

# Shift2Rail Joint Undertaking

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1<sup>st</sup> meeting of the User  
Requirements/Implementation  
and Deployment Working Group

Brussels, 15 April 2016

# Provisional Agenda

## **1. INTRODUCTION – ROUNDTABLE**

- Presentation of the Members/Alternates and Observers

## **2. ADOPTION OF RULES OF PROCEDURE (RoP) OF THE WORKING GROUP (WG)**

- Presentation of the template of the RoP
- Adoption of RoP

## **3. INFORMATION ON THE CURRENT STATE OF PLAY OF THE S2R JU**

- Overview of the S2R JU organisation/activities
- Brief presentation of the MAAP/AWPs/Calls

## **4. ROLE - METHOD OF WORK - EXPECTED DELIVERABLES - TIMETABLE**

Discussion/decision concerning:

- Role of the Working Group
- Expected input/output
- Timetable and next steps

## **5. AOB**



# AGENDA ITEM 1

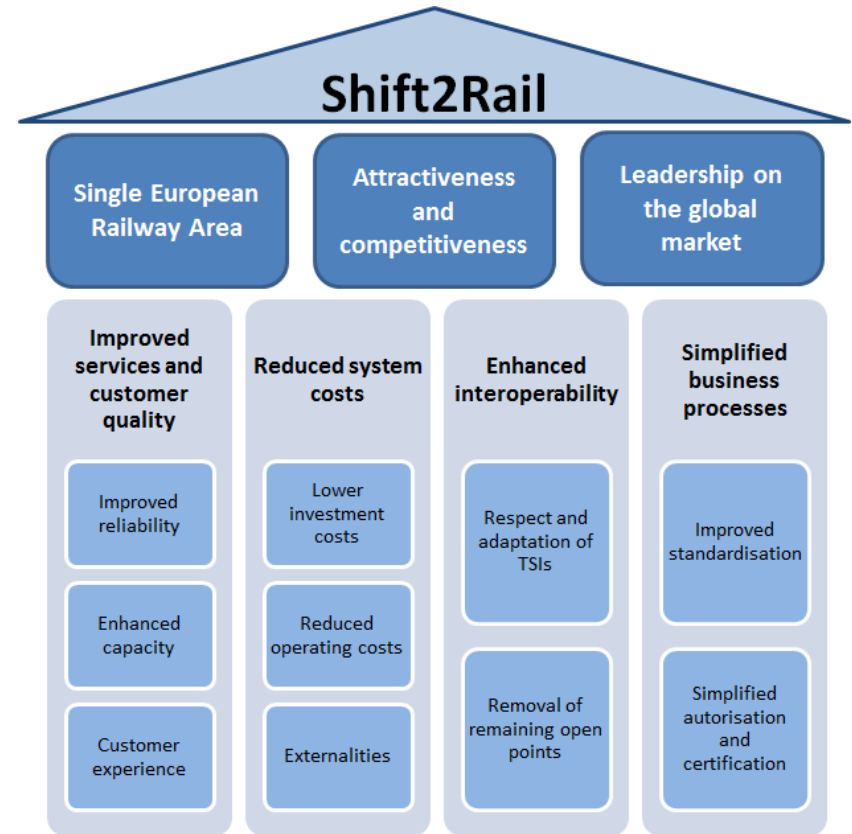
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## Introduction - Roundtable

# Shift2Rail objectives

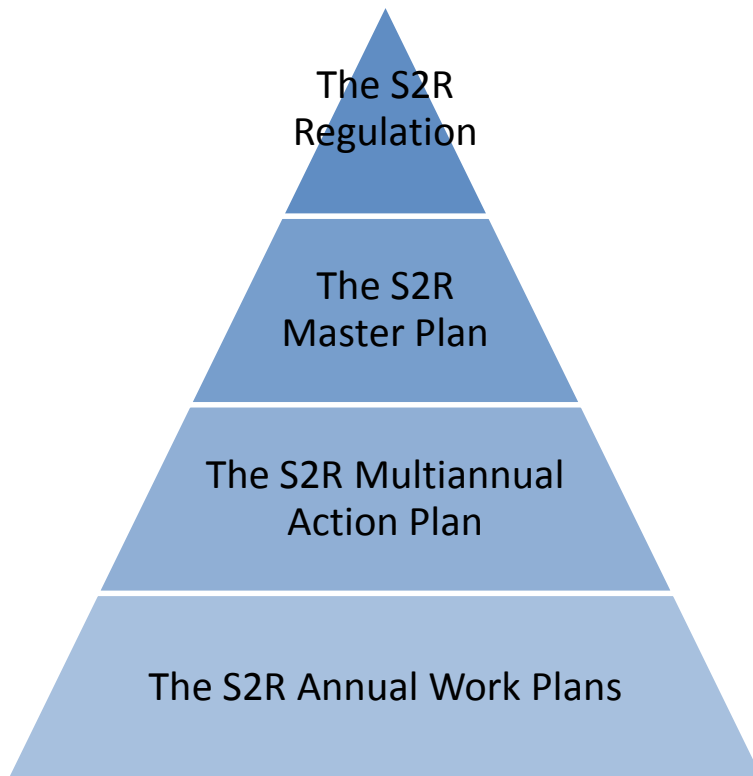
The Shift2Rail Regulation identifies the following key objectives:

- Achieve the **Single European Railway Area** through the removal of remaining technical obstacles holding back the rail sector in terms of interoperability;
- Radically enhance the **attractiveness and competitiveness of the European railway system** to ensure a modal shift towards rail;
- Help the European rail industry to retain and consolidate its **leadership on the global market** for rail products and services.



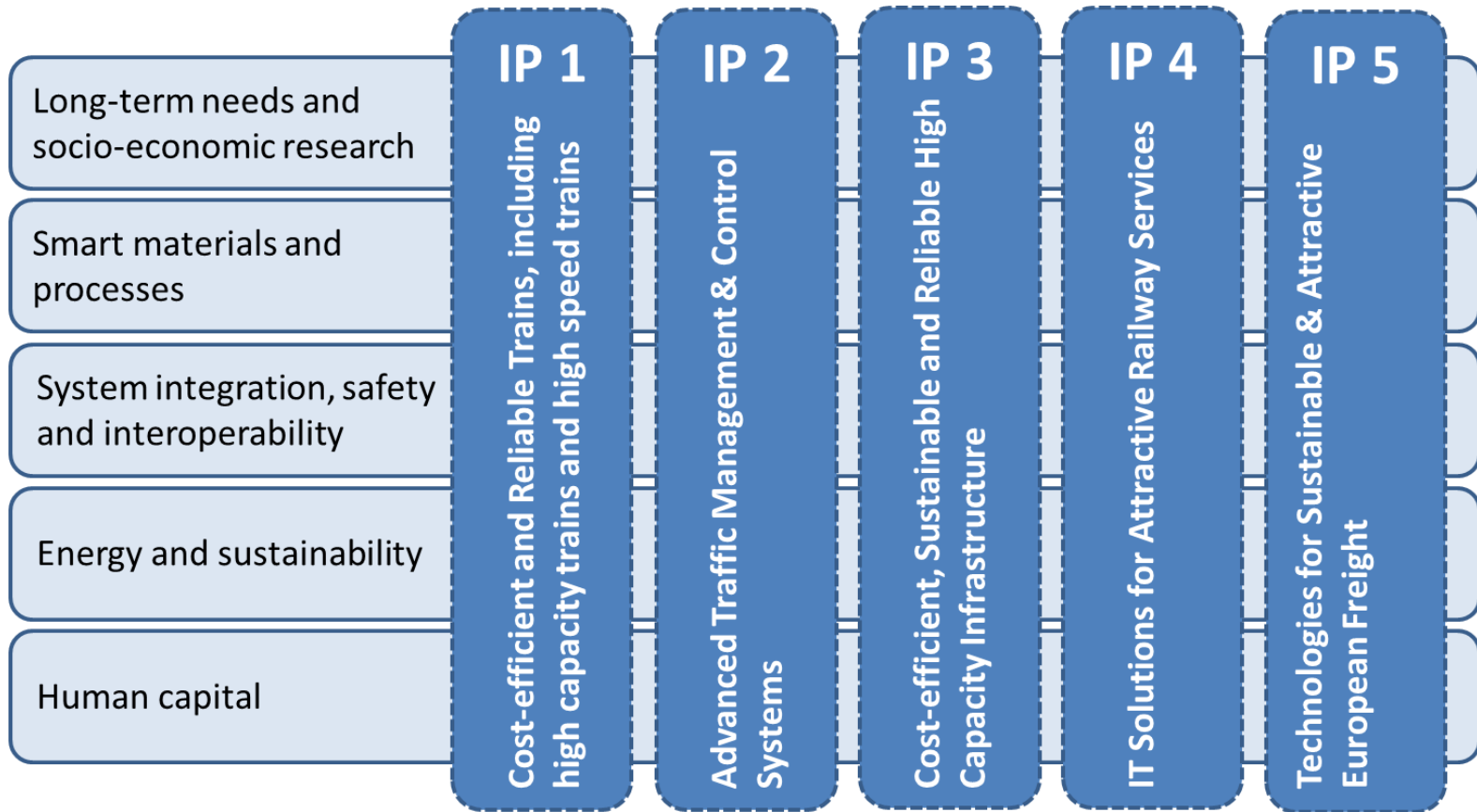
# The Shift2Rail Framework

From policy objectives to concrete activities

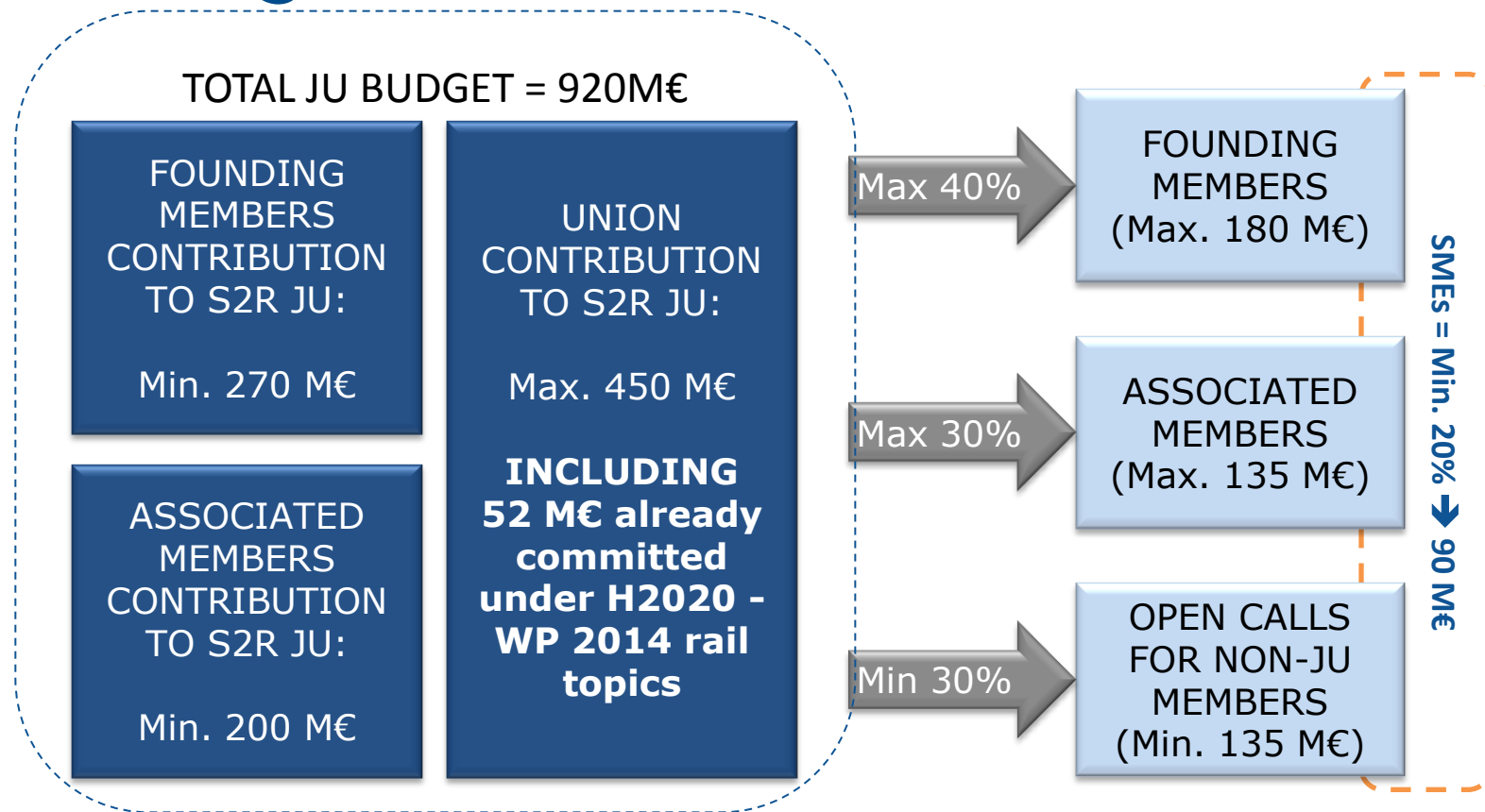


- The general objectives of the Shift2Rail Joint Undertaking are described in the Shift2Rail **Regulation**, adopted on 16 June 2014
- The **S2R Master Plan**, adopted on 30 March 2015, following the Council's endorsement, translates the general objectives into specific objectives, providing a high-level strategic vision to achieve them and identifying key priority research areas
- The **S2R Multiannual Action Plan (MAAP)**, adopted by the S2R JU on 27 November 2015, provides a detailed, long-term investment plan that concretely identifies the projects, milestones and deliverables to achieve the Master Plan objectives
- The **Annual Work Plans** translate the S2R MAAP into detailed, result-oriented activity plans and serve as the basis for identifying the JU calls

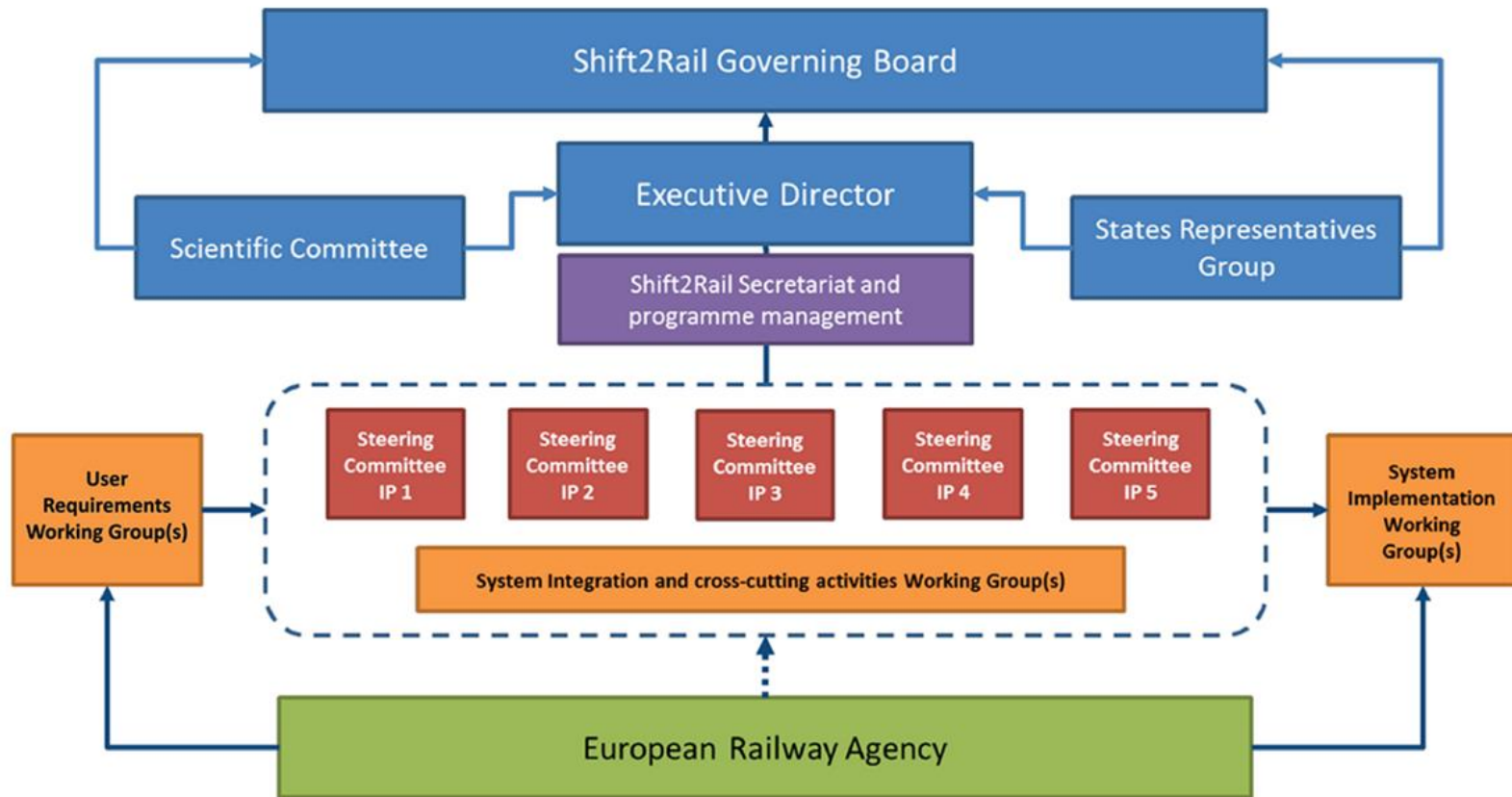
# The Innovation Programmes



# The implementation of the Union funding



# A tailor-made governance structure





# Broad stakeholder involvement

- The broad involvement of all relevant stakeholders from the rail sector, and even outside the traditional rail sector is a key feature of the S2R JU
- Balanced participation of all relevant actors thanks to a three-tier system:
  - **8 Founding Members**, including the largest private and public players, having committed at least EUR 30 million for the duration of Shift2Rail, to secure substantial industry co-funding from the outset
  - **19 Associated Members** selected as a result of a call for members and representing a broad range of actors from the entire rail value chain and from other innovative sectors, including SMEs, research organisations, universities, etc.
  - Allocation of at least 30% of the Union contribution through **competitive calls for non-JU members**, for broader stakeholders' involvement in collaborative research



# AGENDA ITEM 2

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## Rules of Procedure(RoP)

# Background

- According to the S2R Statutes (Article 15): “... *the Governing Board of the S2R Joint Undertaking may set up a limited number of **working groups** to carry out activities which are delegated to them by the Governing Board*”
- In this context the Governing Board of the S2R JU tasked the Executive Director with establishing a Working Group to deal with **User Requirements** as well as with the **Implementation and Deployment** of the solutions developed through the Shift2Rail activities

# Background

- This group will be **consulted** with the view to **assist** the JU in:
  - ✓ specifying the **user needs** and in ensuring that technical solutions developed within S2R meet the specific **business needs** of the end users.
  - ✓ testing the **operational reliability** of the results of Shift2Rail and in ensuring their rapid **market uptake** and large-scale deployment

## RoP - Membership (1 / 3)

In accordance the decision of the Governing Board of the S2R JU the membership of the WG should ensure the **widest** range of expertise and the participation and close involvement of experts from all **relevant stakeholders** from the full rail value chain and from outside the traditional rail industry.

The members shall be **appointed** by the Executive Director, following their positive response to an invitation sent to this extent. The membership may be subject to amendments

The European Commission and the European Railway Agency (ERA) will be represented in the WG , as **observers**.

In accordance with the S2R statutes the WG shall be **chaired** by a representative of the S2R Joint Undertaking .

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## RoP - Membership (2/3)

The list of bodies contacted has been based on the list of the European representative bodies (RBs) approved by the Committee referred to in Article 29 of **Directive 2008/57/EC**.

Each member of the Steering Committee shall nominate its **representative** and an **alternate**.

In nominating their representatives, the members of the Steering Committee shall ensure that the **principle of confidentiality** is respected and that there is no **conflict of interest** or potential conflict of interest between the representatives and any other activity they may have in relation to the S2R JU.

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## RoP - Membership (3/3)

1. Autonomous Train Drivers' Unions of Europe (ALE)
2. Community of European Railway and Infrastructure Companies (CER)
3. European Rail Infrastructure Managers (EIM)
4. European Passenger Train and Traction Operating Lessors Association (EPTTOLA)
5. European Rail Freight Association (ERFA)
6. European Transport workers' Federation (ETF)
7. Association of European Railway Industries (UNIFE)
8. International Union of Private Wagons (UIP)
9. International Association of Public Transport (UITP)
10. International Union of combined Road-Rail transport companies (UIRR)
11. Association of the Notified Bodies for Directive 2008/57/EC on Railway Interoperability (NB-Rail AISBL)
12. European Passengers' Federation (EPF)
13. European Technology and Travel Services Association (ETTSA)
14. Transport & Environment (T&E)
15. International Union of Railways (UIC)
16. European Shippers Council (ESC)
17. European association for forwarding, transport, logistics and customs services (CLECAT)
18. European Rail Research Network of Excellence (EURNEX)
19. European Committee for Standardization (CEN)
20. European Committee for Electrotechnical Standardization (CENELEC)
21. European Telecommunications Standards Institute (ETSI)
22. European Federation of Museum & Tourist Railways (FEDEC)

## RoP - Scope

**Pursuant to Article 15 of the S2R JU Statutes and to the decision of the Governing Board, the WG will assist the JU:**

1. in specifying the operational and maintenance-related user needs
2. in ensuring that technical solutions planned and developed within S2R meet the specific needs of all relevant end users
3. in fostering the operational reliability of the results of Shift2Rail
4. in ensuring the market uptake of the technical solutions developed through the Shift2Rail activities, taking particular care of European standardisation and regulation
5. facilitating exchanges of information on initiatives, projects and partnerships dealing with the thematic areas of each of the Innovation Programmes (IPs)/CCA identified in the Shift2Rail Master Plan and MAAP;
6. delivering opinions, submitting reports, or developing and proposing innovative solutions to the Joint Undertaking



## **RoP - Meetings and attendance**

**The WG shall hold its ordinary meetings at least once a year**

- convened 15 working days before each meeting,
- normally at JU premises.

**The members shall attend the meetings** in accordance with the items under discussion, as indicated in the provisional agenda of the meeting.

**In addition to the members, the following representatives may attend the WG meetings as observers:**

- a representative of the European Commission;
- a representative of the European Railway Agency;
- other members of the S2R JU with an interest in the results of the WG;\*
- any other expert to support the work of the WG.\*

*\* upon consultation of the Executive Director and invitation by the Chairperson*

## Voting and written procedure

- The WG members shall use their best efforts to achieve **consensus**.
- Failing consensus, the WG will record **individual opinions** of its Members.
- Between two WG meetings, opinions or recommendations may be obtained **in writing**

### *“Rapporteure”*

The members of the WG may select a “rapporteur” among its members for the production of a specific report / opinion or for the representation of the WG in the relevant S2R meetings.

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## AGENDA ITEM 3

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Information on the current  
State of Play of the S2R JU

# Shift2Rail: key milestones

- **16 June 2014:** Adoption of Council Regulation No 642/2014
- **7-9 July 2014:** Formal establishment of S2R JU and nomination of Interim Executive Director
- **30 July 2014:** Formal establishment of the **Governing Board** of the S2R JU
- **21 October 2014:** Formal establishment of the **States Representatives Group**
- **10 February 2015:** Endorsement of the Shift2Rail **Master Plan** by the Council
- **1 May 2015:** Launch of S2R 'lighthouse' projects
- **28 May 2015:** Formal establishment of the **Scientific Committee**

# Shift2Rail: key milestones

- **27 November 2015:** Adoption of the S2R Multi-Annual Action Plan
- **11 December 2015:** Selection of **19 associated members** and signature of membership agreements
- **17 December 2015:** Publication of the first calls for activities
- **25-29 January 2016:** Formal establishment of IP Steering Committees
- **16 February 2016:**
  - Appointment of Mr Carlo Maria BORGHINI as Executive Director of S2R JU (as of 16 May 2016)
  - Selection of AM representatives to the Governing Board and determination of voting rights of non-Commisison GB members
- **18 March 2016:** First meeting of the S2R Governing Board in its full composition

# S2R calls 2015 & 2016: Summary of proposal submission

- Call open 17 December 2015 – 17 March 2016
- Calls linked to Annual Work Plans 2015 and 2016:
  - Call for JU members (CFM)
  - Open call for proposals (OC)
- Total budget for all the calls combined :
  - €89,8 mln of EU contribution; in their projects, the JU members will contribute further €79,6 mln, bringing the **total project value to approx. €170 million**
- Infoday on open calls was organised in Brussels on 20 January 2016, other Infodays were held in Greece, Austria, Romania

Call identifier	Number of submitted proposals
H2020-S2RJU-CFM-2015	9
H2020-S2RJU-CFM-2016	4
H2020-S2RJU-OC-2015	33
H2020-S2RJU-OC-2016	10
Total	<b>56</b>

## Next steps

- **April 2016:**
  - meeting of the Scientific Committee (13/4)
  - meeting of the States Representatives Group (26/4)
  - meetings of the IP Steering Committees
- **24 May 2016:** S2R JU Autonomy
- **June - July 2016:** meetings of the S2R Governing Board, initiation of the MAAP revision process
- **autumn 2016:**
  - finalisation of the AWP 2017
  - start of S2R R&I activities

# AGENDA ITEM 4

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Role - method of work -  
expected deliverables -  
timetable



## Role and work method

The role of the WG is to assist the S2R JU in the areas identified within its scope.

The work of the WG will be based on :

- Published documents of the S2R (Master Plan, MAAP, AWP);
- Consultation with other JU bodies, where appropriate.
- Specific questions addressed to the WG

Expected deliverables:

Consolidated or individual input, opinion, report



# MAAP REVISION

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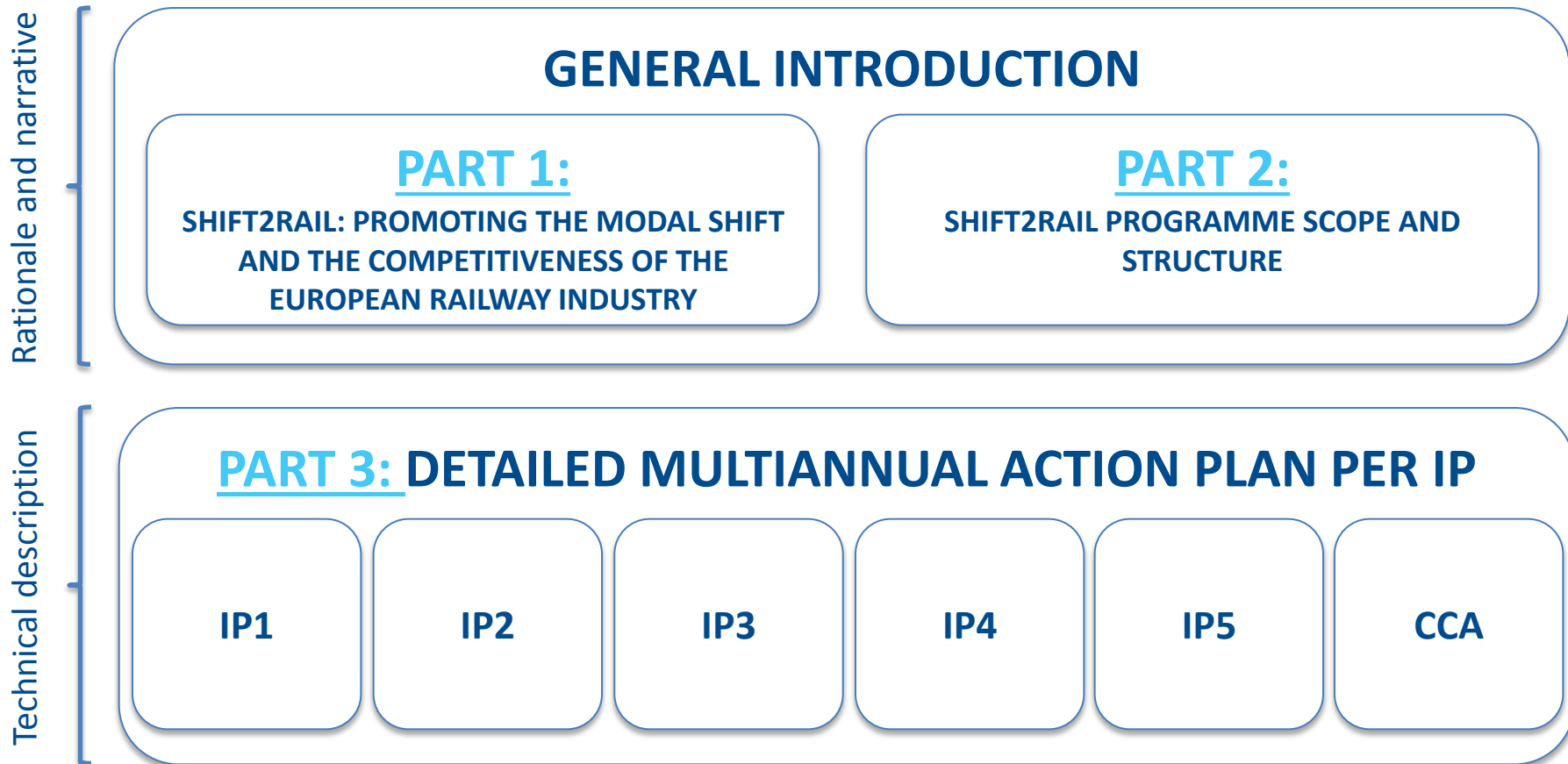
# What is the S2R MAAP?

- 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.

# 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

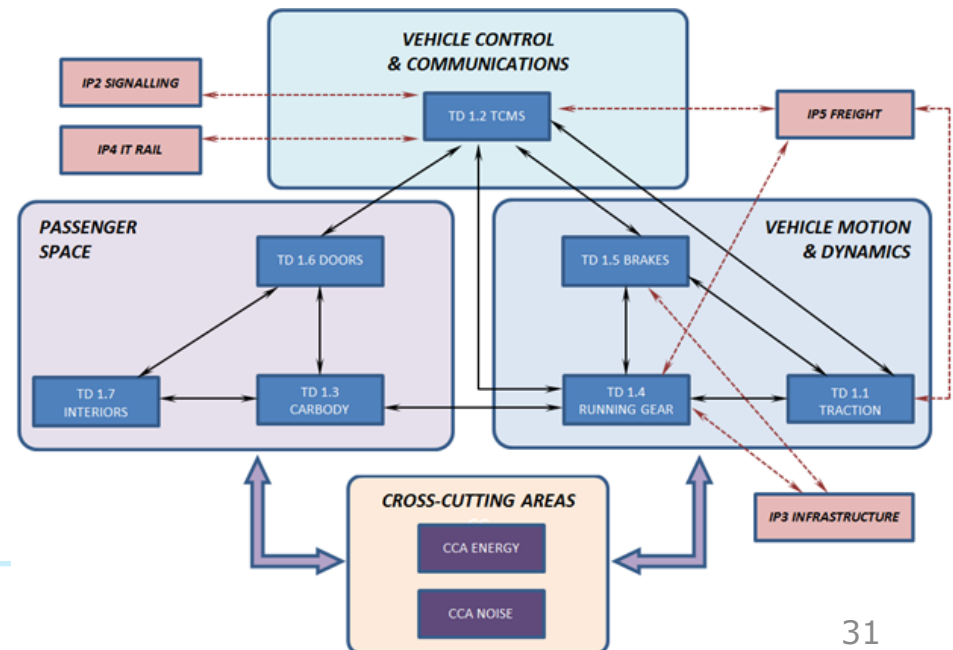
1. Context and motivation
2. Objectives of the IP and expected results
3. Past and ongoing European & national research projects
4. Set-up and structure of the IP
5. Technical Demonstrators (TDs) of the IP: incl. Concept and objectives of the TD, technical ambition of the TD, specific Demonstration activities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

# 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)

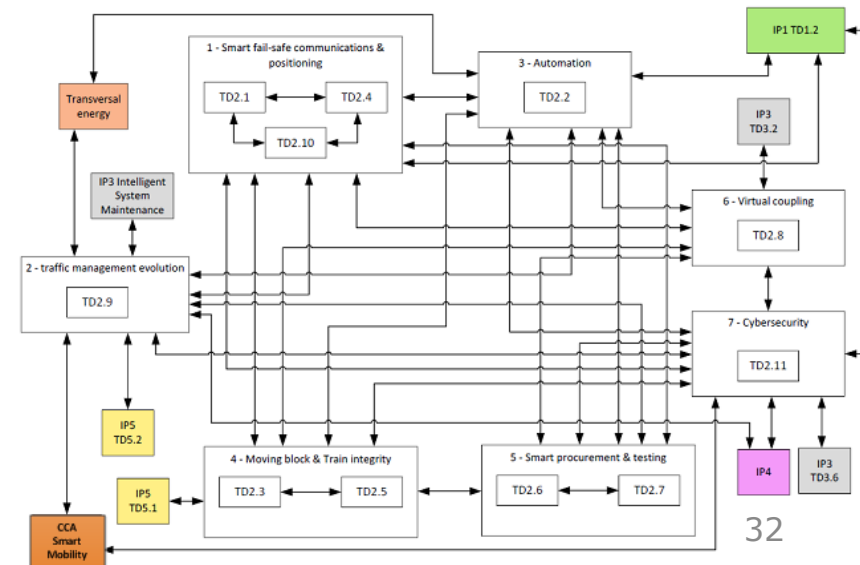


# IP2 - Advanced Traffic Management and Control Systems

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



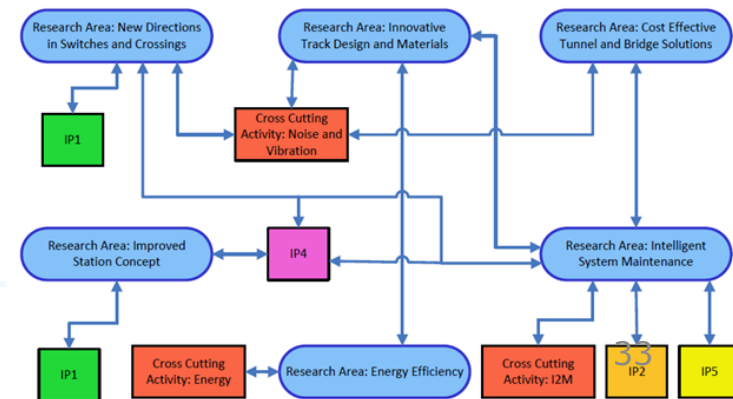


# IP3 - Cost Efficient and Reliable Infrastructure

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

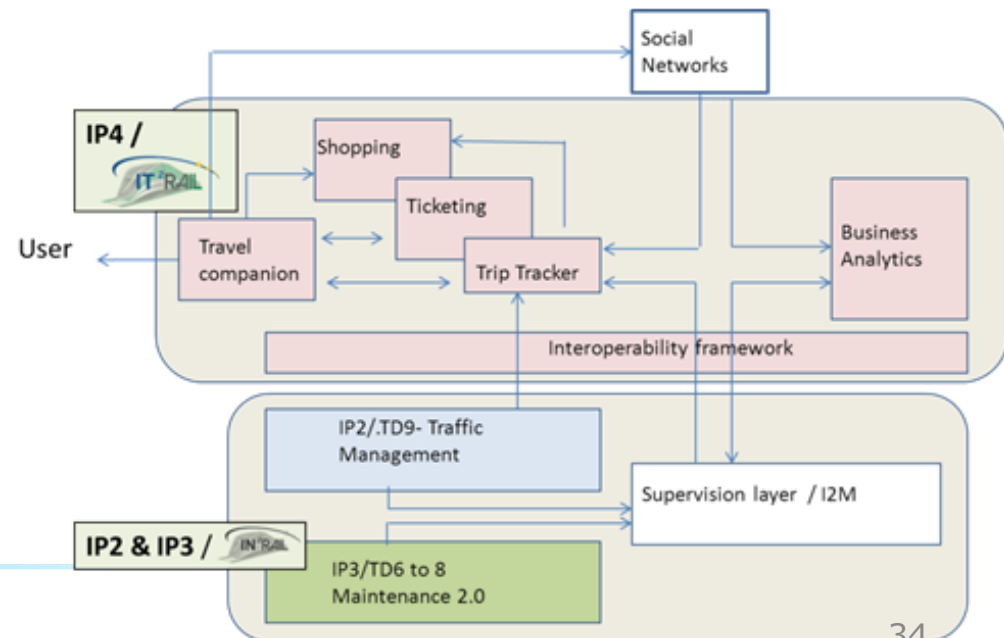


# IP4 - IT Solutions for Attractive Railway Services

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

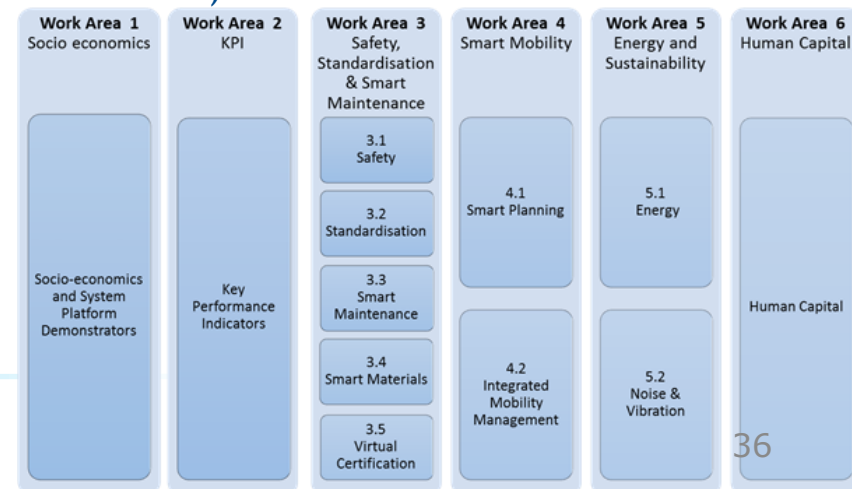
- TD5.0 - Business analytics and implementation strategies
- TD5.1 - Freight electrification, brakes and telematics
- TD5.2 - Access and Operation
- TD5.3 - Wagon design
- TD5.4 - Novel Terminal, Hubs, Marshalling Yards, Sidings
- TD5.5 - New Freight Propulsion Concepts
- TD5.6 - Autonomous train operation

# 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

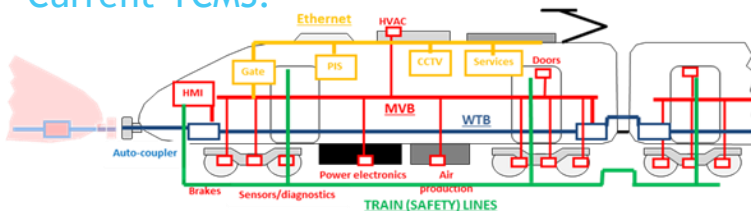


# Example of a Technology Demonstrator

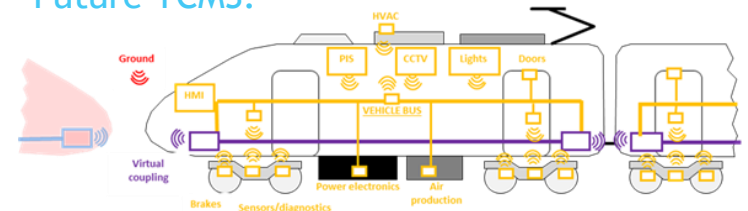
## TD1.2 Train Control and Monitoring System Demonstrator

- 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:



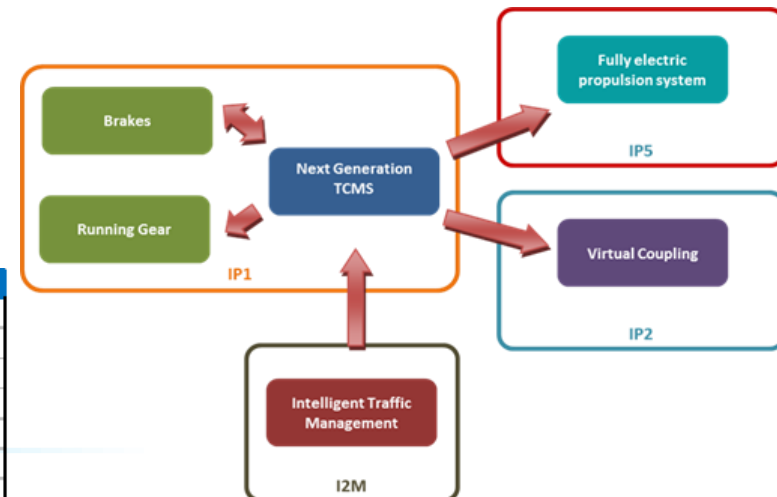
# Example of a Technology Demonstrator

- 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	-							



# 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 enable 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

## MAAP revision

The S2R MAAP is considered as a **living document** and the S2R Governing Board (GB) has already considered that it requires further improvement, in particular towards building a more **top-down, vision-based approach** to the technological developments proposed in the S2R MAAP.

At its meeting of 18 March 2016, the GB approved a process for updating the MAAP, which foresaw the **consultation** of the User requirements / Implementation and deployment working group.

In this context the JU Programme Office has prepared a **questionnaire** addressed to the members of the WG.



## Questionnaire

1. Does the S2R Multi Annual Action Plan (MAAP) adequately address the **key challenges** of the S2R Master Plan? If not, what are the major missing elements and why?
2. In the context of the first answer, what are the major (emerging) **trends** that should be mainstreamed across the S2R programme and/or could help to **cluster** R&I activities within the S2R programme (e.g. digitalisation, security, accessibility, environment, ... )?
  - a. Please identify concrete quantitative or qualitative targets that should be achieved through S2R research, for each of the trends that you identify.
  - b. Please identify the existing activities planned in S2R that could contribute to these trends

## Questionnaire

3. For each of the following **market segments**, could you please identify the main user and business **needs**? Bearing in mind the specific objectives of the S2R Master Plan, what are the **priority** targets for performance improvement in each segment and what are the critical **indicators** for measuring this performance?
- High-speed / mainline passenger rail
  - Regional passenger rail
  - Urban and suburban rail
  - Rail freight

## Questionnaire

4. Do you expect that the R&I activities proposed in the MAAP will **fulfil** the main needs of the different categories of railway users / stakeholders for each of the above market segments?
  - a. If not, what are the missing users' needs/functional requirements elements. Please quantify if possible and describe why (in the current TDs or looking for disruptive new ideas)?
  - b. Where do you think a coordinated EU investment with S2R JU intervention would be mostly needed (i.e. could not be done by individual companies or Member States) and why?
  - c. Could you tell us in your opinion which are the currently planned R&I activities which, if successfully implemented into the market, will add more value to your user/stakeholder needs and why?

## Questionnaire

5. Do you consider that **synergies** between different R&I areas (TDs and IPs) are sufficiently developed in the MAAP? If not please specify with concrete example and proposals for improvement?
6. In concrete terms, what do you expect **S2R to deliver**? Can you already identify possible concrete future scenarios of an integrated EU railway system? Pictures and schematics are welcome, for the different market segments, but also cross-market demonstrations?
7. What critical challenges/steps regarding **deployment** of S2R technologies into the market should be integrated in the process? How can this be addressed and mitigated in the design of S2R activities and how do you think you can contribute?

## Questionnaire

8. How do you think we can best **work with you** in order to ensure that the outcomes of the R&I from the MAAP will fit your expected needs?



# AGENDA ITEM 5

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AoB

## Next steps

- **29 May 2016:** Submission of the replies to the questionnaire
- **8 July 2016:** elaboration of the submitted replies – first conclusions
- autumn 2016 (provisionally) : Next meeting of the WG