



Towards an affordable, resilient, innovative and high-capacity European Railway System for 2030/2050

# Newsletter

Issue 1, May 2015

## Foreword

Here is the first issue of the Capacity4Rail project Newsletter.

Started in October 2013, Capacity4Rail is now entering its second eighteen month period. The project is now running full speed. Innovative track concepts have emerged, requirements for future freight systems have been specified, current practices to improve capacity have been reviewed, future monitoring strategies are being shaped and the vision for 2030/2050 is getting clear.

Now the stage is set for the second phase, where technological developments in all areas will altogether contribute to make this vision concrete.

In this first issue highlighting the main achievements so far, a special focus is given this time to the Infrastructure developments in SP1. Others will follow.

We hope this starting series of newsletters will be a useful tool for you to follow the project progress and stay informed about forthcoming events.

## News from the consortium

### NTnet A.B. enters the consortium

The Capacity4Rail consortium is welcoming a new partner in SP2: NTnet A.B., in replacement of Kockums Industrier A.B.

NTnet AB is a Swedish company working in the Railway Freight sector offering Logistic solutions and freight wagon development. The company is fairly new but its personnel has a very long experience from different previous companies working within these areas.

Companies change but skills remain, as Roger Jönsson, now Managing Director of NTNet AB, used to work on the same Capacity4Rail tasks when employed by Kockums.

### SP2 welcomes its new leader

Nov 2014: Succeeding to Thomas Arvidsson, Micael Thunborg has taken over the lead of SP2 "Freight".



Micael joined Trafikverket in 2009, with responsibilities for the business relations between TRV and the majority of Trafikverkets freight Railway Undertakings. He formerly worked for a number of freight forwarding companies and has gained experience in air, ocean and rail freight services.



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## Short report on Work progress

### SP2 New concepts for efficient freight

SP2 consists of four interacting work packages with the aim to promote future growth in rail transports, to help the designing of a modern fully integrated rail freight system to meet the requirements for 2030/2050

With the submitted deliverable D2.1.1 "Requirements towards the freight system of 2030/2050", SP2 completed a deep and extensive analysis of the current demand and trends for freight flow in Europe, towards 2030/2050. Customers' requirements for different goods segments have been identified and the competitiveness of rail compared to other modes assessed. An extensive set of possible solutions regarding technical developments, and operational processes have been scrutinised to set up the prerequisites for an efficient and attractive rail freight system in 2030/2050.

### SP3 - Operation for enhanced capacity

SP3 is developing railway operations strategies that will increasingly use automation for optimised performance and enhanced capacity.

Delivered report D31.1 is a 'Review of existing practices to improve capacity on the European transport network' which reviews the opportunities and limitations of current networks, (e.g. how much capacity is available and how much of it can be accessed) planning methodologies and strategies, targets, objectives and scenarios

for capacity improvements, and methods used to address interactions with other modes for the benefit of passengers.

'Evaluation measures and selected scenarios' was the first deliverable from the sub-project. It outlines the problems addressed and serves as a plan for the subsequent work. As part of it, the milestone report "Specifications of modelling tools and simulations", sets the base for upcoming simulations and assessment.

### SP4 Advanced monitoring

The objective of SP4 is to develop new concepts for railway structural and operational monitoring, to enhance the availability of the track combined with automated maintenance forecasts, a prediction of the structural lifetime, a fast-check of track and structures after natural hazards and a support for train operation by train monitoring.

SP4 is working in six directions:

- Setting up of a comprehensive monitoring strategy
- Use of sensors from other industries in high units produced
- Original monitoring equipment as part as design solution
- Retro-fit options for existing infrastructure
- Self-powered systems
- Data network for other fields (operation and freight)

With deliverables "Requirements for next generation monitoring and inspection", "Recommendations for monitoring of critical components in the railway" and "Critical components and systems - current and future monitoring", SP4 is shaping in close cooperation with SP1, the monitoring



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strategies of the future railway infrastructure, based on a careful identification of the most critical components.

### SP5 - System assessment and migration

In a transverse way, cross-cutting the technical work streams of the other sub-projects, SP5 ensures a whole-system approach.

Task 5.1.1, describing the current situation and the vision for the railway system is nearly finished. A roadmap has been set up, on the basis of White and Green Papers, national and international strategies and a literature survey. It defines the vision systems for 2020, 2030 and

2050 under five “key aspects”: affordability, adaptability, automation, resilience and high-capacity.

A workshop was held in June 2014 to ensure the connection between the global strategies, visions and milestones and the work in the sub-projects of Capacity4Rail.

SP5 is currently working on identifying the scenarios and methodologies against which the innovative developments of the project will be assessed and the requirements for smooth migration described.

## Forthcoming public events



Capacity4Rail will hold its **first dissemination workshop** on 10-11 June 2015, at UIC headquarters, in Paris. Please see details and register on our website “News” section at [www.capacity4rail.eu](http://www.capacity4rail.eu). It will include the following topics:

- Building a vision for the 2030 and 2050 railway
- Requirements for an efficient freight system
- Capacity4Rail roadmap and key aspects
- Current progress
- Next steps and perspectives ...

Ample time will be reserved for discussion and exchange with the project partners

**10 September 2015: A special Freight dissemination workshop** will be held in Brussels, to present the latest achievements and progress toward target as well as to discuss with end-users the challenges and impacts of SP2. Target audiences are: railway undertakings, wagon manufacturers, wagon keepers, freight forwarders, combined transport operators, terminal operators. By invitation only. Please contact us via website for more information.

**20-22 May: “Upgrading of infrastructure in order to meet new operation and market demands”** – Presentation of work carried out in SP1 by B. Paulsson (TRAFIKVERKET) at the RZD/UIC Asia-Pacific Workshop “**Productivity Increase with Heavier & Longer Trains**” at Saint-Petersburg, Russia



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## The consortium

Capacity4Rail is bringing together a range of 47 stakeholders from 13 nations in an ambitious partnership: infrastructure managers, railway undertakings, logistics developers, research institutes and universities, industrial equipment providers, engineering companies, end-users...

### Project coordination

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## Special Focus

### SP1- Infrastructure Railway track of the future.

The general objective of the subproject Infrastructure is to develop new concepts for the railway track of the future for both mixed traffic & very high speed in order to achieve cost savings, shorter construction time, advanced maintainability through health monitoring, lower global LCC, resilience to natural hazards, environmental efficiency.

The developments will focus on innovative modular slab track concepts designed for mixed traffic and very high speed, and breakthrough concepts of Switches & Crossings which are the most critical component in terms of RAMS.

### Innovative Track Concepts

The work package *"Modular Integrated design of new concepts for infrastructure"* is aimed at designing, developing and testing new concepts for railway track, adapted to mixed traffic and eventually adaptable to very high speed.

Subdivided in four tasks comprised of *"Design requirements & methodology"* (Task1.1.1), *"Track concepts generation, selection & design"* (Task1.1.2), *"Concepts prototyping & testing"* (Task1.1.3) and *"Upgrade Infrastructure to meet new freight demand"* (Task1.1.4), the activities conducted so far under the first task were intended to identify the requirements and develop new knowledge which will be used in the concepts and designs developed in Task 1.1.2 and 1.1.3. Starting from the current tracks systems, the regulatory framework and the

outcomes of the most recent research projects, updated requirements regarding geometrical, mechanical, environmental, construction, maintenance, as well as operational and safety features have been issued. Furthermore, improved guidelines for track loading, resilience and reliability have been achieved. This work resulted in the production of a deliverable on "Design requirements and improved guidelines for design".

With task *"Track concepts generation, selection & design"* (Task1.1.2) Innovative concepts of slab tracks have been generated.

This task relies on the methodology of collaborative workshops proposed by SYSTRA which focuses on teamwork to develop transverse and new proposals steered around needs and uses, in a specific platform providing the ideal environment to stimulate creativity.



Creative session in Systra's "Fabrique"

The work was divided in four sequences: sharing background knowledge, SWOT analysis of existing slab-tracks, "inspiration sequence" and subgroup sessions where teams produced innovative concepts of slab tracks which were then challenged and

assessed. Three main concepts were drafted at the end of the first workshop. And no later than the second workshop, three refined concepts were produced.



3D-printed mock-up of an early SP1 track concept

Beginning of 2015, a special geotechnical workshop allowed defining the nature and requested properties of the track bed layers.

Sprint sessions on 2 selected concepts (1 ladder track & 1 prefabricated concrete slab track) will go deeper into the design of the concepts (structural calculations, LCC assessments). By the end of 2015 both concepts should enter the designing phase.

## Very high speed

The work package "Track for very high speed (VHS)" progressed in elaborating concepts for new HS lines and identifying the aim, scope and requirements of new VHS lines and compatibility with HS freight.

This task conducted under the leadership of ADIF has produced a methodology to establish the maximum speed in HS lines (CBA study optimal speed) as well as technical requirements to design a HS line with top speed ~ 350-400km/h.

The task "New track design and specifications for VHST" has worked on the aspect of non-

linear analysis method for dynamic short and long term behaviour (ongoing), and track irregularities, which will be later tested in Cedex Track Box in Madrid.

A large set of data was gathered from on-site tests in Spanish HSL, track-box and, more specifically from trains, and a test plan was elaborated regarding materials, irregularities to be considered. This will result in a report on innovative design and methods for VHST

Particular care is being given to the dynamical effects of VHS on structures and their consequences in terms of appropriate design principles. This will involve elaborated calculation methods and models to be later verified in full scale on a frame Spanish bridge located in the vicinity of Madrid.

## Switches and crossings

WP1.3 focused on the preparation of a catalogue describing the principal operational failure modes of S&C. A prioritisation of these failure modes was conducted in view of performing simulations both on the switch panel geometry and on the crossing panel support and geometry.

The impact of weather conditions on S&C reliability and availability was also investigated, to further improve the resilience of S&C to extreme conditions.

**SP1 is led by Systra.**