



# Shift2Rail Joint Undertaking

3<sup>nd</sup> meeting of the User Requirements/Implementation and Deployment Working Group





# Agenda

- 1. INTRODUCTION
- Adoption of the Agenda and the MoM from previous meeting
- 2. SHIFT2RAIL JU STATE OF PLAY
- 3. PRESENTATION OF PART A OF THE S2R MAAP
- 4. UPDATE ON S2R JU ACTIVITIES ON STANDARDISATION AND REGULATION
- 6. AOB, NEXT STEPS, CLOSING





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#### Introduction

• Adoption of the Agenda

SHIFT2RAIL JOINT UNDERTAKING
3 <sup>rd</sup> MEETING OF THE USER REQUIREMENTS/IMPLEMENTATION AND DEPLOYMENT WORKING GROUP
BRUSSELS, 11 July 2017
09:30 - 12:00
Provisional Agenda
Venue: White Atrium building
Avenue de la Toison d'Or 56-60, B-1060 Brussels
1. INTRODUCTION - ROUNDTABLE
<ul> <li>Presentation of the Members/Alternates and Observers</li> </ul>
<ul> <li>Adoption of the Agenda and minutes of the previous meeting</li> </ul>
2. SHIFT2RAIL JU - STATE OF PLAY
3. PART A OF THE S2R MULTI ANNUAL ACTION PLAN (MAAP)
Presentation & discussion
Next steps
4. UPDATE ON S2R JU ACTIVITIES ON STANDARDISATION AND REGULATION
1. ANY OTHER BUSINESS, NEXT MEETING, CLOSING
Date of next meeting
Other

• Approval of the minutes of the previous meeting (15/12/2016)

	2 <sup>nd</sup> MEETING OF THE		
USER REQ	UIREMENTS/IMPLEMENTATION AND DEPLOYMENT WORKING GROUP (UR/ID WG)		
	BRUSSELS, 15 December 2016 14:00 – 17:00 <b>draft minutes</b>	atomitted from 10 expected to start in intarity of projects, between individual aerefore avoiding	ady plann be exclude gress of t
		s	ON
14:00 - 14:15	1. INTRODUCTION - ROUNDTABLE	', arguing that this additional budget.	-
	The meeting was chaired by Mr Carlo Maria Borghini, Executive Director of the Shift2Rail Joint Undertaking (S2R JU), who welcomed the participants and outlined the main points of the agenda. The IR IID WG members acceed on the dard neenda as circulated up or to the IR IN DW members acceed on the dard neenda as circulated up or to the IR IN DW members acceed on the dard neenda as	rious areas in the he human-machine ledicated, ongoing ated aspects. The	g to map d norms. ose and t facilitate t
	the meeting (attached) and approved the minutes of the previous meeting (attached). A list of participants is also attached.	dained that usually i limitations in the	he members als towar
14:15 - 14:45	2. INFORMATION ON LATEST DEVELOPMENTS AND PLANS	e fact that recently ibility of seeking	re-conditi ive Direct
	The JU Programme Office presented the latest developments related to the SLR activities, heights emphasis on the Att hall approjest numbeds under the 2015 and 2016 cells for proposals have started their activities in a situant 0.01 The TL has provided also the cells of the proposals for 2017, after the sends temp. Moreover the review of the Mubli Annual Action Plan (MAAP) in progress and expected to be finalised in the first half of 2017 (see also acredit form grid). A number of other updates and one-song activities were briefly presented to the group (see presentions attached).	were successfully re clearly national rector noted that in proposals, despite itted proposals can which is available ties participated in	or restricte s where th included th e significar oration wit 'EULAR an of advisor stage. Th ing advisor of the leader reducing th eration wit n innovatio is adopte
	On a question missio by UIP, the Executive Director explained that there is a budget of 5.5M exailable to be allocation to the SIX associated members and that it is currently under discussion in the Governing Board whether an norm appropriate to seek for additional expection and continuous within the already solected associated members, both ways ensuring extended to be addressed and a decision on this point is expected by the next meeting of the Governing Board.	DING THE of the UR/ID WG 52R Multi Annual rm of a structured in overview of the hat all answers and the MAAP review	
14:45 - 15:15	3. PRESENTATION OF THE ANNUAL WORK PLAN 2017	put for the whole which contains the	il the CE
	The Chair briefly referred to the recently adopted Annual Work Plan 2017, which constitutes the document for the next call for proposals. The JU Programme Office presented the call topics included in the Annual Work Plan 2017 per each Innovation Programme and explained the foreseen timestable of actions. The topics of this call cover a wide spectrum of activities, including also activities for reaching higher TRAL of already.	Executive Director under elaboration weastle university, of maturity, it will groups and other l of the Governing	ns about t articipate <u>n of Jo</u>
	1 review is not expected to significantly affect the 2017	d that the MAAP	March 201 into accou
	activities of the Onion beyond the	year 2020.	une fesear



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# Latest developments

#### • 4 Lighthouse Projects

• Satisfactory results and good progress achieved

#### • 27 Projects (Call 2015-2016)

Satisfactory ramp-up – day-to-day monitoring

#### • Call 2017

- 17 projects retained for funding
- Preparation of Grant Agreement on-going
- Expected start: 01 September 2017

#### Other ongoing activities

- Preparation of Annual Work Plan 2018
- Identification of Quick-wins for TRA and InnoTrans 2018
- Collaboration with other initiatives/JUs (fuel cells, cyber-security dedicated research)
- JU week "Innovation in action" 24 & 25 October 2017, Strasbourg
- KPIs





### **Call Statistics**







# 2017 Members' Call 2017

#### AWP 2017

- 7 topics
- budget available 41.3 M€

#### **Call results**

- all topics covered
- budget requested 40.6 M€
- 9 submissions, 7 eligible and proposed for award







# 2017 Non-Members' Call

#### AWP 2017

- 10 topics
- budget available 19.5 M€

#### **Call results**

- all topics covered
- budget requested 19.5 M€
- 53 submissions, 48 eligible and 10 proposed for award







### **Call 2017 Statistics**

ELIGIBLE PROPOSALS		Retained	SMEs	success	
		for funding	percentage	rate	Delta
Total participants:	472	200		42%	
- total SME :	120	50	25%	42%	
total participants in OC:	379	107		28%	
- total SMEs in OC:	108	38	36%	35%	
Total funds available (Million Euros) :	60.80	60.12			0.68
- total SME grants requests (Million Euros):	27.89	11.00	18%	39%	
total funds available for CFM (Million Euros):	41.30	, 40.63			0.67
total funds available for OC (Million Euros):	19.50	19.41			0.09
- total SME grants requests in OC (Million Euros):	23.56	6.67	34%	28%	
Total Countries:	33	18			15





# **Beneficiary/Country proposed for award**







# **Beneficiary/Country Non-Members only**







- The S2R Associated Members' net contribution to S2R activities amounts to EUR 144.1 million against the minimum requirement of Article 4(2)a of the S2R Regulation of EUR 150 million.
- A similar gap appears in terms of the co-funding to be allocated by the S2R JU to the Associated Members. In accordance with Article 17(1)b of the S2R Statutes, "up to 30 % [of the Union contribution] shall be allocated to associated members and their affiliated entities".
   Out of EUR 131.0 million, a remaining amount of EUR 5.6 million remains to be allocated.
- On 7 June 2017, the Governing Board has mandated the Executive Director to establish the necessary process to allocate the aforementioned amount of EUR 5.6 million, ensuring transparency and equal treatment. The Executive Director shall submit to the Governing Board for adoption his proposal for the allocation of the aforementioned resources, at the latest by 31 December 2017.
- In accordance with the Decision of the Governing Board of 7 June, the Executive Director requested the Associated Members of S2R JU to answer the Invitation in view of their additional commitment to the S2R Programme R&I activities. The S2R JU shall co-fund the additional activities up to EUR 5.6 million in accordance with the provisions contained in the Membership Agreements approved by GB Decision 23/2015 of 11 December 2015. The answer shall also cover the contribution to the administrative costs of the S2R JU.
- In addition, the S2R JU will promote this Invitation so as to create the business opportunities for associating additional entities to the existing Associated Members, whilst giving due consideration to the limited amount of resources available.





#### **GB Decision 7 June**

- Aim: To fill a vacant position within the SC and establish a reserve list
- Expertise in the fields of telecommunication, information technology, artificial intelligence and/or digital sciences. A reserve list will be established.
- Recommendations from SRG, ERRAC and ERA
- Deadline for application (CV and supporting documents) 01 October 2017, 23:59 Brussels Time.
- Call text available at: <u>https://shift2rail.org/news/call-new-member-shift2rail-scientific-comittee/</u>





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### **MAAP Part A: structure**

#### Executive Summary

- Introduction
  - General policy context
- Challenges and opportunities
  - Key challenges for the European Rail Sector
  - Key opportunities for the European Rail Sector
- The S2R vision
  - Addressing key societal trends
  - The need for radical transformation
  - Customer-focused mobility
- A catalogue of railway innovation capabilities
- S2R roadmap to deliver the innovation capabilities
  - The S2R R&I structure
  - How S2R will achieve its vision
  - Programme timelines
- Deployment
  - The business view
  - Standards and regulatory needs
  - Risk management
  - Collaboration strategy with other organisations





# **MAAP Part A: the vision**

It is available seven days a week and is reliable, resilient, safe and sustainable

A whole-system approach across the industry fosters innovation and attracts the best talent. Entrepreneurs and innovators have the right conditions to develop new products and services.

**Network capacity** is optimised to meet all requirements for passengers and freight. **Intelligent maintenance** increases train and track availability and reduces perturbations and delays. World-class asset management is aligned across the industry to **improve performance**, **lower costs and reduce business risks.** 

Flexible, real-time **intelligent traffic** management and in-cab signalling reduces headways and decreases traction energy consumption. Control centres know the precise location, speed, braking and load of every train on the network to **optimise operational performance and keep passengers informed**.

**Carbon emissions are minimised** by widespread electrification of the network and sustainable, energy-efficient solutions for the remaining non-electrified routes. Energy recovery systems in rolling stock and alternative fuels allow trains to lower costs and run on and off the electrified network. **Sustainable Development Principles** are **embedded** in the design, construction and operation of infrastructure and rolling stock assets and the railway is resilient to climate change.

The **industry** is increasingly **cost-effective** as more efficiencies are introduced. Unplanned maintenance and damage to track and train are minimised through enhanced industry-wide condition monitoring. Generic designs for buildings and rolling stock interfaces are used instead of costly bespoke solutions to simplify expansion, upgrades and replacements.

**Operational and customer communications** are supported by equipment that can be updated with **plug-and-play fitments**. Rail services are **integrated** with other transport modes so that passengers have **seamless door-to-door journeys**.

Station information systems and personalised messaging offer passengers all the relevant information to travel easily and reliably to their destinations. Passenger-friendly stations eliminate the need for queues or physical barriers. Revenue collection and security are based on electronic systems



An **extensive high-capability strategic freight network** with increased route availability provide freight customers with flexible and timely responses to their operational and planning requests.

3 "To deliver, through railway research and innovation, the capabilities to bring about the most sustainable, cost-5 efficient, highperforming, time driven, digital and competitive customer centred 6 transport mode for Europe".



### **12 Innovation Capabilities**





#### Capability 1 - Automated train operation

**1A**\_ Automated (passengers and freight) trains run closer together with increased flexibility

**1B\_** Passenger and freight train preparation processes are automated

**1C**\_ Vehicles split and join on the move. New operational approaches (*e.g.* virtual coupling, convoying, reduced headway, communication connections between trains/units) are employed

**1D**\_ Self-propelled automated / autonomous single units guide themselves through the system





#### Capability 2 - Mobility as a Service

**2A**\_ Tailored guidance to the best use of available transport services is provided so that each customer appreciates a personalised service

**2B**\_ Every journey is provided intelligently and seamlessly, with rail physically integrated with the other modes

**2C**\_ Continuous flow of information eases the journey, making connections between the different modes seamless

**2D\_** Electronic ticketing and payment are the norm

**2E\_** Superior passenger experience and comfort as a key value compared to other transport modes





Capability 3 - Logistics on demand

**3A**\_ Planning and scheduling are synchronised in real-time to customer demand

**3B**\_ Flexible, interchangeable, multipurpose and smart freight transport units increase handling flexibility and unit utilisation

**3C**\_ Shipments are moved effectively, efficiently, safely and securely throughout the "physical internet" logistic chain

**3D**\_ Freight trains are able to integrate within high-intensity passenger operations

**3E**\_ Automated yards, intermodal hubs, ports and cross-modal interchange locations connect the rail system into the multimodal logistic chain





#### Capability 4 - More value from data

**4A**\_Secure, robust, scalable and resilient open architecture and protocols allow full interoperability

**4B**\_ The Internet of Things (IoT) and Artificial Intelligent (AI) provide efficient capture, storage, management and interpretation of data

**4C**\_ The customer and the rail system communicate intelligently with each other

**4D\_** Railway businesses exploit new data-driven revenue streams

**4E**\_ Big Data analytics enables a range of new and improved services to be developed. State of the art cybersecurity ensures reliable and secure ICT services, protection of the rail system and business continuity in case of an incident.





#### Capability 5 - Optimum energy use

**5A**\_ Alternative propulsion concepts such as fuel cells are introduced. Hybrid powertrains allow running over non-electrified track sections. Discontinuous electrification at stations and on branch lines dramatically reduces the capital costs of extending electrification.

**5B** Automated Train Operations (ATO) improves energy efficiency

**5C**\_ Optimised on-board and line-side energy storage and charging technologies (e.g. dynamic wireless power transfer) allow the railway to redistribute energy throughout the system according to supply and demand.

**5D** A high proportion of energy is recovered through regenerative braking, and small scale energy generation and harvesting technologies feed energy efficient trackside systems.

**5E** A fully integrated system approach to intelligent energy supply maximises renewable energy generation and the use of smart grids, including those outside the railway system, through links with the wider energy supply sector.





Capability 6 - Service timed to the second

**6A**\_ Automated vehicle identification and monitoring is the basis of precise service operation

- **6B** Smart traffic management ensures every train is in the right place and travelling at the right speed
- **6C**\_ Automated dynamic timetables are facilitated. Automated recovery from perturbation (a "self- healing" process) quickly restores normal service





#Shift2Rail

Capability 7 - Low cost railway

**7A** A low-cost, affordable rail system supports the rural economy. This is supported by the application of tailored standards.

- **7B**\_ Simplified control-command system appropriate for low-intensity operation is used, allowing various degrees of autonomy.
- **7C**\_ The use of lightweight materials for rolling stock reduces maintenance costs and energy consumption.
- **7D** A whole life operating cost approach balances the use of low-cost technical assets and good value service.
- **7E**\_ European simplified train certification processes and validation techniques reduce time and cost of product deliveries and subsequent modifications.





Capability 8 - Guaranteed asset health and availability

**8A** The Internet of Things (IoT) enables real-time monitoring through connected sensors (ground/air/embedded)

**8B**\_Artificial Intelligence (AI) supports predictive maintenance decisionmaking to reduce manual interventions on infrastructure and rolling stock

**8C**\_ Greater use of robotics, modularity and automation simplifies maintenance and reduces the number of components

**8D**\_ Remote maintenance of trains and infrastructure allows operations to continue uninterrupted

**8E\_** Performance based service specifications encourages a diverse supply chain





#### Capability 9 - Intelligent trains

**9A\_** Autonomous trains can monitor and regulate themselves

**9B** Communications is possible between trains, between train and infrastructure and between train and passenger/freight customers

- **9C**\_ Trains feature advanced mechatronics, reducing dependence on wheel conicity and permitting simplified running gear design.
- **9D**\_ In-train signalling capability is used to resolve conflicts at junctions and stations.





Capability 10 - Stations and "smart" city mobility

**10A**\_ Railways are a core part of smart city mobility management systems and city fulfilment and delivery services. Stations are key to smart city governance structure and development plans

**10B**\_ Railways are connected to smart city mobility platforms for a seamless end to end journey within and beyond the city

**10C** New designs of infrastructure and rail vehicles provide easy access and interchange between transport modes

**10D** Flow management systems guide customers safely and efficiently through stations and to/from adjacent transport hub and city infrastructure, using dynamic way finding, barrier free access and multi-sensory information systems

**10E**\_ Platform management systems help passengers position themselves for their train and facilitate efficient boarding

**10F**\_ Security and revenue protection at stations and interchanges are based on electronic gates using smart wireless technologies, ticket detection systems and biometrics





Capability 11 - Environmental and social sustainability

**11A** Adoption of 'circular economy' principles enable the railway to move towards 'zero-waste' operation

**11B**\_ Sustainable and ethical procurement and production reduces the carbon footprint, with a whole life approach and focus on inputs to the system, recycling, transport of materials, renewable energy, operations and disposals.

**11C** A climate change adaptive approach mitigates the impact of climate change on the railway

**11D** Green technologies enable the railway to operate exhaust emissions free and with low noise and vibration levels

**11E**\_Information and accessible facilities put railways within the reach of citizens as an inclusive, affordable and accessible transport system







#### Capability 12 - Rapid and reliable R&I delivery

**12A** An R&I ecosystem with centres of excellence fosters a high participation in knowledge networks, opening new forms of collaboration, technology transfer from other industry sectors and keeping railway skill sets fresh.

**12B**\_ The sector has a strong commercial focus and awareness of the maturity levels of new technologies. There is a well-coordinated and fast decision-making process, reducing time to market.

**12C**\_ Virtual testing and efficient implementation processes speed up production and deployment of new products. There is close cooperation within the sector for standardisation and testing. Component-driven development, modularised products are key elements of a rapid deployment of innovation to the market. Railways have a permanent focus on disruptive technologies, using their challenges to increase their innovation capabilities and speed.

**12D**\_ Agile development approaches, Labs, Hackathons, early involvement of customers are the elements of customer centric innovations. Open-labs invite end-users/customers to be part of the innovation process.









	80, 80	TD1.1 Traction	TCMS	TD1.3 Carbodyshell	TD1.4 Running gear	TD1.5 Brakes	TD1.6 Accessibility & doors	TD1.7 Modularity in use
Automated train operation		"/////,	BB1.2_1 BB1.2_2		BB1.4_1	BB1.5_1 BB1.5_2	BB1.6_1	BB1.7_2
Mobility as a Service	2		BB1.2_1		BB1.4_1		BB1.6_1 BB1.6_2	BB1.7_1
Logisitcs on demand	3							
More value from data	4	BB1.1_3	BB1.2_1 BB1.2_2 BB1.2_3		BB1.4_1		BB1.6_1	
Optimum energy use	5	BB1.1_1 BB1.1_2	BB1.2_1	BB1.3_1	BB1.4_2		BB1.6_2	
Service operation timed to the second	6		BB1.2_1			BB1.5_1 BB1.5_2	BB1.6_1	BB1.7_1
Low cost railway	7	BB1.1_1 BB1.1_2 BB1.1_3 BB1.1_5 BB1.1_6	BB1.2_2 BB1.2_3 BB1.2_4	BB1.3_1 BB1.3_4	BB1.4_1 BB1.4_4	BB1.5_3	BB1.6_1 BB1.6_2	BB1.7_1
Guaranteed asset health and availability	8	BB1.1_3	BB1.2_1		BB1.4_1			
Intelligent trains	9	BB1.1_3	BB1.2_1		BB1.4_1	BB1.5_1 BB1.5_2	BB1.6_1	
Stations and "smart" city mobility	10	//////	(BB1.2_1)				BB1.6_1	BB1.7_1
Environmental and social sustainability		BB1.1_4	<i></i>		BB1.4_3			
Rapid and reliable R&D delivery	12					<i></i>		



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# **Shift2Rail – Cross Cutting Activities**

# Development of a global standardisation roadmap (update 1)





# **E**Shift 2Rail **4-step approach** Preliminary work on 1st, 2nd and 3rd

**Screening of project deliverables** and cross-checking with existing standards and ongoing standardisation activities



**Analysis and assessment** of the standardisation potential of expected results



Identification of best **standardisation target**: level, nature, liaisons with appropriate standardisation bodies

Support to the standardisation process







Joint identification of standardisation trajectories with JPCR and RASCOP







# Cooperation with ERA (1/2) overall principles

- The role and responsibilities of each organisation is set in the respective Regulations
- ERA attends as observer the following meetings, amongst others :
  - S2R Governing Board;
  - IP and CCA Steering Committees;
  - User Requirement, Implementation and Deployment Working Group.
- ERA is also requested to **provide inputs to the S2R JU Annual Work Plans**. In this regard, ERA can also propose the S2R JU to undertake *"research and development activities leading to technical standards with a view to guaranteeing the interoperability and safety of results"*.
- The S2R JU will be attending relevant ERA Committees and working groups.





# Cooperation with ERA (2/2) at project level

- To ensure that the results from the S2R projects do not encounter a regulatory blocking point because of their novelty (e.g. integration in TSIs), the S2R JU has defined with ERA and DG MOVE a process for collaboration at project level.
- Different desired "levels" of involvement have been defined:

0	ERA has <b>minimal direct interest/competence</b> and does not attend any meeting, conference, seminar, workshop or any other event organised and managed by the S2R research project management.
1	ERA <b>attends at least one of the major events</b> organised and managed by the S2R research project, e.g. kick-off, final conference, mid-term meeting or workshop.
2	ERA <b>follows on a regular basis open meetings</b> organised and managed by the S2R research project. The Agency follows the discussion and has knowledge of the research project management activities.
3	ERA <b>shows particular interest in the research project due to the specific match with its competence</b> . In particular it follow the development of results by attending meetings and may act in a particular role, e.g. member of an advisory board.





# **Cooperation with CEN-CENELEC**

- First coordination meeting held between CEN/CENELEC and the S2R JU in April 2017
- **<u>Objective</u>**: how to best approach cooperation between the S2R projects and CEN/CENELEC Technical committees:
  - How to best manage the information flow coming from projects;
  - How to best handle the input coming from these projects and how to guide the drafting of deliverables to ensure a smooth transposition to draft standards.
- Cooperation will continue in the coming months to establish a sound and efficient process (input from S2R standardization roadmap)



# **Control Memorandum of Understanding with ETSI**

- Discussions have started for the signature of a possible "MoU" between ETSI and the S2R JU.
- <u>Specific objectives</u>:
  - Identify and agree on key work areas (e.g. IP2's Adaptable radio communication systems)
  - Exchange on information in areas of mutual interest;
  - to take part in and/or organise jointly meetings, conferences and workshops promoting issues of mutual interest and their partnership.
- Identification of specific areas is on-going
- Target: finalisation after Summer 2017





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6. AOB, NEXT STEPS, CLOSING





# AGENDA ITEM 6 AOB, NEXT STEPS

