



Presentation of the Shift2Rail Multi-Annual Action Plan

Shift2Rail Information Day for non-JU
members (Open calls for proposals)

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Giorgio TRAVAINI, S2R Programme Coordinator



S2R Multiannual Action Plan

Background

What is the S2R MAAP?

- The MAAP is a long-term investment planning document, which translates the strategic research and innovation priorities for the rail sector - as described in the S2R Master Plan - into **concrete actions, milestones and deliverables** to be undertaken collaboratively by the S2R JU in the period 2015-2024.
- The MAAP has been **developed collaboratively** between the founding members of the S2R JU other than the Union and the pre-selected candidate associated members of the S2R JU, with the support and coordination of the S2R JU interim Executive Director and the S2R Programme Office.
- The **advisory bodies of the S2R JU** (Scientific Committee, States Representatives Group) **and the European Railway Agency** have been consulted on the MAAP and their recommendations taken into account.

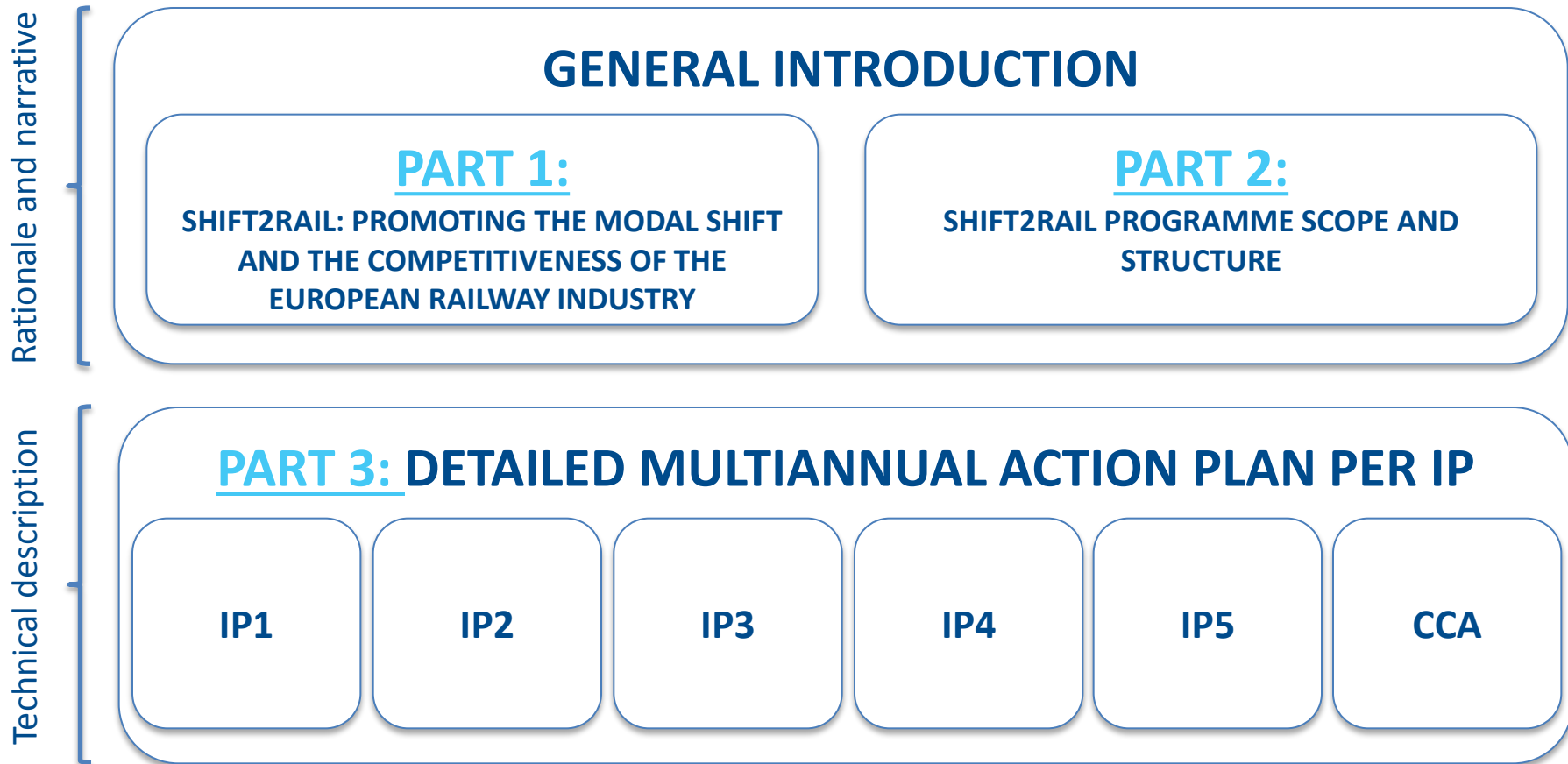
What is the S2R MAAP?

- The MAAP includes all the activities that are foreseen to be co-funded by the S2R JU. It currently contains the description of activities worth an estimated **value of about EUR 765 million** (a reserve of the S2R JU budget has been left aside for contingency reasons, e.g. outcome of evaluation review cases, second call for associated members). The estimated total value of the total S2R activities, which will have to be reflected in the next version of the MAAP, is estimated at EUR 777 million.
- These activities will either be undertaken directly by the JU members other than the Union, or implemented by non-JU members following calls for proposals or calls for tenders.
- The document will serve as the **basis for preparing the annual work plans** of the S2R JU, thereby helping to ensure continuity and synchronicity of investments.
- It is a **living document** that will be updated on a regular basis.



S2R Multiannual Action Plan

Structure of the MAAP



Structure of the MAAP - details

General introduction

- PART 1: SHIFT2RAIL: PROMOTING THE MODAL SHIFT AND THE COMPETITIVENESS OF THE EUROPEAN RAILWAY INDUSTRY
 - Meeting the challenges set in H2020
 - Rationale for S2R
 - S2R governance structure
- PART 2 - SHIFT2RAIL PROGRAMME SCOPE AND STRUCTURE
 - S2R programme structure
 - Summary of Major Demonstrations and Technology Developments

PART3: Detailed multiannual action plan per IP

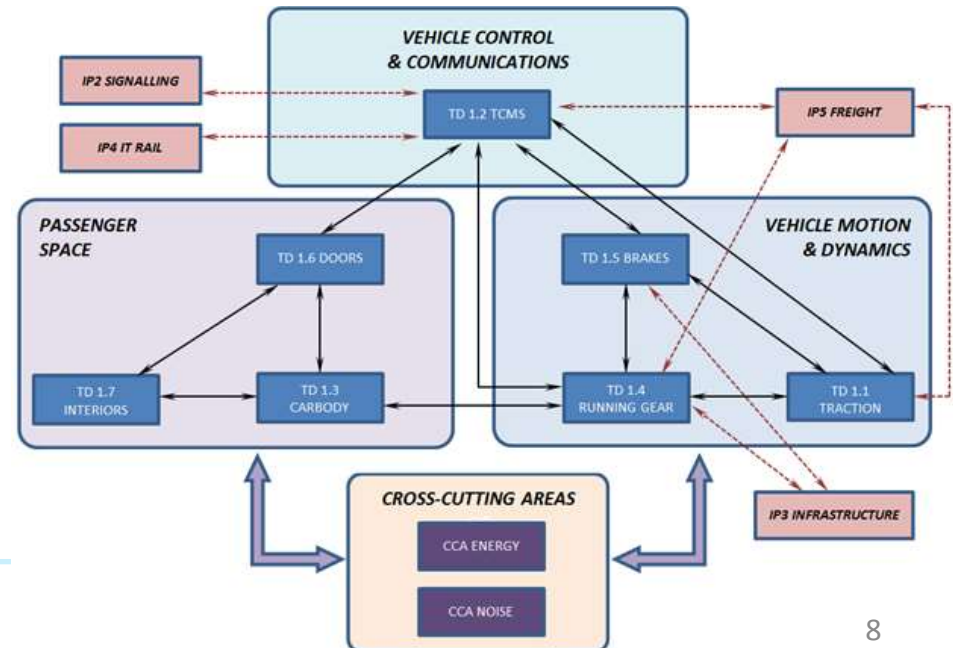
1. Context and motivation
 2. Objectives of the IP and expected results
 3. Past and ongoing European & national research projects
 4. Set-up and structure of the IP
 5. Technical Demonstrators (TDs) of the IP: incl. Concept and objectives of the TD, technical ambition of the TD, specific Demonstration activities and contribution to ITDs/SPDs, impact of the TD, implementation of the work programme and planning and budget
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IP1 - Cost Efficient and Reliable Trains

Expected value of the entire IP (incl. open calls, without reserve): EUR 221.5M

Overview of the Technical Demonstrators

- TD1.1 - Traction Systems
- TD1.2 - Train Control and Monitoring System (TCMS)
- TD1.3 - Carbody Shell
- TD1.4 - Running Gear
- TD1.5 - Brakes Systems
- TD1.6 - Doors and Access Systems
- TD1.7 - Train Modularity In Use (TMIU)

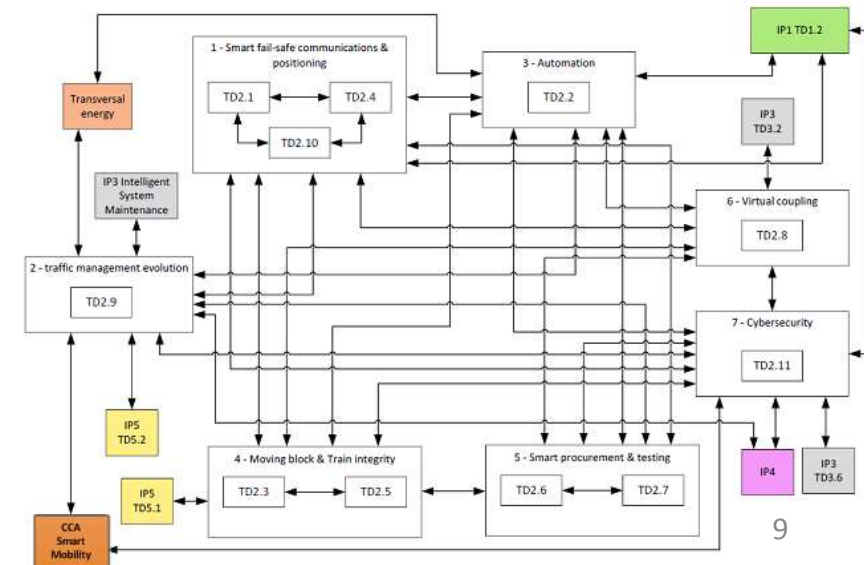


IP2 - Advanced Traffic Management and Control Systems

Expected value of the entire IP (incl. open calls, without reserve): EUR 191,4M

Overview of the Technical Demonstrators

- TD2.1 - Adaptable communications for all railways
- TD2.2 - Railway network capacity increase (ATO up to GoA4 - UTO)
- TD2.3 - Moving Block
- TD2.4 - Fail-Safe Train Positioning (including satellite technology)
- TD2.5 - On-board Train Integrity
- TD2.6 - Zero on-site testing
- TD2.7 - Formal methods and standardisation
- TD2.8 - Virtually - Coupled Train Sets
- TD2.9 - Traffic management evolution
- TD2.10 - Smart radio-connected objects
- TD2.11 - Cyber Security

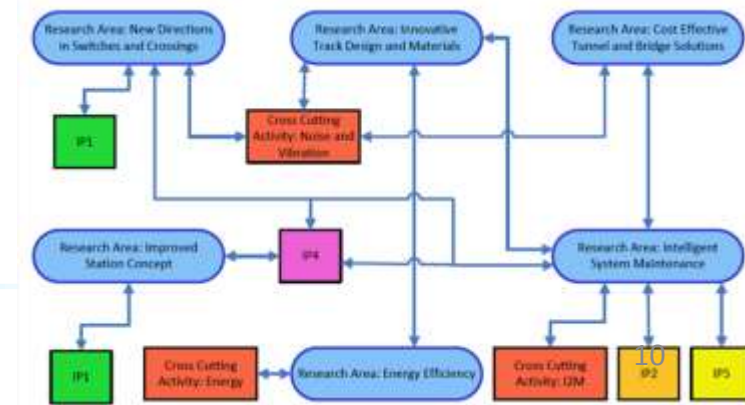


IP3 - Cost Efficient and Reliable Infrastructure

Expected value of the entire IP (incl. open calls, without reserve): EUR 150,3M€

Overview of the Technical Demonstrators

- TD3.1 - Enhanced Switch & Crossing System
- TD3.2 - Next Generation Switch & Crossing System
- TD3.3 - Optimised Track System
- TD3.4 - Next Generation Track System
- TD3.5 - Proactive Bridge and Tunnel Assessment, Repair and Upgrade
- TD3.6 - Dynamic Railway Information Management System
- TD3.7 - Railway Integrated Measuring and Monitoring System
- TD3.8 - Intelligent Asset Management Strategies
- TD3.9 - Smart Power Supply
- TD3.10 - Smart Metering
- TD3.11 - Future Stations

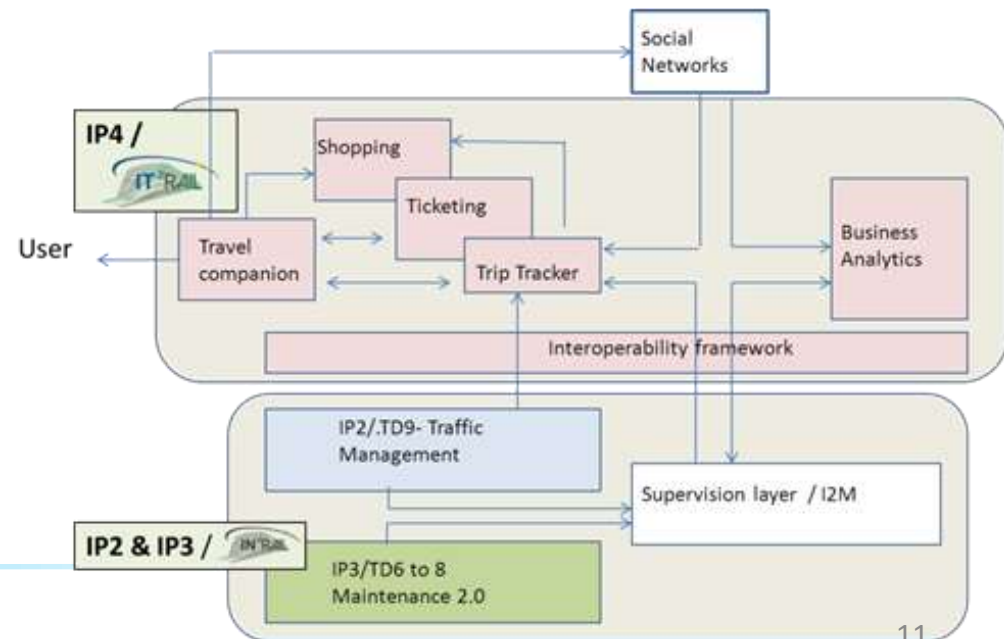


IP4 - IT Solutions for Attractive Railway Services

Expected value of the entire IP (incl. open calls, without reserve): EUR 84,8M€

Overview of the Technical Demonstrators

- TD4.1 - Interoperability Framework
- TD4.2 - Travel Shopping
- TD4.3 - Booking & Ticketing
- TD4.4 - Trip Tracker
- TD4.5 - Travel Companion
- TD4.6 - Business Analytics Platform
- TD4.7 - integrated TD



IP5 - Technologies for sustainable and attractive European rail freight

Expected value of the entire IP (incl. open calls, without reserve): EUR 82,1M

Overview of the Technical Demonstrators

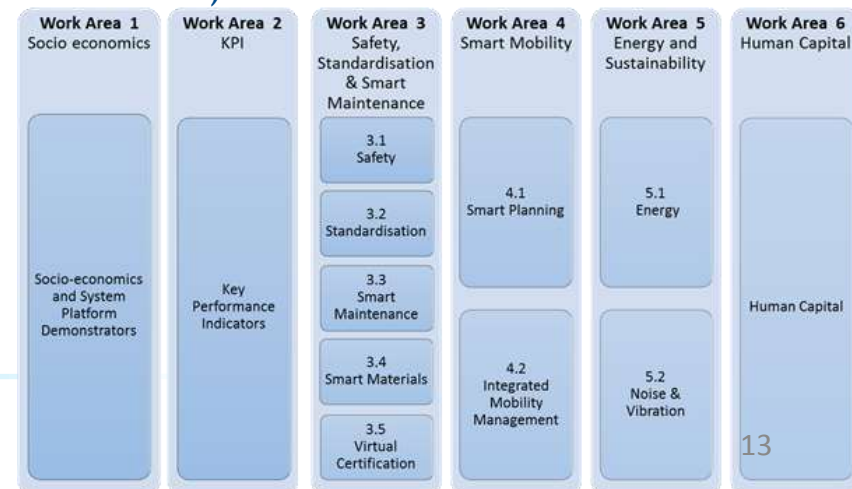
- TD5.0 - Business analytics and implementation strategies
- TD5.1 - Freight electrification, brakes and telematics
- TD5.2 - Access and Operation
- TD5.3 - Wagon design
- TD5.4 - Novel Terminal, Hubs, Marshalling Yards, Sidings
- TD5.5 - New Freight Propulsion Concepts
- TD5.6 - Autonomous train operation

CCA – Cross Cutting Activities

Expected value of the entire IP (incl. open calls, without reserve): EUR 34,6M

Overview of the Working Areas

- Work Area 1 - Long-term needs and socio-economic research
- Work Area 2 - KPI method development and integrated assessment
- Work Area 3 - Safety, Standardisation, Smart Maintenance, Smart Materials & Virtual certification
- Work Area 4 - Smart Mobility (Smart Planning & Integrated Mobility Management)
- Work Area 5 Energy and Sustainability (Noise & Vibration)
- Work Area 6 - Human Capital

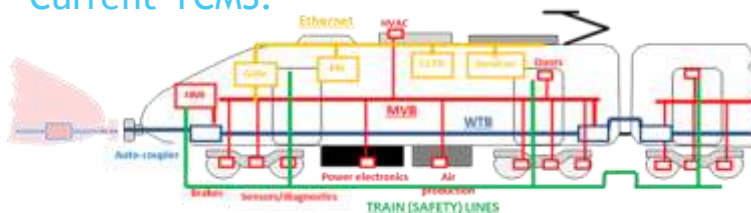


Example of a Technology Demonstrator

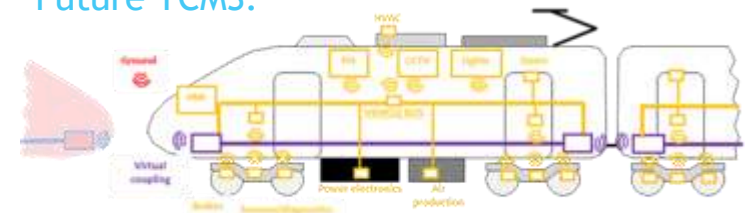
TD1.2 Train Control and Monitoring System Demonstrator

- Technological output to be delivered by this TD:
New generation TCMS architectures and components with wireless capabilities, enhanced throughput, safety and security functionalities, supporting distributed function execution and mechanisms for easier authorisation.
- Specific achievements to be delivered by this TD:
 1. Reduce the amount and weight of cabling for train control by half (Save 10 km of cable in each 20 m railcar). Reduce the space used by electronics hardware by 25%
 2. Ability to implement SIL4 functions in the TCMS to perform additional safety-critical tasks.
 3. Increase in the availability of trains related to the functioning of train control and monitoring by 50%
 4. Ability to couple any pair of multiple unit of different types, a feature currently totally non-existent and can significantly increase line capacity
 5. Support technologically the development of the “virtual coupling” concept, which can dramatically increase the capacity of lines
 6. Reduce cost, time and effort in project engineering, integration and authorisation phases by 50%

Current TCMS:



Future TCMS:



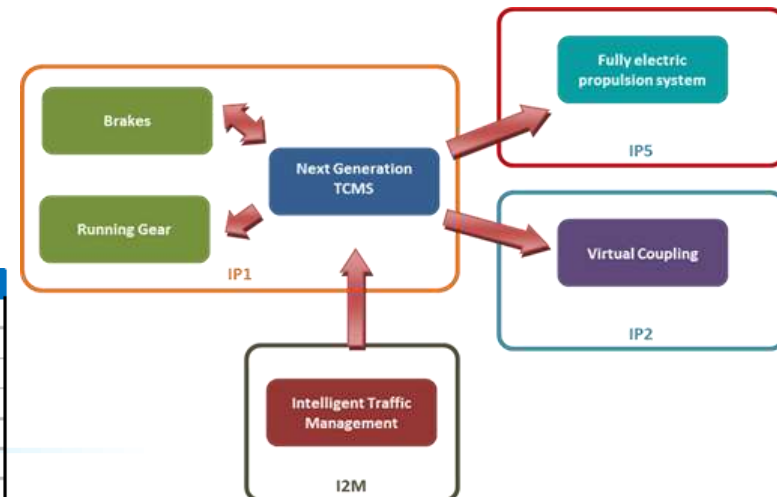
Example of a Technology Demonstrator

- the contribution of TD 1.2 TCMS to the different ITDs of Shift2Rail :

Research Area	Specific Techn. objective	Specification Activities	Demonstrator		Focus of activity
			Market	TRL	
Train Control & Monit. System	Wireless TCMS	Radio techn., architecture and protocols	Metro Regional	6/7 6/7	Incorporate wireless technologies to the train communication network solutions (i.e. train backbone, consist network and train to ground communication).
	Drive-by-data	Architecture, protocols	Metro Regional	6/7 5	Provide a train-wide communication network for full TCMS support including the replacement of train lines, connecting safety functions up to SIL4 (incl. signalling).
	Functional distribution architecture	Specification, architecture and interface definition	Metro Regional	6/7 5	New architectural concept based on standard framework & application profiles, distributed computing to allow execution of compliant functions on end devices distributed along the vehicle meeting different safety & integrity requirements
	Virtual Placing on the Market	Technology definition, protocols and procedures	Generic	6/7	Support the Functional Open Coupling

- Interaction with other TDs and IPs:
- Planning (budget estimated at 48,8M€):

TASKS	TRL	2015	2016	2017	2018	2019	2020	2021
TD1.2 TCMS								
1.2.0 General specification	-							
1.2.1 Wireless TCMS	6/7							
1.2.2 Drive-by-data	6/7							
1.2.3 Functional distribution architect.	6/7							
1.2.4 Virtual placing on the market	5							
1.2.5 Integration, demo & assessment	6/7							
1.2.6 Technical coordination	-							



S2R Multiannual Action Plan

Its importance

The MAAP importance

- It constitutes a reference document along life of the JU, therefore all grants awarded for the action/projects should aim to implement part of the Multi Annual Action Plan ('MAAP').
- It constitutes the base for qualitative content of the JU Membership Agreements
- It enables the preparation of result-oriented Annual Work Plans:
 - **launch of calls for proposals** to JU members and through open call (non-JU Members):
 - The projects contribute to the realisation of the objectives of the S2R Master Plan and are an integral part of the S2R MAAP
 - Open-calls are launched to cover gaps in the expertise of JU members and to fund fundamental research in relation to the Shift2Rail activities