

# Shift2Rail, moving together to 2030

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Head of Research & Innovation

S2R Joint Undertaking

@Shift2Rail\_JU  
#Horizon2020



# S2R OBJECTIVES

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**INCREASE** RELIABILITY & PUNCTUALITY **BY 50%**



**DOUBLE** RAILWAY CAPACITY



**HALVE LIFE-CYCLE COSTS** OF RAILWAY TRANSPORTS



CONTRIBUTE TO **REDUCTION OF NEGATIVE EXTERNALITIES**, SUCH AS NOISE, VIBRATIONS, EMISSIONS & OTHER ENVIRONMENTAL IMPACTS



CONTRIBUTE TO THE **ACHIEVEMENT OF THE SINGLE EUROPEAN RAILWAY AREA**

**S2R PROGRAMME, ABOUT € 1BLN and A NEW APPROACH TO R&I IN RAILWAY**

**working together & driving innovation**



**28**  
MEMBERS



**412**  
PARTICIPANTS



**29**  
COUNTRIES

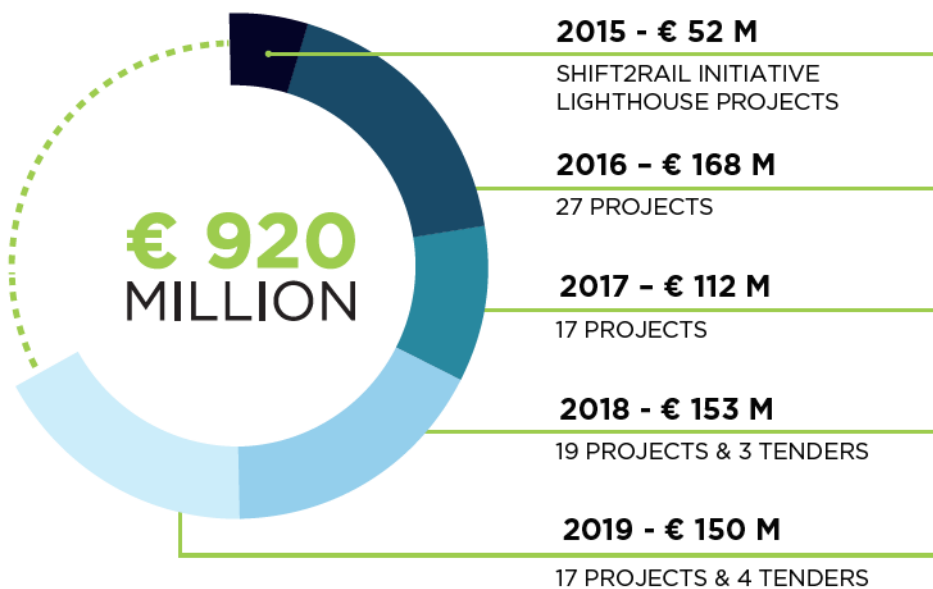


**109**  
SMEs

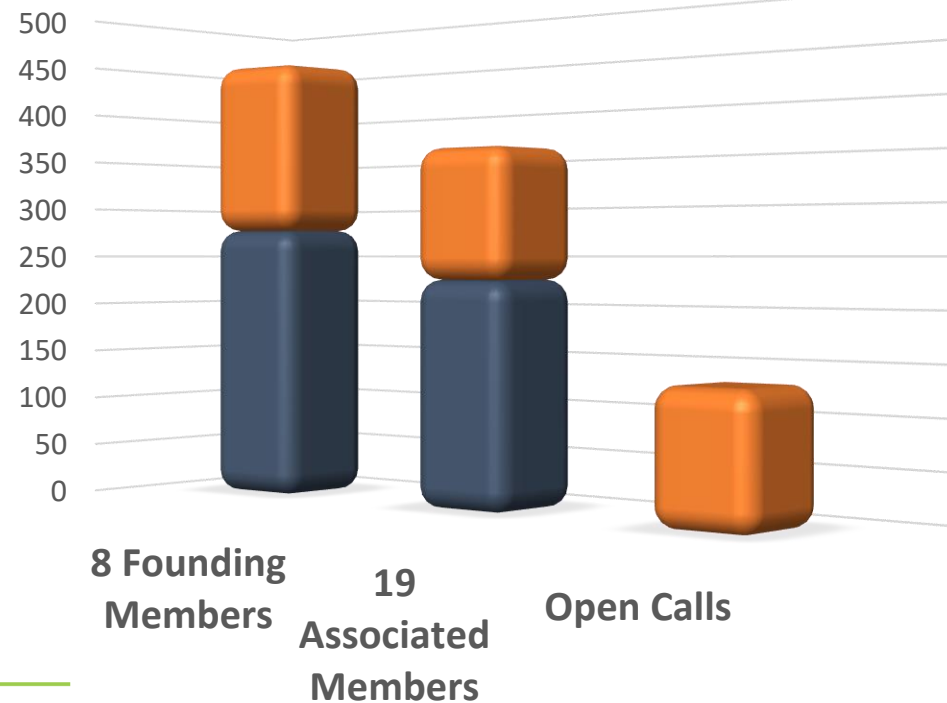


**113**  
RESEARCH CENTRES  
AND UNIVERSITIES

## AN OPEN and ACTIVE ORGANISATION

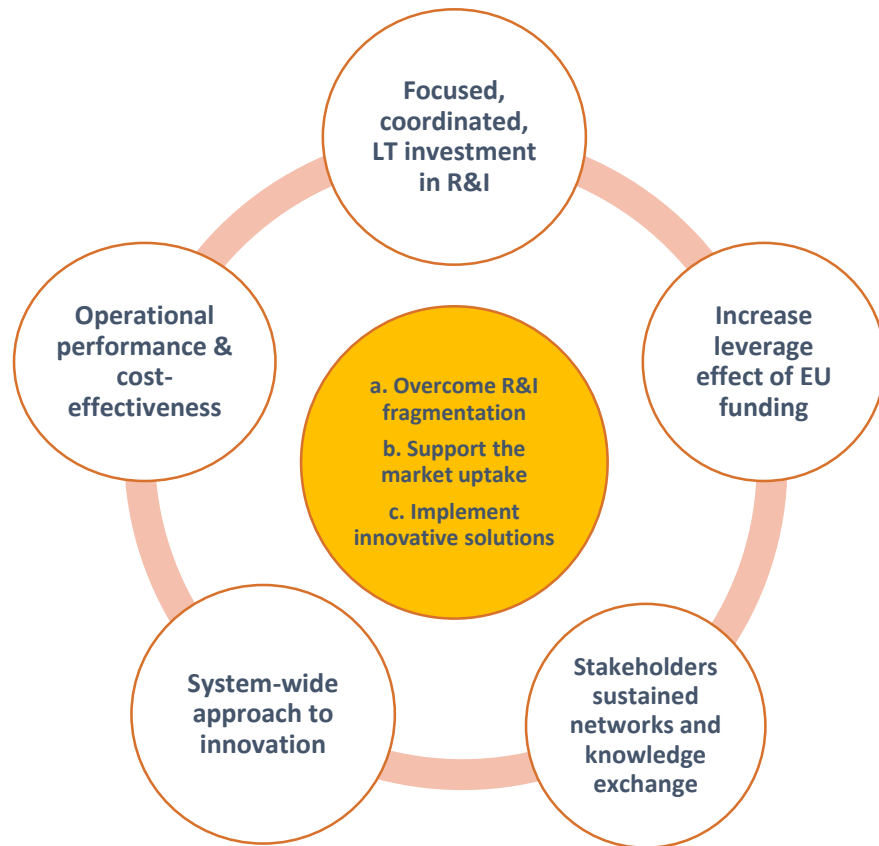


\*incl. at least 120M€  
of additional activities



Values as at 1 Sept 2016 in Million EUR

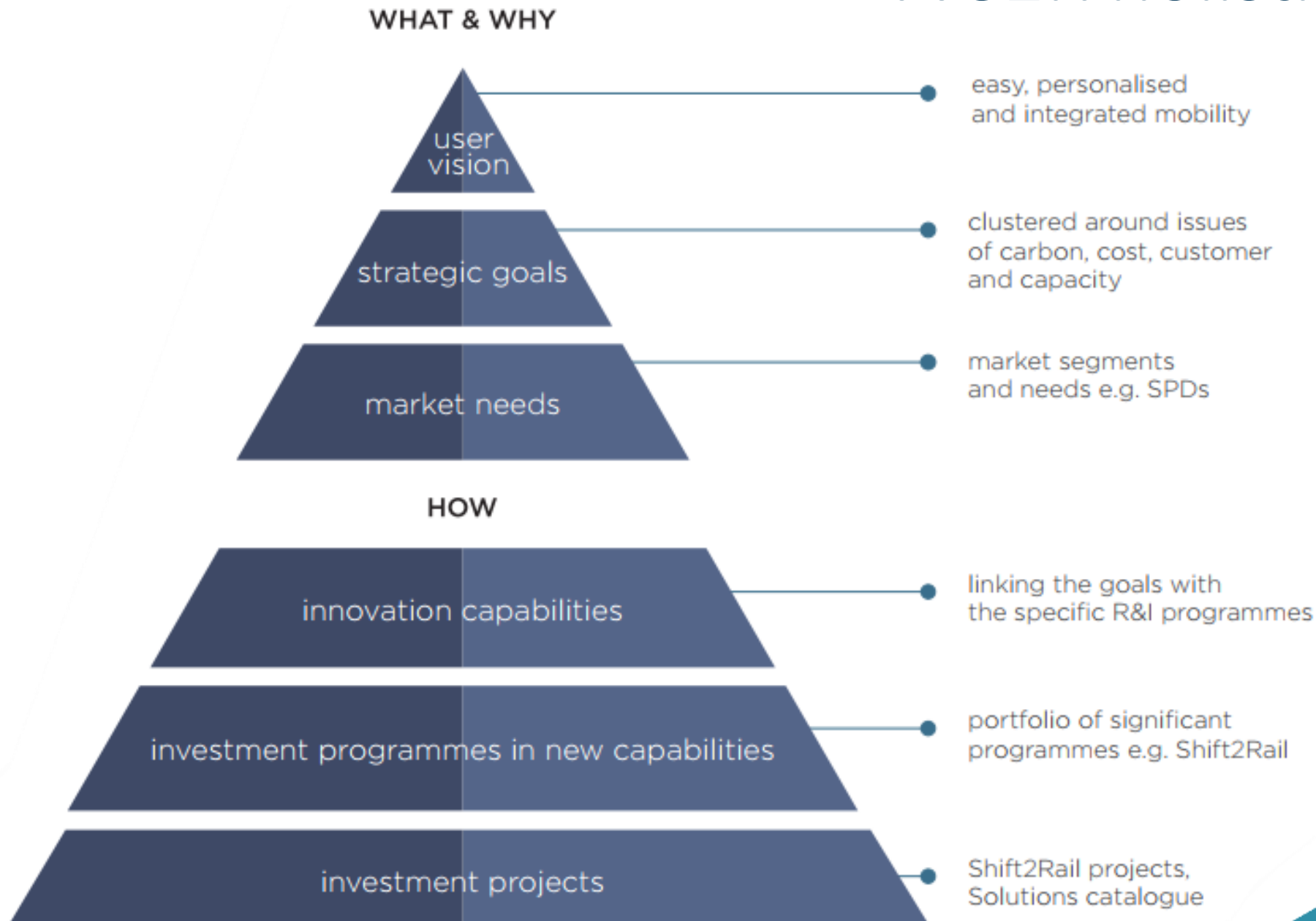
# NEW APPROACH R&I IN RAILWAY



# USER FIRST



# A S2R holistic approach...



# AN OPEN and ACTIVE ORGANISATION

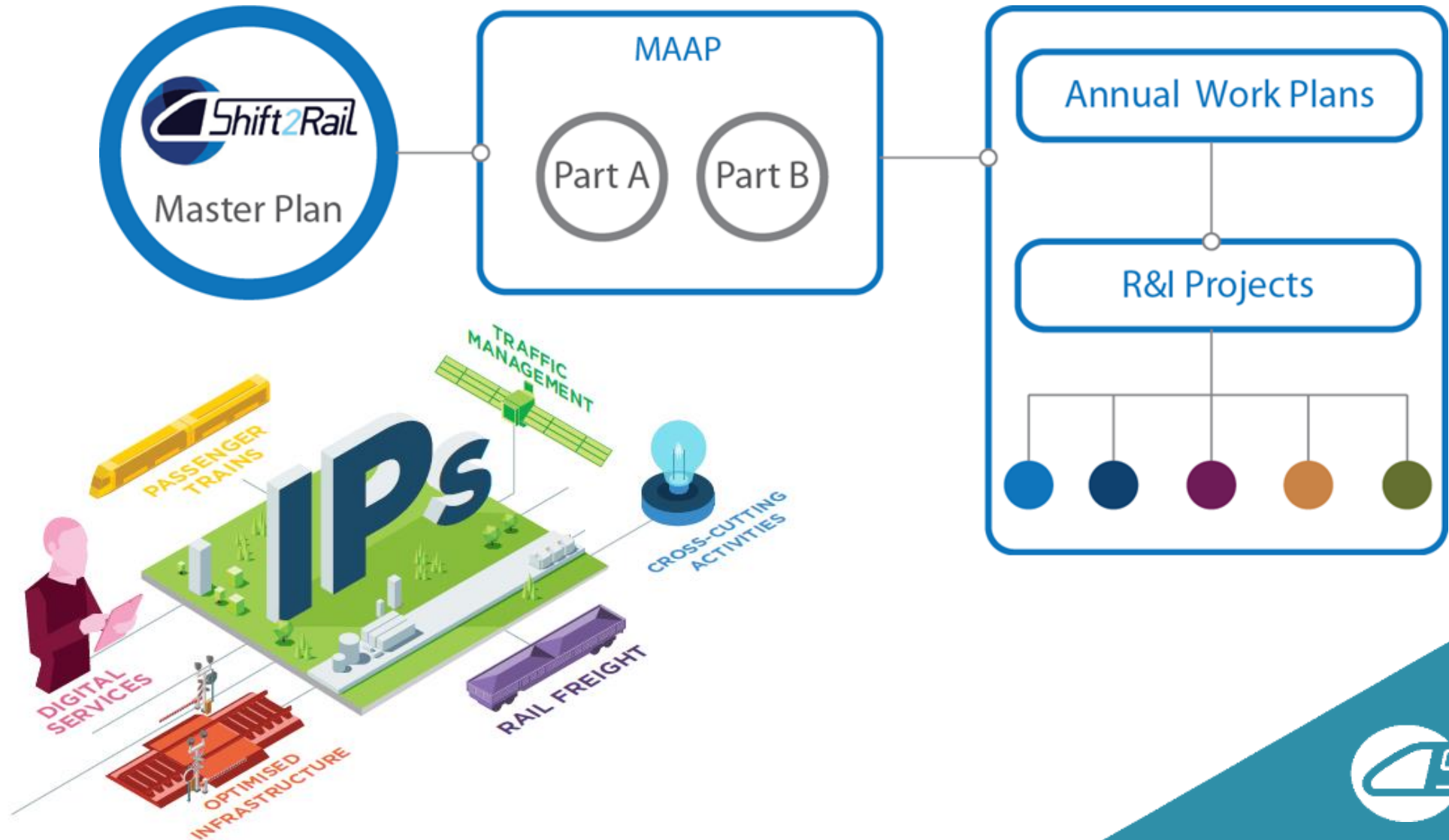


...opening up new  
Capabilities coming from  
emerging technologies or  
concepts!



# Programme approach and future/current projects

# The S2R Programme implementation





# Programme approach, future/current projects

- EACH PROJECT contributes to the **achievement of the Master Plan and the MAAP objectives**
- EACH PROJECT is part of a programme and **cooperation with other projects** must be ensured
  - Through the **collaboration and input to the JU Members**, EACH PROJECT will support the realization of **long-term S2R technological demonstrations or innovative break-through**
- Particular attention is given to ensure that there is **no duplication of work** between EACH PROJECT and current/future R&I activities
- EACH PROJECT results are taken into consideration for the next annual work plans to ensure sufficient **complementarity** and **coherence**

# AWP S2R Programme specificities

*How to read the topic acronyms*

Topic number - IP	Topic name	Type of action and expected TRL	Value of action (*) EUR	Maximum S2R co-funding (*) EUR	Other contributions from non-Members (*) EUR
S2R-OC-CCA-01-2019	Noise & Vibration	RIA TRL 4	1,309,000	1,309,000	0

Number of topic

Who can apply  
OC (open call)  
CFM (call for member)

Which area  
(IP/CCA)

Technology  
Readiness  
Level

RIA – Research  
and Innovation  
Action (100%)  
Innovation  
Action (70%)

# The applicable rules

<https://shift2rail.org/participate/call-for-proposals/>

- **Shift2Rail model Grant Agreement:**

- Based on the Horizon 2020 General Model Grant Agreement
- A single document with all provisions
- [http://ec.europa.eu/research/participants/data/ref/h2020/other/mga/jtis/h2020-mga-multi-shift2rail-ju\\_en.pdf](http://ec.europa.eu/research/participants/data/ref/h2020/other/mga/jtis/h2020-mga-multi-shift2rail-ju_en.pdf)
- **Annotated Model Grant Agreement** (v. 26 June 2019):
- User guide that aims to explain to applicants and beneficiaries the General Model Grant Agreement (not covering any S2R specificities)
- [http://ec.europa.eu/research/participants/data/ref/h2020/grants\\_manual/amga/h2020-amga\\_en.pdf](http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/amga/h2020-amga_en.pdf)

# who can participate?

- **Standard H2020 eligibility conditions:**
  - 'Research and Innovation Actions' (**RIA**) and 'Innovation Actions' (**IA**): **Minimum three** legal entities established in **minimum three different Member States or an Associated Countries**
  - 'Coordination and Support Actions' (**CSA**): **one** or more legal entity(ies) established in a Member State or in an Associated Country
  - ➔ Other entities from countries outside a Member State or Associated Country may participate to the open calls, but are, in principle, not eligible for funding unless there is a reciprocal agreement in place with that country or the applicant can demonstrate that the entity has unique resources that render its participation essential for the project to go ahead successfully
- **Additional conditions of S2R (Art 9(5) of H2020 RfP & Art. 17 S2R Regulation):**
  - Calls for members: Open only to members of the S2R JU and their affiliated entities
  - Open calls: Open only to entities that are not members or affiliated entities of members of the S2R JU

# who can participate?

- **Who are the affiliated entities of the S2R JU members?**
  - Any legal entity that is **under the direct or indirect control** of a member (or, in the case of consortia, a constituent entity of the consortium), or **under the same direct or indirect control** as the member (or constituent entity of the consortium), or that is **directly or indirectly controlling a member** (or constituent entity of the consortium)
  - The control may take in particular either of the following forms:
    - direct or indirect holding of more than 50% of the nominal value of the issued **share capital** in the legal entity concerned, or of a majority of the **voting rights** of the shareholders or associates of that entity or
    - the direct or indirect holding, in fact or in law, of **decision-making powers** in the legal entity concerned.
  - The following relationships between legal entities do not constitute control relationships:
    - the same **public** investment corporation, institutional investor or venture-capital company has a direct or indirect holding of more than 50% of the nominal value of the issued share capital or a majority of voting rights of the shareholders or associates;
    - the legal entities concerned are owned or supervised by the same **public body**.

## FOUNDING MEMBERS



ALSTOM

BOMBARDIER

CAF

Hitachi Rail STS

NetworkRail

SIEMENS

THALES

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## ASSOCIATED MEMBERS

amadeus



DIGINEXT  
be visionary

Faiveley Transport  
A Wabtec Company

HaCon

indra



KNORR-BREMSE

kontron  
S&T Group

mermec  
AN ANGEL COMPANY

SNCF

Talgo

Virtual Vehicle Austria consortium+  
(VVAC+)

European Rail Operating  
community Consortium (EUROC)

Swi'Tracken consortium

Smart DeMain (SDM) consortium

virtual vehicle

WIENER LINIEN

ÖBB  
Immer in Bewegung

bls

RAILENIUM

Universidade do Porto  
Euskal Herriko Unibertsitatea

Strukton  
Rail

cemosa

FCP  
getzner  
engineering a quiet future

TATRAVAGÓNKA  
POPRAD

CP  
COMBOIOS DE PORTUGAL

liikennevirasto

U.PORTO

University of Miskolc

Fraunhofer  
IVI

acciona

KIRCHDORFER  
CONCRETE SOLUTIONS

ACT

PKP  
POLSKIE KOLEJE PAŃSTWOWE  
Spółka Akcyjna

SBB CFF FFS

TATA STEEL

vossloh

TRONICO  
ALCEN

DLR

Plasser & Theurer

MCL

ProRail

Infraestruturas  
de Portugal

izt  
Institut für  
Zahnradbau und  
Technologiebewertung

egis

voestalpine  
ONE STEP AHEAD

2IM

TCDD

Slovenske železnice

EURO  
TUNNEL

AVL

AERFITEC

Competitive Freight Wagon  
Consortium (CFW)

Smart Rail Control  
(SmartRaCon) consortium

AERnova

ConTraffic  
Consulting Network for Traffic Systems

DLR

DLR

RAILENIUM

FIDAMC

DIE BAHNINDUSTRIE.  
VDB VERBAND DER BAHNINDUSTRIE IN DEUTSCHLAND E.V.

ceit  
Research Alliance

ceit  
Research Alliance

NSL

tecnalia  
Inspiring  
Business

WBN  
ESTABLISHED SINCE 1888

Shift2Rail

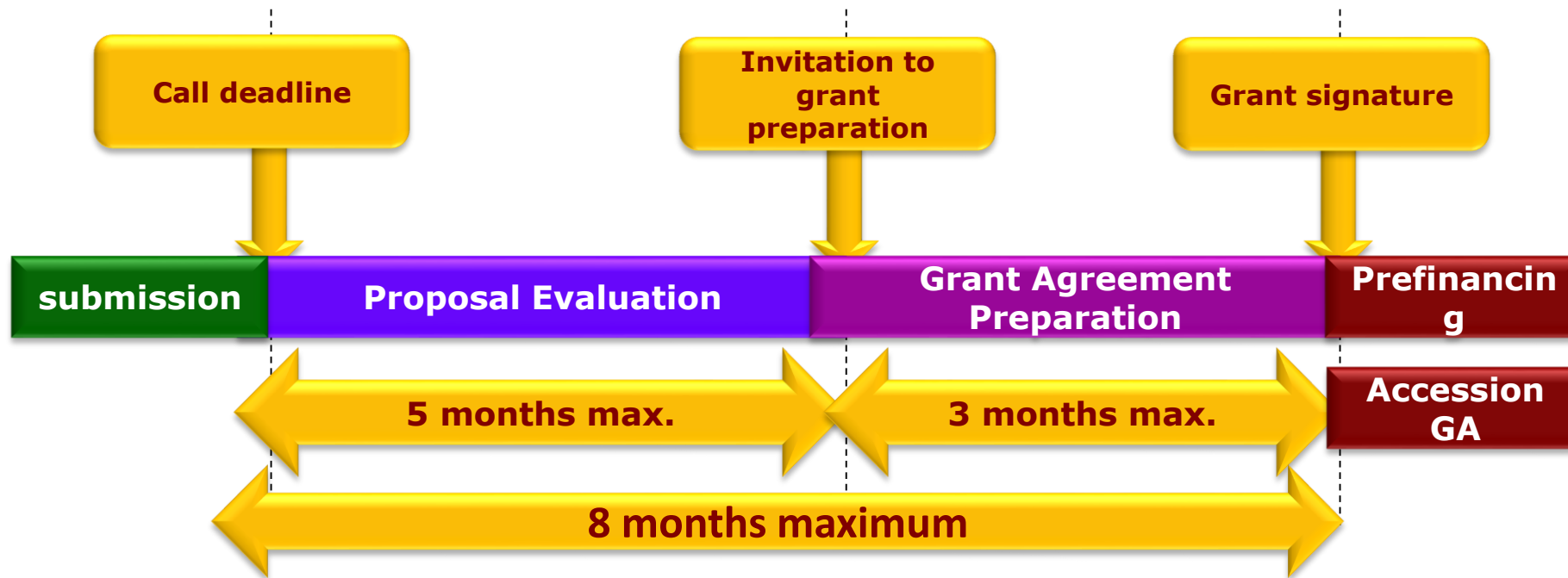


# funding rates

- **Applicable funding rates for the open calls:**
    - Funding rate depending on the type of action:
      - Up to 100% of eligible costs for 'Research and Innovation Actions' (RIA) and for 'Coordination and Support Actions' (CSA)
      - Up to 70% for 'Innovation Actions' (IA), except non-profit organisations (up to 100%)
    - One project = One funding rate for all beneficiaries / activities in the grant\*
- \*However, if non-profit organisations are in an IA together with for-profit organisations, their eligible costs will be reimbursed according to the different reimbursement rates specified above

The reimbursement rates apply to all forms of costs, including indirect costs (overheads): 25% flat rate (calculated on the basis of eligible direct costs, excluding direct sub-contracting costs)

# Overview of the standard call process



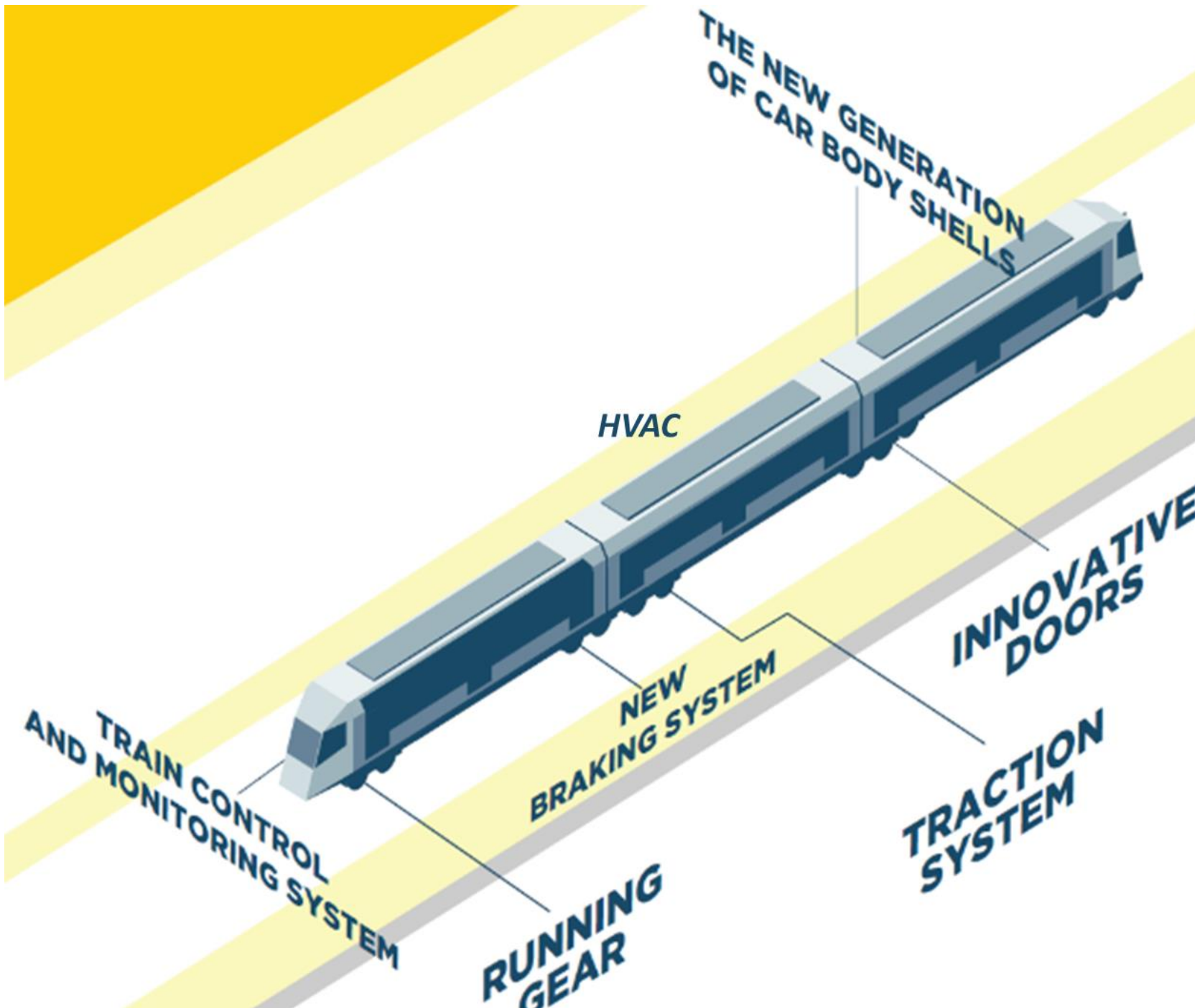
## H2020 max. duration to Grant signature:

- Maximum **five months** from call closure date to end of evaluation - until the date of informing applicants
- Maximum **three months** to prepare grant agreement from the date of inviting (informing) applicants until the signature of the grant agreement
- Maximum **eight months** from call closure - until the signature of the grant agreement

# *Overview of the different IPs and CCA activities*

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IP1: Cost-efficient and reliable trains, including high-capacity trains and high-speed trains

# IP1: key achievements and ongoing activities

- ✓ **Traction:** Technical Demonstrator with innovative components for energy saving, weight and size reduction, using mainly SiC technology
  - ➔ up to 20% of Energy saving for Traction chain on Regional Platform
- ✓ **TCMS:** Wireless Technology for train communication network, Drive by Data and Functional Open Coupling concept.
  - ➔ Prove of concept for integration of SIL4 functions in TCMS, significant reduction of wires (Installation and Maintenance Costs)
- ✓ **Doors:** next gen doors, PRM access, noise attenuation and increased accessibility
- ✓ **Interiors:** new modularity concepts, easier upgrades

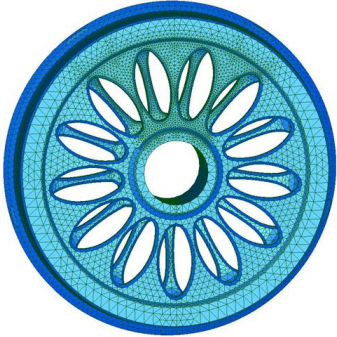


InnoTrans 18 – Virtual Coupling Demo

# IP1: key achievements and ongoing activities

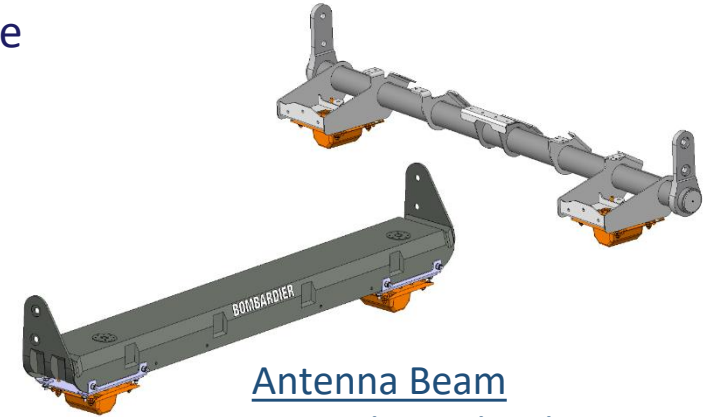
- ✓ **Carbody Shell and Running Gear:** Introduction of composite material for hybrid consist's structure.

➔ Weight reduction - impact on vehicle's payload -> capacity increase



Spoke Wheel for Metro Bogie

- Wheel wear (use of new materials) and rail wear
- Weight (by 10%)
- Noise emission



Antenna Beam

- Carbon Fibre laminate
- 13 kg vs 60 kg for conventional solution

- ✓ **Brakes :** Design of Electro-Mechanical Brakes, High SIL Electronics and wheelset slide protection.

- ➔ No pneumatic pipes for brakes management -> LCC
- ➔ Braking distance reduction in poor adherence, from +25% to 15%



TD1.1 Traction Systems demonstrator								
2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: Roll2Rail (10/2017), PINTA (11/2018)			Ongoing: PINTA2			Planned activities		

TD1.2 Train Control and Monitoring System Demonstrator								
2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: Roll2Rail (10/2017), CONNECTA (09/2018)			Ongoing: Safe4RAIL, CONNECTA-2, Safe4RAIL-2			Planned activities		

TD1.3 Carbody Shell Demonstrator								
2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: Roll2Rail (10/2017)		Ongoing: PIVOT, Mat4Rail		AWP 2019: CFM, OC		Planned activities		

TD1.4 Running Gear Demonstrator								
2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: Roll2Rail (10/2017)		Ongoing: PIVOT, Run2Rail		AWP 2019: CFM, OC		Planned activities		

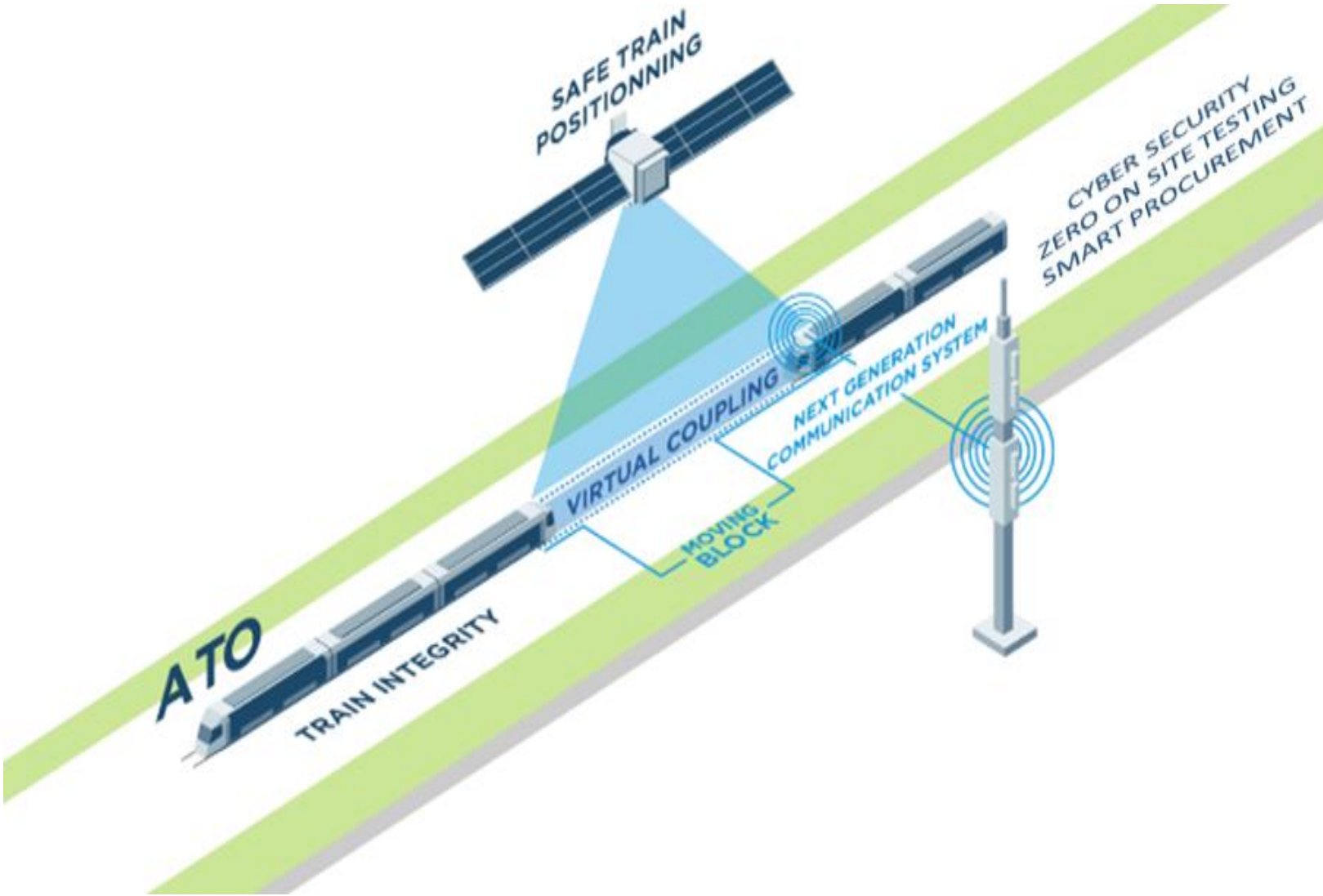
TD1.5 Brake Systems Demonstrator								
2015	2016	2017	2018	2019	2020	2021	2022	...
Fin: Roll2Rail (10/2017), CONNECTA (09/2018)								
		Ongoing: Safe4RAIL, PIVOT, PINTA-2						
					AWP 2019: CFM, OC			
						Planned activities		

TD1.6: Doors and Access Systems Demonstrator								
2015	2016	2017	2018	2019	2020	2021	2022	...
Ongoing: PIVOT,Run2Rail				AWP 2019: CFM, OC				

TD1.7: Train Modularity In Use (TMIU)								
2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: Roll2Rail (10/2017)		Ongoing: PIVOT,Mat4Rail			AWP 2019: CFM, OC			

TD1.8: HVAC								
2015	2016	2017	2018	2019	2020	2021	2022	...
					AWP 2019: CFM		Planned activities	

# IP2: Advanced Traffic Management and Control Systems



# IP2: Key achievements so far

## **Railway System Architecture under preparation**

- Relationship with RCA initiative is ongoing in order to coordinate the actions.

## **ATO for mainline railways; GoA4 will reduce human error and increase service availability**

- GoA2 draft specifications available (reviewed by sector + ERA);
- Pilot tests for GoA2 in first half of 2019 (delay for train availability in UK);
- Use cases/specifications for GoA4 are ongoing.

**Moving Block** based on ERTMS/ETCS specifications and opportunity to remove trackside fixed signalling systems . Different kind of MB application including Hybrid.

**GNSS/ positioning systems** applied to rail to remove physical balises and facilitating the application of moving block

- System Requirements Specification and system architecture to be delivered. Extension of the SoW to new vehicle localization principle

## **Adaptable communication for railways, technology and bearer independent**

- Cooperation UIC FRMCS (+ ERA) on use cases;
- Specifications development and prototypes preparation

**Dynamic control of train management** – based on Virtual Coupling



TD2.1: Adaptable communications for all railways (quality of service, interfaces to signalling)								
2015	2016	2017	2018	2019	2020	2021	2022	...
		Finished: MISTRAL (10/18)						
		Ongoing: X2Rail-1, X2Rail-3, EMULRADIO4RAIL						
					Planned Activities			

TD2.2: Railway network capacity increase (ATO up to GoA4 – UTO)								
2015	2016	2017	2018	2019	2020	2021	2022	...
		Ongoing: X2Rail-1, ASTRail						
					AWP 2019: CFM			

TD2.3 Moving Block								
2015	2016	2017	2018	2019	2020	2021	2022	...
		Ongoing: X2Rail-1, ASTRail, X2Rail-3, MOVINGRAIL						
					Planned Activities			

TD2.4: Fail-Safe Train Positioning (including satellite technology)								
2015	2016	2017	2018	2019	2020	2021	2022	...
			Ongoing: X2Rail-2; ASTRail, GATE4Rail					
					Planned Activities			

TD2.5: On-board Train Integrity								
2015	2016	2017	2018	2019	2020	2021	2022	...
			Ongoing: X2Rail-2; ETALON					
					AWP 2019: CFM			

TD2.6: Zero on-site testing (control command in lab demonstrators)								
2015	2016	2017	2018	2019	2020	2021	2022	...
		Finished: VITE (10/18)						
		Ongoing: X2Rail-1, X2Rail-3, GATE4Rail						
						Planned activities		

TD2.7: Formal methods and standardisation for smart signalling systems								
2015	2016	2017	2018	2019	2020	2021	2022	...
			Ongoing: X2Rail-2; ASTRail					
					AWP 2019: CFM,OC			
						Planned activities		

TD2.8: Virtually – Coupled Train Sets (VCTS)								
2015	2016	2017	2018	2019	2020	2021	2022	...
			Ongoing: X2Rail-3, MOVINGRAIL					



### TD2.9: Traffic management evolution

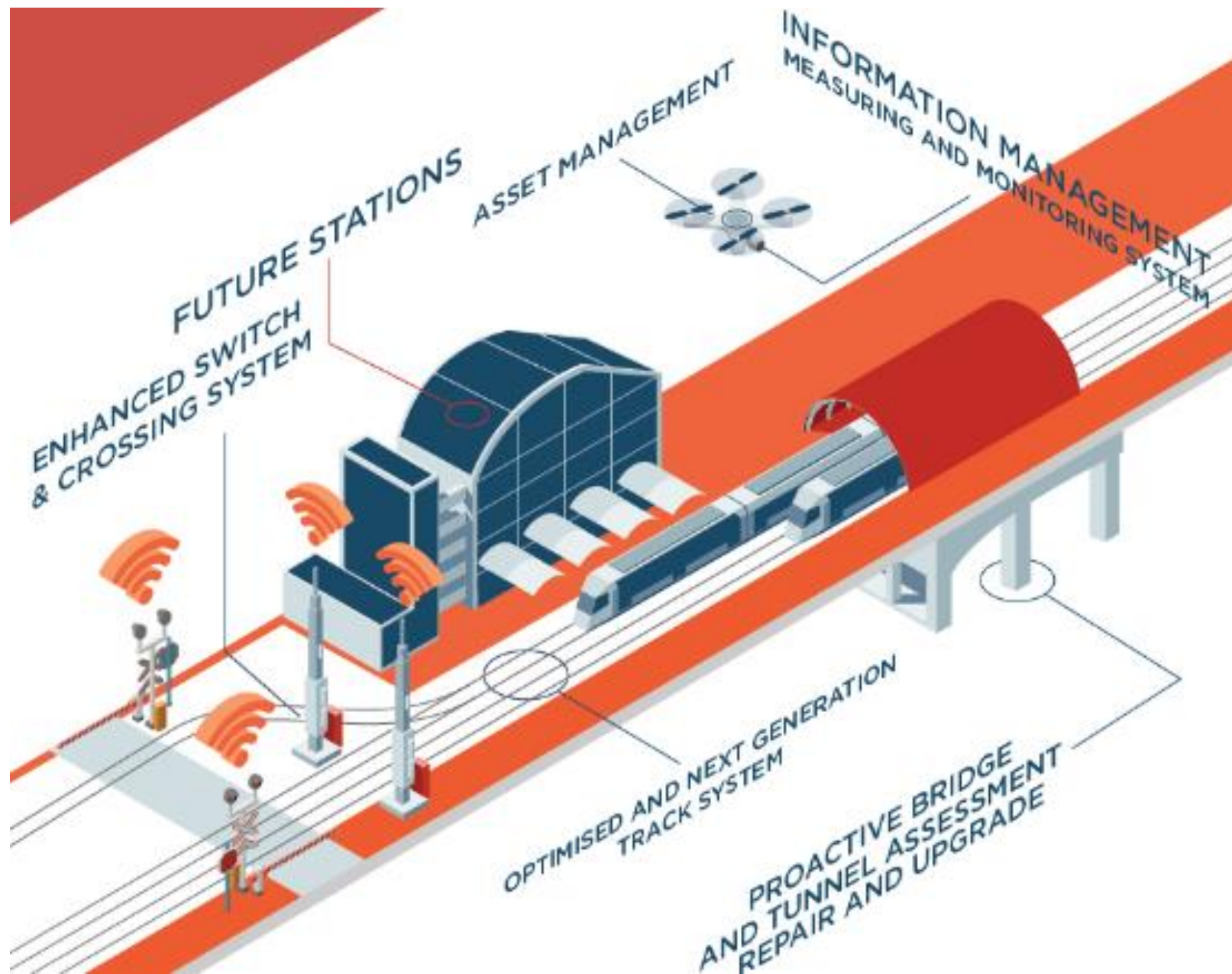
2015	2016	2017	2018	2019	2020	2021	2022	...
			Ongoing: X2Rail-2					
					AWP 2019: CFM, OC			

### TD2.10: Smart radio-connected all-in-all wayside objects

2015	2016	2017	2018	2019	2020	2021	2022	...
		Ongoing: X2Rail-1, ETALON						
					AWP 2019: CFM			

### TD2.11: Cyber Security

2015	2016	2017	2018	2019	2020	2021	2022	...
		Finished: CYRAIL (09/18)						
		Ongoing: X2Rail-1						
					AWP 2019: CFM, OC			
						Planned activities		

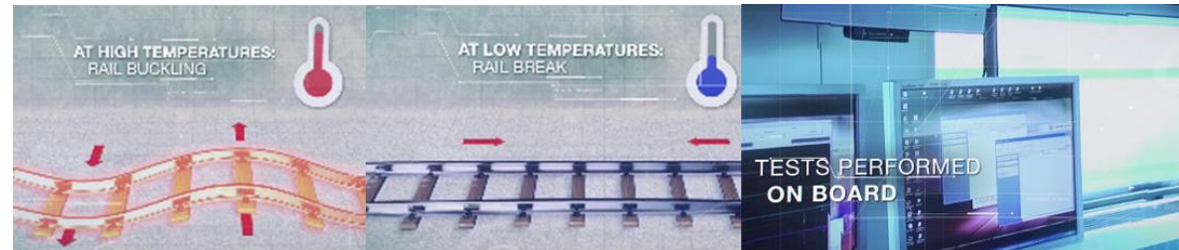


## IP3: Cost-Efficient and Reliable High-Capacity Infrastructure

# IP3: key achievements and ongoing activities

✓ **Intelligent Asset Management:** Shift from reactive to proactive maintenance based on innovative monitoring/ measuring & processing technologies

- ➔ Innovative technologies in asset measuring & monitoring (satellite, drones, robotics), data processing & decision support (IoT, Artificial Intelligence)
- ➔ Demonstration & evaluation of asset management, maintenance strategies: Thermal Stress Monitoring, and Lean Tamping



✓ **Intelligent Energy Management:** mapping of all energy flows in railway system for management strategies. Future traction power supply system in integration with public grid

- ➔ Proof-of-Concept in light-train environment (tramway)
- ➔ Design of an intelligent substation, 66% savings on transmission losses, 25% reduction on dimensioning

# IP3: key achievements and ongoing activities

## ✓ **Optimized & Future Infrastructure Design:**

✓ **Track and S&C System:** Analysis of deformation mechanisms & introduction of advanced capabilities to existing systems. Design of radically new designs & systems

➡ Novel concept for locking & detection capabilities

➡ Conceptual designs for radical switch actuation, locking and detection

✓ **Bridges & Tunnels:** Improved inspection & repair methods → service life extension, disruption time reduction, N&V reduction

➡ Digital Imaging for asset monitoring + BIM-based asset management for remaining life estimation & bridge prediction behavior

➡ Investigation of bridge-rolling stock interface & contribution to standards

✓ **Stations:** New designs enhancing mobility, accessibility & crowd management

➡ Analysis of the passenger needs and expectations at railway stations

➡ Conceptual design of Platform-Train Interface (PTI) solution

TD3.1 Enhanced Switch & Crossing System								
2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: In2Rail (04/18)			Ongoing: IN2TRACK, IN2TRACK2			Planned Activities		

TD3.2 Next Generation Switch & Crossing System								
2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: In2Rail (04/18)			Ongoing: S-CODE, IN2TRACK2			Planned Activities		

TD3.3 Optimised Track System								
2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: In2Rail (04/18)			Ongoing: IN2TRACK, IN2TRACK2			Planned Activities		

TD3.4 Next Generation Track System								
2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: In2Rail (04/18)			Ongoing: IN2TRACK2			Planned Activities		

TD3.5 Proactive Bridge and Tunnel Assessment, Repair and Upgrade								
2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: In2Rail (04/18)			Ongoing: IN2TRACK, IN2TRACK2			Planned Activities		

TD3.6 Dynamic Railway Information Management System (DRIMS)								
2015	2016	2017	2018	2019	2020	2021	2022	...
Ongoing: IN2SMART, IN2DREAMS				AWP 2019: CFM		Planned Activities		

TD3.7 Railway Integrated Measuring and Monitoring System (RIMMS)								
2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: In2Rail (04/18)								
		Ongoing: IN2SMART, MOMIT, Assets4Rail						
					AWP 2019: CFM			
				Planned Activities				

TD3.8 Intelligent Asset Management Strategies (IAMS)								
2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: In2Rail (04/18)			Ongoing: IN2SMART		AWP 2019: CFM		Planned Activities	



TD3.9 Smart Power Supply								
2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: In2Rail (04/18)			Ongoing: IN2STEMPO					
			AWP 2019: OC					
			Planned Activities					

TD3.10 Smart Metering for Railway Distributed Energy Resource Management System								
2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: In2Rail (04/18)			Ongoing: IN2STEMPO, In2Dreams					

TD3.11 Future Stations								
2015	2016	2017	2018	2019	2020	2021	2022	...
			Ongoing: In2Stempo, FAIR Stations					

# IP4: IT Solutions for Attractive Railway Services



# IP4: key achievements and ongoing activities

- ✓ **Interoperable framework:** semantic based IT solution capable of making interoperable different databases using different standards, without the need of changing the legacy systems – creating a multimodal framework

- ➔ First converter demonstrating semantic interoperability using FSM and TAP-TSI
- ➔ Enhance the Interoperability Framework with AI

- ✓ **Multimodal travel services:** providing to the passenger the easy interface, masking the complexity of technical and financial interaction among the several services provider, for shopping, booking and retrieving their right to travel

- ➔ First demonstration of the IP4 ecosystem at Innotrans 2018



# IP4: key achievements and ongoing activities

- ✓ **Customer experience applications:** providing to the user the engine to search its travel accordingly to his/her specific needs/preferences + providing an useful companions guiding the user across the right platform or across a service disruption through an automatic re-routing, etc.
  - ➔ inclusion of new Mobility Services in the ecosystem
  - ➔ Starting on MaaS, for a European « roaming service »
- ✓ **Business analytics:** providing to the operating companies the means to understand and adapt their offer to a real time multi-modal demand

### TD 4.1 Interoperability Framework

2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: IT2RAIL, GOF4R, ST4RT				Ongoing: CONNECTIVE, SPRINT			AWP 2019: OC	

### TD4.2 Travel Shopping

2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: IT2RAIL				Ongoing: Co-Active, MaaSive			AWP 2019: OC	
							Planned activities	

### TD4.3 Booking and Ticketing

2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: IT2RAIL				Ongoing: Co-Active, MaaSive			AWP 2019: OC	
							Planned activities	

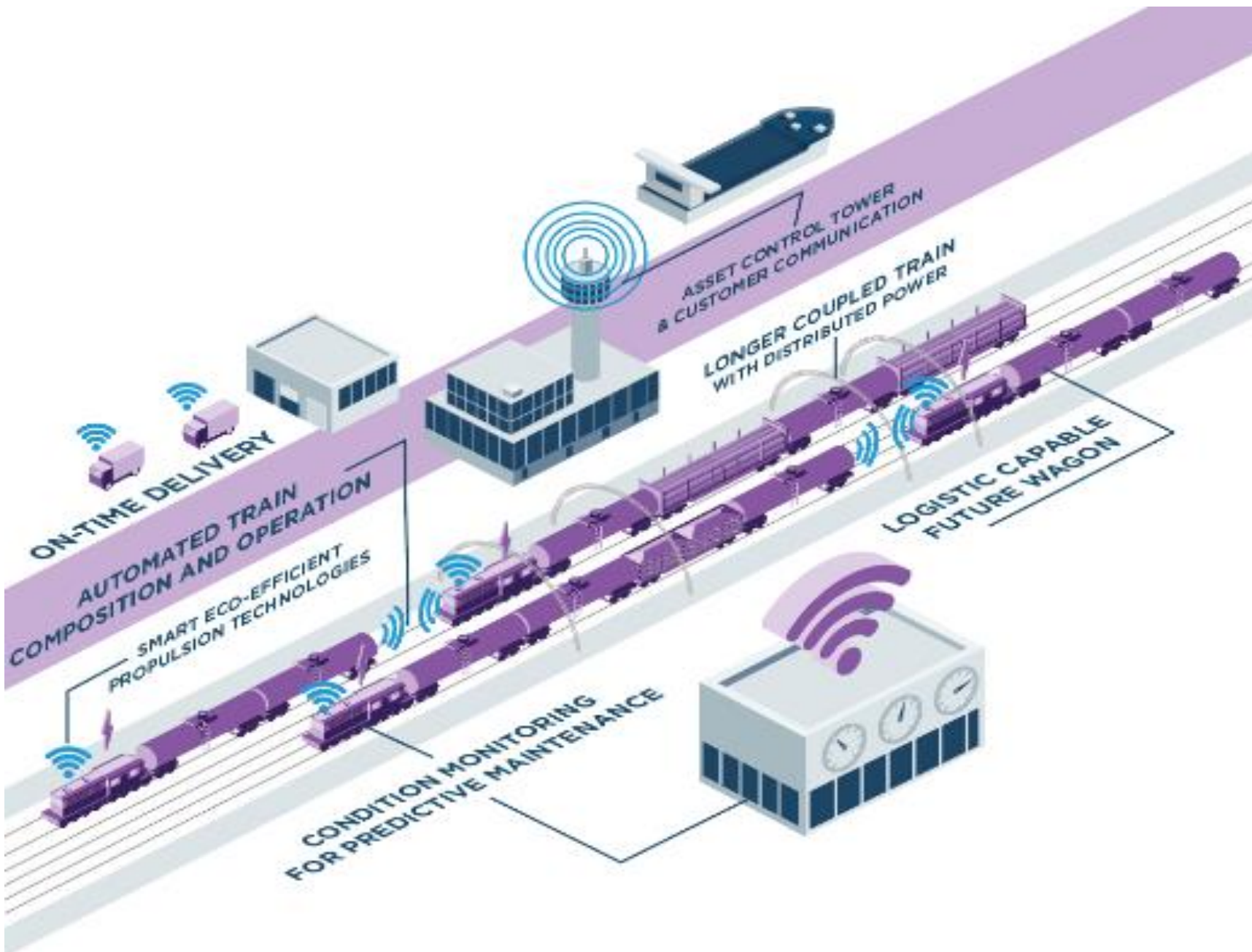
### TD4.4 Trip Tracker

2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: IT2RAIL				Ongoing: ATTRACKTIVE, My-TRAC, MaaSive			AWP 2019: OC	
							Planned activities	

TD4.5 Travel Companion								
2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: IT2RAIL								
		Ongoing: ATTRACKtIVE, My-TRAC, MaaSive						
					AWP 2019: OC			
						Planned activities		

TD4.6 Business Analytics								
2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: IT2RAIL, GOF4R, ST4RT				Ongoing: CONNECTIVE				

TD4.7 Integrated Technical Demonstrator								
2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: IT2RAIL				Ongoing: COHESIVE, SPRINT, Shift2MaaS				



## IP5: Technologies for Sustainable & Attractive European Rail Freight



# IP5: key achievements and ongoing activities

- ✓ **Fleet Digitalisation/Automation:** automatic coupling (flexible wagon composition), CBM (data handling, analytics and dashboards), ATO/DAS (testing of ATO developed in IP2)

➔ Multi-sensor obstacle detection up to 1km

- ✓ **Transport Management:** IT solutions electronic communication technologies to maximise punctuality and capacity.

➔ Intelligent Video Gate for high speed wagon scan and multi modal dispatching

- ✓ **Freight waggon concepts:** Low-noise, lightweight, high speed & track friendly Freight Running Gear & Modular lightweight freight wagon design

➔ Automatic brake test and a new silence wheelset



- ✓ **Freight Propulsion systems:** New freight locomotives with network independent operation capabilities, supporting increased train lengths up to 1500m, energy reduction

➔ Demo on 740m long train: 2 locos being remotely controlled by the leading one (next step: 4 locos and increased length)

TD 5.0 – Business analytics and implementation strategies								
2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: SMART-RAIL (04/18)			Ongoing: FR8RAIL, INNOWAG, FR8HUB					

TD5.1 Freight electrification, brakes and telematics								
2015	2016	2017	2018	2019	2020	2021	2022	...
		Ongoing: FR8RAIL, INNOWAG, FR8HUB, FR8RAIL II						
				AWP 2019: CFM, OC				
					Planned Activities			

TD5.2 Access and Operation								
2015	2016	2017	2018	2019	2020	2021	2022	...
		Ongoing: ARCC, SMART, OPTIYARD, FR8HUB, FR8RAIL II				AWP 2019: CFM		

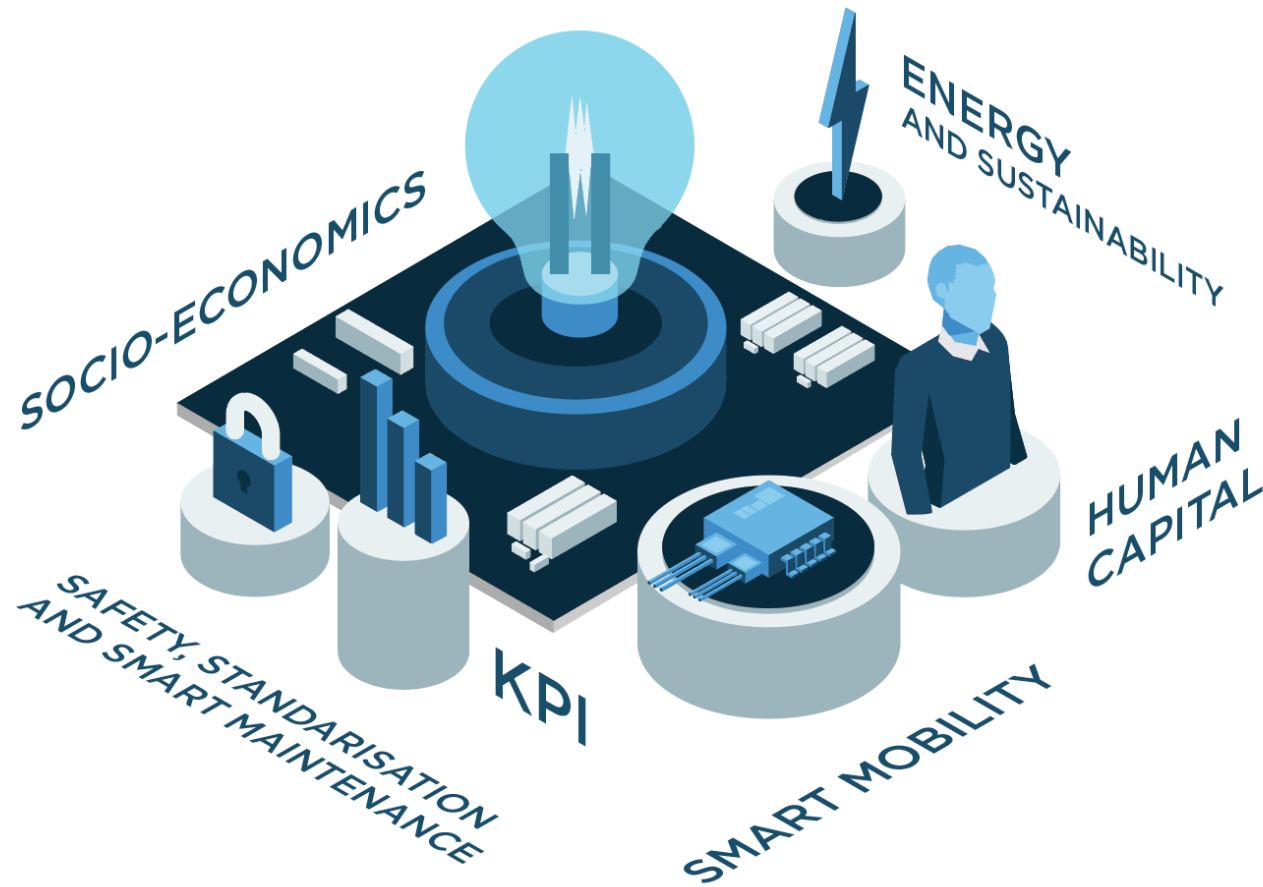
TD5.3 Wagon design								
2015	2016	2017	2018	2019	2020	2021	2022	...
		Ongoing: FR8RAIL, INNOWAG, FR8RAIL II				AWP 2019: CFM		
					Planned Activities			

TD 5.4 Novel Terminal, Hubs, Marshalling Yards, Sidings								
2015	2016	2017	2018	2019	2020	2021	2022	2023
		Ongoing: FR8HUB						
					AWP 2019: CFM			
						Planned Activities		

TD 5.5 New Freight Propulsion Concepts								
2015	2016	2017	2018	2019	2020	2021	2022	...
		Fin: DYNAFREIGHT (06/18)						
		Ongoing: FFL4E, FR8HUB, FR8RAIL II, M2O						
					AWP 2019: CFM			
						Planned Activities		

TD 5.6 Autonomous train operation								
2015	2016	2017	2018	2019	2020	2021	2022	...
		Ongoing: ARCC, SMART, FR8RAIL II, X2Rail-3						
					AWP 2019: CFM + OC			
						Planned Activities		

# CCA: Cross Cutting Activities



# CCA: key achievements and ongoing activities

- ✓ **Long-term needs and socio-economic research:** to what extent rail can be a catalyst in transformational societal changes
  - ➔ Specifications for the 4 S2R System Platform Demonstrators (SPDs) high-speed, regional, urban passenger rail (metro) and rail freight
- ✓ **KPI method development:** based on the 3 quantitative KPIs of the S2R regulation and assessment of the S2R innovation technologies against those
  - ➔ High-level KPI architecture is completed and the first quantification is under assessment
- ✓ **Safety, Standardisation, Smart Maintenance, Smart Materials & Virtual certification**
  - ➔ Standardisation Rolling Development Plan lists the potential needs and opportunities of the S2R innovations those feeds into standardisation

# CCA: key achievements and ongoing activities

- ✓ **Noise & Vibration:** N&V management to be applied on an overall system approach and enable mitigation actions
  - ➔ Auralisation and visualisation technology InnoTrans
  - ➔ Tools and methods to improve prediction of noise from different sources on a system level and to rank railway noise mitigation options together with assessment of their cost-effectiveness
- ✓ **Human Capital:** management of technological & demographical Changes from the human factor's aspect
  - ➔ Impacts of the S2R innovations on rail employment and future skills
- ✓ **I2M:** Integration layer for data exchange between traffic management system, freight operations and asset management services
  - ➔ Use-cases and business rules for high-efficient freight operations



WA1 Long-term needs and socio-economic research & SPD's								
2015	2016	2017	2018	2019	2020	2021	2022	...
<div> <div>IMPACT-1 (04/18), NEAR2050 (04/18)</div> <div>Ongoing: IMPACT2</div> <div>Planned activities</div> </div>								

WA2 KPI method and integrated assessment								
2015	2016	2017	2018	2019	2020	2021	2022	...
<div> <div>Finished: Roll2Rail (10/17), IMPACT-1 (06/18)</div> <div>Ongoing: Tender KPIs, IMPACT2</div> </div>								

WA3 Safety, Standardisation, Maintenance, Materials, Virtual Certification								
2015	2016	2017	2018	2019	2020	2021	2022	...
<div> <div>Finished: PLASA (08/18)</div> <div>Ongoing: GoSAFE RAIL, IMPACT2, SMarTE, PLASA-2</div> </div>								



### WA4 Smart Planning, I2M

2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: IN2RAIL (04/18), PLASA (08/18)			Ongoing: GoSAFE RAIL, IMPACT2, PLASA-2			AWP 2019: CFM		


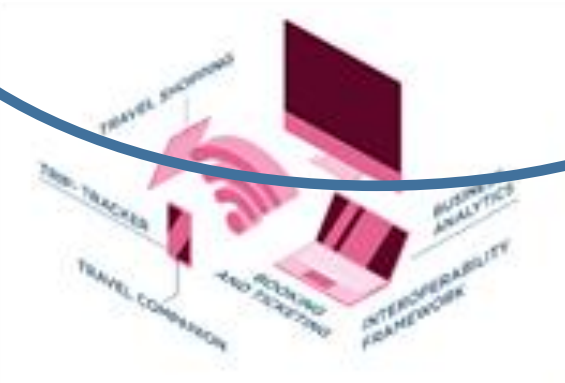
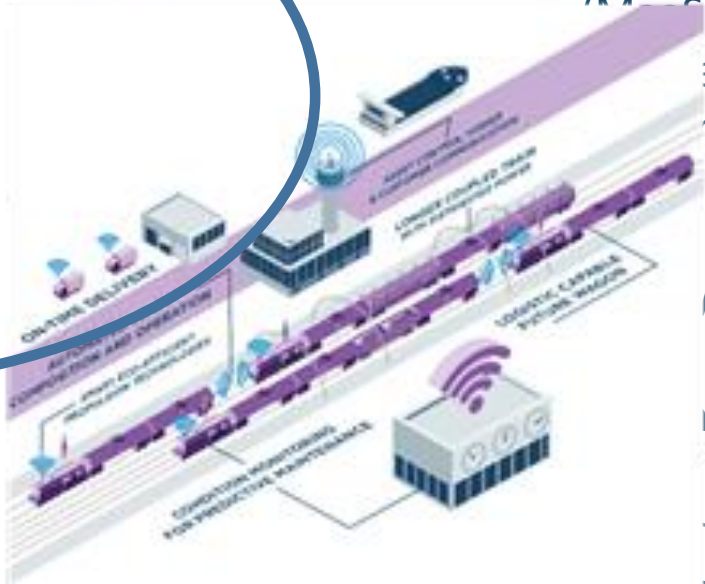



### WA5 Energy and sustainability

2015	2016	2017	2018	2019	2020	2021	2022	...
Finished: Roll2Rail (10/17), DESTINATE (10/18)			Ongoing: FINE1, OPEUS		AWP 2019: CFM,OC		Planned activities	

### WA6 Human Capital

2015	2016	2017	2018	2019	2020	2021	2022	...
			Tender HC (12/18)	Ongoing: IMPACT2, SMaRTE				

# IPx: looking beyond S2R currently planned technology applications and integrating them with disruptive innovations



ed

technologies :  
vehicles “train-centric”  
mation systems and

obility as a service  
ed ownership

riers -2019 call)

ata Model (2019 call +

is in terms of  
ling principles and digital data exchange format  
ehensive model/architecture, technologies and  
strategy for implementation of a new encompassing railway  
system approach

**REGISTER NOW:**

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**10 DECEMBER  
BRUSSELS**

**#S2RCall2020**

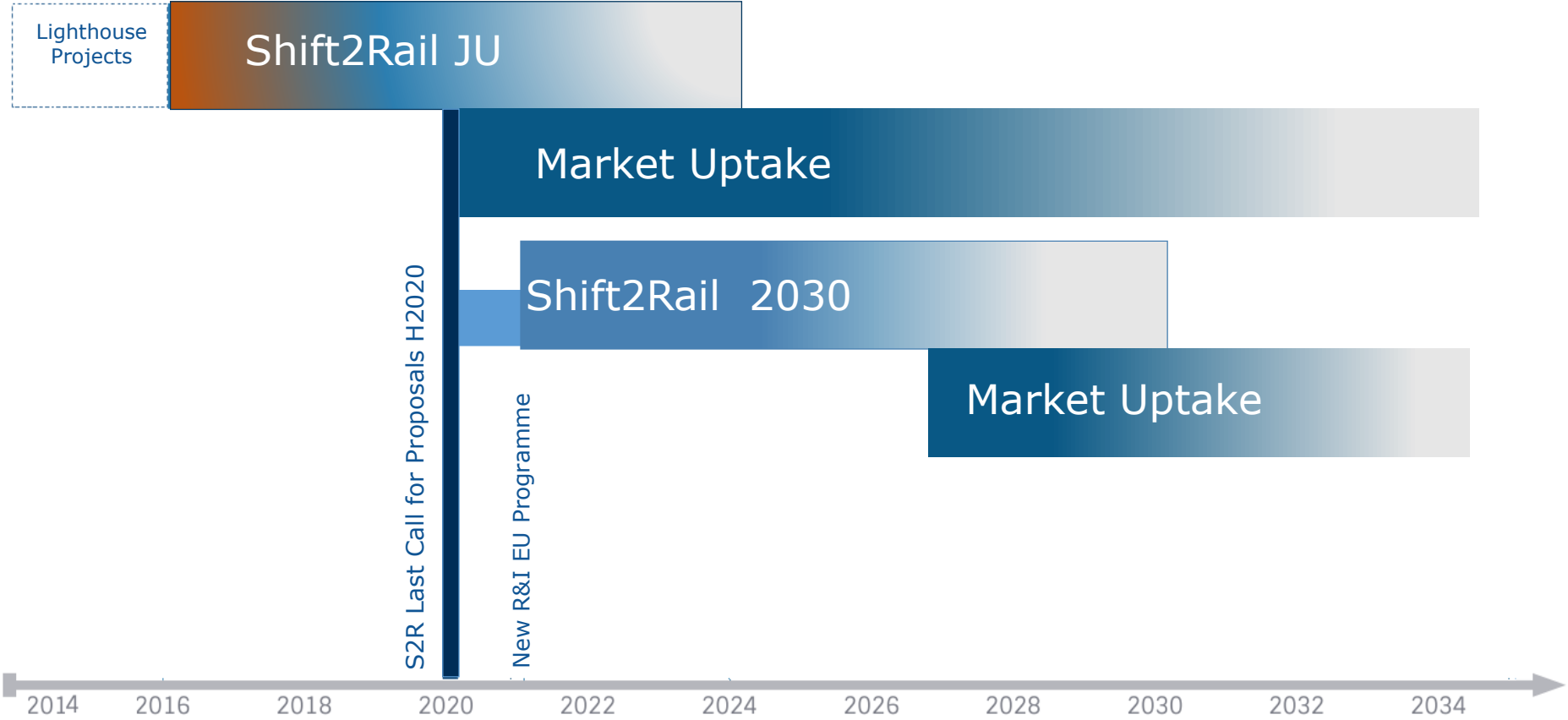
**@Shift2Rail\_JU**

→ Watch out the S2R website for more information: [www.shift2rail.org](http://www.shift2rail.org)

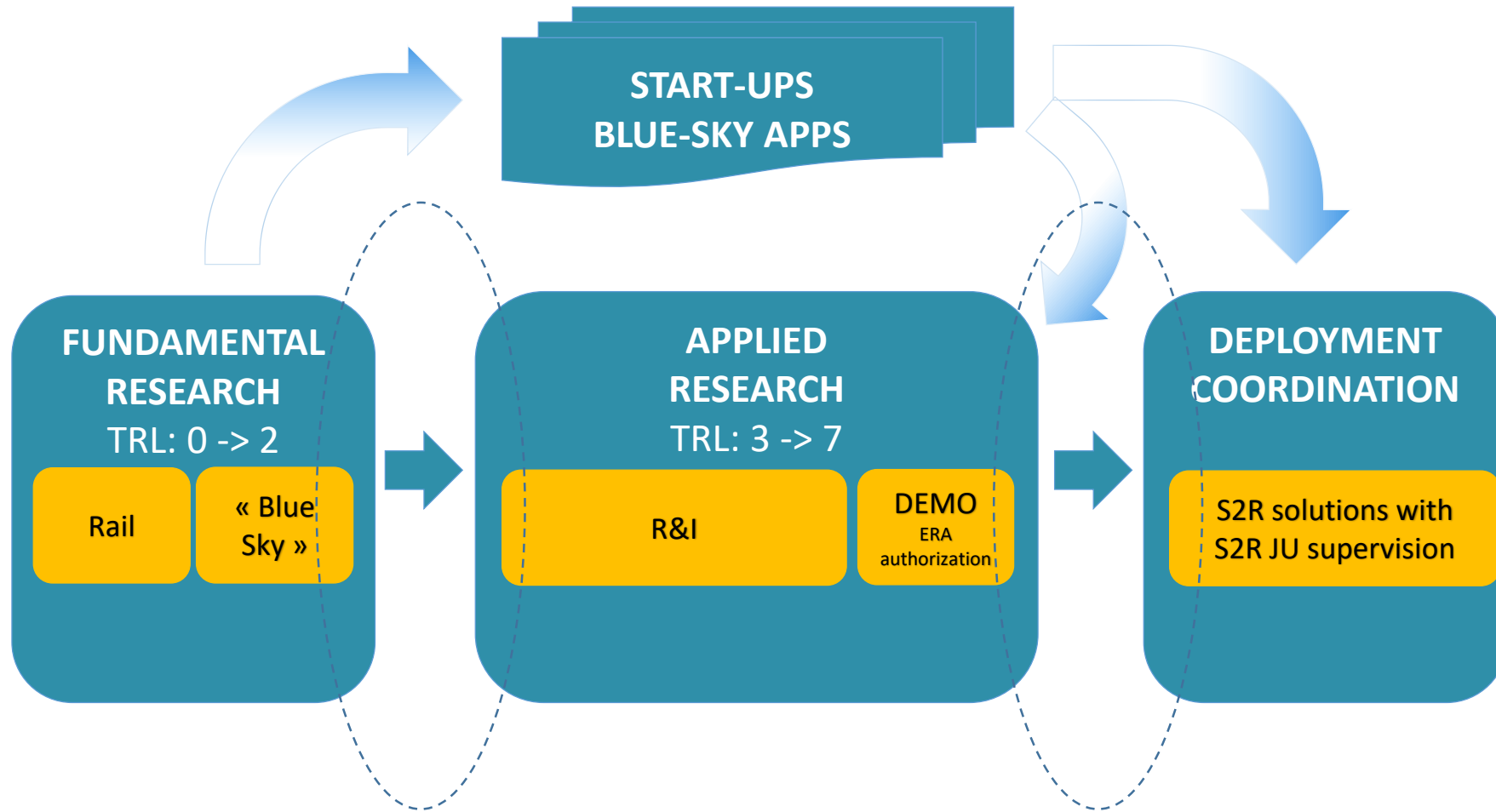
Registration link: <https://ec.europa.eu/eusurvey/runner/S2RInfoDay>



# R&I BEYOND 2020



# S2R Europe 2030 Research and Innovation beyond 2020



# Transforming Europe's Rail System

The Commission published the public consultation for a European Partnership “Transforming Europe's rail system” under Horizon Europe.

Feedback will be taken into account for further development and fine tuning of the initiative.

The questionnaire is available for your reply here:

[https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2019-4980251/public-consultation\\_en](https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2019-4980251/public-consultation_en)

The deadline for replies is 6 November 2019.



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**AVL**

AERFITEC

Competitive Freight Wagon  
Consortium (CFW)

Smart Rail Control  
(SmartRaCon) consortium

**AERnova**

**ConTraffic**  
Consulting Network for Traffic Systems

**DLR**

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