Innovations for Increasing Track Performance and Capacity
Paris, 15th March 2017
The transport challenge of 2030/2050

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

- **SP1 - Infrastructure**
- **SP2 – New concepts for efficient freight**
- **SP3 - Operation for enhanced capacity**
- **SP4 - Advanced monitoring**
- **SP5 – Migration**
  - State of art
  - Vision
  - Roadmap
- **SP6 – Dissemination and management**

Scenarios for smooth migration from now to 2050
Assessment of the full sustainability of the developed solutions
Demonstration
Project structure breakdown

SP1 - Infrastructure

SP2 – New concepts for efficient freight

SP3 - Operation for enhanced capacity

SP4 - Advanced monitoring

SP5 Migration

State of art

Vision

Roadmap

2020

2030

2050

Recommendations, roadmap

Scenarios for smooth migration from now to 2050

Assessment of the full sustainability of the developed solutions

Demonstration

SP6 – Dissemination and management
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
Capacity for Rail

SP4 Advanced monitoring
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
Capacity for Rail

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
SP2-Scope and main objectives

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 transhipment 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.
Capacity for Rail

SP3 Operations for enhanced capacity
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

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OLTIS Group Headquarters, Olomouc, Czech Republic

www.capacity4rail.eu
C4R website

www.capacity4rail.eu
Thank you for your kind attention

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