



ANNUAL ACTIVITY REPORT

EXECUTIVE VIEW





ANNUAL ACTIVITY REPORT 2019 EXECUTIVE VIEW

Manuscript completed in 2020

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01. Foreword



“ We need a modern and innovative rail to drive the digital and green transition, and Shift2Rail’s work until now has been and will continue to be fundamental in delivering this. ”



ADINA-IOANA VĂLEAN
Commissioner for Transport, European Commission

02. Shift2Rail in 2019

- Rail is one of the very most environmentally friendly and energy-efficient transport modes available. It is largely electrified, increasingly uses renewable energy, and emits far less CO2 than equivalent travel by road or air. This is true for passengers and cargo, and available data show that rail has reduced its CO2 emissions almost continuously since 1990, despite increasing transport volumes.

Rail is a priority of my mandate, and many of the investments in infrastructure to be made in the future are related to this transport mode. We need a modern and innovative rail to drive the digital and green transition, and Shift2Rail's work until now has been and will continue to be fundamental in delivering this. Effective deployment of new technologies is critical to achieving better performance and

greater network efficiency. The innovative solutions at the heart of Shift2Rail's Research and Innovation Programme have made significant progress during 2019 and we look forward to them achieving market uptake in the coming years ahead.

In March, I proposed 2021 to be declared the "European Year of Rail". Beyond a symbolic meaning, it has a tangible value: if we want rail to realise its full potential, we need both to promote its benefits, while addressing the remaining obstacles. Next year's European Year will be a fantastic occasion to showcase the innovative technologies developed under the Shift2Rail programme and to highlight the concrete impact they will have in making rail the most smart and green mobility and transport solution for freight and passengers.

“ During the last three years and especially in 2019, Shift2Rail has shifted from being technology driven to a mission oriented Programme, designed together with its Members to meet passengers’ and shippers’ needs.

It has in the last year contributed and continues to contribute to achieving sustainable mobility and transport, where railway offers an integrating platform in a multimodal approach, enabled by new technologies, such as digitalisation, automation, telecoms and satellite services. ”



CARLO M BORGHINI
Executive Director, Shift2Rail Joint Undertaking

● 2019 was marked by several pioneering activities for Shift2Rail: the very first edition of our Catalogue of Solutions was published, a regional cooperation event was organised for the first time; the Czech Republic became the first country with whom we signed a Memorandum of Understanding, setting a precedent for future cooperation with other countries, and the first concrete steps in preparing Shift2Rail's successor programme were taken.

Shift2Rail's R&I activities in 2019 successfully contributed to the progress of the innovative solutions which are due to be industrialised as from the next years. Moreover, the past year's activities have significantly paved the way to the R&I activities expected to be performed by Shift2Rail's successor programme. The technological demonstrators, at the heart of Shift2Rail's R&I programme, are the

building blocks of a more systemic railway transformation which is strategically driven by the European Green Deal and Union's Digital Strategy. The leverage effect created by an integrated programme, such as Shift2Rail, is demonstrated by the number of national programmes making use of the know-how developed by the Members of the Programme, *ATO in primis*.

Shift2Rail was not only active in delivering its R&I programme during the past year, but also in disseminating its results widely at institutional, external and internal meetings and conferences organised in Brussels, EU Member States and beyond. The Catalogue of Solutions was presented at the World Congress on Railway Research in Tokyo, illustrating successful R&I results as possible stand-alone and integrated products, while highlighting the benefits of Shift2Rail solutions for final users, operators, infrastructure managers and

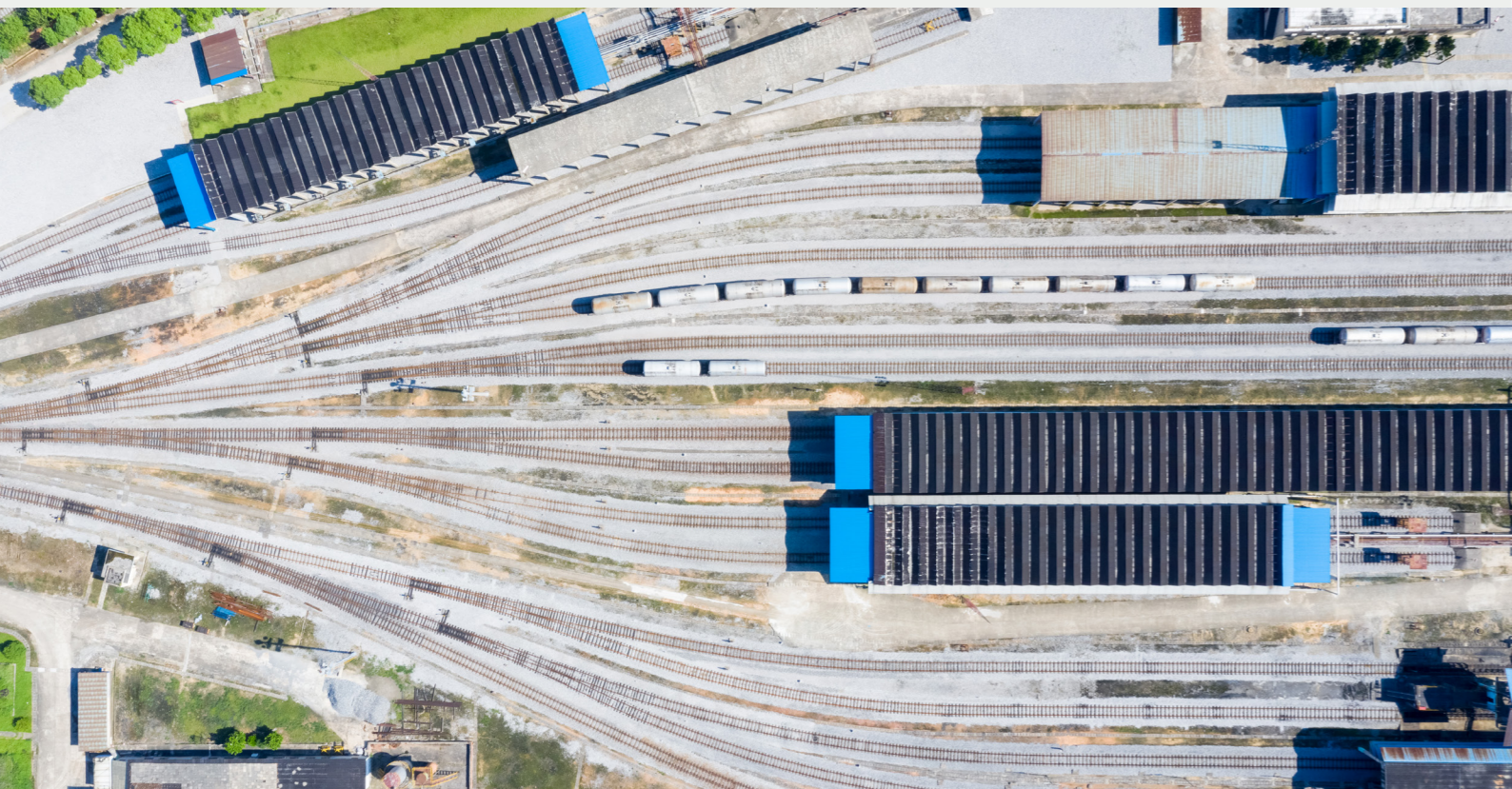
suppliers. In addition to participating in flagship international events such as WCRR and Digital Transport Days, Shift2Rail also supported a number of regional Information Days to continue raising awareness of the programme, mobilise rail stakeholders at local level, and encourage cooperation.

Following the 2019 Call for Proposals, Shift2Rail has cumulatively invested more than €0.6 billion in Research & Innovation activities, more than half of its 2014-2020 Budget, which combined with the additional activities delivered by the Members until now reaches almost €0.8 billion of railway R&I activated in just three years. This is a clear testament to the continuing efforts being made by the Members, together with all beneficiaries of S2R funding, to innovate the sector as a whole.

Thanks to the commitment and ongoing work of Shift2Rail staff, Members and beneficiaries, the six Innovation Programmes and Cross Cutting Activities are on target to deliver according to the expected planning. In cooperation with its Members, Shift2Rail has progressed during 2019 towards its goals that contribute to a sustainable, interoperable, high capacity rail system,

allowing it to become the backbone of the future sustainable carbon-neutral mobility and transport system in Europe.

A lot has been achieved, and a lot more is to come as we look forward to demonstrating our latest technical innovation achievements at InnoTrans 2021, while championing the proposed European Year of Rail. All this at a difficult and delicate time when Europe and the world is currently working hard on a smart and green recovery from the coronavirus pandemic. What the current situation has shown us, is the strategic and innovative capacity of the rail sector, demonstrated by its resilience during and after the crisis peak. We look forward positively to the Shift2Rail successor programme which will create the opportunity to accelerate research and innovation investments with a delivery system-oriented view, especially needed in the current pandemic situation.



03. Call 2019 in figures

389

participants 

17

projects

for a total value of €148.6 million



11

Open Call
Projects 

€74.8 million

Shift2Rail
co-funding

41.2% of
women project
coordinators 

22

EU Member
states

90 SMEs / **40** SMEs retained



04. Executive summary

- The Shift2Rail Joint Undertaking (S2R JU or S2R) is a public-private partnership under the Horizon 2020 Framework Programme¹ established to manage and coordinate mission-oriented Research and Innovation (R&I) activities for a major transformation of rail systems in Europe.

The S2R JU was officially established on 7 July 2014, following the adoption of Council Regulation (EU) No 642/2014 of 16 June 2014 establishing the Shift2Rail Joint Undertaking (S2R Regulation).

During 2019, the S2R JU has progressed towards achieving its targets, delivering the S2R Programme implementation, ensuring an effective and efficient sound financial management.

¹ Regulation (EU) No 1291/2013 of the European Parliament and of the Council of 11 December 2013 establishing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020), OJ L 347, 20.12.2013 and Council Decision (EU) No 2013/743/EU of 3 December 2013 establishing the specific programme implementing Horizon 2020 (2014-2020), OJ L 347, 20.12.2013, p. 965.

05. Programme status

- By the end of 2019, the Programme reached a pivotal milestone in terms of implementation: more than 50% of the Programme has been delivered in view of the TRL6/7 operational demonstrations planned for 2022. At large, all projects have delivered the planned activities: only 8 TDs/WAs report having performed less than 80% of their planned activities in the year, of which one TD below 50%. In addition, by year-end, also the R&I activities of the Call 2019 started: they set the implementation of the first TD Demonstrators at TRL 6/7. In total, it is estimated that the Total Project Cost of the activities performed in 2019 amounts to EUR 117.5 million, of which EUR 98.9 million delivered by the Members other than the European Union (hereinafter Other Members).

During the month of April 2019, the S2R JU assessed its R&I activities through a third Control Gate exercise².

This exercise took into account the deliverables and reports submitted in the context of the Annual Review of the ongoing projects coordinated by the Other Members. The S2R JU also ensured through this process that the recommendations made during the previous Control Gate Assessment had been properly applied. The overall result is that the Programme benefited from such feedback, also built upon external expertise.

In order to foster the performance of the Programme, a new continuous review process has been put in place for deliverables, combined with a control gate of the annual review. This process is integrated in the overall Programme monitoring realized through the quarterly meetings of the Innovation Programmes (IPs), where the progress of the different R&I activities organised within projects is assessed.

The S2R JU Programme Team also conducted projects review meetings for non-S2R Members during 2019. The request of such projects to better interact with the reviewing experts and the S2R Programme Managers will have to be considered in the light of the future staffing of the JU.

The outcome of this joint work between the S2R Programme Office, the Other Members and beneficiaries confirms that the Programme is progressing in line with the expectations, with a limited number of cases requiring mitigating actions. In addition, the launch of the system approach activities within IPX allowed for additional coherence and consistency between the interdependencies of the implementing projects.

**** This report provides an overview of the results achieved in 2019 and so far in the Programme. Nevertheless, the ongoing pandemic situation and the consequent lockdowns have such magnitude that diversified mitigating measures have been assessed and are being implemented. The 2020 results will extensively report on it.*


² In accordance with the procedure set in the S2R Governance and Process handbook, transparently published on the S2R website: https://shift2rail.org/wp-content/uploads/2020/06/S2RJU-Governance-and-Process-Handbook_20200127_v2.0.pdf

06. United Nations Sustainable Development Goals

The R&I work performed by the S2R JU contributes to, at least, 7 out of 17 UN SDG. In particular, the S2R Programme contributes to:

- building resilient infrastructure,
- promoting inclusive and sustainable industrialisation processes – at manufacturing or operational levels,
- fostering innovation at all levels of the value chain,
- promoting inclusive and sustainable economic growth, tackling also aspects related to human capital opportunities and impact of new technologies on future skills and competences,
- new mobility and transport models towards smart and sustainable cities and regions, connecting people and providing new socio-economic opportunities,
- the urgent actions taken at Union level to combat climate change and its impacts,
- promoting gender equality at all levels.

During the last three years of activities and especially in 2019, S2R shifted from being only technology driven to become a mission oriented Programme. Also in 2019, S2R continued with the application of the agreed implementation measures stemming out of the Action Plan, addressing the suggestions for improvement indicated in the Interim Evaluation of S2R of 2017. S2R remains strongly delivery oriented while coupling the need to further explore new solutions to harvest their full benefits.



IP1 Passenger trains

IP2 Traffic management

IP3 Optimised infrastructure

IP4 Digital services

IP5 Rail freight

CCA Cross-cutting activities

IPX – System Architecture
and Disruptive Technologies

IP1



Passenger trains

Positive progress has been reported on all TDs that on average have reached 98% of the estimated work planned in 2019 and all IP1 TDs started between 2016 and 2017 have reached the significant milestone of being half-way through their implementation.

TD1.8 instead only started at the end of 2019 because it is a newly introduced activity to greening the heating and ventilation system, showing the ability of IP1 to tackle new challenges. The initial results in each TD show that the investment in research and innovation

is going to bring the expected results in terms of more efficient, lighter, automated and customer oriented passenger trains.

The TDs are preparing for the TRL 6/7 demonstrations and are producing quality technical results.

Several IP1 innovation results are expected to affect European or international standards; for this reason, its work is closely monitored and activities are shared with standardisation setting organisations and regulatory bodies. During 2019, synergies between IP1 and IP2 have continued in particular with regard to Train Control and Monitoring System (TCMS) and telecoms. The IP1 programme has also contributed with valuable results to Cross Cutting Activities (CCA) work areas (Energy, Noise and Vibration, Smart Maintenance, Virtual Certification, etc.).



IP2



Traffic management



Positive progress has been reported on all TDs that on average have reached 94% of the estimated work planned in 2019, and all IP2 TDs started between 2016 and 2017 have reached the significant milestone of being half-way through their implementation. TD2.8 on virtual coupling instead only started at the end of 2018, showing also some implementation delays and having reached an overall implementation maturity of 30% by the end of 2019. S2R started in 2019 to provide to the European Union Agency for Railways

(ERA) the first sets of specifications for a number of ERTMS Game Changers, and notably on automated train operation over ETCS and moving block. Test benches are ongoing or finalised and the pilot tests for interoperability purposes will start soon to demonstrate the validity of the specifications, allowing as well for fine-tuning where needed.

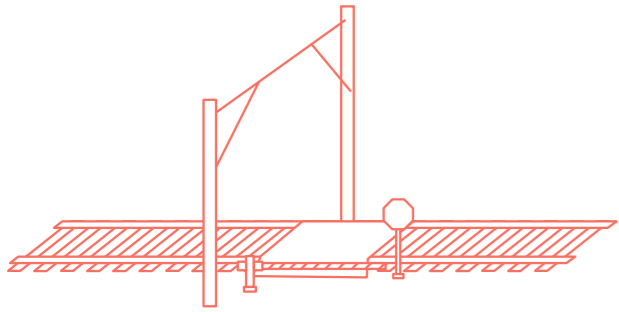
The preparations for the ATO demonstrator progressed very well; nevertheless, there are still pending discussions on the availability of the NR train and network for the demonstrations. Where such issues would not be solved within the 1st Quarter of 2020, the demonstration will have to take place on another network.

Overall, the results achieved are key milestones for the market uptake of

the solutions of this IP and prepare the integration of functions and its specifications in the Control Command and Signalling TSI, in the next revision, currently targeted by 2022. The work performed in IP2 will show how R&I will feed the new regulatory framework and become a test bed for the future deployment of S2R innovative solutions. The next couple of years will demonstrate the expected Game Changers benefits of IP2 to ERTMS: in particular, how the rail sector in S2R is able to feed the working groups of ERA that will shape R&I results in regulatory proposals for future proof systems.

With particular regard to the activities of IP2, in agreement with the Governing Board (GB), the Executive Director (ED) adopted a decision establishing a renewed Programme Governance and Change Management to foster the integration of innovations and subsystems making use of a new functional (or better service-oriented) system architecture. The renewed Programme Governance and Change Management will support the integration within the S2R Programme of new concepts, ideas, solutions, etc. compared to the Multi-Annual Action Plan and its Annual Work Plans (AWPs). This renewed Programme Governance and Change Management are also an answer to the initiatives brought forward by Infrastructure Managers and Railway Undertakings in terms of subsystems specific architectures.

IP3



Optimised infrastructure



As in the previous years, this IP suffered an uneven progress between TDs. On average, IP3 has reached 89% of the estimated work planned in 2019, but TDs 3.1 to 3.5 have struggled in 2019 with the full implementation of their expected activities. Switches and crossings, track and bridges and tunnels activities are therefore showing a delay in their overall implementation, estimated in average at 30% (instead of a theoretical 50%). The S2R JU is asking related projects to implement mitigation measures and there is confidence that with some additional

efforts in 2020 the gap could be closed. In general, all R&I is moving towards the operational environment demonstrators, with very good progress showed by the Asset Management activities (TDs 3.6 to 3.8), Energy management (TDs 3.9 and 3.10) and the Future Stations (TD3.11), all of which reached their milestone of being half-way through their overall implementation.

IP4



Digital services

Moderate progress has been made on all TDs that on average have reached 85% of the estimated work planned in 2019. IP4 shows good progress towards the final demonstrations. IP4 has a dedicated ITD which is integrating all technologies coming from the TDs and it is already testing functionalities with an agile approach. In 2019, IP4 fully embraced the Mobility as a Service Functionality, evolving its original concept of passenger information system, focusing more and more towards cities' concerns. A significant number

of testing activities in real cities has been planned and work is ongoing to ensure a timely delivery of the technology. The S2R JU is addressing with the Members an acceleration of the technological progress in order to avoid real-life testing activities not taking place because of implementation delay.



IP5



Rail freight



In 2019, the TDs reached an average implementation rate of 67%, including some key results such as the first CBM-dashboards streaming live data from the locomotive fleet, as well as a demonstrator for intelligent video gates, and the testing of distributed power in push-pull operation of a commercial freight train. The running projects (AWP2015 to AWP2018) consumed less than 50 % of the overall IP5 budget, with a defined scope largely on analysis, requirements and technology specification. Consequently,

the 50% milestone of overall progress has not been reached yet. Nevertheless, some key IP5 demonstrators will already follow in 2020. Where delays were detected, S2R JU also addressed the issue with the IP5 and TDs leadership to ensure that mitigating measures are dealt with in a systemic manner and adequate resources are assigned for quality delivery of the planned work.

Great expectations are built especially on TD 5.1, considering the work to be performed on freight ATO in coordination with IP2, in view of the upcoming TRL7 demonstrator in Switzerland, additional CBM innovations, and the prototype development of a standard European digital automatic coupler. The reorganization of IP5 introduced in the new MAAP Part B promotes a more consistent approach

to innovative solutions for rail freight, resulting in a combination of digitalization-driven developments and migration plans, which may pave the way for a substantial change in the business. Nevertheless, the acceleration in some key aspects of IP5 may require additional resources to achieve market impact - resources not yet available for rail freight in the S2R Programme.

CCA



Cross-cutting activities

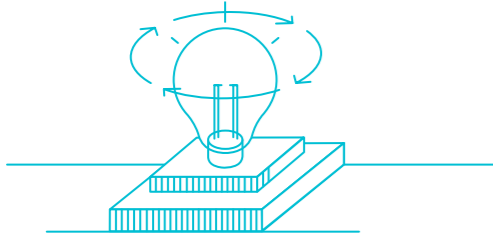
The Cross Cutting Activities were able to catch up the slower pace showed in 2018, with an average of 93% of implementation of planned activities for 2019. Several Work Areas are close to successful completion.

The work performed on the Key Performance Indicators demonstrates that the approach through Releases provides opportunity for monitoring the progress of the Programme, while assessing the different contributions of the TDs and their relations. Nevertheless,

the progress achieved might be at risk if the efforts are not duly matched by the continuing contributions of the TDs as well as scenarios beyond the usual “comfort zones”.



IPX



System Architecture and Disruptive Technologies

These activities are the result of the evolution of the Programme and the recognition of the need for a system approach to deliver the enablers for a major transformation of rail.

The commitment and involvement of key players in the rail sector, which the S2R JU has ensured since its creation, has been focused on Technological Demonstrators. These were highlighted in the 2019 Catalogue of Solutions and also delivered via the support to the ERTMS to create a baseline on which to build new

solutions and technologies. The setting up of a new Functional System Architecture and Disruptive Technologies that facilitates the integration of subsystems which maximise the performance of the railway system, taking into account the needs of the urban rail sector, became a key priority that resulted in setting up specific projects.

The activities implemented around IPX have provided some initial results in 2019 but they are still at their early implementation stage. Linx4Rail is supposed to deliver a draft version of the first railway Functional System Architecture and Disruptive Technologies in 2020.



08. Programme Management and MAAP

- Having in mind a holistic approach, the role of the S2R JU is to ensure that interactions between the various IPs are adequately considered and managed, as technological developments in one part of the system could lead to changes in performance, or even create barriers, in other parts. In addition, cross cutting activities include research on long-term economic and societal trends, such as customer needs and human capital and skills, which must be taken into account by the different IPs.

In this respect, at the end of 2019, in agreement with the GB, the ED adopted a decision establishing a renewed Programme Governance and Change Management to foster the integration of innovations and subsystems, making use of a new functional (or better service-oriented) system architecture. The renewed Programme Governance and Change Management will support the integration within the S2R Programme of new concepts, ideas, solutions, etc. compared to the MAAP and its AWP. The aforementioned ED Decision also includes the establishment of a formal advisory support to the ED in the form of a new ED Programme Board.

By Decision N°15/2015 of 27 November 2015, the Governing Board adopted the first version of the Multi-Annual Action Plan (MAAP). By Decision No 7/2017 of 27 October 2017, the MAAP has been amended. Parts 1 and 2 of the MAAP were replaced by a new Part A, including the S2R JU high-level objectives. In 2018 and 2019, the Other Members, in coordination with the JU, worked on the MAAP Part B to align it with the vision set in the MAAP Executive View Part A, to take stock of the results of the ongoing Projects of new technologies/businesses emerging in view of future demonstrations paving the way to future deployment activities. During the 22nd GB meeting of 14 November 2019, a consolidated version of the MAAP, including the new Part B was adopted.

The S2R JU MAAP therefore consists of two parts:

- 1- Part A - Executive View, adopted by the S2R JU Governing Board on 27 October 2017;
- 2- Part B - Technical Content, adopted by the S2R JU Governing Board on 14 November 2019;

The original MAAP of 2015 will be maintained as a reference document.

09. R&I activities launched in 2019 and prepared for 2020



- In September 2019, the S2R JU awarded 17 grants as a result of the 2019 Call launched on 15 January 2019 based on the amended Annual Work Plan (AWP) 2019. One topic has not been covered (equating to 2 Million Euros unspent from the call).

17 grant agreements were signed between September and December 2019, allowing the timely start of the projects. In total, the grants will co-fund up to EUR 74.8 million against Research and Innovation activities for a total value of EUR 148.6 million. The CFM part of the Call was implemented through the Lump Sum Pilot approach which begins to demonstrate its benefits.

203 entities, of which 40 SMEs (20.0%), were retained for funding in the 2019 Call. The participants represented 25 countries, of which 17 EU Member States and 2 Countries associated to the Horizon 2020 Framework Programme.

To facilitate a future stronger participation from the EU-13 Member States, feedback received by the S2R JU suggests that it will be important to integrate successful S2R R&I results with longer-term demonstration activities, encompassing a wider geographical sector involvement and impact across Europe, to bridge the way towards future deployment.

In December 2019, the S2R JU started the process for the preparation of the 2020 Call that was finally published on 7 January 2020 in the Horizon 2020 Funding & Tender Opportunities Portal, and based on the original version of the AWP 2020 adopted by the S2R JU GB on 14 November 2019. This process included the key contribution of the S2R Members, the review and advice at different points of the SC, SRG, ERA and UR-ID and the adoption by the S2R GB, after the overall work was finalized under the responsibility of the Executive Director.

10. Activities aligned to feed the successor of the S2R JU

- In September 2019, in agreement with the European Commission services, Shift2Rail organised the first workshop in the form of a brainstorming discussion on the next partnership and the ambition of the rail sector. The European Commission participated to the event as observer.

Further to this, S2R was asked to contribute to the 1) S2R Impact Assessment coordinated by DG RTD and 2) to the “Supporting analysis for defining the future rail research and innovation partnership under the next multi-annual financial framework” coordinated by DG Move. The S2R JU, its members and stakeholders provided all necessary background to the contractors of the European Commission in interviews and by disseminating the necessary material and questionnaires.

In addition, the JU coordinated and supported the development of a High Level Paper on the S2R successor, the candidate European Institutional

Partnership “Transforming Europe’s Rail System”. As part of its preparations to set new R&I European partnerships under the next research and innovation framework programme (Horizon Europe), the European Commission asked the rail sector (EIM, CER with the technical support of UIC, UNIFE, UITP, ERRAC, etc.) in autumn 2019 to develop the key features of a future European partnership. The S2R JU, in its integration role of sectorial stakeholders, coordinated the various inputs, which led to the submission of a first version of the High Level Paper to the Commission services in December.

This work was also an opportunity for the S2R JU to re-assess the maturity level expected to be reached by the different streams of work, the potential in terms of market take up of R&I outputs, and indicate the areas of improvements to foresee for the next generation of R&I projects, the so called “transforming projects”.

The results of the Inception Impact Assessment which closed in August 2019, and for which 46 contributions were received, are available on the following website:

<https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/11910-European-Partnership-for-transforming-Europe-s-rail-system>

The public consultation lasted from 11 September to 12 November 2019; results will be published on the above-mentioned website.

Further information on the S2R successor is available on the following website:

<https://shift2rail.org/shift2rail-successor/>

11. Other activities

- In order to provide administrative support to the Programme execution, the JU has progressed in the recruitment of staff filling budgetary open positions; at the end of the year, 24 positions were filled, including 3 Seconded National Experts.

The S2R JU further reinforced its communication and dissemination activities. In 2019, the first edition of Shift2Rail's Catalogue of Solutions was published, illustrating successful R&I results in the form of possible stand-alone and integrated products. It highlights the benefits of Shift2Rail solutions for final users, operators, infrastructure managers and/or suppliers, as well as specifying delivery dates.

The Catalogue of Solutions was presented by the JU at the World Congress on Railway Research in Tokyo. In addition to participating in flagship international events such as WCRR and Digital Transport Days, Shift2Rail also supported a number of regional Info Days to continue

raising the awareness of the programme and to mobilise rail stakeholders at local level, encouraging cooperation.

In order to increase cooperation in Member States, the S2R JU signed a Memorandum of Understanding (MoU) with the Czech Republic on 4 January 2019 and with ETSI on 14 May 2019. In January 2020, a MoU was signed with the Basque Region.

In addition to the efforts on stakeholder involvement, the JU further continued improving its internal organisation as to provide continuous support to its Members and beneficiaries. By implementing its internal control system, performing defined control activities as well as assessing and managing risks, the JU has ensured the sound financial management of EU funds.

With regard to the Discharge in respect of the implementation of the Budget of the S2R JU for the financial year 2018 and the European Parliament resolution, the full version of the Annual Activity Report provides in its different sections the answers requested by the Budgetary Authority. All actions stemming from audit recommendations have been implemented without delay, thus reinforcing the internal management and control system of the S2R JU.

12. Projects 2019



IP1: PASSENGER TRAINS

PROJECT TITLE		PERIOD	PROJECT VALUE
PIVOT2	Performance Improvement for Vehicles on Track 2	01/10/2019 - 31/12/2022	€ 40 155 405,03
CARBODIN	Car Body Shells, Doors and Interiors	01/12/2019 - 30/11/2021	€ 3 549 291,25
NEXTGEAR	NEXT generation methods, concepts and solutions for the design of robust and sustainable running GEAR	01/12/2019 - 30/11/2021	€ 2 573 877,50

IP2: TRAFFIC MANAGEMENT

PROJECT TITLE		PERIOD	PROJECT VALUE
X2RAIL-4	Advanced signalling and automation system - Completion of activities for enhanced automation systems, train integrity, traffic management evolution and smart object controllers	01/12/2019 - 28/02/2023	€ 41 109 699,98
4SECURAIL	Formal methods and CSIRT for the railway sector	01/12/2019 - 30/11/2021	€ 549 875,00
OPTIMA	Communication Platform for Traffic Management demonstrator	01/12/2019 - 28/02/2023	€ 2 249 897,50

IP3: OPTIMISED INFRASTRUCTURE

PROJECT TITLE		PERIOD	PROJECT VALUE
IN2SMART2	Intelligent Innovative Smart Maintenance of Assets by integrated Technologies 2	01/12/2019 - 30/11/2022	€ 23 091 203,50
FUNDRES	Future unified DC Railway Electrification System	01/12/2019 - 30/11/2021	€ 749 540,00

IP4: DIGITAL SERVICES

PROJECT TITLE		PERIOD	PROJECT VALUE
RIDE2RAIL	Travel Companion enhancements and RIDE-sharing services synchronised to RAIL and Public Transport	01/12/2019 - 31/05/2022	€ 2 999 993,75

IP5: RAIL FREIGHT

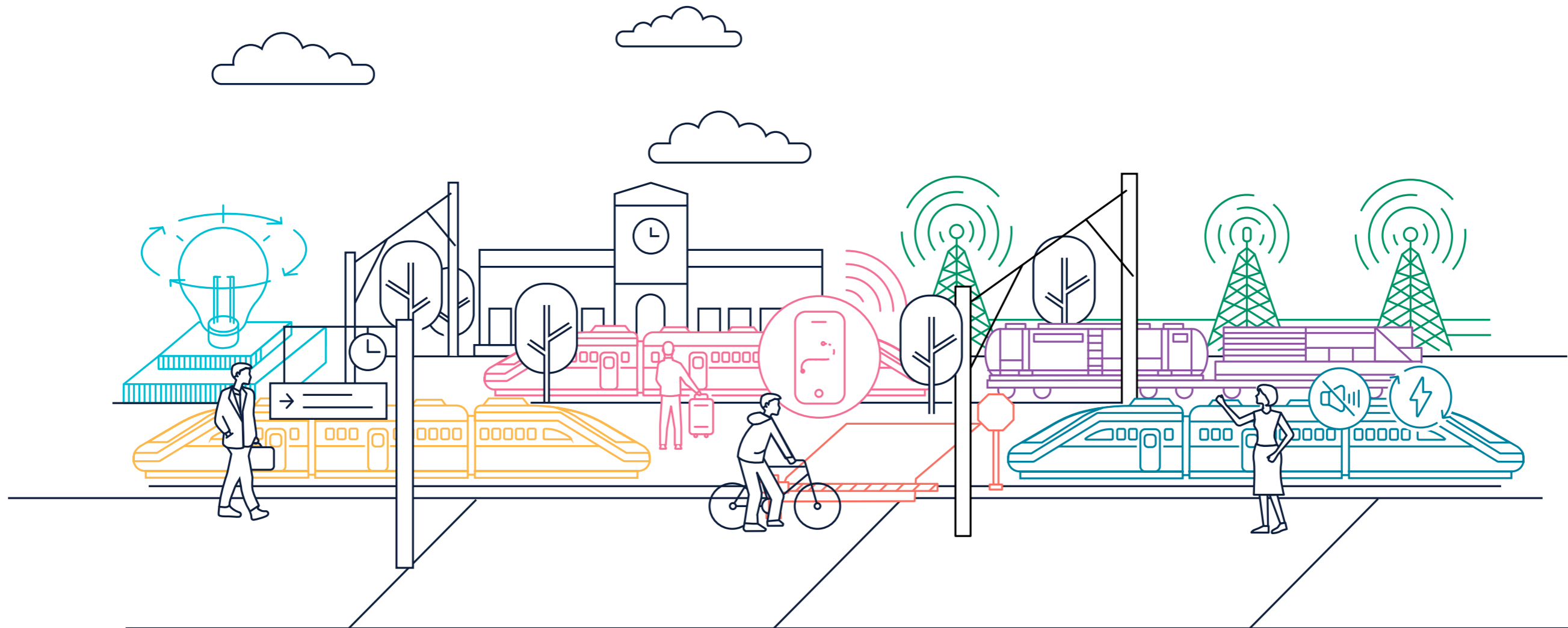
PROJECT TITLE		PERIOD	PROJECT VALUE
FR8RAILIII	Smart data-based assets and efficient rail freight operation	01/12/2019 - 30/11/2022	€ 13 061 601,01
LOCATE	Locomotive bogie Condition maintenance	01/11/2019 - 31/10/2021	€ 1 499 072,50
SMART2	Advanced integrated obstacle and track intrusion detection system for smart automation of rail transport	01/12/2019 - 30/11/2022	€ 1 708 737,50

CCA: CROSS-CUTTING ACTIVITIES

PROJECT TITLE		PERIOD	PROJECT VALUE
FINE2	Furthering Improvements in Integrated Mobility Management (I2M), Noise and Vibration, and Energy in Shift2Rail	01/12/2019 - 30/11/2022	€ 8 179 973,07
TRANSIT	Train pass-by noise source characterization and separation tools for cost-effective vehicle certification	01/12/2019 - 30/11/2022	€ 1 308 718,75

IPX: RAIL SYSTEM ARCHITECTURE

PROJECT TITLE		PERIOD	PROJECT VALUE
LINX4RAIL	System architecture and Conceptual Data Model for railway, common data dictionary and global system modelling specifications	01/12/2019 - 30/11/2022	€ 5 216 494,26
RAILS	Roadmaps for A.I. integration in the rail sector	01/12/2019 - 30/11/2022	€ 299 953,75
TRANSLATE4RAIL	Translation for breaking language barriers in the railway field	01/12/2019 - 30/11/2021	€ 248 093,75



13. Shift2Rail overview



NAME

Shift2Rail Joint Undertaking (S2R JU)

OBJECTIVES

The Shift2Rail Joint Undertaking is a public-private partnership in the rail sector, providing a platform for cooperation that drives innovation in the years to come. The S2R JU pursues research and innovation

(R&I) activities in support of the achievement of the Single European Railway Area and should improve the attractiveness and competitiveness of the European rail system.

The S2R JU contributes to:

01. a 50 % reduction of the life-cycle cost of the railway transport system (i.e. costs of building, operating, maintaining and renewing infrastructure and rolling stock),
02. a 100 % increase in the capacity of the railway transport system,
03. a 50 % increase in the reliability and punctuality of rail services (measured as a 50 % decrease in unreliability and late arrivals).

The S2R JU shall propose innovative solutions to be explored, tested and demonstrated in operational environment and/or “zero on site” to achieve market uptake.

Beyond that, with the deployment of its innovative solutions the S2R JU will foster connections between people, regions, cities, and businesses, supporting the socioeconomic objectives of the Union.

FOUNDING LEGAL ACT

Council Regulation (EU) No 642/2014 of 16 June 2014 establishing the Shift2Rail Joint Undertaking¹ (S2R Regulation)

EXECUTIVE DIRECTOR (ED)

Mr Carlo M. Borghini, as from 16 May 2016

GOVERNING BOARD (S2R GB)

European Commission (EC) members (at 20/01/2020):

01. Henrik HOLOLEI, DG MOVE
02. Elisabeth WERNER, MOVE DDG 2
EC alternate (at 31/12/2019):
03. Ratso SIGNE (RTD.I)

Industry members (at 20/01/2020):

01. ALSTOM – Nicolas CASTRES-SAINT-MARTIN
02. Hitachi Rail STS – Antonella Trombetta
03. AZD Praha – Vladimir KAMPIK
04. BOMBARDIER TRANSPORTATION – Massimo SIRACUSA
05. CAF – Imanol ITURRIOZ
06. DEUTSCHE BAHN – Hans Peter LANG
07. EUROCC – Thomas PETRASCHEK
08. HACON – Lars DEITERDING
09. INDRA – Javier Rivilla LIZANO

¹ OJ L 177, 17.6.2014, p. 9

GOVERNING BOARD (S2R GB)

Industry members (at 20/01/2020):	<ol style="list-style-type: none"> 10. KNORR BREMSE –Hans-Christian HILSE 11. NETWORK RAIL (Industrial Spokesperson) – Andy DOHERTY 12. SIEMENS – Roland EDEL 13. SMARTDEMAIN – Henk SAMSON 14. SMARTRACON – Michael Meyer zu HÖRSTE 15. SNCF – Carole DESNOST 16. THALES – Alberto PARRONDO 17. TRAFIKVERKET – Bo OLSSON 18. VVAC+ – Filip KITANOSKI
Industry alternates (at 20/01/2020):	<ol style="list-style-type: none"> 01. ALSTOM – Sophie PERROCHEAU 02. Hitachi Rail STS – Nadia MAZZINO 03. AZD Praha – Michal PAVEL 04. BOMBARDIER TRANSPORTATION – Richard FRENCH 05. CAF – Jorge DE CASTRO 06. DEUTSCHE BAHN – Ralf MARXEN 07. EUROCC (to be appointed) 08. HACON – Rolf GOOßMANN 09. INDRA (tbc) 10. KNORR – BREMSE – Jasmina BRACKOVIC 11. NETWORK RAIL – Felicity OSBORN 12. SIEMENS – Jürgen SCHLAHT 13. SMARTDEMAIN – Javier Bonilla DÍAZ 14. SMARTRACON – Jaizki MENDIZABAL 15. SNCF – Christophe CHERON 16. THALES – Yves PERREAL 17. TRAFIKVERKET – Christer LOFVING 18. VVAC+ – Erik STOCKER

Other participants (at 20/01/2020):	<ol style="list-style-type: none"> 01. Carlo M BORGHINI – Executive Director of the S2R JU
Observers (at 20/01/2020):	<ol style="list-style-type: none"> 01. Josef DOPPELBAUER (ERA) 02. Anna GIGANTINO (ERA) 03. Angela DI FEBBRARO (SC) 04. Sarah BITTNER-KRAUTSACK (SRG)

OTHER BODIES

Scientific Committee (SC)
States Representatives Group (SRG)
Innovation Programmes' Steering Committees (IP SteCos)

STAFF

24 at 31 December 2019 including 3 Seconded National Experts (SNEs) and excluding one exceptional recruitment (cf. 2.6)

2019 BUDGET

The initially adopted budget was amended a first time on 24 June 2019; by year end, in agreement with the Governing Board as per minutes of the meeting of 4 December, the Executive Director transferred EUR 2 million in terms of commitments and payments appropriations, from Title 3 to Title 4 in order to be made available immediately to the S2R JU Call 2020, in accordance with S2R JU FR art.6.5 and with the GB Decision.

As a result, the Final Adopted Budget amounted to EUR 82.8 million in commitment appropriations, of which EUR 76.7 million for operational expenditure, EUR 3.5 million for administrative expenditure and EUR 2.6 million of unused appropriations not required in the financial year but needed to meet early 2020 commitments.

In payment appropriations, the Final Adopted Budget was EUR 81.3 million, of which EUR 74.9 million for operational expenditure, EUR 3.7 million for administrative expenditure and EUR 2.6 million of unused appropriations not required in the financial year.

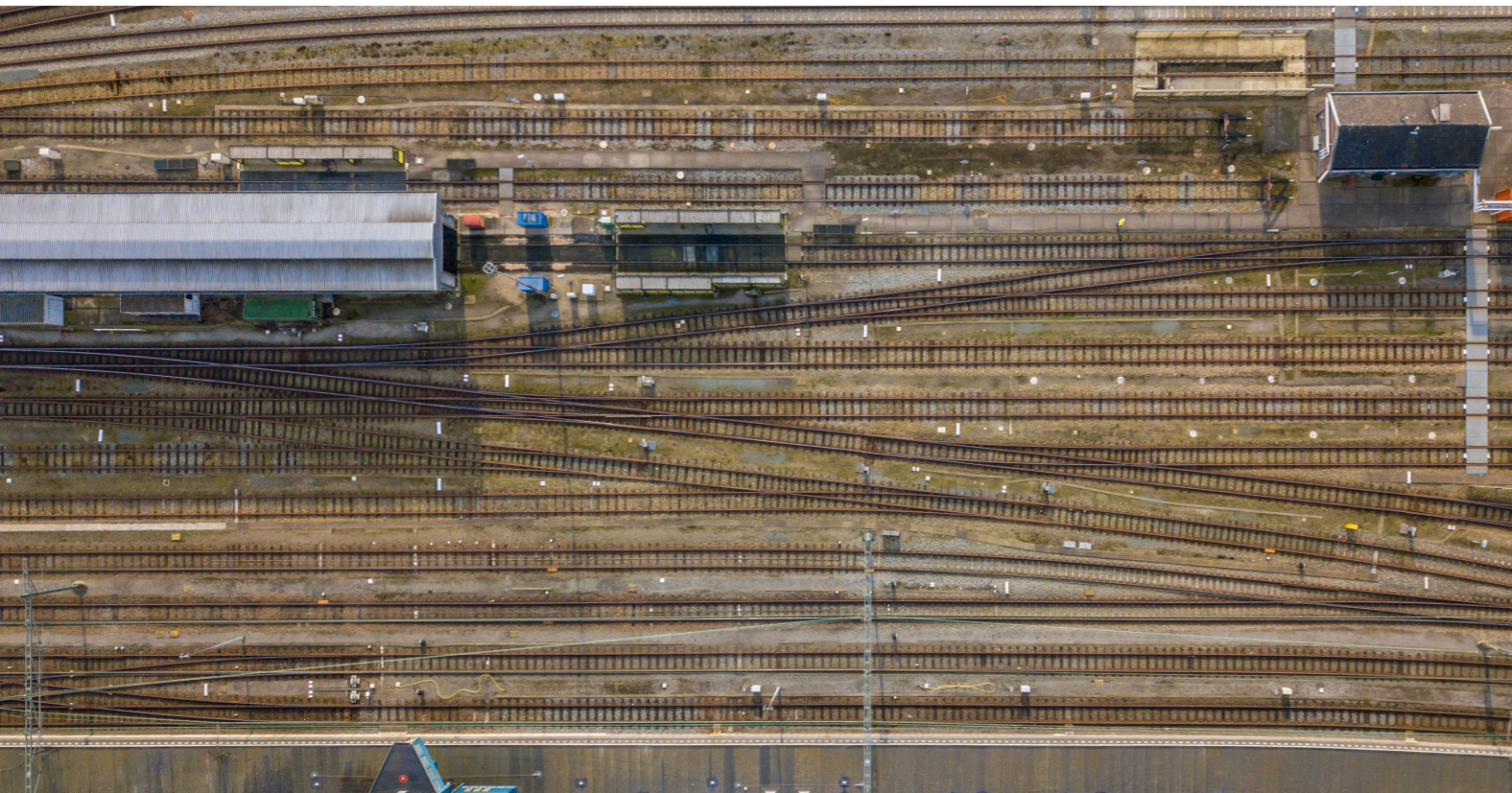
BUDGET IMPLEMENTATION

Based on the above, the Budget implementation in terms of commitment appropriations is at 100% and, in terms of payment appropriations at 89% (both excluding the unused appropriations not required in the financial year).

appropriations, respectively representing 100% and 96.1% of budget execution.

The payment appropriations' implementation presents a constant improvement compared to previous years (78.6% in 2017 and 82.3% in 2018). The implementation of Administrative budget was EUR 3.5 million in commitment appropriations and EUR 3.6 million in payment

Applying sound financial management, the JU makes use of multi-annual framework contracts in particular in Title 2. The Administrative budget corresponds to approximately 4% of the JU Budget. The Operational Budget was implemented at EUR 76.7 million in commitment appropriations (100%) and EUR 66.3 million (88%) in payment appropriations.



GRANTS

In September 2019, the S2R JU awarded 17 grants as a result of the 2019 Call launched on 15 January 2019 based on the amended Annual Work Plan (AWP) 2019. One topic has not been covered (equating to EUR 2 Million unspent from the call). All 17 grant agreements were signed between September and December 2019, allowing the timely start of the projects.

In total, the awarded and signed grants will fund Research and Innovation activities up to EUR 74.8 million against a total value of EUR 148.6 million. In this respect, it should be noted that the Founding Members other than the Union and the Associated Members (jointly referred to as the "Other Members") agreed to limit their requests for funding to 44.44% of the total project cost.

STRATEGIC RESEARCH AGENDA

The S2R JU Programme is described in the Multi-Annual Action Plan (MAAP) adopted by the S2R GB in 2015. In November 2019, the S2R JU MAAP was updated.

It consists now of two parts:

- 01. Part A – Executive View adopted by the S2R JU Governing Board on 27 October 2017 by Decision N°7/2017
- 02. Part B – Technical Content annexed to the Decision of the GB N° 9/2019;

The original MAAP of 2015 is maintained as a reference document.

CALL IMPLEMENTATION

The Call 2019 was implemented already at the beginning of the year. The award of the call 2019 took place during the Governing Board meeting of 4 September 2019.

With an exceptional commitment and effort, the Other Members and OC together with the JU were able to reach the signature of 17 grants related to the Call 2019
















































by year end. Two other grants related to the Call 2018 were signed in the first quarter 2019.


In accordance with a multi-annual calendar, all the preparatory works of the Call 2020 were realized in 2019 and on 14 November 2019, the S2R GB adopted the AWP 2020 and budget.

PARTICIPATION, INCLUDING SMES

Under the 2019 Call, 90 Small and Medium Enterprises (SMEs) participated to the 2019 Call (20.0%) and 40 SMEs were retained for funding (44%). SME's represent 30% of the entities selected in the Open Calls projects.

<u>Founding Members</u>			
			
			
			
<u>Associated Members</u>			
			
			
			

<u>Virtual Vehicle Austria Consortium (VVAC+)</u>	<u>European Rail Operating community Consortium (EUROC)</u>	<u>Swi'Tracken Consortium</u>
		
		
		
		
		
		
		
		
		
		
		
		
<u>Smart DeMain (SDM) Consortium</u>	<u>Competitive Freight Wagon Consortium (CFW)</u>	<u>AERFITEC</u>
		
		
		
		
		



In accordance with Article 20 of the Statutes of the S2R JU annexed to Council Regulation (EU) No 642/2014 and with Article 20 of the Financial Rules of the S2R JU. The annual activity report will be made publicly available after its approval by the Governing Board.



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