Furthering Improvements in Integrated Mobility Management (I2M), Noise and Vibration (N&V), and Energy in Shift2Rail

General Overview for UIC Experts

Presenter(s): Rüdiger Garburg (DB)
Email: ruediger.garburg@deutschebahn.com

The structure of S2R Programme

- S2R is structured into 5 IP + CCA (Cross cutting activities) programme

Overview
S2R topics and technical demonstrators

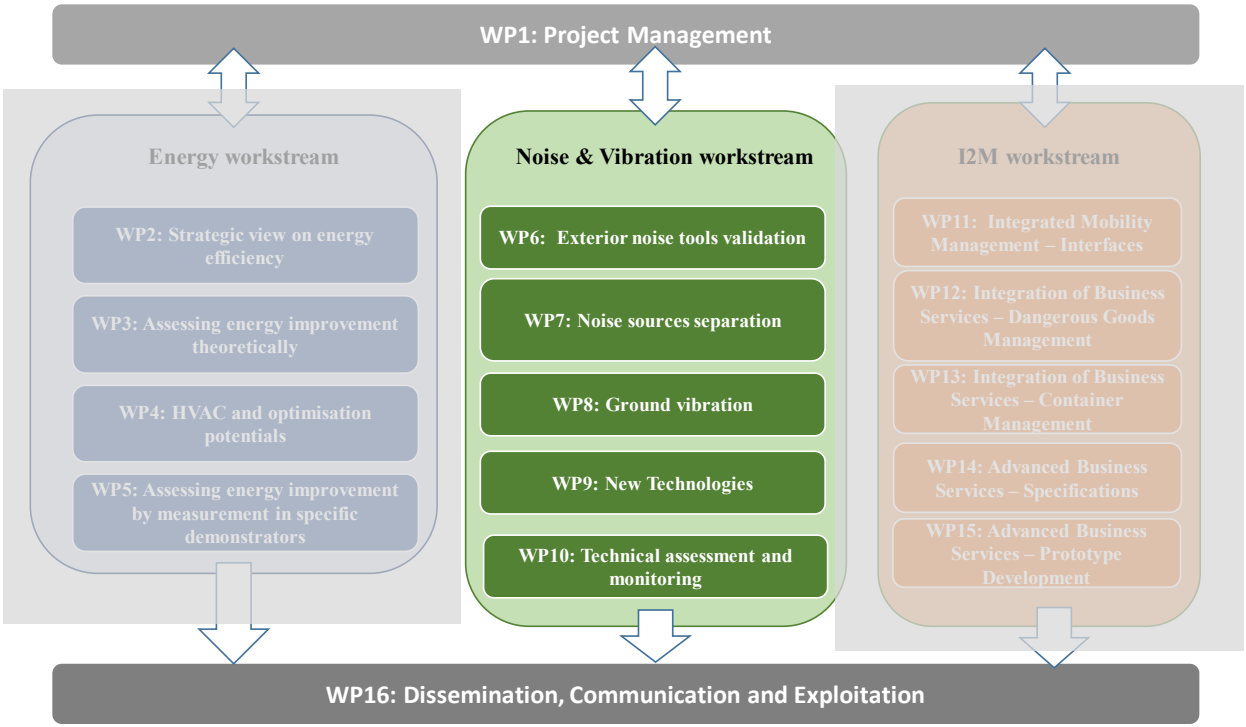
IP 1	IP 2	IP 3	IP 4	IP 5
Cost Efficient and Reliable Trains (221,5 Mio. €)	Advanced Traffic Management and Control Systems (191,4 Mio. €)	Cost Efficient and Reliable Infrastructure (150,3 Mio. €)	IT Solutions for Attractive Railway Services (84,8 Mio. €)	Sustainable & Attractive European Rail Freight (82,1 Mio. €)
1.1 Traction System (75,1 Mio. €)	**2.1 Communication System (26,4 Mio. €)**	3.1 Enhanced Switch & Crossing System (15,5 Mio. €)	4.1 Interoperability Framework (10,4 Mio. €)	**5.0** Implementation Strategies and Business Analytics (6,9 Mio. €)
1.2 Train Control & Management System (48,8)	**2.2 Automatic Train Oper. (22,5)**	3.2 Next Generation Switch & Crossing System (16,7)	4.2 Travel Shopping (11,6)	**5.1 Freight Electrification, Brake & Telematics (16,4)**
1.3 The new generation of car body shells (26,7)	**2.3 Moving Block (25,1)**	3.3 Optimised Track System (18,7)	4.3 Booking & Ticketing (22,7)	**5.2 Access & Operations (9,6)**
1.4 Running gear (26.6)	**2.4 Safe Train Positioning (24,3)**	3.4 Next-Generation Track System (14,5)	4.4 Trip-tracker (10,0)	**5.3 Wagon Design (10,1)**
1.5 New braking systems (31,8)	**2.5 Train Integrity (10,0)**	**3.5 Proactive Bridge and Tunnel Assessment, Repair & Upgrade (15,6)**	4.5 Travel Companion (12,5)	**5.4 Novel Terminal, Hubs, Marshalling yards, Sidings (11,3)**
1.6 Innovative doors (9,8)	**2.6 new laboratory test framework (20,9)**	3.6 Dynamic Railway Information Management System (DRIMS) (14,2)	4.6 Business Analytics (9,9)	**5.5 New Freight Propulsion Concepts (21,8)**
1.7 Train modularity in use (2,8)	**2.7 Standardized engineering & operational rules (8,0)**	**3.7 Railway Integrated Measuring & Monitoring System (RIMMS) (20,1)**		**5.6 Autonomous train operation (5,7)**
1.8 HVAC	**2.8 Virtual Coupling (4,8)**	**3.8 Intelligent Asset Management Strategies (IAMS) (17,0)**		
	2.9 Traffic Management System (24,4)	**3.9 Smart Power Supply (7,5)**		
	2.10 Smart radio-connected all-in-all wayside objects (12,5)	3.10 Smart Metering for Railway Distributed Energy Resource Management System (7,5)		
	2.11 Cyber Security (12,5)	3.11 Future Stations (6,2)		

Cross Cutting Activities (34,6 Mio. €)

Socio-economics (22,2 Mio. €)	**KPI (1,9)**	**Safety, Standardization & Smart Maintenance (3,5)**
Smart Mobility (14,7)	**Energy & Sustainability (11,7)**	**Human Capital (0,5)**

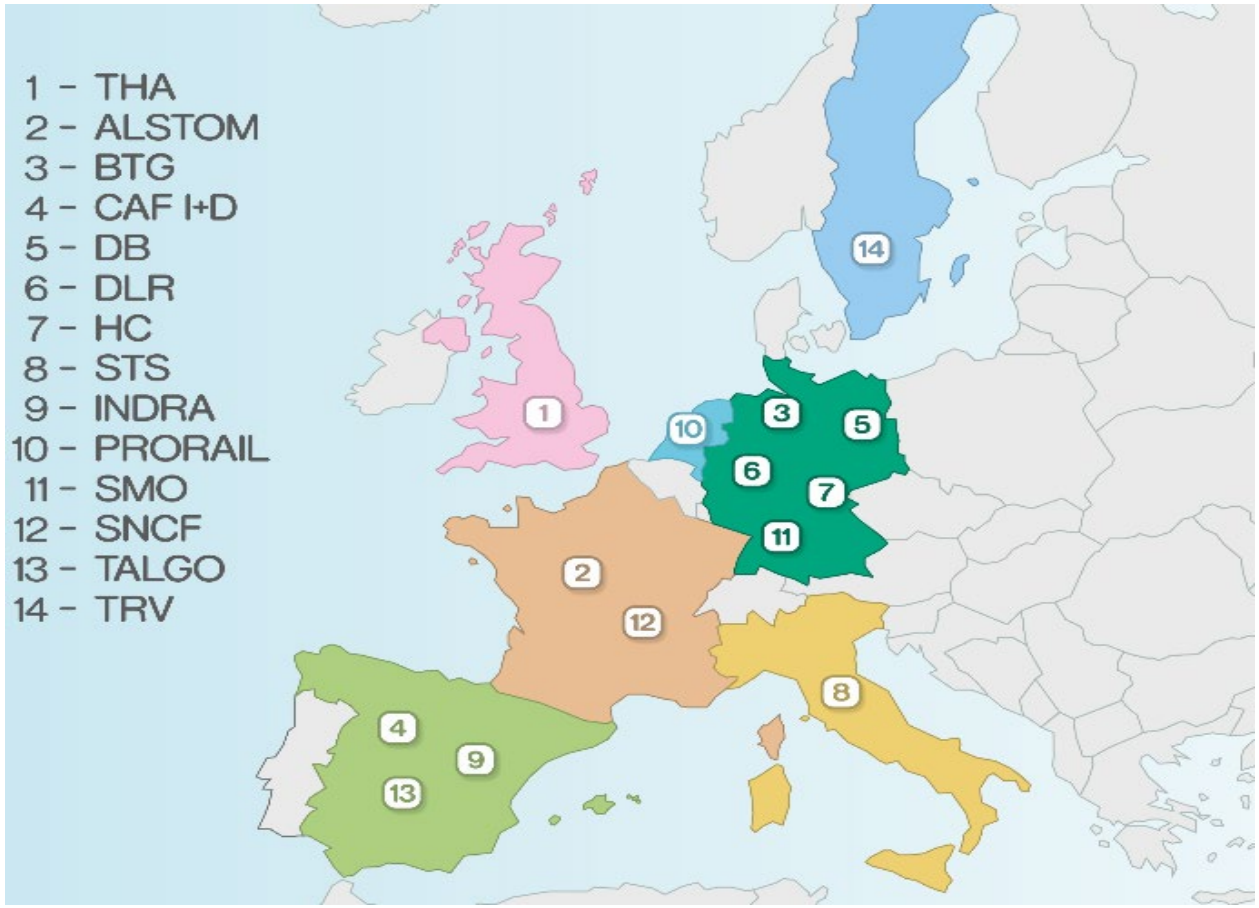
FINE-2: its structure

- **FINE-2: F**urthering Improvements in **I**ntegrated Mobility Management (I2M), **N**oise and Vibration, and **E**nergy in Shift**2**Rail
- It covers 3 independent different workstreams (WS)



The FINE-2 Consortium

- The project consists of 14 Member Partners out of Shift2Rail Member consortium

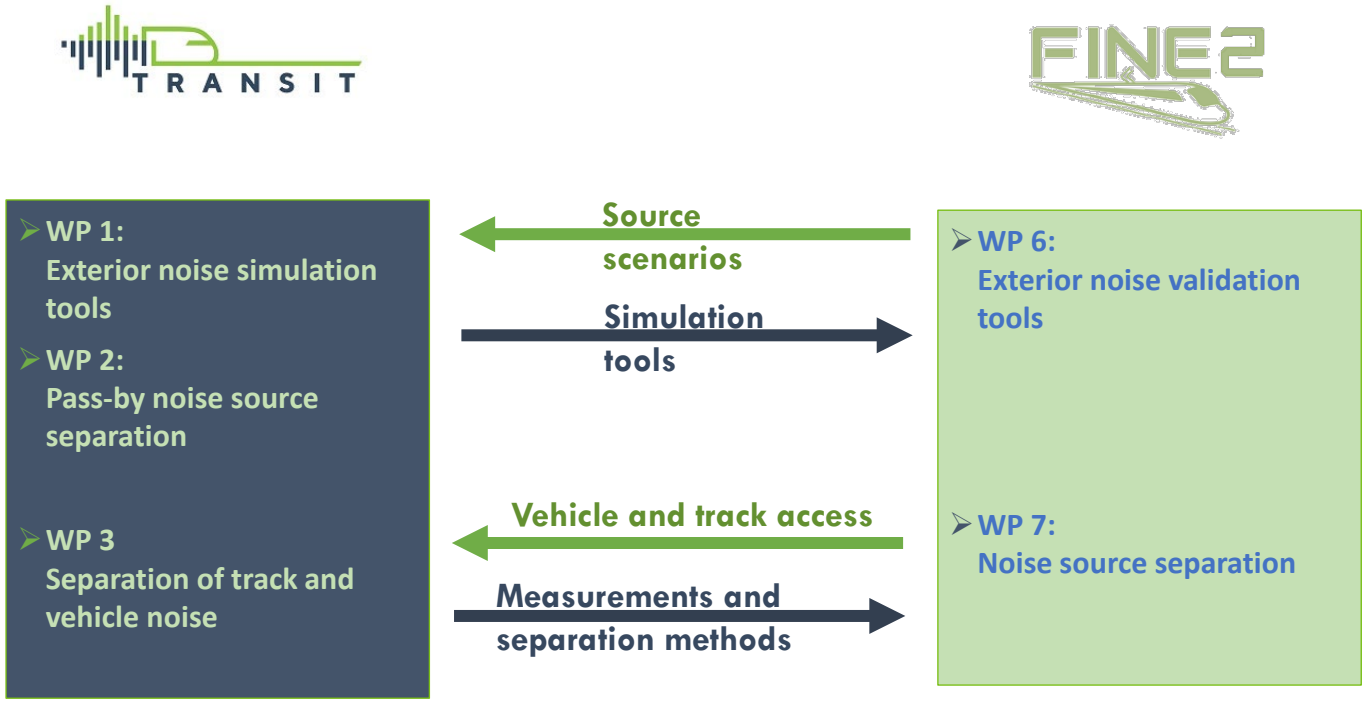


FINE-2 the Main topics for the WP

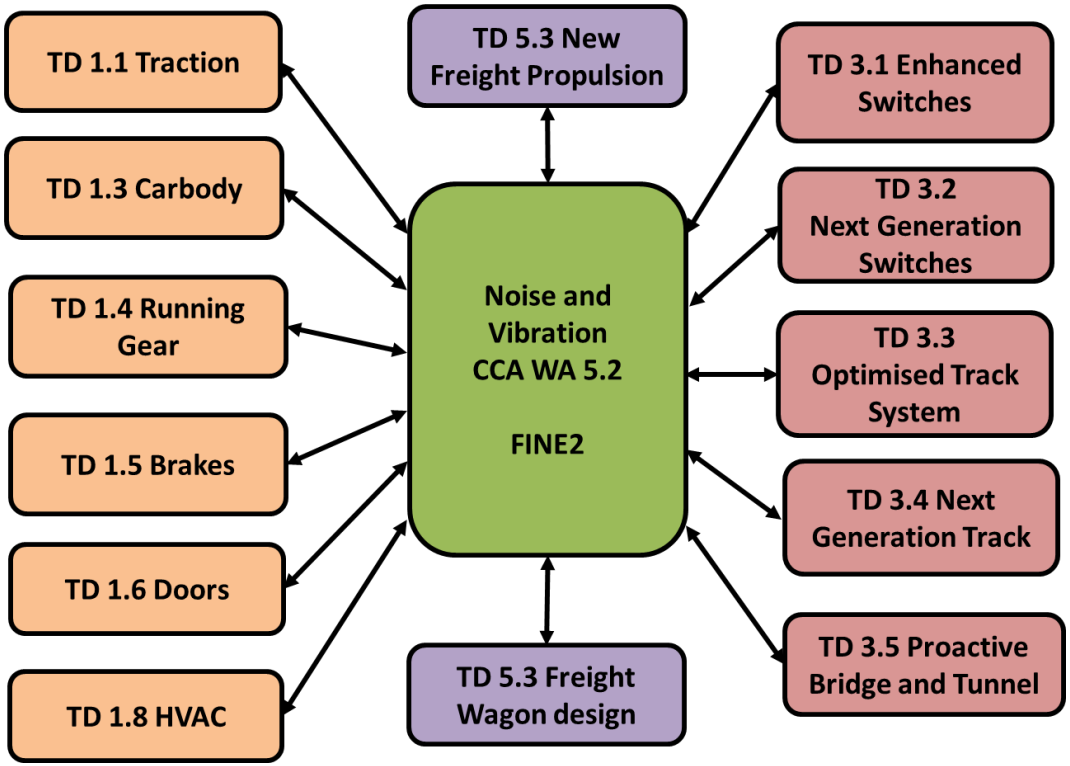
The basic idea for handling noise and vibration control in S2R is that the development of low noise solutions is embedded into each S2R TD, not as a separate project. This is a preferred approach in order to assure new low noise technologies are compatible with all other constraints of a system. The overall effect of the improvement on system level is however evaluated and analysed in the FINE-2 N&V workstream **(WP10).** For this, like the Energy workstream the FINE-2 N&V workstream will establish a strong cooperation with all relevant S2R projects of all S2R IPs (1,2,3 and 4) and the S2R sub-work area 3.2 'Standardisation'. Hence a close cooperation with the S2R TDs controlling the main sources is of great importance. The work is organized in 5 parallel and independent WPs (WP6 - 10):

- **WP6** will validate **simulation methodologies of noise sources including their ranking of equipment** installed in the train, propose a methodology to validate the tools for simulation and propose uncertainty evaluation methods of the complete simulation process;
- **WP7** will enhance and simplify the existing methodologies for **track versus vehicle noise separation on rolling noise** to reduce the costs of implementation. In addition, innovative techniques to **separate the different types of acoustic sources during pass-by** will be developed;
- In **WP8**, a commonly accepted, practical, and validated **prediction tool for ground-vibration impact studies** will be developed;
- Inside **WP9** the applicability of **new and innovative materials and design technologies** for vehicle design is being tested to meet the requirements for lightweight construction as well as the increasing demands on vehicle acoustics. In addition, this WP supports the work in the complementary S2R OC project on the further development of **noise auralisation technologies** based on physically and synthetically generated noise emissions;
- **WP10** provides a comprehensive **analysis and evaluation of the outcomes** regarding N&V effects across all S2R IP and monitors this with regard to their effects on environmental noise.

Coopeartion with OC project



Links from CCA WA 5.2 N&V to other S2R projects with potential noise impacts



FINE2

Furthering Improvements in Integrated Mobility Management (I2M), Noise and Vibration (N&V), and Energy in Shift2Rail

Save the date: **S2R Inovation days:**
December, 9th – 10th as Webinar (for FINE-2, at **9th** (afternoon)

Thank You for Your Attention

Shift2Rail

This project has received funding from the Shift2Rail Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 881791