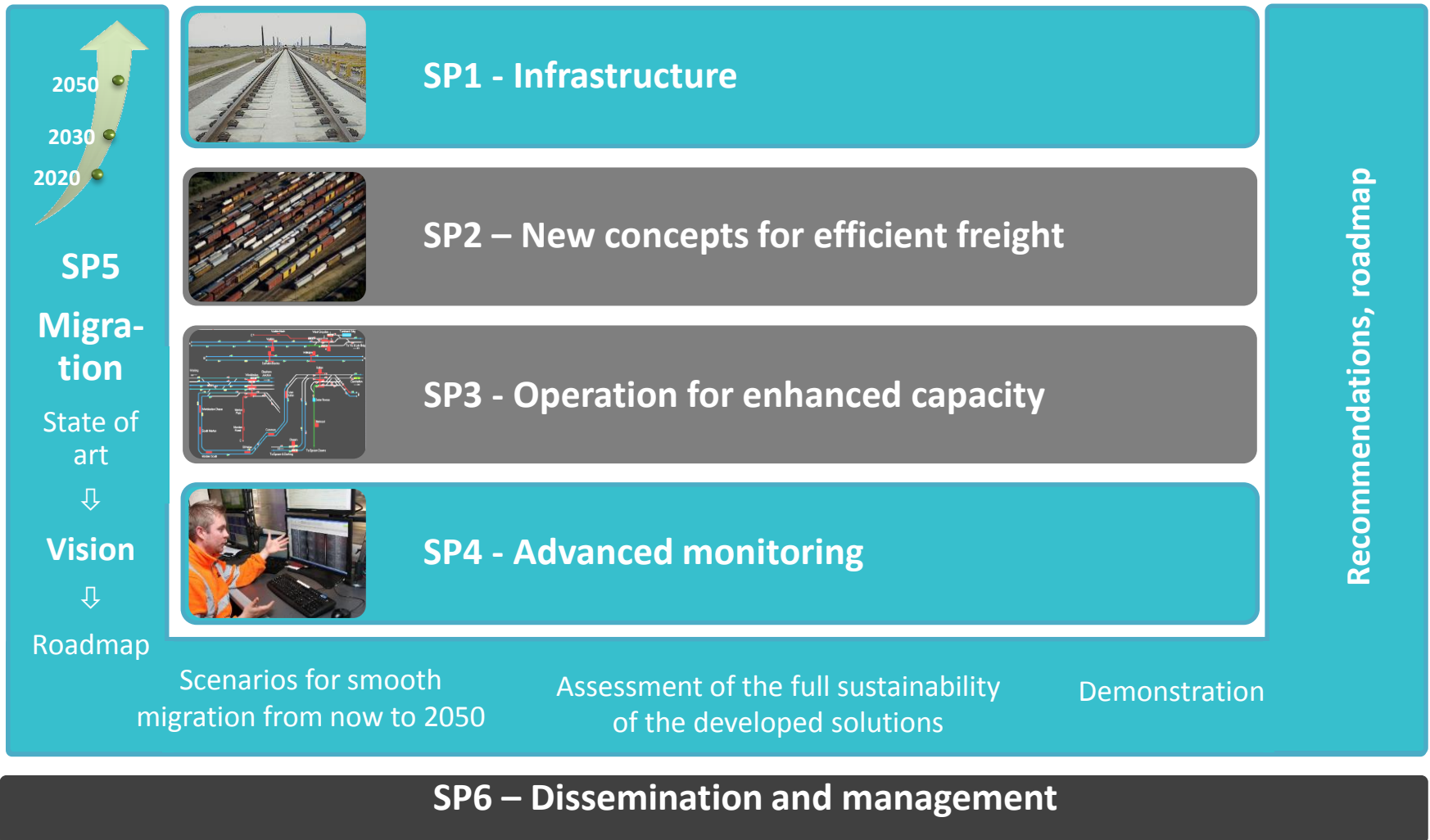
- infrastructure design,
- construction and maintenance, including advanced monitoring
- operations management
- incident recovery through real-time data management
- freight operations, with a particular focus on transshipment and improved performance of rolling stock



# Project structure breakdown



# Project structure breakdown





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## SP1 Infrastructure



# *SP1-Scope and main objectives*

To develop new concepts for railway track of the future, in view of potential application for mixed traffic, but also very high speed.

SP1 is focusing on:

- Developing low maintenance and modular designs of slab tracks for mixed traffic
- Understanding and solving the current obstacles to very high speed traffic (over 350 km/h).
- Analysing the failure mode and developing breakthrough innovative concepts to improve the reliability of switches and crossings.



# SP1-Scope and main objectives

- ✓ *“New track concept generation, selection & design - Slab track concept”*  
*Amador Quintana – INECO*
- ✓ *“Effect of very high speed on track and bridges”*  
*Erica Calatozzo, SYSTRA*
- ✓ *“New approach to maintenance based on advanced sensors and monitoring technologies in S&C”*  
*Edd Stewart, University of Birmingham*
- ✓ *“Understanding root causes of S&C defects and assessing effective remedies”*  
*Yann Bezin, University of Huddersfield*



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## SP4 Advanced monitoring



# *SP4-Scope and main objectives*

The objective of SP4 is to develop new concepts for railway structural and operational monitoring, in order to enhance the availability of the track, combined with automated maintenance forecasts and a prediction of the structural lifetime.

# SP4-Scope and main objectives

- Monitoring strategies
- Monitoring technologies and sensors
- Implementation in new structures
- Migration of innovative technologies to existing structures
  
- ✓ *“Advanced Monitoring and diagnostics of track infrastructure for predictive track maintenance”*  
*Gunnar Baumann, DB*
- ✓ *“Sustainable strategies for monitoring in slab track”*  
*Javier Morales, CEMOSA*



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# SP5 System assessment and migration to 2030/2050



# SP5-Scope and main objectives

SP5 is drawing the common vision for an affordable, adaptable, automated, resilient and high-capacity railway.

SP5 is developing a ‘roadmap’ to pave the way for the target system.

The SP ensures a whole system approach across the SPs to identify the visions, future requirements and boundaries:

- By identifying the necessary steps
- Developing the migration scenarios
- Improving the tools for assessment
- Assessing of technologies/scenarios
- Identifying the optimal capacity enhancement scenarios
- Performing demonstrations

✓ *“Migration strategies for innovative track solutions 2030/2050”*

*Burchard Ripke, DB*



## SP2 New concepts for efficient freight systems



## Develop the rail freight system of the future

- Describe today's and future demand for rail freight.
- Analyse existing/future customer requirements for different goods segments.
- Describe scenarios up to 2030/2050.
- Specify requirements for an efficient rail freight system 2030/2050.
- Conceptually design the rail freight vehicles of the future to enhance capacity.
- Conceptually design transshipment technologies of the future.
- To produce a catalogue on rail freight systems to contribute to the EC goals.
- To suggest standards for fully integrated rail freight systems.





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## SP3 Operations for enhanced capacity



# *SP3-Scope and main objectives*

To develop railway operation strategies that will increasingly use automation for optimised performance and enhanced capacity.

- Develop and test tools for capacity planning and operation
- Develop algorithms for improved timetabling and delay prediction on railway networks
- Derive recommendations for standard European strategies to manage traffic more effectively in case of large disruptions.
- Develop a data model that can be used to support autonomous data exchange and reasoning

## Digital operations for enhanced performance and capacity in European railways

27-28 April 2017

OLTIS Group Headquarters,  
Olomouc, Czech Republic

[www.capacity4rail.eu](http://www.capacity4rail.eu)



ABOUT

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WORKSHOP & TRAINING - DIGITAL OPERATIONS FOR ENHANCED PERFORMANCE AND CAPACITY IN EUROPEAN RAILWAYS

27 & 28 APRIL 2017, OLTIS GROUP HQ, OLOMOUC (CZECH REPUBLIC)





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## ABOUT



## NEWS



### PRESENTATION OF THE PROJECT

CAPACITY4RAIL aims at paving the way for the future railway system, delivering coherent, demonstrated, innovative and sustainable solutions for:

- **Track design:** transversal approach for infrastructure solutions for conventional mixed traffic and very high speed, integrated monitoring and power supply, reduced maintenance, new concept for highly reliable switches and crossings.
- **Freight:** longer trains, lower tare loads, automatic coupling, enhanced braking, modern, automated, intelligent, fully integrated system for efficient, reliable and profitable freight operations
- **Operation and capacity:** traffic capacity computation for freight and passenger, models and simulators for planners: capacity generation, traffic flow, resilience to perturbations, ability to recover from disturbance, computerised real time information to customers and operators at any time
- **Advanced monitoring:** Integration of Advanced Monitoring Technologies in the design and building process, for a easier-to-monitor (self monitoring) infrastructure with low cost and low impact inspection

The full sustainability of the developed solutions and innovations will be assessed and scenarios for a smooth migration of the system from its current to its future state will be evaluated.

### WHAT

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and ope  
services

### INNOVATIONS FOR INCREASING TRACK PERFORMANCE & CAPACITY - PROJECT WORKSHOP & TRAINING, 15 MARCH 2017, THURSDAY 22 DECEMBER 2016



The event is open to anyone wishing to attend and Europe's rail infrastructure industry.

The event will be used to showcase the key infrastr  
CAPACITY4RAIL Project, namely

### ENEWS ARTICLES

UIC's work on improving capacity of the railway system: General Assembly of the European funded project Capacity4Rail held on 25 November, Paris, UIC (...)  
from eNews Nr 425

UIC's work on improving the capacity of the railway system: official launch and General Assembly of the European Capacity4Rail Project at UIC HQ in (...)  
from eNews Nr 370

Participation of UIC in Transport Research Arena 2014  
from eNews Nr 295

## RESULTS

SP1 - INFRASTRUCTURE	③
SP2 - NEW CONCEPTS FOR EFFICIENT FREIGHT SYSTEMS	③
SP3 - OPERATIONS FOR ENHANCED CAPACITY	③
SP4 - ADVANCED MONITORING	③
SP5 - SYSTEM ASSESSMENT AND MIGRATION TO 2030/2050	③
SP6 / WP61 - DISSEMINATION, EXPLOITATION AND TRAINING	③

This page will display all public deliverables approved by the European Commission.

### SP1 - INFRASTRUCTURE

[www.capacity4rail.eu](http://www.capacity4rail.eu)

■ ■ ■ ***Thank you for your kind attention***

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