Shift2Rail JU Funded IP3 Project

IN2TRACK final Conference

22 January 2019, UIC, Paris

Welcome to the

Final Conference

of the Shift2Rail JU Funded IP3 Project

In2Track

at UIC in Paris

on 22nd January 2019

Presentations made during the conference will soon be available at:
https://events.uic.org/final-conference-of-the-shift2rail-ju-funded-ip3-project-in2track?var_mode=calcul#Event-Programme

For more information, please contact: Christine Hassoun at: mailto:hassoun@uic.org.

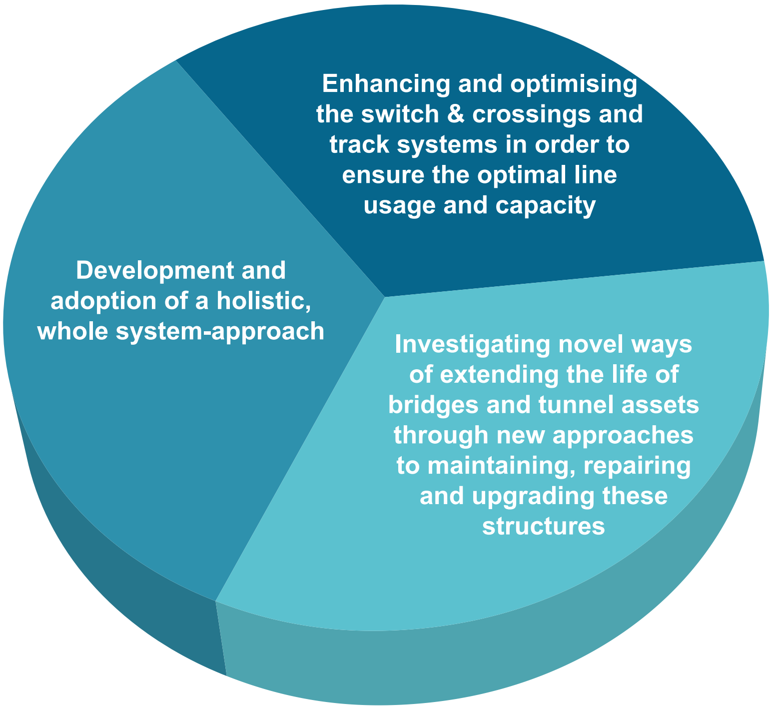
This project has received funding from the Shift2Rail JU under the European Union's Horizon 2020 research and innovation programme under grant agreement No 730841

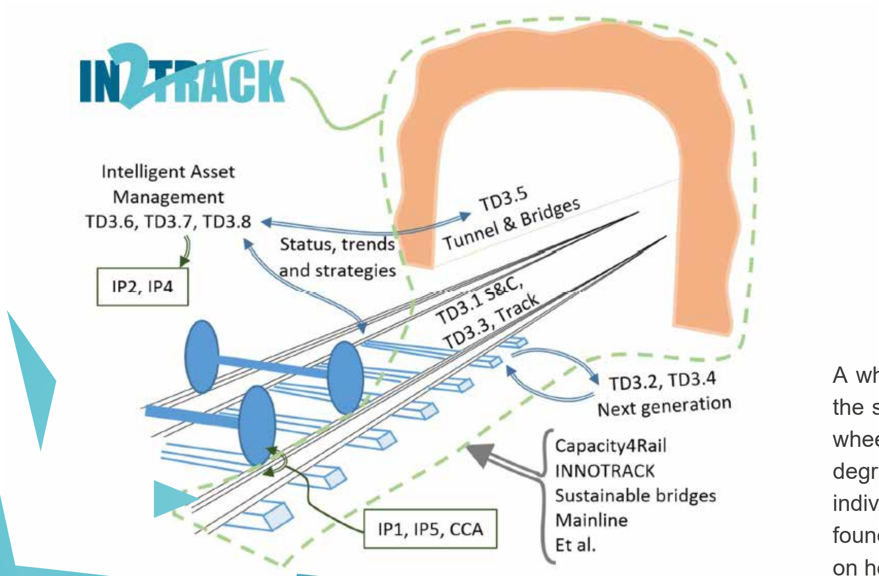
IN2TRACK
Research into Enhanced Tracks, Switches and Structures

Objectives of In2Track

The main objective of In2Track project is to set the foundations for a resilient, consistent, cost-efficient, high capacity European network by delivering important building blocks that unlock the innovation potential that have been identified as part of the Shift2Rail Innovation Programme.

The specific objectives of IN2TRACK are divided into three parts





A whole-system approach, which is defined as the system boundaries extending from dynamic wheel-rail interaction (loading input) through to degradation of the S&C system, sub-systems, individual components, and underlying track foundation, will also be at the heart of IN2TRACK on how to reach the objectives.

Facts and Figures

Total Budget: €6.4 million
Duration: 30 months
Project Start Date: 01/09/2016
Project End Date: 28/02/2019
Partners: 25 from 10 countries
Grant agreement n° 730841

Project coordinator

Sam Berggren
Trafikverket, TRV
in2track@eurtd.com

twitter

@in2track

Website

Shift2Rail JU Funded IP3 Project
IN2TRACK final Conference

22 January 2019, UIC, Paris

Moderator: Mr. Simon Fletcher, Union Internationale des Chemins de fer

PROGRAMME		
09:00-09:30	*Registration and welcome*	
09:30-10:20	**Introduction to the project, its contextualisation in Shift2Rail (IP3 and TDs involved)**	**Mr. Sam Berggren, Trafikverket** **Mr. Nikolaos Athanasopoulos Shift2Rail JU**
10:20-11:20	**WP2 - Enhanced switches and crossings** ✓ Identifying and understanding core S&C issues ✓ Enhanced S&C whole system analysis, design and virtual validation ✓ Enhanced monitoring, operation, control and maintenance of S&C	**Ms. Melanie Denley, Mr. Andrew Turner, Network Rail**
11:20-11:40	*Coffee Break*	
11:40-12:40	**WP3 - Enhanced track** ✓ Extending knowledge of key features to optimise railway tracks ✓ Employing simulations and enhanced design in track optimisation ✓ Optimised inspection, maintenance and operation of track	**Mr. Anders Ekberg, Trafikverket** **Mr. Samir Assaf, Railenium**
12:40-13:50	*Lunch*	
13:50-14:50	**WP4 - Structures** ✓ Sharpshooter bridge and tunnel asset management: enhanced and exhaustive monitoring, inspection and evaluation for minimal traffic disturbance ✓ Repairs and refurbishing: techniques to extend the life and enhance the capacity of existing bridges and tunnels ✓ Low-cost dynamic bridge design: enhancing the understanding of bridge dynamics to optimise high-speed bridge costs	**Mr. Carlos Hermosilla, Acciona**
14:50-16:00	**Round table, wrap-up and conclusions**	
16:00	*Meeting close*	

SPEAKERS

Ms Melanie DENLEY	**Network Rail**	**WP2**
Mr. Andrew TURNER	**Network Rail**	**WP2**
Mr. Anders Ekberg	**Trafikverket**	**WP3**
Mr. Samir Assaf	**Railenium**	**WP3**
Mr. Carlos Hermosilla	**Acciona**	**WP4**

Ms. Melanie Denley, Network Rail

Melanie is a chartered civil engineer, with over 30 years' experience in the UK rail industry. She has a background in both structures and track engineering and has held key appointments within infrastructure maintenance, renewals and enhancements. She is currently Programme Engineering Manager for track engineering R&D projects within Network Rail's Track, Switches & Crossings team.

Mr. Andrew Turner, Network Rail

Andrew graduated with a Masters in Mechanical Engineering in 2013 and joined as a graduate engineer at Network Rail soon after. He undertook several placements around the business before settling in the Switches & Crossings discipline where he currently works as a Senior Engineer. He has worked on the development of new designs of UK S&C as well as the organisation's controls and requirements framework.

SPEAKERS

Mr. Anders Ekberg, Trafikverket

Anders graduated in Civil Engineering in 1992. Worked as a track engineer at the Swedish national rail administration before starting PhD-studies in 1994. Since then he carries out research on railway mechanics within the National Centre of Excellence CHARMEC at Chalmers University of Technology in Gothenburg, Sweden where he currently is director. His research focus is on structural integrity, and mainly fatigue issues in railway applications.

Mr. Samir Assaf, Railenium

Samir joined Railenium Research Institute in 2015 acting as project manager in “Modélisation et Prévision en Ferroviaire” Program (MPF). He was professor at ESTACA Engineering School specialised in transport sector with research activities in fluid/structure numerical modelling. He obtained the “Habilitation à Diriger des Recherches” (HDR) in 2012.

Mr. Carlos Hermosilla, Acciona

Born in Madrid in 1979 from a long line of civil engineers, Carlos Hermosilla Carrasco graduated from the Civil Engineering School in Madrid specialized in Structures and Foundations in 2007.

After a short period as bridge designer in a civil engineering company, he joined ACCIONA’s R&D department in 2010, where he has managed several research projects on a broad range of topics.

As main contact from ACCIONA for the Shift2Rail program, Carlos has participated in both In2Smart and In2Track projects, acting as WP4 leader for In2Track.

SHIFT2RAIL INNOVATION PROGRAMME 3:
COST-EFFICIENT AND RELIABLE HIGH-CAPACITY INFRASTRUCTURE

Challenge

The design, construction, operation and maintenance of rail network infrastructure has to be safe, reliable, supportive of customer needs, cost-effective and sustainable. Furthermore, to deliver the benefits of market opening and interoperability and to reduce the life-cycle costs of rolling stock and on-board signalling systems, there needs to be a (gradual) elimination of network diversity through a migration towards a common high-performing infrastructure system architecture.

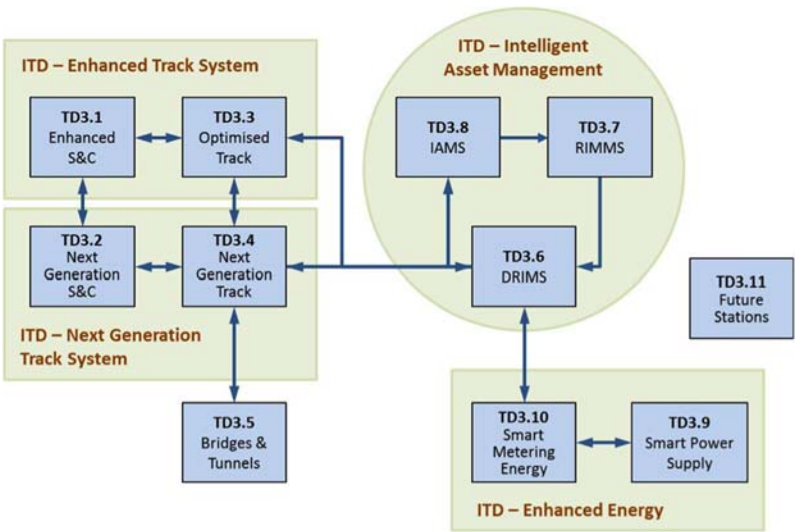
Infrastructure accounts for approximately one-third of the railway's operating costs; EU Member States spent between EUR 29 billion and EUR 34 billion on railway infrastructure in 2012. A significant part of these costs is related to labour-intensive maintenance, most of which is preventive, although ad hoc interventions are also needed when faults occur — and these can be particularly costly and disruptive. Taking into account the ageing of existing infrastructure and the expected growth in passenger and freight volumes (+ 34 % and + 40 % in 2030 respectively, compared to a 2005 baseline), shorter infrastructure access times, maintenance needs and costs are likely to increase significantly in the coming years. Therefore, Shift2Rail must first and foremost focus on activities to support the reduction of these maintenance costs (such as simplified procedures or automation), and on solutions that can be rapidly and efficiently deployed.

At the same time, many parts of existing railway infrastructure (railway lines, stations and terminals) are nearing maximum capacity or are incapable of offering users and customers the level of service they demand. There is thus a need for a step change in the productivity of infrastructure assets. These will have to be managed in a more holistic and intelligent way, using lean operational practices and smart technologies that can ultimately help improve the reliability and responsiveness of customer service, as well as the capacity and overall economics of rail transportation.

Lastly, in order to support vital pan-European rail corridors and co-modal links and offer a smart and competitive alternative to short and medium-distance flights and water and road-borne freight flows, rail infrastructure must ensure compatibility between infrastructures (interoperable and standardised infrastructure), as well as with other modes (intermodal infrastructure, including stations and passenger and freight hubs).

IP3 Innovations and ambitions

Work in IP3 will be organised around the following Technical Demonstrators (TDs) covering all R&I areas indicated in the Shift2Rail Master Plan: Enhanced S&C System, Next-Generation S&C System, Optimised Track System, Next Generation Track System, Proactive Bridge and Tunnel Assessment, Repair and Upgrade, Dynamic Railway Information Management System, Railway Integrated Measuring and Monitoring System, Intelligent Asset Management Strategies, Smart Power Supply, Smart Metering for Railway Distributed Energy Resource Management System and Future Stations.



The 11 TDs are strongly interrelated and are clustered together into Integrated Technology Demonstrators (ITDs). IN2TRACK is linked to TD3.1, 3.3 and 3.5.

The main objective of the 'Enhanced Switch & Crossing System' (TD 3.1) is to improve the operational performance of existing Switch & Crossing (S&C) designs through the delivery of new S&C subsystems with enhanced reliability, availability, maintainability and safety (RAMS), life-cycle costs (LCCs), sensing and monitoring capabilities, self-adjustment, noise and vibration performance, interoperability and modularity.

The 'Next Generation Switch & Crossing System' (TD 3.2) aims to provide radical, novel system solutions that deliver new methods for directing trains to change tracks with the aim of increasing capacity, while reducing maintenance needs, traffic disturbances and LCCs.

The 'Optimised Track System' (TD 3.3) will challenge track construction assumptions currently implicit in track design, and will explore how innovative solutions in the form of products, processes and procedures can provide higher levels of reliability, sustainability, capacity and LCC savings. The aim is to derive medium-term solutions, which calls for the solutions to be harmonised with current solutions and regulations.

The 'Next-Generation Track System' (TD 3.4) aims to drastically improve the track system, targeting a time range some 40 years beyond the present state of the art. This implies that step changes in performance are to be highly prioritised. The TD process will follow a tightly integrated chain, setting out by initially identifying the long-term needs of the railway and the potential solutions for meeting these.

The main objective of the 'Proactive Bridge and Tunnel Assessment, Repair and Upgrade' (TD 3.5) is to improve inspection methods and repair techniques to reduce costs, improve quality and extend their service life, if possible. Moreover, the reduction of noise and vibrations are prioritised objectives.

The 'Dynamic Railway Information Management System (DRIMS)' (TD 3.6) aims to define an innovative system for the management, processing and analysis of railway data. The activities in this TD will be strongly linked with the other two TDs in the area of information capturing and management. DRIMS is intended to collect information from the Railway Integrated Measuring and Monitoring System (RIMMS – TD 3.7) and to provide high-quality input to the Intelligent Asset Management Strategies (IAMS – TD 3.8).

The 'Railway Integrated Measuring and Monitoring System (RIMMS)' (TD 3.7) is to provide innovative tools and techniques for capturing information on the current status of assets, in a non-intrusive and fully integrated manner. To this end, the TD will focus on asset status data collection in close interaction with TD3.1 through TD3.5.

The vision of the 'Intelligent Asset Management Strategies (IAMS)' (TD 3.8) is a holistic, whole-system approach of asset management employing collected and processed data provided by TD3.6 and TD3.7. This includes putting long-term strategies in the context of day-to-day execution of the maintenance and other maintenance activities.

The wider objective of the 'Smart Power Supply' (TD 3.9) is to develop a railway power grid in an overall interconnected and communicating system.

The objective of the 'Smart Metering for Railway Distributed Energy Resource Management System' (TD 3.10) is to achieve a fine mapping of energy flows within the entire railway system, as the basis of any energy management strategy.

The primary objective of the 'Future Stations' (TD 3.11) is the provision of improved customer experience at stations. The TD is organised around four identified key functional demands: two demands relate to improving capacity and security in large stations, one demand relates to the design of small stations with the objective of reducing whole life costs and standardising design, where possible, and the final demand relates to accessibility.

IN2TRACK

Research into Enhanced Tracks, Switches and Structures

TRAFIKVERKET SWEDISH TRANSPORT ADMINISTRATION

virtual vehicle

getzner engineering a quiet future

KIRCHDORFER INDUSTRIES

Plasser & Theurer

voestalpine

WIENER LINIEN

AC2T research

MCL www.mcl.at MATERIALS CENTER LEOBEN

acciona Infraestructuras

cemosa

ÖBB

NetworkRail

RAILENIUM

SNCF RÉSEAU

BRITISH STEEL

vossloh

Universidad del País Vasco Euskal Herriko Unibertsitatea

Infraestruturas de Portugal

SBB CFF FFS

TCDD Turkish Railways

Liikennevirasto

Slovenske železnice

bls