

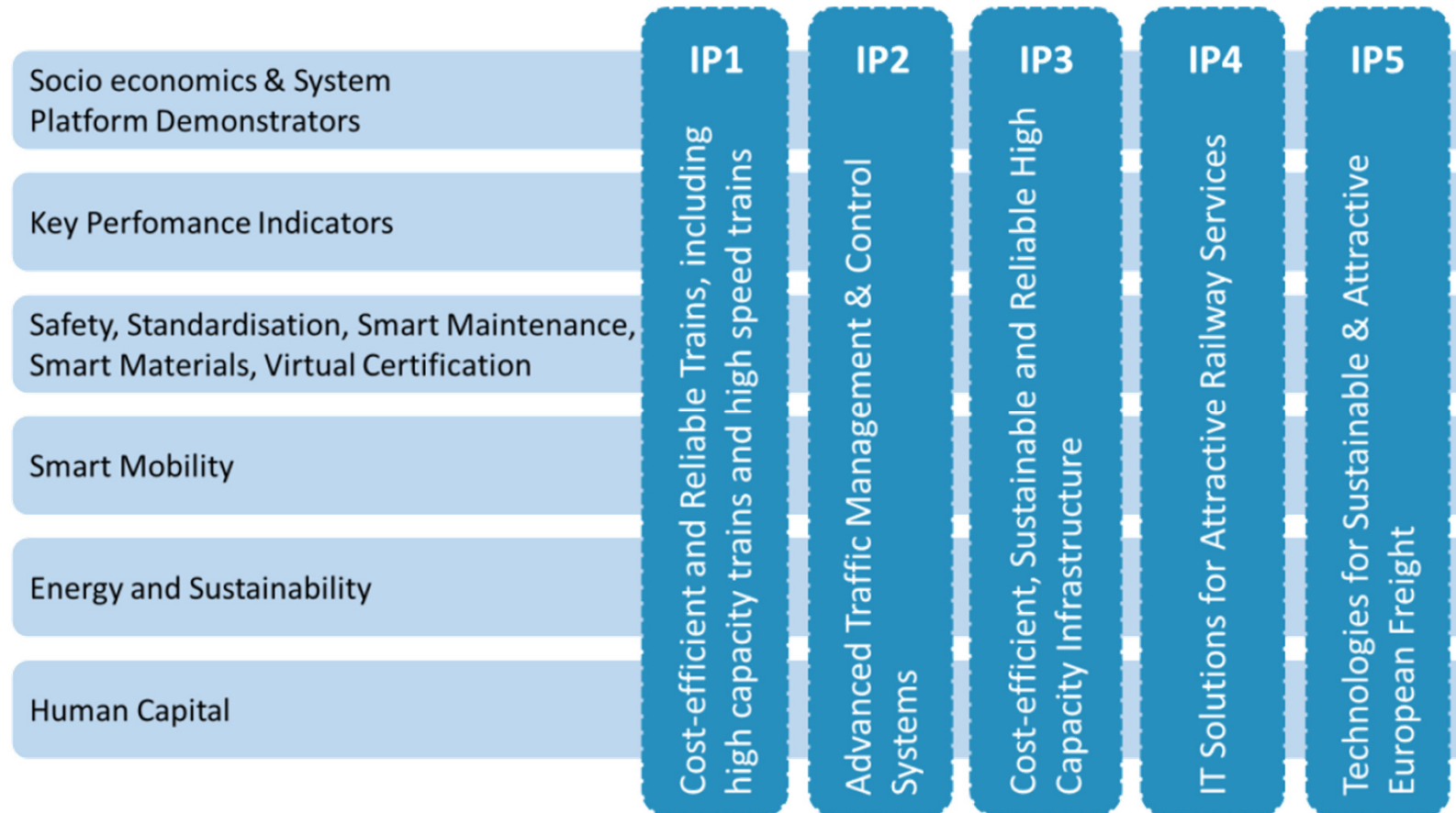
Cross Cutting Activities

Overview and outlook

@Shift2Rail_JU
#Horizon2020



To implement the systems approach, work conducted within the five IPs are supported by cross-cutting activities (CCA)



Working Area „Energy and Sustainability“

- **Overall objectives:**

- Support innovation process within S2R by providing methodology and know-how to enable development of low noise and low energy TDs
- Develop practical methods for predicting noise and vibration performance on system level including both rolling stock, infrastructure and its environment.
→ Supporting overall S2R targets of improving the competitiveness of the European railway system compared to other modes of transportation and thus promoting a modal shift to rail.

- **Achievements:**

- develop auralisation and visualisation (A&V) techniques of railway related scenarios → Successfully presented at INNOTRANS 2018
- Systematically approach to assess the impact of innovative technologies on energy demand and costs in European railway system
- modular prediction framework for interior noise predictions



S2R-CFM-CCA-01-2019: Integrated mobility management (I2M), Energy and Noise & Vibration

SPECIFIC CHALLENGE

Integrated Mobility Management (I2M)

The project IN2RAIL (GA number 635900) has delivered a first system design for an integrated Communication Infrastructure to link the defined rail operation services and their field assets. This platform (Integration Layer) uses standardized data structures and processes to manage the data exchange between different stakeholders and provides a gateway for data exchange with external clients. The availability of such data will enable analyses to enhance rail traffic management, including improved planning and timetabling, reliable and resilient operations and informed asset investment and maintenance decision making.

The most critical factor to realize the proposed system concept is the maturity of the Canonical Data Model with embedded elements of information required from the different applications of subscribed services/clients. To achieve this goal, applied operational procedures or technical functionalities must be described in such depth that the necessary data to be received or send from/to other clients can be specified. If preceding projects deliver their targeted outputs, the works proposed for WA4.2 in this project will not face significant risk to be completed.



S2R-CFM-CCA-01-2019: Integrated mobility management (I2M), Energy and Noise & Vibration

Energy. The challenge regarding energy is linked to the need to reduce energy consumption within the railway sector in order to ensure that the environmental advantage of railways remains or increases. The necessity to reduce energy costs, an important part of the total Life-Cycle Cost, to contribute to the general S2R objective “Reduced operating costs” is also a priority. Furthermore, reduction energy consumption from HVAC is needed is required, as HVAC accounts for a major part of the energy consumption from the traction.

Noise and Vibration. In order to ease vehicle certification and reduce the associated cost and time expenses without penalising the real vehicles noise performance, virtual certification will play an important role in the near future. Thus, current exterior noise simulation tools require further research and validation in order to ensure that the procedures and methodologies applied, and the results obtained represent the noise performance the real train will have. Additionally, current noise measurement procedures lack the possibility to accurately separate noise sources on pass-by noise tests, and do not cover the common vehicle scenarios (including different track types). Separation of contributions is relevant both for vehicle validation and for source ranking prior to mitigation measure implementation, and the improvement of separation techniques shall finally lead to more flexibility, better comparability and hence a better vehicle characterization in current homologation procedures and for the customers.

S2R-OC-CCA-01-2019: Noise & Vibration

SPECIFIC CHALLENGE

Noise and vibration (N&V) represent one of the biggest environmental challenges for the railway. The target of this work area is to reduce the exposure to noise and vibration related to the railway sector in Europe. Population in the vicinity of railways do not accept the increasing N&V annoyance while on the other hand a shift to rail-traffic is important for environmental reasons.

Exterior Noise: In order to ease vehicle certification and reduce the associated cost and time expenses without penalising the real vehicles noise performance, virtual certification can play an important role in the future. Thus, current exterior noise simulation tools require further research and validation in order to ensure that the procedures and methodologies applied, and the results obtained represent the noise performance the real train will have.

Additionally, current noise measurement procedures lack the possibility to accurately separate noise sources on pass-by noise tests, and do not cover the common vehicle scenarios including different track types. Source separation is relevant both for vehicle validation and for source ranking prior to mitigation measure implementation, and the improvement of separation techniques shall finally lead to more flexibility, better comparability and hence a better vehicle characterization in current homologation procedures.

New Technologies: Noise control of railways is a challenge also from a comfort point view of the passenger. New and innovative solutions are required to match and exceed the development of passenger comfort and acoustic performance in other modes of the transport such as cars, busses and aircraft, in the future.