



***Shift2Rail Joint Undertaking
Governance and Process Handbook***

Version 2.0

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Glossary

AWP	Annual Work Plan
CCA	Cross Cutting Activities
CFM	Call for Members
ED	Executive Director
ERA	European Union Agency for Railways
GAP	Grant Agreement Preparation
GB	Governing Board
IKAA	In-kind contribution for additional activities
IKOP	In-kind contribution for operational activities
IP	Innovation Programme
ITD	Integrated Technical Demonstrator
JTI	Joint Technology Initiative
MAAP	Multiannual Action Plan
OLAF	EUROPEAN ANTI-FRAUD OFFICE
Other Members	Members other than the Union
R&I	Research & Innovation
REA	Research Executive Agency
S2R JU	Shift2Rail Joint Undertaking
SERA	Single European Railway Area
SIWG	System Integration Working Group
SPD	System Platform Demonstration
SteCo	Steering Committee
TD	Technical Demonstrator

1 Introduction

1.1 Context

The Shift2Rail Joint Undertaking (hereafter referred to as the S2R JU) was established in 2014 as a new public-private partnership in the rail sector¹.

Shift2Rail is the first European rail joint technology initiative (JTI) to seek focused research and innovation (R&I) and market-driven solutions by accelerating the integration of new and advanced technologies into innovative rail product solutions. Shift2Rail will promote the competitiveness of the European Rail Industry and will meet the changing EU transport needs. Through the R&I carried out within this Horizon 2020 initiative, the aim is to create the necessary technology to establish a Single European Railway Area (SERA).

The Shift2Rail programme is structured in five asset-specific Innovation Programmes (IPs), covering all the different technical and functional (process) subsystems of the rail system:

1. IP1: cost-efficient and reliable trains, including high-capacity trains and high-speed trains;
2. IP2: advanced traffic management & control systems;
3. IP3: cost-efficient, sustainable and reliable high-capacity infrastructure;
4. IP4: IT solutions for attractive railway services;
5. IP5: technologies for sustainable & attractive European freight.

In addition, horizontal activities are performed through the Cross Cutting Activities and most recently with some disruptive R&I and system architecture approach within IPx activities.

1.2 Purpose and scope of the handbook

The purpose of the Governance and Process Handbook is threefold:

- Describe the governance and processes of the S2R JU;
- Define the roles and responsibilities of the S2R JU;
- Specify the key documentation, reporting and evaluation requirements for the execution of the five Innovation Programmes and Cross Cutting Activities.

The scope of the Governance and Process Handbook is limited to:

- The roles and responsibilities of the S2R JU Programme Office and interfaces with the Other Members;
- The roles and responsibilities of the Other Members and the interfaces between these Other Members;

¹ Council Regulation (EU) No 642/2014 of 16 June 2014 establishing the Shift2Rail Joint Undertaking

- The roles and responsibilities of the S2R JU and the Other Members towards other beneficiaries and third parties involved in the Programme.

1.3 Position in the S2R JU documentation hierarchy

The position of the Shift2Rail Governance and Process Handbook is based on the overall document hierarchy shown in Figure 1.

The Regulation of Shift2Rail defines the rules underpinning the JU as body of the European Union entrusted with the implementation of the S2R Initiative.

The S2R Master Plan describes a forward-looking roadmap to drive innovation in the rail sector in the medium-long term. It is this overall plan of the S2R JU that defines the technical targets and activities as well as the programme structure towards the completion of the S2R Programme.

The Multiannual Action Plan (MAAP) is the translation of the S2R Master Plan into a detailed, medium-long term R&I plan that concretely identifies the activities, milestones and deliverables to achieve the overall Master Plan objectives. The MAAP also contain a “long-term vision” chapter, called Executive view. Its therefore also provides a high-level view of what needs to be done to deliver the S2R vision as from 2014 onwards. The MAAP is implemented through R&I activities awarded to the Other Members and open calls in the form of grants or contracts. These calls will result from the detailed specifications established in the AWP.

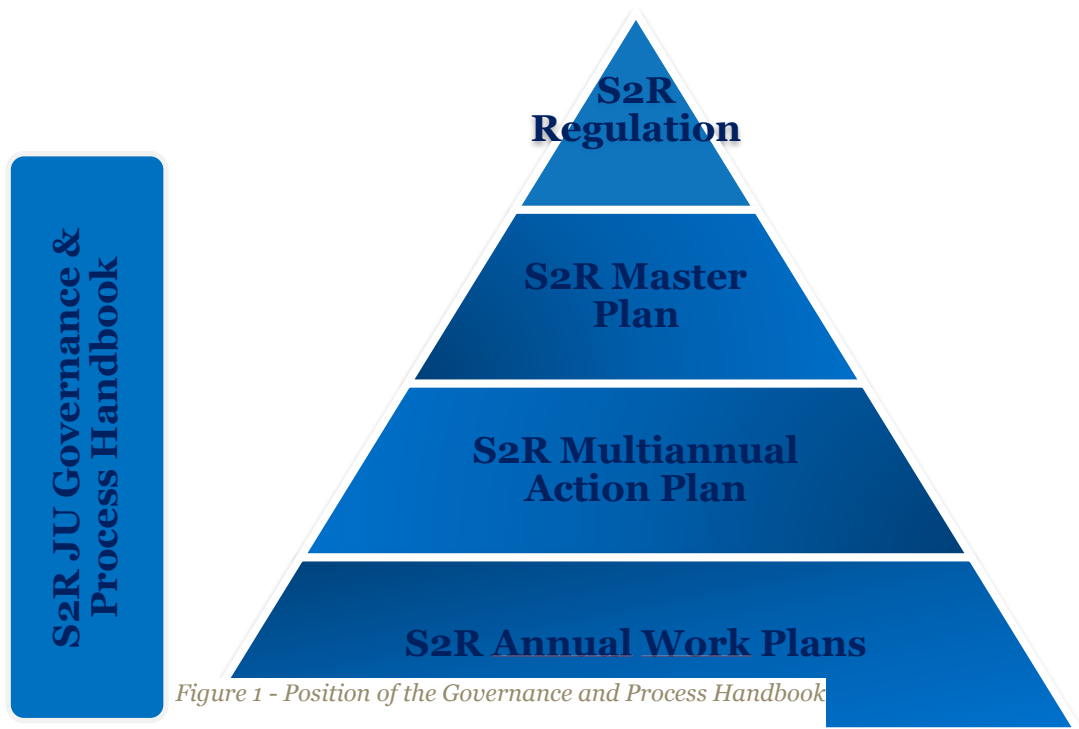


Figure 1 - Position of the Governance and Process Handbook

The S2R JU Governance and Process handbook describes the procedures, processes and actions underpinning the implementation of the S2R Programme and the roles and responsibilities of the S2R JU and its Other Members. The handbook defines and documents the Programme governance and relevant business processes, including relevant templates and guidelines.

2 Legal Framework

The legal framework of the S2R JU is described in the regulation and its operational aspects and targets detailed in S2R Master Plan.

2.1 S2R Regulation

Council Regulation (EC) No 642/2014 of 16 June 2014² sets out the basis for the Joint Undertaking and its legal basis for the establishment and execution of the S2R Programmes. As the Other Members of the S2R JU have expressed in writing their agreement and acceptance of the Statutes to this Regulation, as a consequence duly, they are bound to jointly contribute to and adopt the management principles put in place by the S2R JU in order to execute agreed R&I activities.

Further adopted from the S2R Regulation are the Membership Agreements and GB decisions.

2.1.1 Membership Agreements with Other Members

Each Membership Agreement states that any Other Member of the S2R JU, who expressed in writing their agreement and acceptance, shall contribute to the proper implementation of the S2R Programme in accordance with the objectives and requirement set out in the S2R Regulation.

2.1.2 GB Decisions

The Governing Board has overall responsibility for the strategic orientation and the operations of the S2R JU and shall supervise the implementation of its activities. In order to efficiently and effectively manage this responsibility, the GB can decide on new actions or procedures by means of GB decisions.

- Rules of Procedure of the Governing Board of the Shift2Rail Joint Undertaking³;
- Decision of the Governing Board adopting the revised financial rules of the Shift2Rail Joint Undertaking⁴.

2.1.3 The Executive Director (ED) & ED Decisions

The Executive Director (ED) is the chief executive responsible for the day-to-day management of the S2R JU in accordance with the decisions of the Governing Board. The ED is the legal representative of the S2R JU and has the role to take ED decisions which have the purpose to implement the strategic plan and budget of the Programme. The ED is accountable to the Governing Board and shall provide the GB with all information necessary for the performance of its functions.

The ED shall:

- prepare and submit for adoption to the Governing Board the draft annual budget, including the corresponding staff establishment plan indicating the number of temporary posts in each

² <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014R0642>

³ http://shift2rail.org/wp-content/uploads/2013/07/Consolidated_GB_RoP.pdf

⁴ http://shift2rail.org/wp-content/uploads/2016/01/S2R-JU-GB_Decision-N-21-2015-revised-financial-rules.pdf

grade and function group and the number of contract staff and seconded national experts expressed in full-time equivalents;

- manage the calls and submit for approval to the Governing Board the list of actions selected for funding;
- organise, direct and supervise the operations and the staff of the S2R Joint Undertaking;
- monitor the progress made by the IPs towards achieving the objectives.

For a complete description of the functions of the Executive Director, refer to the S2R Statutes⁵.

The ED Programme Board has been created at the end of 2019 by ED decision (see annex I) as an integral part of the decision-making procedure of the Programme supervised by the ED.

⁵ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014R0642>

3 Programme Cycle

3.1 S2R Master Plan⁶

The Master Plan of the S2R JU was developed by the European Commission services in close cooperation with the eight S2R Founding Members, and in consultation with the European Union Agency for Railways (ERA). Inter alia, it serves as a reference document for the call of associated members to achieve a more competitive and resource efficient European transport system to address major societal issues such as rising traffic demand, transport safety and security of energy and climate change.

The Master Plan is a forward-looking roadmap to drive innovation in the rail sector in the medium-long term. It is the key document to define the strategy of the S2R JU to develop, integrate and validate innovative technologies and solutions. It defines the technical targets and activities as well as the programme structure for the whole duration of the programme in order to define S2R's contribution to the improvement of the competitiveness and attractiveness of the Railway Sector in Europe.

3.2 S2R Multiannual Action Plan (MAAP)

As already indicated, the Multiannual Action Plan (MAAP) provides a high-level view of what needs to be done; it explains why and by when. It sets the framework for the research and innovation (R&I) activities to be performed within and beyond the S2R Programme and the deployment activities to be carried out by all operational stakeholders, coordinated to achieve the Single European Railway Area. The description of the visionary part which includes activities beyond the current framework in order to build the necessary Railway Capabilities is called "Executive View – Part A"⁷. The second part called "Part B" is the translation of the S2R Master Plan into a detailed, medium-long term R&I plan that concretely identifies the activities, milestones and deliverables to achieve the overall Master Plan objectives. The MAAP Part B is a live document and it has been recently updated taking into account the latest technological advancement and with a more streamlined presentation of the Technological demonstrators⁸. In addition, it was decided to maintain the original MAAP of 2015 as reference document in cases of doubts with regard, for example, type of assets that the Members other than the Union committed to provide for demonstration activities. The MAAP is implemented through R&I activities awarded to the Other Members and open calls in the form of grants or contracts. These calls will result from the detailed specifications established in the AWP.

This document includes the R&I activities to be carried out by the Other Members complemented by the 'open calls', through calls for proposals and tenders, main deliverables and milestones per

⁶ <http://ec.europa.eu/transport/sites/transport/files/modes/rail/doc/2015-03-31-decisionn4-2015-adoption-s2r-masterplan.pdf>

⁷ https://shift2rail.org/wp-content/uploads/2018/04/Maap_2018_FINAL_2.pdf

⁸ <https://shift2rail.org/research-development/key-documents/>

technical demonstrator (TD), integrated technical demonstrator (ITD) and finally system platform demonstration (SPD).

3.2.1 Shift2Rail Research and Innovation

The overall goal of the S2R Programme, as stated, is **to manage⁹ and perform comprehensive and coordinated research and innovation focusing on the needs of the rail system users and providers, contributing to address the challenges faced by the rail sector**. In particular, the S2R R&I activities should prioritise the following general objectives (Figure 2):

- Achieve a Single European Railway Area;
- Enhance attractiveness and competitiveness of the European railway system;
- Retain and consolidate its leadership on the global market for rail products and services.

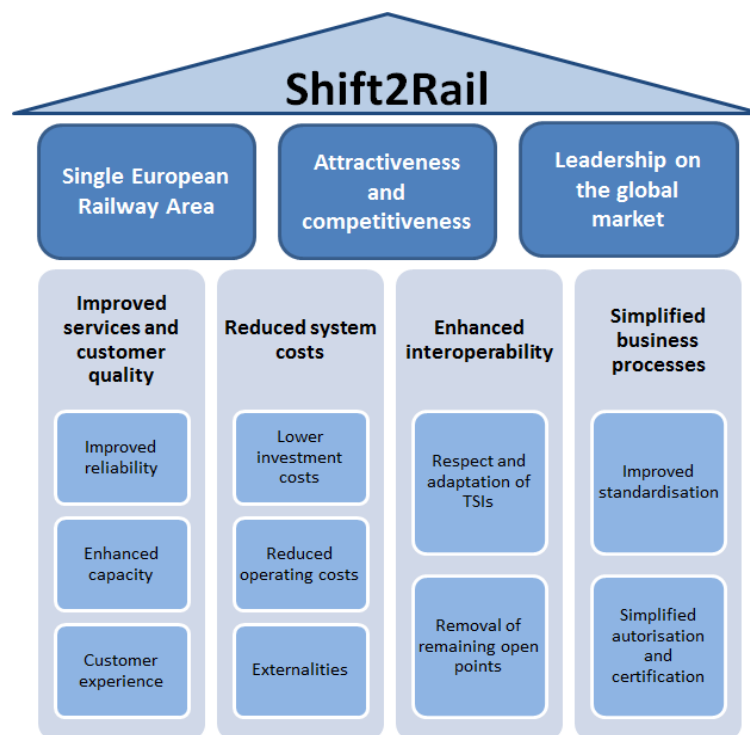


Figure 2 - Shift2Rail objectives

3.2.2 Innovation Programmes

Notwithstanding the specificities of some segments, such as urban transport, the performance of the railway system will only be improved if it is understood and managed as a whole system of systems incorporating many different actors each responsible for their own system as part of the system of systems. It should allow for the inclusion and consideration of all relevant railway subsystems, actors and complex interactions to contribute to the emergence of a Single European Railway Area (SERA). Given this shared-system approach, the work in S2R JU is structured around five asset-specific Innovation Programmes (IPs), which form a whole assembly of the railway system with a number of

⁹ Including railway research and innovation financed by the Union beyond the S2R Programme itself, as per S2R Basic Act.

common cross-cutting themes, the CCA. Together they constitute the S2R Programme, which ensures a system integrated approach to railway R&I to meet the expectations of the users and stakeholders.

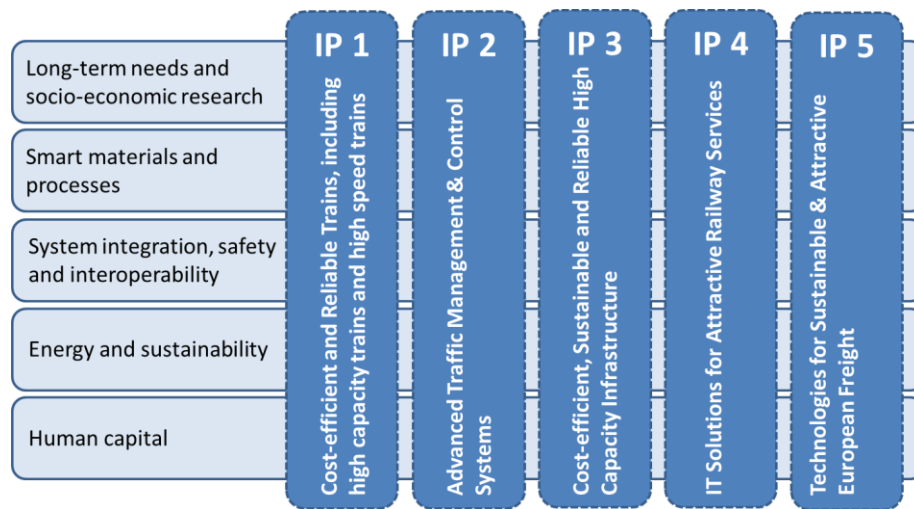


Figure 3 - Innovation Programmes

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

The goal of this IP is to address the challenges generated by rail customers' ever-evolving requirements for rail passenger vehicles, such as higher quality of service, reliability, comfort, lower energy costs and decreasing the stress on the economics of rail operations. In order to compete more effectively and attract more passengers in the future, both the traditional approach to vehicle development and an entirely new way of thinking on product development is needed. An innovative system approach will be used to introduce the future generation of passenger trains.

3.2.2.2 IP2: Advanced Traffic Management & Control Systems

This IP aims to go beyond merely being a contributor to the control and safe operations of trains. The goal is to become a shared, flexible, real-time, intelligent traffic management and decision support system.

Current systems do not sufficiently take advantage of new technologies and practices, i.e. automation, satellite positioning technologies, Wi-Fi and high-speed data, to increase functionalities and become even more competitive. R&I activities should support, by design, the rapid and broad deployment of advanced interoperable traffic management and control systems to raise the competitiveness of European solutions globally.

3.2.2.3 IP3: Cost Efficient and Reliable High Capacity Infrastructure

A migration towards a common high-performing infrastructure system architecture is the main objective of IP3. Network diversity needs to be gradually eliminated to create a rail network infrastructure that is safe, reliable, supportive, cost-effective and sustainable.

The aging of existing infrastructure will increase costs and maintenance. At the same time, reaching the maximum capacity and being unable to deliver quality services are concerns that need to be addressed. Automation and managing in a holistic approach (using lean operational practices and smart technologies) can improve responsiveness, capacity and overall economics of rail transportation.

3.2.2.4 IP4: IT Solutions for Attractive Railway Services

Anywhere, anytime, multi-modal door-to-door travel is the goal to increase attractiveness and respond to the customer demand. Interoperability with other transport modes and mobility services must be achieved by taking advantage of the increasing connectivity of people and object, the availability of European Global Navigation Satellite Systems, cloud computing and social media.

Improved information technology made interoperable and increased cross-industry collaboration and real-time information must help to create a personalised service, where customers can plan door-to-door journeys seamlessly.

3.2.2.5 IP5: Technologies for Sustainable & Attractive European Rail Freight

The modal share of intra-EU rail freight transport has stagnated in the past decades, partly explained by the existence of legal barriers restricting competition (including the track access regime, taxation, etc.), but also by problems of an operational and technical nature. The challenge is to acquire a new service-oriented profile for rail freight services based on excellence in on-time delivery at competitive prices and to increase productivity, by addressing current operational and system weaknesses and limitations.

Continued growth is expected in the intermodal segment, which relies on the use of container trains, and the wagon load/block train activity segment, which relies on the use of specific freight wagons. The potential growth in these market segments can be exploited by increasing reliability, service quality, cost competitiveness and improving overall transport time.

3.2.2.6 Cross-cutting Themes and Activities

To implement a system approach and address the new technologies in several Technology Demonstrators (TDs), both at vehicle level and complete railway system level, cross-cutting themes and activities (CCAs) will insure all IP activities are closely aligned. Horizontal coordination, such as energy and noise management, safety, standardisation, overall traffic management, maintenance and virtual certification, impact assessment, as well as long-term societal effects and human capital management are taken into account.

CCA is structured to realise the objectives of 5 work areas, as well as the development of a common methodology for assessing the achievement of the Shift2Rail objectives.

3.2.2.7 S2R System Architecture and CDM

In 2019, the activities under the acronym IPx were redesigned to also support the achievement of a System of Systems Approach by starting to build a railway Functional System Architecture and a Conceptual Data Model (CDM), introducing a structured approach to the functional evolution of the railway systems. The objective is to provide the sector with a shared path and vision of the future operations of rail systems, under the policy leadership of the European Commission and in strict coordination and collaboration with the European Union Agency for Railways.

Concerning the Functional System Architecture, more concrete reflections on new system approaches started on the control command and signalling side since the work initiated in 2018 by some Infrastructure Managers with a Reference Command Control Signalling Architecture (RCA) and recently by some Railway Undertakings with an Open CCS On-board Reference Architecture (OCORA). This also in the continuation of work started almost a decade before on the EULYNX activities. During 2019, the S2R Programme agreed to launch more structured activities related to the development of a Conceptual Data Model (CDM) that will contribute to overcome “data” and “systems” fragmentation with a view to produce a system of systems approach and enabling well-defined modularity. The developed approach is expected to become the standardised way for existing and new systems to interact, ensuring their interoperability through “digital continuity”.

Initial activities on implementing a system of systems approach have started with LinX4Rail, a Members’ project, started in December 2019, with the objective of developing the first railway Functional System Architecture and defining a Conceptual Data Model (CDM), delivering a system-of-systems approach and enabling seamless data exchange. The project will take into account the outputs of existent activities from other IPs, RCA (Reference CCS Architecture), OCORA (Open CCS on-board reference architecture), standardisation activities, and from initiatives such as EULYNX, railML, IFCRail, Rail Topo Model (RTM) etc.

3.3 From the Annual Work Plan (AWP) to the Project Kick-Off

Taking into consideration the current legal framework (EU General Financial Regulation, H2020 Rules of Participation, the S2R Financial Rules, etc.), the S2R Programme is implemented through Annual Work Plans (AWPs) which detail the R&I activities to be performed in the years to come (from 12 to 48 months indicatively).

The AWP follows a specific management cycle in line with the provisions of the S2R Financial Rules. It is established on the template provided by the Commission Services for all the Union JUs.

The AWP for year N is established as from October year N-2. The process starts with the request of the Programme Office to the IP/CCA Steering Committees to provide their contribution to detail the R&I activities expected to be awarded in year N in line with the overall planning foreseen in the MAAP. The contributions received are grouped together in coherent “topics” by the IP/CCA coordinators which detail how the activities are expected to be performed in order to ensure that the objectives of each TD are duly achieved.

The IP contributions shall be provided to the respective S2R Programme Manager not later than end of December of the year N-2, in order to ensure that the S2R JU ED is in the position to submit the Preliminary Draft Budget for year N to the EC Services by 31 January N-1.

The Preliminary Draft Budget for year N includes the request to the Union in terms of Commitment and Payment Appropriations necessary to realize the activities planned in the AWP year N. The Preliminary Draft Budget for year N is discussed with the Commission Services and becomes part of the overall negotiations with the Union Budget Authority, the European Parliament and Council.

During year N-1 and in view of the adoption of the AWP for year N at the GB planned in the month of October N-1, the Programme Office will continue working with the IP Coordinators to finalize the AWP and further detail as necessary the content.

The IP Steering Committees organized around March-April of year N-1 are the occasion for an in-depth exchange on the content of the AWP for year N in perspective of the MAAP and the results achieved through previous and ongoing R&I activities. The final contributions to the AWP for year N by the IP Coordinators shall be provided to the respective Programme Manager not later than end of June N-1. In the period March-April N-1, the S2R Scientific Committee (SC) and States Representatives Group (SRG) will hold their respective meetings to examine the draft AWP at the relevant stage and provide their scientific and political advice/input in line with the S2R Regulation. This will be taken into account in the final draft of the AWP to be submitted to the GB.

The European Union Agency for Railways (ERA) shall be involved in the preparation process during the full cycle, in line with the domains of activity of its responsibility and in agreement with the Programme Office. Their input on the draft AWP is expected by March N-1.

During the same period, as far as possible, the draft AWP shall be presented also to the Commission Services in order to anticipate any possible comments and suggestions to reduce the final approval process within the GB.

As from July N-1 to the final submission to the GB early September N-1, the Programme Office elaborate the final draft of the AWP for year N, running specific consultations with the IP Coordinators, SC and SRG.

In September N-1, the final draft AWP is sent to the GB for its adoption by the end of October N-1. The adoption of the GB shall be formalized after having duly consulted the SC and SRG.

The adopted AWP for year N is published on the S2R JU website on the date of the relevant GB Decision. Unless the budget of the Union is adopted before that date, it shall contain a disclaimer indicating that the final amounts and content are subject to the final adoption of the budget of the Union for the relevant year.

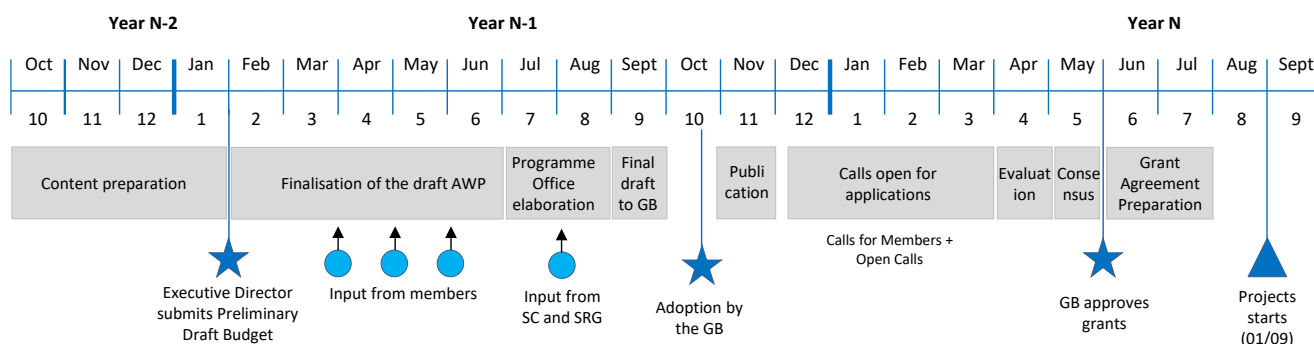


Figure 4 - Annual Work Plan cycle

As a result of the AWP adoption, the ED instructs the Programme Office to launch the publication of the draft call for proposals and/or call for tenders. The call(s) for proposals are expected to be available in draft format on the H2020 Portal during the first half of November N-1 while the call for tenders will be following the provisions of Title V of the Union General Financial Regulation.

The call(s) for proposals shall be open for submissions immediately after the adoption of the Union budget; the close date should allow for sufficient time for the preparation of the proposals, indicatively three months.

As from submission deadline, indicatively end of March, until early May of year N, all receivable proposals are evaluated by panels which consist of the S2R JU Programme Manager that chairs the meetings, a representative of the Commission Services and/or ERA as observers (where appropriate) and independent experts. The latter are selected by the Programme Office from the H2020 database.

The first step of the evaluation consists of an individual assessment by the independent experts. These individual assessments are provided to a rapporteur who will prepare the first draft of the evaluation report. A consensus meeting for each of the panels is organised around mid-May. During the panel meeting, all evaluators come together and try reaching consensus of the evaluation and relative score. The process is observed by an independent expert (called observer) to assess any possible issue, qualitative aspects, transparency, etc. This evaluation process is aligned with the evaluation of proposals describe in Section 7.1.

In parallel to the operational evaluation, the administrative evaluation of the proposals is performed by the S2R Finance and Administration with the support of some of the Commission Services and the Research Executive Agency (REA).

The panel reports are transmitted to the S2R JU ED who, taking into account the outcome of the evaluation process, submits a report to the GB including his recommendations on the proposals' ranking and financing.

The Governing Board shall approve the list of actions selected for funding, subject to the relevant provisions on Conflict of Interest. For more details we refer to Article 23 in the Statutes of the Regulation. The GB meeting is planned to take place during the first half of June year N to ensure the Grant Preparation phase during June – July. This shall allow the ED, with the timely cooperation of the awarded consortia and Commission Services/REA, to sign the Grant Agreement with the project coordinator before the month of August and start the R&I activities of the new Projects as from the 1st of September of year N. As from here, the 'Project life cycle' starts.

3.4 Project life cycle

Supervision and monitoring activities of the Programme Offices have been duly adapted, taking into consideration the role of the Other Members in the JU compared to that of the Open Calls.

3.4.1 Other Members Projects

In order to support the collaboration between the Other Members in their Projects (CFM Projects), the S2R JU has made available the S2R Multi-Projects Cooperation Tool, which use is mandatory for all CFM Projects and which facilitates the organization of meetings, the collaboration in the preparation and review of deliverables, sharing information, monitoring consumption of resources vis-à-vis the progress of the Projects, management of risks and opportunities, etc. The Programme Office maintains an overview of the S2R Multi-Projects Cooperation Tool, on the specific Projects, aggregated at the level of Members, IPs and finally Programme. A specific area of the S2R Multi-Project Cooperation Tool per Project is available for their internal preparatory work, to which the S2R JU has no access.

On 14 February 2017, the S2R JU transmitted a guidance document explaining the conditions for use, status, functionalities, required input, etc. of the private part of the Multi-Projects Cooperation Tool, called "20170213_Cooperation Tool - S2R memo".

In addition, the S2R Multi-Projects Cooperation Tool provides the Projects with a public website that is embedded in the S2R Website.

The Projects are nothing else than the administrative instrument to implement the S2R Programme and the focus should be on the delivery of the Programme results through the means of Project activities.

The review and monitoring of the Other Members' Projects are based on a calendar year cycle (see Figure 5). The reporting period for interim payment ends at the end of December each year. Based on the rules of Horizon 2020, the Project Coordinator has 60 days as from that date to submit both their periodic financial and technical reports (i.e. by the end of February N+1), through the H2020 Portal. The S2R Cooperation Tool should be able to facilitate this reporting phase.

The last reporting period¹⁰ for final payment based on the rules of H2020 will coincide with the project end, deviating therefore from the annual cycle.

As from then, the Programme Office has 90 days to proceed with the possible payment of the co-funding. The Programme office, helped by independent experts when needed, may carry out the review of the reporting/deliverables for the next 2 calendar years after the payment of the balance.¹¹

Subject to the timely submission of the Financial and Technical Reports, the annual review called here below "Control Gate" is carried out during April N+1, when the S2R Programme Managers supported by experts and observers (IP Coordinator(s), external and/or ERA and/or Commission) will assess the performance of the Projects in accordance with the criteria established in the S2R Financial Rules, H2020 Rules of Participation and the Grant Agreement and summarized in Chapter 7 – Quality management.

- Beyond the Control Gate, the S2R JU will monitor the progress of the R&I activities through a bi-annual reporting, at the following conditions: twice per year, once by end of July (for the period Jan – Jun of the year n) and once by the end of Jan n+1 for the full previous year (the latter already in place and foreseen in accordance with the S2R Regulation on IKOP/IKAA)
- only financial data (no men/months)
- Total Cost (is the total full cost sustained against which we measure co-funding at 44.44 %) per Member (including linked third parties) and Project
- per Member/project , the estimated % of the progress of the work compared to the estimated planning (**if available**)
- directly per Member to the JU through the Cooperation tool, no transit through project coordinators
- based on reasonable estimates if no other data available, especially for reporting at the end of July.

The reporting will be consolidated by the JU and distributed to all JUs' Members.

¹⁰ Refer to Article 20.2 of the H2020 General MGA

¹¹ Refer Article 22.1.2 of the H2020 General MGA

These indicators will also be reported to the meetings of the GB as well as the SC and SRG. Based on the work performed on the indicators, the aforementioned three may be subject to revision.

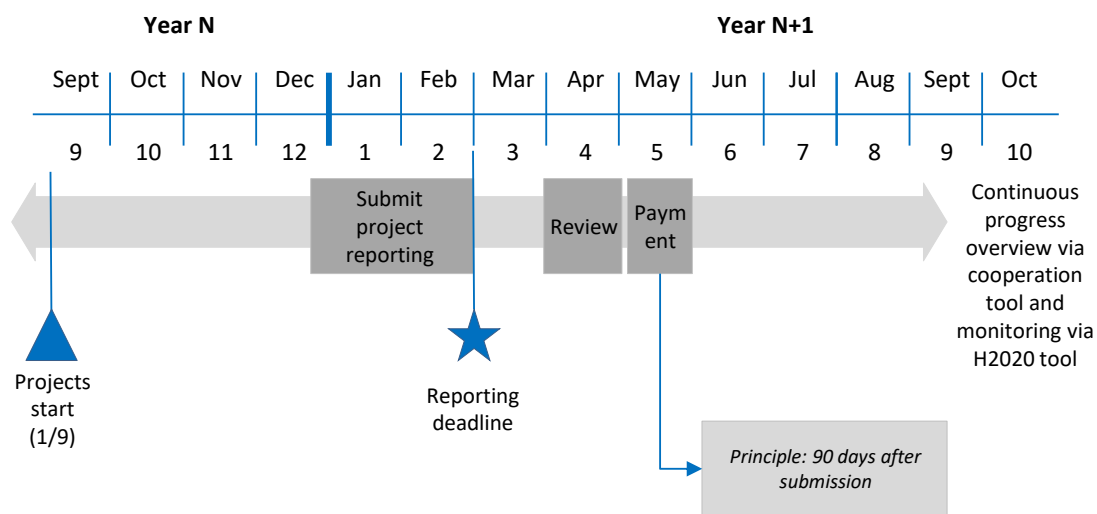


Figure 5 - Call for Other Members

The project review is performed through quantitative and qualitative data, as described in Chapter 7 – Quality Management.

In parallel to the Control Gate, the Financial Reporting will be subject to initiation and verification in accordance with the S2R Financial Rules and any available vade mecum/procedure/guideline applicable to H2020 Grants.

The results of the Control Gate and the Financial Review will converge in the proposal to the S2R Authorizing Officer to accept them and proceed with the payment of the co-funding in accordance with the relevant grant agreement provisions. Further details can be found in Articles 20, 21, 22, 42 and 43 of the Grant Agreement.

Where there would be the need for additional information, clarifications, etc. these will take place in accordance with the procedure established in Article 17 of the Grant Agreement.

Based on the experience gained from the implementation of this approach to the first series of Projects, S2R may decide to amend the Control Gate approach.

3.4.2 Open calls Projects

With regard to Project awarded through Open Calls, the cycle is in line with the usual practice applied within H2020 projects. Consequently, the reporting period for interim payment ends is not combined with the annual cycle but has been set every 12 months after the start of the project, for projects between 18 to 24 months, and every 18 months for longer life projects. Based on the rules of Horizon 2020, the Project Coordinator has 60 days as from that date to submit both their periodic financial and technical reports, through the H2020 Portal.

The S2R JU will assess the periodic review and will decide on a case by case basis on the need for a project review with experts etc.

The Open Call Projects are not benefitting of the S2R Multi-Projects Cooperation Tool and they will develop their own communication channels, both internal and external (public). S2R will ensure the connection with its website to create a platform for the Railway R&I.

A visualization is depicted in Figure 6:

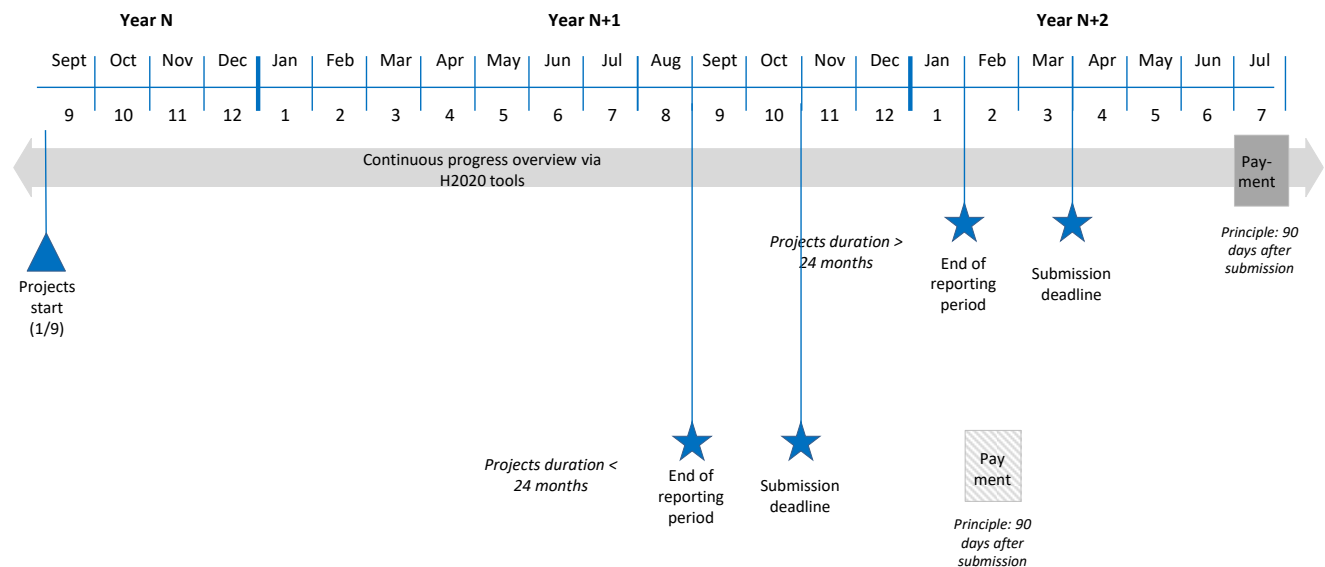


Figure 6 - Open Calls

3.5 IKOP and IKAA reporting Cycle

On 25 October 2016, the S2R JU transmitted the guidance on the IKOP and IKAA reporting and auditing, which includes these costs definition. This document, named “Guidance for members and their appointed auditors_20161118 final” was sent on 26 November 2016 (document reference ED Decision 2016/017) after a proposal and consultation process was made by the JU to the Other Members. See below Annex

F.

The purpose of this document is to provide the Other Members with a framework for their IKOP and IKAA reporting as well as for the in-kind contribution certification. For further details on the IKOP and IKAA reporting and auditing we refer to the aforementioned document.

3.6 Project closure and final review

The objective of project closure is to ensure that the project is closed efficiently and effectively. This is done by ensuring that the agreed scope has been completed, costs are line with the contract, status is documented, project objectives have been achieved, no work or actions are left outstanding, and all parties agree and have been informed of the project closure. Project closure takes place when a project has completed all its goals or if a decision is taken to end the project early.

This process will take place in accordance with the procedures established in Articles 19, 20 and 22 of the Grant Agreement.

A final review, compliant with the internal quality process, will be performed at the end of each project. This review will follow the same process as the annual reviews, described in section 3.4.1.

3.7 Controls and audit

According to Article 22 of the Grant Agreement, the S2R JU and/or the Commission can perform checks, reviews and audit of the proper implementation of action by the Other Members.

The checks are conducted by S2R JU and, as an example it may consists in asking to the coordinator (or directly to the beneficiaries) for additional information, mainly during the payment validation process. If the check shows ineligible costs or serious breach of obligations, it may lead to cost rejection or grant reduction and, if necessary, recovery (as per art. 42, 43 and 44 of the Grant Agreement).

The reviews (Art. 22.1.2 of the Grant Agreement) normally concern mainly the technical implementation of the action, but may also cover financial and budgetary aspects or compliance with other obligations under the Grant Agreement. They consist in an in-depth examination of the progress of the action and they could be conducted at any moment and up to 2 years after the payment of the balance.

The audits normally concern mainly the financial implementation of the action by a beneficiary but may also cover technical aspects or compliance with other obligations under the Grant Agreement (e.g. use of the logo). They performed an in-depth examination by the Commission services or any appointed entity on behalf of the S2R JU.

In addition the S2R JU will propose to the Other Members to organise on-site visits in order to share experience in the financial management of H2020 projects.

In accordance with the Grant Agreement, audits, checks and verifications can be performed by the European Court of Auditors and OLAF.

Please note that since the AWP2018 the S2R JU has applied the Lump Sum approach for the Grants awarded to S2R Members. This is regarded as an administrative simplification as the costs actually

incurred are not relevant and therefore there is no need to report them, neither Certificate of Financial Statements needs to be produced at the final payment anymore. It should be noted although that records should be kept in the Members' systems in accordance with their accounting practice. The checks and reviews made by the S2R JU will focus on the full accomplishment of the work committed in Annex 1, checking in each reporting period which work packages have been successfully concluded and releasing the corresponding lump sum share amount only for those ones. During the final payment possible partial releases of the lump sum share could happen. Audits on financial implementation are therefore also not applicable and audits would focus on the technical aspects or compliance with other obligations under the Grant Agreement. In general all kind of checks, reviews, audits and investigation conducted by JU or ECA, OLAF are always possible under exceptional circumstances.

4 S2R JU Governance

This chapter introduces the elements of governance created to manage the different programmes and describes the committees, boards and groups that are used to steer the programmes and their activities.

4.1 Basis of Authority

Council Regulation (EU) No 642/2014 of 16 June 2014 sets out the basis for the S2R JU its objectives, scope and tasks. The S2R JU shall constitute a body entrusted with the implementation of a public-private partnership referred to in Article 209 of Regulation (EU, Euratom) No 966/2012. The S2R Joint Undertaking shall be represented by its Executive Director. Its mandate goes beyond the resources provided by the Union for its Railway R&I and include the management of all-rail focused research and innovation actions co-funded by the Union.

4.2 S2R JU Governance Structure

The governance of the S2R Programme is depicted in Figure 7:

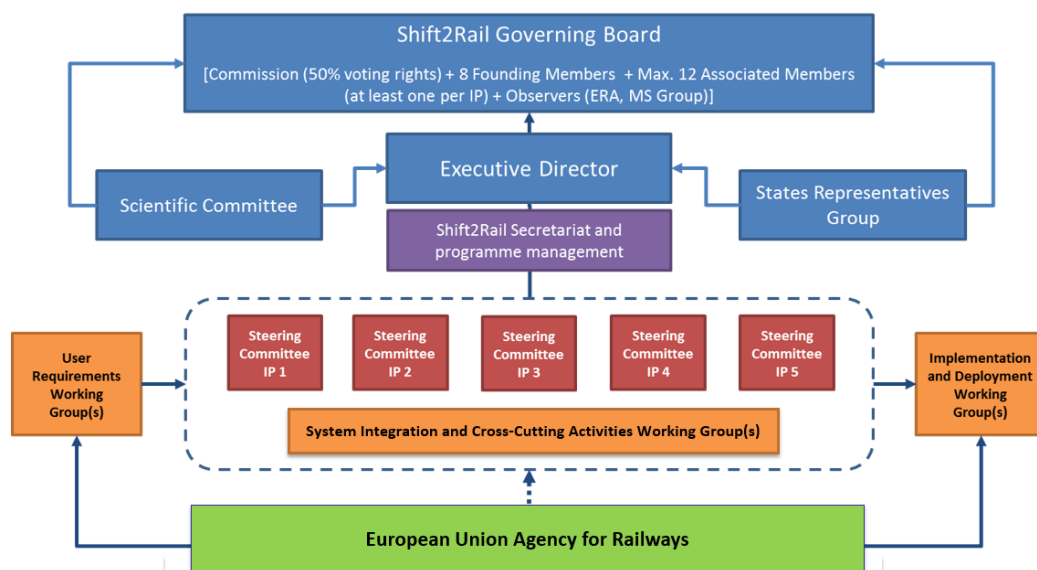


Figure 7 - S2R Governance Structure

The governance of the Programme is performed by the following main bodies:

- The Governing Board (GB) which has the overall responsibility for the strategic orientation and operations of the S2R JU and supervises the implementation of its activities by its Executive Director. The role, composition, tasks, decision making process of the GB is established in the

S2R Regulation, complemented by ‘Rules of Procedures of the Governing Board of the S2R JU’¹²;

- The Executive director (ED), who is a Member of the staff of the JU, and responsible for the day-to-day management of the S2R JU as well as managing the Shift2Rail Secretariat;
- The Scientific Committee which will advise on the scientific and technological priorities to be addressed in the Annual Work Plans (AWPs);
- The States Representatives Group, representing EU Member States and countries associated with the Horizon 2020 Framework Programme; inter alia, this group will offer opinions on the strategic orientations of the JU and on the links between Shift2Rail activities and relevant national or regional research and innovation programmes.

The Scientific Committee and the States Representatives Group are advisory bodies to the Shift2Rail JU. The ED is also supported by:

- European Union Agency for Railways;
- IP Steering Committees;
- Working Groups setup by the GB:
 - User Requirements Working Group and Implementation and Deployment Working Group;
 - System Integration Working Group, including the Cross Cutting Activities subgroup, the IP coordinators subgroup and temporary subgroup.

4.3 Programme Governance

4.3.1 ED Programme Board

The ED Programme Board has been created at the end of 2019 by ED decision as an integral part of the decision-making procedure of the Programme Governance supervised by the ED.

In order to create a reference architecture for railways and ensure its wide adoption, IPx will work in conjunction with all IPs and CCA and liaise with the S2R Programme Board to streamline the change management within the running projects, ensuring these follow well evaluated business cases for all relevant stakeholders.

The “Change Management process for the S2R Common functional Railway System Architecture and impact on the S2R programme” is reflected in the document of Annex I.

¹² <http://ec.europa.eu/transport/sites/transport/files/modes/rail/doc/2014-07-30-rules-of-procedure-of-the-governing-board-of-the-shift2rail-ju.pdf>

This work can become the base for a much more Programme and rail sector integration, starting with achieving a European sectoral agreement on the way the system will be operated in the future, notably with the use of the ERTMS game changers. This would set the ground for multimodal collaboration, especially in area dealing with similar aspects such as air traffic management, smart mobility, etc. It will also provide a new set of business cases and potentially new services that implementing a new system of system architecture and a new approach in sharing data, will prove in S2R benefits and performance that would potentially override any concerns on migration costs.

4.3.2 The System Integration Working Group (SIWG)

This Working Group shall support the Executive Director in steering the Programme R&I activities in line with the strategic orientation established by the GB and in the implementation of the Programme, in particular ensuring a system of systems approach towards ITD and SPD.

In addition, the SIWG should support the ED in:

- providing strategic views for the execution of the Programme and beyond;
- tracking issues with business impact;
- monitoring the resources of the Programme and contractual issues;
- assessing the Go/No Go of a project;
- assessing major risks and issues.

This Working Group shall meet in different configurations, taking into consideration the following aspects to be examined:

- SIWG in the Programme Management set up – IP SteCo Coordinators, TD Leaders and Project Coordinators;
- SIWG in the Programme Strategic View – Members’ representatives mostly GB members, to which the IP SteCo Coordinators shall be invited based on the agenda;
- Any possible other configuration as the need may arise.

The SIWG is chaired by the ED of the S2R JU. The SIWG may also establish on a case by case basis other dedicated teams to prepare its work or ad hoc activities.

The GB also established two permanent subgroups:

- The CCA Steering Committee, which operates similarly to the IP SteCo but focuses on the cross cutting activities;
- The IP Coordinators subgroup, where the IP coordinators (including the CCA coordinator) are asked to take coordination actions on a needed basis.

4.3.3 Innovation Programmes’ Steering Committees

Steering Committees are established for each of the five Innovation Programs and CCA. Each Steering Committee is composed of:

- a representative of each Founding Member and Associated Member fulfilling the criteria listed in Article 1(2) or, for railway undertakings, the criteria listed in Article 4(5);

- a representative of each Associated Member participating in the Innovation Programme;
- one or more representatives of the Programme Office¹³, as designated by the Executive Director.

These Steering Committees are established to guide and monitor the technical functions of the TDs and ITDs, and to take decisions on technical matters in line with the ED decisions. They discuss the masterplan, annual work plan and relevant linked projects and report on the progress and status of the programme.

Each Steering Committee has adopted its rules of procedures, based on a common model approved by the GB. A chairperson, the IP/CCA coordinator, is selected amongst the Other Members by vote. These Steering Committees are, in specific, responsible for:

- proposing to the Governing Board a shortlist of a minimum of two candidates from which the IP's representative in the Governing Board will be selected, as well as, where necessary, establishing an order of rotation. Insofar as possible, the shortlist should reflect a balanced representation of SMEs, of the research community and of actors from the entire rail value chain, including from outside the traditional rail sector;
- providing the relevant technical input to its IP, in particular for the development of the calls for proposals with a view to approval by the Governing Board;
- establishing the detailed annual implementation plans for the IP in line with the annual work plans adopted by the Governing Board in accordance with Article 2(c);
- ensuring the continuity and synchronicity of the activities to be undertaken in the framework of the IP and in relation to other IP and cross-cutting activities;
- reporting to the Executive Director on the basis of the key performance indicators defined in Article 2(2) of this Regulation;
- responding to requests, related to the IP, from the Executive Director or Governing Board of the S2R JU;
- nominating Technical Demonstrator leaders.

Each Committee meets every three months to handle disputes, propose possible budget re-allocations and check the implementation of detailed plans. Extraordinary meetings are convened at the request of the Chairperson or the Executive Director.

4.3.3.1 Other Working Groups and ad-hoc Groups

Other Working Group(s) consist of:

- The User Requirements Working Group(s) is composed of S2R JU members and non-members to assist the JU in ensuring that technical solutions developed within S2R meet the specific needs of all relevant end users;
- The Implementation and Deployment Working Group(s) is composed of S2R JU members and non-members to test the operational reliability of the results of Shift2Rail and thereby

¹³ See art. 10.5 for Programme Office definition and art. 11.2 of the S2R Statute (annex 1 of the S2R Regulation)

contribute to a more rapid uptake and large-scale deployment of the solutions developed through the Shift2Rail activities.

These two working groups have been clustered together for time being (URID-WG).

An ad-hoc group for the revision of the MAAP has also been created and it is called Tiger Team MAAP.

4.4 Working with ERA

The S2R JU should “bring in the experience and expertise of the European Union Agency for Railways (ERA) on issues relating to interoperability and safety”¹⁴ through different measures of cooperation. This may include, in its role as regulator and, in this respect, subject to risks of conflict of interest, facilitating market opening and exchangeability of components.

In the same manner, the relation between ERA and the S2R JU shall be interpreted at the light of the role of the JU “to manage all rail-focused research and innovation actions co-funded by the Union”.

Firstly, ERA attends as observer the following meetings, with defined contact points maintained in the S2R JU contact lists:

- Governing Board;
- IP and CCA Steering Committees;
- System Integration Working Group;
- Tiger Team MAAP ad hoc group;
- User Requirement, Implementation and Deployment Working Group.

As the IP/CCA SteCo and SIWG benefit from the use of the S2R Multi-Projects Cooperation Tool set up for the sharing of information and documentation, the S2R JU provided direct access to the ERA to these sections of the Cooperation Tool. Similarly, ERA has access to the Members area of the S2R website where the GB and SC meeting documentation is stored.

The S2R JU is also regularly informing ERA on matters relevant to their advisory role, though:

- Regular email exchanges;
- Ad-hoc coordination meetings and conference calls, happening on average every four months.

The S2R JU also requests ERA to provide inputs to the Annual Work Plans as indicated in the section 3.3 of this document. The S2R Regulation provide to the Agency a contributor role, “in particular by performing the following advisory tasks:

(a) proposing possible amendments to the S2R Master Plan and to the annual work plans, in particular to ensure that research needs relating to the realisation of the Single European Railway Area are covered;

¹⁴ Council Regulation (EU) No 642/2014 of 16 June 2014: whereas 11

(b) proposing, after consultation with the stakeholders referred to in point (e) of Article 2(1) of this Regulation, guidelines for research and development activities leading to technical standards with a view to guaranteeing the interoperability and safety of results;¹⁵

(c) reviewing the common developments for the future system and contributing to defining target systems in regulatory requirements;

(d) reviewing project activities and results with a view to ascertaining their relevance to the objectives identified in Article 2(2) of this Regulation and to guaranteeing the interoperability and safety of research results.”

Taking into account the above and in order to ensure that the results from the S2R projects do not encounter a regulatory blocking point because of their novelty, the S2R JU has defined with ERA and DG Move a process for collaboration at project level.

This process allow the ERA to “*reviewing the common developments for the future system and contributing to defining target systems in regulatory requirements*” and “*reviewing project activities and results with a view to ascertaining their relevance to the removal of remaining TSI technical obstacles and to guaranteeing the interoperability and safety of research results.*” in the following way:

1. The S2R JU will provide the possibility to ERA to attend the evaluation of the call proposals as observer. ERA does not have voting right but has the possibility to access to the relevant documentation and provide to the JU and the independent evaluators with feedback on the aspects related to interoperability and safety included in the proposals;
2. ERA will provide to the S2R JU, within 2 calendar weeks after the GB approval of the list of actions/projects selected for funding, the “*the level of desired involvement*” in those projects within the scope of its activities¹⁶;
3. The S2R JU will discuss the involvement of ERA in the indicated projects with the relevant Project Coordinator to ensure their participation as appropriate. This should be defined during the Grant Agreement Preparation (GAP) phase, as far as possible;
4. ERA will provide to the S2R JU by August 1st the name and contact details of the ERA representative who will be following up the indicated projects;
5. S2R will provide the possibility to the ERA representative(s) to attend the respective Project Kick-off meeting, which is expected to starting as from September 1st, and may involve him/her as observer during the Review meetings or Projects checks and may request ERA to provide written advice on specific Project deliverables or reports.

The level of desired involvement is defined as follow:

¹⁵ A compendium on Safety and Interoperability has already been developed together with the ERA and published on the S2R website: https://shift2rail.org/wp-content/uploads/2020/02/Compendium_on_safety_and_interoperability_2019.pdf

¹⁶ see Annex H

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

For the level of involvement “2” and “3” the S2R JU will discuss bilaterally with the Project consortium during the GAP and identify on a case by case analysis the Work Packages and appropriate meetings where the ERA could be directly involved, as well as access to project documentation. This involvement be formalised, including the possibility to assign to the ERA a specific role within the project (e.g. member of an advisory board), as far as possible in the Project Grant Agreement preparation.

During the course of the project, in case ERA estimate that a different level of involvement into the project is necessary, this will be communicated to the S2R JU and following the same above procedure, then the S2R JU will discuss it with the Project Coordinator.

In case ERA would like to have access to Project documentation where they have no access or that is not yet available (because not yet submitted as deliverable), ERA will provide the request of access to the S2R JU. ERA will explain the need, possible time constraints and any other information that is important to take into account. The S2R JU will agree with ERA the most appropriate course of action and discuss it with the Project Coordinator.

For the CFM Projects using the S2R Multi-Projects Cooperation Tool, the S2R JU will also ask on a bilateral basis to the Project Coordinator the authorisation to provide access to the project part of the tool, in its entirety or partially.

The ERA staff is subject to the Provisions of the Union Staff Regulations and in particular specific obligations in terms of confidentiality and non-disclosure in the performance of their duties, also after the end of their work contracts.

In a reciprocity manner, the S2R JU will be attending the relevant ERA Committees working groups, including, for example, the participation of the S2R ED to the ERA Management Board as observer in particular when matters related to the scope of activities of the JU are mentioned.

The S2R JU will also provide representatives (from its staff or Members) to the ERTMS Stakeholders’ Platform meeting at Board level as well as in the relevant subgroups of the Platform created for

addressing specific topics linked, for instance, to the “ERA Longer Term Strategy” (ATO project, Next Generation Telecommunications coordination group, and any other future groups to be created by ERA). The Coordination subgroup of the ERTMS Stakeholders’ Platform may also be considered.

This initial setup should be further considered in the future to avoid overlapping between design and R&I of innovative solutions and their certification and authorization.

In addition, ERA will also provide access to the nominated S2R JU representatives to other relevant committees linked to CCS activities (including ERTMS/ETCS) such as the ERA CCS Working Party or the ERA ERTMS Control Group.

ERA will provide also access to the S2R JU staff representatives to its Extranet and calendar of activities. ERA will add in their relevant distribution lists the nominated S2R JU staff representatives, ensuring the proper dissemination of the activities and information on workshop/events.

ERA will also request the S2R JU staff representatives to attend their internal RSG (Research Steering Group), to ensure full alignment of activities.

5 Programme implementation roles and responsibilities

This paragraph describes the roles and responsibilities of the JU staff accountable for the successful implementation of the S2R Programme. In Annex C, the Programme Contact Persons of the S2R JU can be found.

5.1 Research and Innovation

5.1.1 Head of Research & Innovation

The Head of Research & Innovation reports to the Executive Director of the S2R JU. The Head of Research and Innovation has overall responsibility for the Programme management. More specifically, the Head of Research and Innovation is responsible for the following activities:

- Together with the Other Members, ensure new and relevant technology is incorporated in the programme;
- Manage the S2R JU programme, including the status of all projects, scope changes, delays, etc.;
- Manage the Programme Managers activities and the legal support for grants;
- Lead the review process during the annual review of preliminary deliverables of all projects;
- Develop the competences and skills of the personnel reporting to her/him and evaluate their performance;
- Revise and finalise the content and scope of the Calls for Other Members and the Open Calls;
- Take on additional tasks as required in the interest of the service.

5.1.2 Programme Managers

The Programme Managers are reporting to the Head of Research & Innovation. They are responsible for the operational and technical aspects of the IP(s) and projects allocated to them. Their role is to ensure effective management of the overall IP; to monitor and report on the TDs/ITDs/IPs progress towards the goals and milestones as set, and to take all measures needed under the direction and in close cooperation with the Head of R&I and finally the ED to assure the Programme's success.

The Programme Manager assists in management, monitoring and evaluation of all aspects of the JU IPs and their specific projects with a view to ensuring that these contribute to fulfil the objectives of the S2R Master Plan. He/she will ensure the following tasks:

- Being the central contact point for S2R actions (awarded grants, projects), supervise those actions and the fulfilment of the contractual obligations; check, deliverables, periodic reports, perform on-site reviews, etc. maintaining an overview of progress and financial expenditures of projects under his/her responsibility;
- Review and approve projects deliverables and milestones completion and their alignment with the Multi-Annual Action Plan;
- Participate, as required, to projects progress reviews and other verifications;
- Assist in evaluating proposals submitted to S2R calls for proposals or tenders;

- Follow up Innovation Programme Steering Committees and Cross Cutting Activities and ensure their work alignment with the Master Plan objectives;
- Follow up S2R Working Groups;
- Prepare input for S2R bodies;
- Safeguard a culture of consistent compliance with rules and regulations as well as ethical behaviour;
- Draft reports and meeting minutes;
- Contribute to the finalization of the S2R documentation.

5.1.3 *Legal support - grants*

The legal support - grants reports to the Head of Research and Innovation of the S2R JU and functionally to the S2R JU legal offices. In particular, the legal support - grants will:

- Provide legal advice related to calls for proposals, evaluation of proposals, grant preparation and grant management;
- Provide legal advice related to rules applicable to the Horizon 2020 programme;
- Drafting calls and other documents to be used by the operational team, Other Members and projects beneficiaries (Model Collaboration Agreement, for example);
- Management of the Info-Call mailbox and the Q&A register.

5.1.4 *IP/CCA Coordinators*

The IP/CCA Coordinator from each respective IPs/CCA reports through the IP SteCo to the S2R ED on the performance of the activities on the basis of the key performance indicators¹⁷ and any other specific key performance indicators which may be developed by the S2R JU and that will be measured by the appropriate tools put at the disposal of the IP Steering Committees in cooperation with the CCA. The IP/CCA Coordinators work closely with the Programme Managers assigned to their IP and with the Head of Research and & Innovation.

The IP/CCA Coordinator are also chairing the respective IP/CCA Steering Committee and shall have overall responsibility for the technical and organisational coordination of the Activities launched for the completion of their IP/CCA.

In particular the IP/CCA coordinator:

- Provide to TD/CCA Area Leaders all the relevant information in order to allow their contribution to support the IP SteCo Members as described in the approved IP/CCA rules of procedure,
- Check the real advancement of the TDs and produce the related reporting to the IP Steering Committee,
- Report to the IP Steering Committee any issues, disputes, risks or opportunities might arise among the TDs that are not solved or not exploited at TD or Activity level,

¹⁷ Refer to Article 2(2) of the S2R JU Regulation

- Notify the TD/CCA Area Leaders and Activities Coordinators of any decision taken by the IP Steering Committee regarding organisational, financial, technical matters or any other subject that impacts the TD working activities,
- Cooperate with the Activities Coordinators in order to foster and promote synergies between TDs and CCA Area, different Activities of other IPs and CCA, H2020 1st call projects, etc.

5.1.5 *TD/CCA Leaders*

Each Technology Demonstrator and the Areas for CCA have one Leader. This TD/CCA Leader reports through the IP SteCo to the S2R ED on the performance of the activities on the basis of the key performance indicators¹⁸ and any other specific key performance indicators which may be developed by the S2R JU and that will be measured by the appropriate tools put at the disposal of the IP Steering Committees in cooperation with the CCA. The TD/CCA Leader shall have overall responsibility for the technical and organisational coordination of the Activities launched for the completion of the TD/CCA Area and to establish required connections to other IPs and the CCA.

In case of TDs/CCA Areas clustering in one research Activity as defined in the AWP, the involved TD/CCA Area Leader nominate among themselves one Leader who shall be responsible to coordinate the collaboration of the involved TD/CCA Areas.

The TD/CCA Area Leaders shall support the IP Steering Committee members for the activities described in the approved IP/CCA rules of procedure.

5.1.6 *Project Coordinators and beneficiaries*

The Project or Action¹⁹ Coordinators and beneficiaries are representatives from awarded organisations (being representative from Other Members organisation or non-JU Members carrying on Open call actions) who carry out the day-to-day project management, technical oversight and administration of the funded activities related to TDs and ITDs.

The Project Coordinator report to the JU through the S2R Programme Manager that is responsible for that Action by monitoring the progress against the project Work Plan and budget to the timely execution and proper implementation²⁰ of the projects under his/her responsibility.

In particular, the Project Coordinator:

- Is the Central Contact Point for the S2R JU;
- Administers the S2R financial funding of his project;
- Reviews the project reports to verify consistency;
- Monitors the project compliance under the GA.

In particular, the Project beneficiaries:

- Carry out the work as identified in the Annex 1 of the project GA;

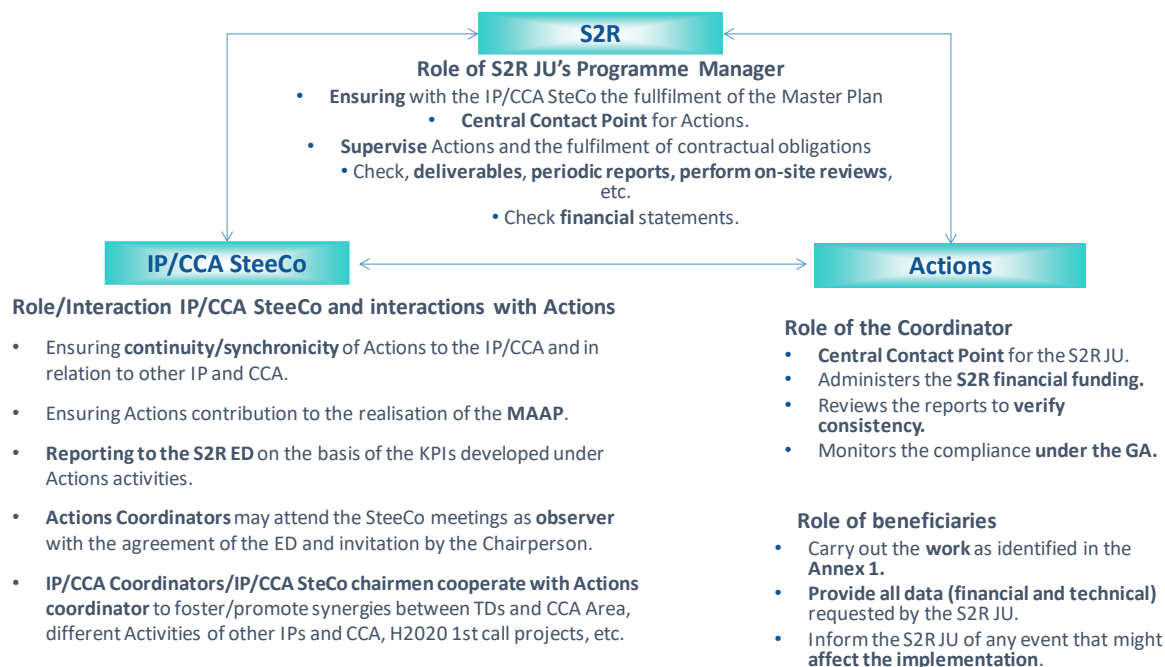
¹⁸ Refer to Article 2(2) of the S2R JU Regulation

¹⁹ Terminology defined in Article 29.4/38.1.2 of the H2020 MGA

²⁰ Refer to Article 41.2b of the H2020 General MGA

- Provide all data (financial and technical) requested by the S2R JU;
- Inform the S2R JU of any event that might affect the implementation.

The figure 8 below summarises the main interactions and roles with Actions/Projects:



The figure 8 - interactions and roles with Actions/Projects

5.2 Administration and Finance

5.2.1 Head of Administration and Finance (HAF)

The Head of Administration and Finance reports to the Executive Director of the S2R JU. The Head of Administration and Finance carries overall managerial responsibility for financial and administrative issues. More specifically, the Head of Administration and Finance is responsible for the following activities:

- Ensure the coherence among the work elements assigned to the Administration;
- Manage the S2R JU budget (annual budget preparation and presentation, follow-up and co-ordination, monitoring of expenditures, preparation of reconciled financial reports, etc.);
- Tendering and contracts management, including contract laws and regulations;
- Infrastructure and facilities management;
- Overall security matters, including physical and cyber-security;
- Maintain a harmonized knowledge management framework across the S2R JU;
- Develop the competences and skills of the personnel reporting to her/him and evaluate their performance;
- Lead the effective and efficient implementation of S2R's internal control framework.

5.2.2 *Finance team*

The Finance team reports to the Head of Administration and Finance of the S2R JU. The activities expected from the finance department cover a wide range from basic financial statements to providing clear information to assist management in making strategic decisions, as well as being responsible for managing cash flows and ensuring sufficient funds are available. In particular, the finance department will carry out following tasks:

- Financial initiation transactions, i.e. invoices, cost statements, payments, in-kind contribution declarations, etc.;
- Financial support to S2R JU operational activities (including assisting Programme Managers, analysing financial viabilities and following up financial implementations of grants);
- Advice on financial practices in line with S2R JU budgetary, financial and contractual rules;
- Provide assistance for control and audit missions;
- Prepare financial reporting tables and reports.

5.2.3 *Legal officer*

The Legal Officer reports to the Head of Administration and Finance. His role is to ensure the legal soundness of the actions and decisions of the S2R JU. In addition to overseeing the work of the legal support - grants function, the Legal Officer is responsible for the following:

- Procurement and other legal administrative issues;
- Monitor the implementation of applicable rules, regulations and procedures within the JU;
- Advise management and staff on the validity and conformity of procedures with the standing rules and regulations;
- Improve quality and consistency of the JU's output from a legal standpoint;
- Provide legal analysis and advice in support of S2R JU policies;
- Advise management on possible litigation risks and contribute to find solutions to avoid litigation;
- Ensure the follow up of litigation in liaison with the relevant services such as the Commission's Legal service, the Ombudsman and OLAF;
- Contribute to the production of manuals for management and units on legal and procedural issues;
- Deal with issues relating to protection of data and access to documents in the JU.

6 RACI matrix

Via a RACI matrix (Table 1) an overview is created of which role needs to do what during a certain task or event.

Actions	GB	ED	Head of R&I	HAF	IP/CCA Coordinators	TD/WA Leaders	Project Coordinators	Independent experts	SC	SRG	IP SteCo
Content & budget for AWP	A	R	C	C					C	C	C
Publication of calls		A	R	C					I	I	I
Evaluation of proposals		A	R	C	C		I	C			
Evaluation of (interim) project results		A	R	C				C			C
Payment of Other Members conducting projects		A	C	R	I	I	I				
Scope changes to the projects/programme	A	C	R	C	C	C	C		C		C
Audit preparation		A	I	R				C			
Verify end deliverables		A	R	R				C			
IT security (S2R Cooperation Tool)		A	C	R			C				C
Communication and Dissemination		A			C		R				R
Risk management		A	C	R			C			C	
Change management	A	R	R	C	R	C	C				C

Table 1 - RACI matrix

Four types of roles are defined:

- Responsible: “R”: Refers to the person who must ensure that activities are completed successfully. In a RACI chart, answers the question: **Who is getting the task done?** Roles taking the main operational stake in fulfilling the activity listed and creating the intended outcome.
- Accountable: “A”: The individual, group or entity that is ultimately responsible for a subject matter, process or scope. In a RACI chart, answers the question: **Who accounts for the success of the task?**
- Consulted: “C”: Refers to those people whose opinions are sought on an activity (two-way communication). In a RACI chart, answers the question: **Who is providing input?** Key roles that provide input. Note that it is up to the accountable and responsible roles to obtain information

from other units or external partners, too; however, inputs from the roles listed are to be considered and, if required, appropriate action has to be taken for escalation, including the information of the process owner and/or the steering committee.

- Informed: “I”: Refers to those people who are kept up to date on the progress of an activity (one-way communication). In a RACI chart, answers the question: **Who is receiving information?** Roles who are informed of the achievements and/or deliverables of the task. The role in ‘accountable, of course, should always receive appropriate information to oversee the task, as do the responsible roles for their area of interest.

7 Quality Management

7.1 Evaluation of proposals

7.1.1 Evaluation process

The proposals submitted by the S2R JU Other Members (CFM) as well as the open calls (OC) proposals, are evaluated according to the H2020 award criteria and must meet the minimum thresholds in order to be funded (See Figure 10). Each proposal has to sufficiently demonstrate its added value in according to the award criteria of 'excellence', 'impact' and 'quality and efficiency of the implementation' in order to be funded by the S2R JU.

The evaluation should take into consideration the coherence of the proposal with the MAAP, which provides a benchmark for the different criteria evaluated (i.e. expected level of technical ambition, expected level of innovation potential, expected level of progress beyond state of the art, or expected level of impact of the proposals).

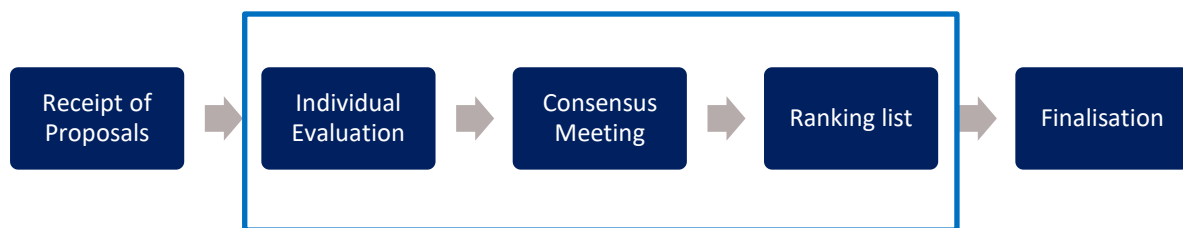


Figure 9 - Evaluation process

After the individual evaluations, consensus meetings are conducted in the different established panels, covering the different IPs and cross-cutting themes, which attribute scores (0 to 5) on 3 core capabilities:

- Excellence of the approach and concept:
 - Correspondence to work plan;
 - Clarity of objectives;
 - Credibility of the objectives;
- Impact:
 - Expected impacts listed in work plan;
 - Substantial impacts, not mentioned in the WP, that enhance innovation capacity;
- Skills and Implementation:
 - Quality and effectiveness;
 - Appropriateness of management structures and procedures (including risk, innovation, etc.);
 - Appropriateness of allocation of tasks.

This consensus meeting is held in Brussels where the different evaluators start their discussion from the individual evaluations. First, an agreement must be found on comments before a final score can be given.

7.1.2 Scoring method

A score of between 0 and 5 is awarded to each criterion, as can be seen in Figure 10. In order for a proposal to be considered for funding, scores must pass the threshold of 3 out of 5 on each criterion and the total score of the proposal must be above the overall threshold of 10 out of 15. The criterion Impact is given a weight of 1.5 to determine the ranking.

All proposals considered for funding are subject to ethics screening and possible assessment.

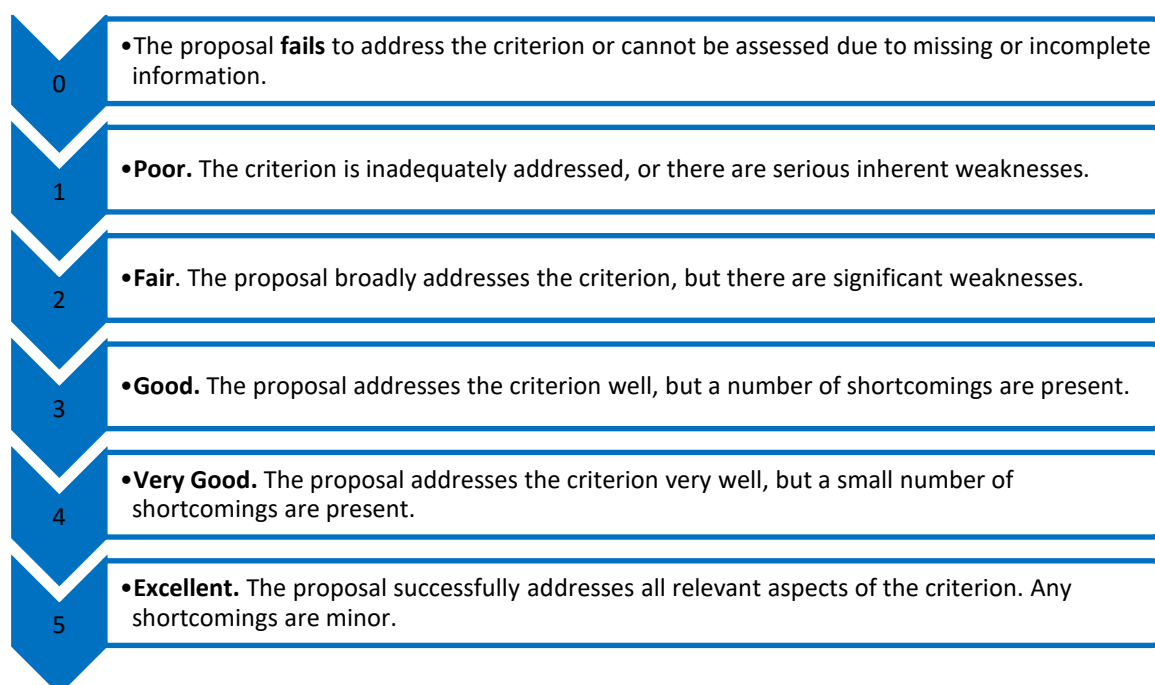


Figure 10 - Scoring scale

7.2 Financial Viability Check

An Other Member acting as coordinator of a consortium which submitted a successful proposal in answer to a call shall be subject, under certain conditions to a viability check by S2R JU through the competent Commission Services (Article 15.9 of the H2020 Rules for Participation)²¹.

²¹ Main conditions for beneficiaries subject to a financial viability check: coordinators (no public bodies nor international organisations and no mono-beneficiary) if the project requested JU co-funding for the action is ≥ 500.000 EUR

In other cases (i.e. for entities that are not coordinators or for coordinators where the project requested JU co-funding is below the threshold), the financial viability may be checked only if the request is duly justified by the JU.

In the circumstance where the financial viability check result is weak, the JU Finance Team will:

1. Investigate the possibility for the Other Member concerned to have joint and several liability (in this case the entity with joint and several liability should itself be made subject to an on-demand financial viability);
2. Request clarifications from the Other Member concerned (e.g. bilateral meeting) in order to address the issue, for example through additional complementary information to ensure there is the necessary financial capacity to implement the project (and being coordinator) through a risk analysis for the project;
3. Submit the results of these additional steps to the Executive Director who will assess the situation and, taking into consideration the views of the Other Member concerned, take the most appropriate measures.

Where following the overall assessment of the situation, the viability check remains classified weak, the JU shall implement reinforced monitoring, such as an annual update of the viability assessment, risk profile of the project and its achievements, etc. (see also Grant Preparation Report), evidence of the transfer of the pre-financing/interim and final payments to the consortium's beneficiaries and any other measure deemed appropriate to protect the financial interest of the Members, the JU and the Union.

7.3 Continuous monitoring

Monitoring is a continuous task that takes place in various forms throughout the project (and beyond).

In order to ensure good implementation, therefore the projects are monitored on:

- technical: compliance with the description of the action (DoA)
- financial: compliance with the GA rules on cost eligibility
- other: compliance with all other obligations under the grant agreement. In particular for S2R project the major importance of Article 2 of the GA which specify that the grant is awarded for an action which aims to implement the IP/CCA part of the Multi Annual Action Plan ('MAAP') and that is 'complementary' to another grant.

The S2R Project Managers are responsible for the monitoring and liaising with other colleagues for legal, financial, or administrative issues. They are assessing the deliverable at any moment before approving the periodic reports (these latter are assessed accordingly to the timeline indicated in the sections 3.4.1 and 3.4.2 of this document).

Beneficiaries are requested to regularly report, in 2 different ways²²:

- periodic reporting (at the end of each reporting period), for:
 - periodic reports, including financial statements;
 - final report.
- continuous reporting, for the:
 - summary for publication;
 - deliverables;
 - progress in achieving milestones;
 - follow-up of critical risks;
 - answers to questionnaires (H2020 and S2R (KPIs) indicators);
 - etc.

7.4 Criteria to be applied in the Project Control Gate assessment

Within the Project Control Gates being the interim or annual review supported by the Periodic reports, the S2R JU assesses the Project according to project management and project results factors.

The S2R JU requests the Project to submit the Technical Periodic Report following a standard S2R template providing some guidelines for use, it is made available in Annex A below. The objective of the process is to have a comprehensive evaluation of the Project status and of its orientation, at a certain moment in time. Beside the decision on interim payments, the main consequence of the Control Gate is an agreement (or not²³) to the Project to proceed, possibly under certain conditions and with possible changes to the plan. The Control Gate will be subject to initiation and verification in accordance with any available procedure/guideline applicable to H2020 Grants.

Project Control Gates assess in a qualitative and quantitative manner, using all the available project management and project results related criteria and the corresponding indicators or measurements.

During the Project Control Gates, Projects are evaluated looking both backward (how has the project performed up to now?) and forward (is the plan for the future still adequate?). The evaluation aims to answer the two following questions:

- “Is the Project delivering the expected result and contributing to the right Programme outputs?” This factor encompasses evaluation criteria related to the alignment of the Project DoA/plan (scope, content and schedule) vis-à-vis the needs of the Programme,

²² Refer to Article 19 and 20 of the H2020 General MGA

²³ Refer to Article 50.3.1 of the H2020 General MGA

the submission of project deliverables on time and at the expected level of quality, achievements of milestones, main scientific/technological achievements etc.

- “Is the Project properly managed and under control?” This encompasses evaluation criteria related to the quality of the project execution i.e. adherence plan and dependencies, the effectiveness of the follow-up of previous project control gates actions, as well as of mitigation actions for risks and opportunities, and the effort consumed in relation with the actual delivery of the project.

The S2R Programme Office is also assessing the proper dissemination & exploitation of project results, coming from the project in a programme context.

The major input for the Project Control Gate is the Periodic Report, and in particular the Technical one, submitted by the Project Coordinator, established in accordance with the provisions of the grant agreement. Each milestone and deliverable, as defined in the Grant Agreement Annex 1, Sections 1.3.2 and 1.3.4 shall be assessed at the Control Gate together with the Technical Report in order to gain reasonable assurance regarding the effectiveness, efficiency and economy of operations, the reliability of reporting, the safeguarding of assets and information, the prevention and detection and correction of fraud and irregularities and their follow-up, and the adequate management of the risks relating to the legality and regularity of the underlying transactions, taking into account the multiannual character of programmes as well as the nature of the payments concerned.

This is more relevant in the context of Projects belonging to an integrated Programme such as S2R where deliverables may have interdependencies and the final success of the activities build upon the contribution of each single element.

The Control Gate process shall follow:

- The Control Gate shall be organized by IP/CCA and all the Projects belonging to an IP/CCA shall be assessed together by the same panel as far as possible;
- The assessors will be provided access to the Technical Reports, including deliverables and milestones available in the H2020 Portal per IP/Project;
- The Programme Manager shall invite the Project Coordinator(s) and the WP Leaders to a Control Gate meeting (or web-conference) within 20 working days from the launch of the Control Gate procedure. The respective IP/CCA Coordinator shall be invited as well;
- At least 4 working days before the Control Gate meeting, the Programme Manager shall discuss with the panel their individual assessment; any major aspect shall be brought to the attention of the Head of R&I;
- At the Control Gate meeting all the relevant aspects coming from the panel assessment shall be discussed in order to reach a conclusion on the sound financial management of the Project in accordance with the S2R Financial Rules;

- At the end of the Project Control Gate, the Project also receives a status by the S2R JU:

In addition to the official and in depth control process that it is done through the reporting period Checks and Reviews, the S2R JU Programme Office is implementing a regular project status analysis during each IP/CCA Steering Committee meetings. Each project Coordinator and/or TD Leader is requested to fill in a PowerPoint template (see annex A) indicating various KPIs of the project and the IP/CCA Steering Committee with the respective S2R Programme Manager will assess the overall status, represented by the following colours code:

Green: the Project is under control and objectives to date have been achieved. A 'GREEN' status is the recommendation to continue with the project as planned. Nevertheless, there may be an action plan with minor corrective actions to be completed. In essence, this covers issues and improvements identified at the review that impact on the Project, such as process improvement, schedule alignment, content refinement etcetera.

Amber: significant issues have been identified which pose a significant threat to a successful outcome of the Project or Projects and its / their deliverables. An 'AMBER' status is a recommendation to continue with the Project against a corrective action plan, which will be monitored by the S2R JU.

Typical reasons for an amber status may include but are not restricted to some of the following:

- Material delay to deliverables and/or project milestones;
- Project management team not demonstrating adequate control;
- Significant non-synchronisation of dependencies;
- Overconsumption of effort in comparison with the achievements of the Project;
- Inadequate technical coherence and non-alignment with overall Programme plan (content, scope, schedule);
- High level of risk identified by the Project but with few and/or ineffective and/or not implemented action plans.

Red: gross deficiencies have been identified with the Project's management and control and/or the technical quality and direction. The project with a 'RED' status is seen to need suspension, termination, or major realignment to overcome the significant problems encountered. In this circumstance, the S2R JU ED takes action to either reorient drastically or close the project; the relevant IP SteCo and the SIWG will be consulted as necessary.

Typical reasons for a red status may include but are not restricted to some of the following:

- Highly significant delay to project deliverables and milestones;
- Excessive scope change;
- Key deliverables assessed as critically deficient or with major reservations;

- The level of risk (net criticality) is very high without any mitigation action planned.

Following the overall Project Control Gate and in particular after the Check or Review of the Reporting phase, the Programme Manager formulates, via the Head of R&I, the operational proposal to the S2R JU Executive Director to accept in whole or in part the Interim Technical Report in view of the approval process for the co-funding.

The proposal to the S2R JU Executive Director for acceptance of the Interim Technical Report including related efforts, conditions to authorise the Project to continue, and actions to be taken, are registered in a Project Control Gate Report.

From a contractual standpoint, the Periodic Technical Report constitutes the Contractual Deliverable against which the Periodic Financial Report is assessed.

Within the meaning of the S2R Financial Rules, the Project Control Gates constitute a key component of the Authorisation process for the acceptance of the deliverables to become eligible for the co-funding.

The Interim Financial Report is assessed taking into consideration, as necessary, the guidance material developed in the context of H2020.

The positive conclusion of the authorisation process – Project Control Gate and Financial assessment leads to the payment of the co-funding by the S2R JU.

7.5 Use of S2R label and S2R position

The S2R funded Projects can and must make use of the S2R logo as described in the Grant Agreement art.29.4.

A particular attention should although be paid on Projects documents with the S2R logo, or documents developed within a S2R project (by beneficiaries of S2R JU Grant Agreements or external contractors of S2R JU procurement contracts) for external stakeholders (e.g. standardisation organisations), which they can only represent a S2R position if the following conditions are all met:

- a) There is an agreement within the Project and following the Project decisional procedure set in the respective Consortium Agreement or Grant Agreement
- b) There is an agreement within the respective IP/CCA SteCo and following the decisional procedure set in the IP/CCA SteCo RoP
- c) There is an official agreement from the S2R JU, through a written confirmation of the S2R ED

Each Project beneficiary should therefore not distribute documents labelled S2R without having taken the above steps or taken the necessary measures to explain that the document do not represent a S2R position.

Similarly, any Project beneficiary or S2R Member can only officially represent a S2R position if:

- the conditions a, b and c above are all met in case of a Project beneficiary
- the conditions b and c above are all met in case of a S2R Member

The Project Coordinator or the concerned S2R Member will need to promptly inform the S2R Programme Manager assigned to the Project or the S2R Head of R&I should such cases arise.

A list of official S2R positions, including possible names of official S2R representatives in external working groups will be listed and made available in Annex G.

8 Risk Management

8.1 Risk Policy

8.1.1 Introduction

The S2R Joint Undertaking is responsible for the execution of the S2R Master Plan leading to the modernisation of the European Rail system, and contributes to the completion of the Single European Rail Area (SERA); it is therefore essential to set up a risk management system to enable the Joint Undertaking to fulfil its mission in the most efficient way.

Risk is defined as: “Any event that could occur and adversely impact the achievement of the S2R Joint Undertaking strategic and operational objectives. Lost opportunities are also considered as a risk”.

8.1.2 Policy Objectives

The S2R JU adopts a Risk Management system aiming at optimising the ratio between the level of acceptable risk by the S2R JU and the use of the relevant resources by anticipating and proactively identify, analyse, treat, control and monitor risks and opportunities. The objectives are:

- Enable informed decision making;
- Determine the acceptable level of risk;
- Prevent the occurrence and mitigate the impact of risks;
- Seize opportunities and enhance their benefits;
- Establish and implement internal control.

8.1.3 Risk Management Principles

The following principles are at the basis of risk management:

- Risk Management is a continuous process which develops at different level of responsibility to ensure that the S2R JU’s activities execution and objectives delivery;
- Risk Management is linked to the S2R JU strategy and the risk policy is part of it;
- Risk Management is a process that identifying potential events affecting the ability of the S2R JU to reach its objectives, allows the management to take actions and define mitigating measures giving them reasonable assurance on the achievement of the objectives maintaining the residual risk at an acceptable level;
- Risk Management covers both risks (potential events that may affect the S2R JU negatively) and opportunities (potential events that may affect the S2R JU positively).

When an event actually occurs it is managed outside the scope of this policy.

8.1.4 Risk management Governance rules

An effective risk management ensures that risks are managed at the appropriate level of responsibility, therefore it foresees a layered approach based on criticality and scope of the risk to be treated.

The process to identify risks starts at any level within the system: project, Innovation Programme (IP), Cross Cutting Activities (CCA), overall Programme and Joint Undertaking. Escalating or cascading process ensures that risk is managed at the appropriate level.

The creation of a risk register ensures awareness within the system. The risk management activities coordination falls within the responsibilities of the Head Administration and Finance.

8.1.5 Alignment with European Commission

The S2R JU follows the principles of the recognised international standards and aligns to the requirements of the European Commission as indicated in the Communication SEC (2005) “towards an effective and coherent risk management in the Commission services”.

The policy and the implementation of the risk management system will be subject to internal auditing.

8.2 S2R JU Risk Management Organisation and Process

8.2.1 Background

The complexity of the S2R JU activity with the involvement of many stakeholders participating to the execution of the programme organised on the five Innovation Programmes (IPs) and the Cross Cutting Activities (CCA) with many projects interconnected one with the others, calls for the adoption of a common framework to manage risks and opportunities at the different levels. This introduces common language, process, procedures and methodology, providing a benchmark against which the S2R JU could assess the progress made. This, based on the risk policy, also ensures consistency of information and data related to risks and opportunities enabling a comprehensive risk analysis at the level of the Programme and of the Joint Undertaking.

8.2.2 Framework principles

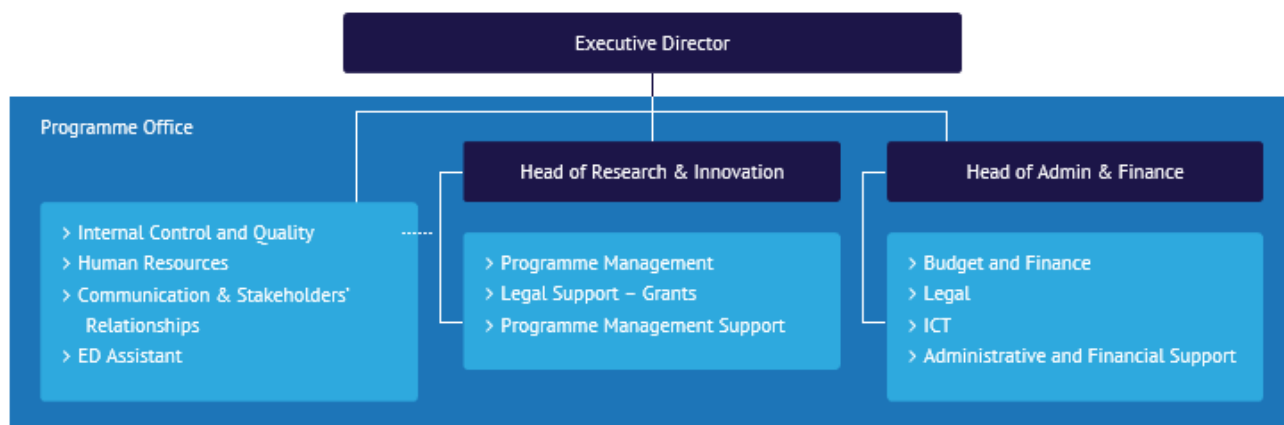
The main principle for the S2R JU Risk Management is the integration and management within one single framework of:

- The risks relating to the S2R Programme at all levels (Programme Risk Management);
- All risks relating to the S2R JU activities other than the Programme.

The framework is based on organisation principles, processes and tools.

8.2.3 Organisation

The following picture shows the organisation of the S2R Risk Management system:



The overall coordination of the risk management activities remains within the responsibility of the Head of Administration and Finance. He reports to the Executive Director who in turn reports to the JU Governing Board who is responsible to oversight the execution of the S2R JU.

8.2.4 S2R JU layered approach

This approach shall be applied to treat both for operational risks and other non-operational risks.

Operational risks:

Layer 1 Joint Undertaking organisation level

Here are managed risks which may impact the achievement of the strategic objectives. The scope encompasses all the Joint Undertaking activities including governance, funding and resources risks. The Executive Director is responsible to take action on these risks informing the Governing Board and where necessary the EU budgetary Authorities.

Layer 2 Programme Activities

Here are managed risks which because of their criticality may affect the effective execution of the Programme. Considering the interdependency among projects within the same Innovation Programme and with the other IPs and CCA, focus should be put on those risks that may have an impact throughout the Programme. The responsibility of risk management is with the Head of Research & Innovation²⁴ who with the support of the Programme Managers will identify and analyse risks and implement mitigating actions. The Head of Research & Innovation will report to the Executive Director.

²⁴ This role is now held by the Programme Coordinator (ED decision 17-02)

Layer 3 Project level

Here are managed risks related to meeting objectives and performances of individual projects. The Programme Manager is responsible for risk management for the project he/she is responsible for and, with the IP/CCA coordinator, for escalating at the level of Programme when required. The risk management of projects is also part of the section 7 Quality management described above.

The following table shows how risk management is distributed in respect of operational risks:

Risk Layer	Risk Manager	Supporting Group	Frequency of review	Report
Layer 1	Executive Director	Management Team and SIWG	Once a year in AWP and in AAR	Governing Board
Layer 2	Head of Research and Innovation	IPs Programme Managers and IP Coordinators	At least once a year and in line with the IP/CCA SteCo and SIWG meetings	Executive Director
Layer 3	IP Programme Managers	Project Coordinator and IP Coordinators	At least once a year and in line with the project reviews	Head of Research & Innovation

Similarly for non-operational risks:

Layer 1 Joint Undertaking organisation level

As above

Layer 2 Administration and Finance section level

Here are managed risks relating to the support functions that may affect the efficient and effective execution of the Programme, and may jeopardise the legality and correctness of the activities performed by the Joint Undertaking. The responsibility to manage these risks is with the Head of Administration and Finance. However, risks relating to the Human Resources and Communication are directly under the responsibility of the Executive Director.

Layer 3 Sector level

Staff of each sector is responsible to identify and manage risks which are related to their activities and which may jeopardise the achievement of the specific sector objectives set. They will escalate the risk at the level above as appropriate.

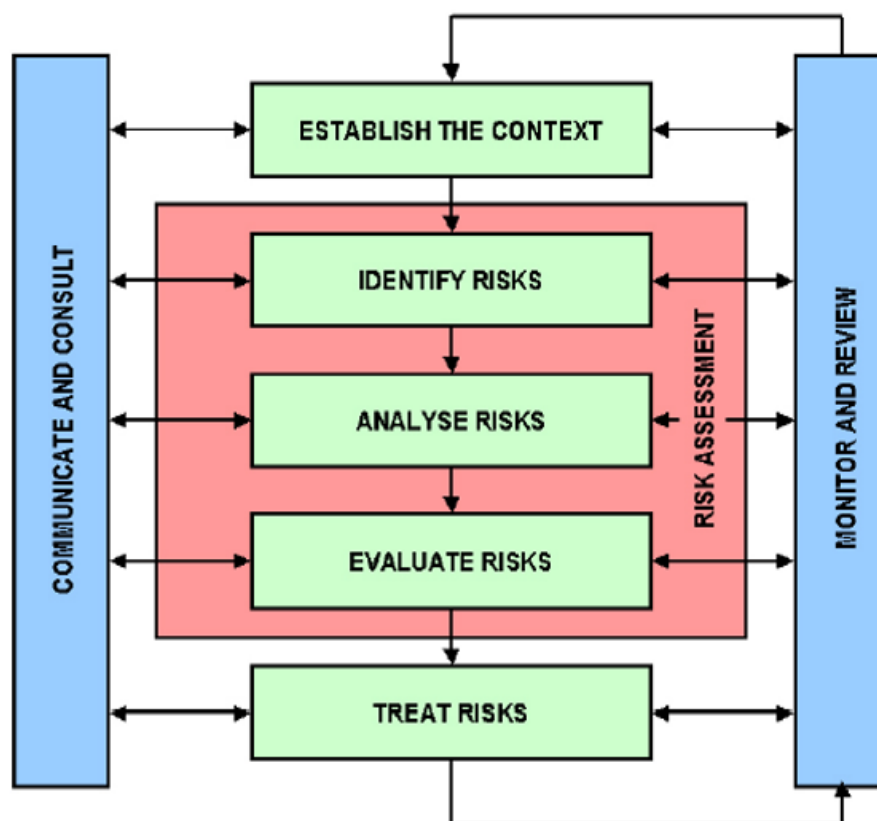
This approach implies that risk management albeit centrally coordinated by a specific function facilitating and fostering compliance with the S2R JU risk policy and application of the common framework and its processes, is a business owned and driven process.

8.2.5 Internal Control

Internal Auditor plays an important role in evaluating the effectiveness of the S2R JU risk management process, regular review should be part of the Internal Auditor annual work plan. It should be noted however that to preserve its organisational independence and objective judgement, Internal Auditor should not take any direct responsibility for making risk management decisions or taking risk management functions.

8.3 Risk Management Process

The process is built on different steps and is iterative, the picture below gives a clear idea of how it is organised.



8.3.1 Establish the context

A clear Risk policy communicates to the staff and stakeholders how the S2R JU positions itself against risks defining what is the level of uncertainty is willing to accept (risk appetite) in respect to the achievement of its objectives and how it will manage it. The Executive Director approves the policy and set the tone, staff at the different levels implement the policy. The strategic objectives of the S2R JU are set in the Regulation 642/2014 and are the reference to assess risks and opportunities. The strategic objectives are then broken down in specific objectives relating to the effective use of resources, reporting relating to the reliability of report giving a true and clear situation of the activities performed, and compliance objectives related to the respect of applicable laws and regulations.

8.3.2 Identify risks

Events are identified by management and staff considering a variety of internal or external factors which may give rise to risks and opportunities at different levels within the S2R JU.

8.3.3 Analyse and evaluate risks

Managers and staff should assess the extent which a risk, or opportunity, have on the achievement of objectives. Risks are assessed from two perspectives, likelihood and impact both from a quantitative and qualitative potential impact. Risks are assessed on both an inherent and residual basis.

8.3.4 Treat risks

Having assessed relevant risks, management and staff determine how they will respond. Responses include risk avoidance, reduction, sharing and acceptance. Responses should be determined considering the effect on risk likelihood and impact as well as costs and benefits selecting a response that brings residual risks within the desired risk tolerance.

8.3.5 Monitor and review

Adherence to the risk policy and implementation of the response actions should be monitored at the different levels under the responsibility of the risk manager. Review of the process to identify new risks and verify that the criticality of those already identified remain within the limit of tolerance set.

8.3.6 Communicate and consult

Periodic reports should be produced at the different levels to reassure senior management on the implementation of risk management process and its effectiveness.

8.4 Methodology²⁵

The evaluation of a risk or an opportunity is influenced by the scenario in which the S2R JU operates, this is the present environment or the future predicted one. The criticality of a risk is the result of the combination of the severity of the risk, and the probability that the risk actually occurs. The severity can be assessed as the impact of the risk occurrence on the activities of the S2R JU. The severity of a risk can be assessed considering the impact on the S2R JU activities and reputation. As an initial proposal the following impact can be considered:

- Cost;
- Delay;
- Performance;
- Reputation.

The severity can be evaluated on a scale from 1 to 4 as follows:

- Low;
- Medium;
- High;
- Very high.

As shown in the following tables:

Cost Impact Matrix		
#	Impact	Description
1	Very low	Incidental, maybe even avoidable impact resulting from non-optimal use of resources
2	Low	Minor impact resulting from non-optimal use of resources
3	Medium	Significant impact requiring a review of the underlying activity
4	High	Endangers the financial viability of the underlying activity with effects on other related activities (interdependencies)
5	Very High	Jeopardises the effective execution of the S2R JU budget due to uncontrolled and excessive rise of costs

Delay Impact Matrix		
#	Impact	Description
1	Very low	Delay conceivable but Programme planned execution not affected and delay may also be avoided
2	Low	Involves probable delay but does not affect the Programme planned execution
3	Medium	Requires a re-planning of the activity with minor impact on other related activities

²⁵ Methodology for operational risks: considering the similarity of risks identified at project level – Layer 3 (i.e. similar risks in different projects/grant agreements) - the Programme Managers will use the methodology developed in this chapter and escalate to the Programme Activities – Layer 2 – those risks identified as unique or as recurrent and that may have an impact throughout the Programme.

4	High	Determines non-compliance with set milestones with significant impact on interdependencies and causing substantial re-planning
5	Very High	Determines an unrecoverable delay affecting the whole execution of the Programme

Performance Impact Matrix		
#	Impact	Description
1	Very low	Non-compliance so negligible that Program may not even be affected, but still conceivable
2	Low	Little non-compliance with the expected results requiring limited adjustments with no significant impact on the Program
3	Medium	Causes non-compliance which significantly affects the achievement of the objectives set
4	High	Determines important problem of non-compliance with very negative impact on interdependencies requiring a review of the objective set
5	Very High	Serious non-compliance that jeopardises the achievements of the Programme objectives

Reputation Impact Matrix		
#	Impact	Description
1	Very low	S2R JU reputation very unlikely to be damaged
2	Low	S2R JU reputation damaged without affecting trust and involvement of stakeholders
3	Medium	S2R JU reputation damaged and affecting trust and involvement of stakeholders requiring remedial actions through communications
4	High	S2R JU reputation damaged in a way that specific and extensive communication and additional unplanned actions are needed to recover trust and involvement of stakeholders
5	Very High	S2R JU reputation damaged in a way that trust and involvement of stakeholders is certainly lost and cannot be recovered.

Probability Matrix		
#	Impact	Description
1	Very low	Improbable – so unlikely that probability is close to zero
2	Low	One or no occurrence during the execution of the S2R JU Programme
3	Medium	Few occurrences may happen during the execution of the S2R JU Programme
4	High	Several occurrences may happen during the execution of the S2R JU Programme
5	Very High	Will almost certainly happen many occurrences expected during the execution of the S2R JU Programme.

8.4.1 Gross criticality

Gross criticality is the combination of the probability and severity of the risk and is assessed before the any action is undertaken to reduce it.

It can be calculated using the matrix below:

Likelihood	Column1	Column2	Column3	Column4	Column5
	5	5	10	15	20
	4	4	8	12	16
	3	3	6	9	12
	2	2	4	6	8
	1	1	2	3	4
	1	2	3	4	5
Severity					

In order to assess the gross criticality it should be considered:

- Risk likelihood, which corresponds to the most probable scenario of the risk occurring;
- Risk severity, which corresponds to the most severe impact that could be assessed as resulting from the occurrence of the risk.

This is a conservative approach, which is sound with the activity performed by the S2R JU.

As shown in the above matrix, the criticality assessment results in four levels:

- Green – Very low / low criticality (from 1 to 6)
- Yellow – Medium criticality (from 8 to 12)
- Orange – High criticality (from 15 to 16)
- Red – Very high criticality (from 20 to 25)

8.4.2 Mitigating actions

Mitigating actions that should be taken at different level within the risk management system could aim at:

- Avoiding the risk as for example not performing a specific action;
- Transferring the risk as buying an insurance policy paying a premium;
- Mitigating the risk through actions reducing its severity or likelihood;

- Accepting the risk whereas the impact falls within the limit set as risk tolerance, or when mitigating actions are not possible.

A matrix could help measuring the mitigating action impact:

Mitigating action effectiveness Matrix		
#	Impact	Description
1	Very low	Negligible – almost no reduction at all
2	Low	Small reduction of severity/probability
3	Medium	Significant reduction of severity/probability
4	High	Important reduction of severity/probability
5	Very High	Risk criticality eliminated or reduced to non-significant level

8.4.3 Net Criticality

The effect of the implementation of the mitigating actions determines the residual risk.

Likelihood	Column1		Column2		Column3		Column4		Column5	
	5	5	10	15	20	25				
	4	4	8	12	16	20				
	3	3	6	9	12	15				
	2	2	4	6	8	10				
	1	1	2	3	4	5				
		1	2	3	4	5				
Severity										

There are five levels of net criticality:

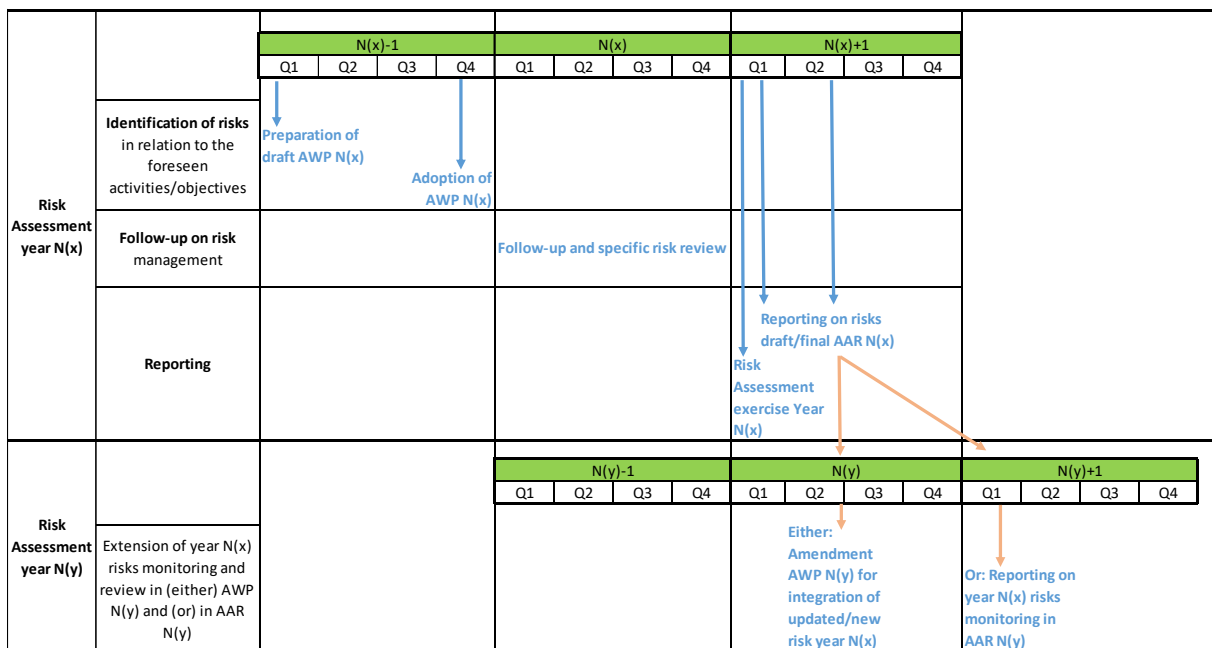
- Green – Low net criticality (1 to 3)
- Yellow – Medium net criticality (from 4 to 6)
- Orange – High net criticality (from 8 to 12)
- Red – Very High net criticality (from 15 to 16)
- Black – Unacceptable net criticality (from 20 to 25)

The net criticality indicates the residual risk the S2R JU has to manage and is an indication of the urgency and effectiveness of further actions as needed in order to secure the execution of the activities in line with the Programme.

8.5 Reporting cycle

Risk Management is part of the planning process insofar it identifies, analyses and treats risks which may jeopardise the achievement of the objectives set in the plan. Concerning the S2R JU activity, risk management is encompassed in the Annual Work Plan process whereas risks and mitigating actions are identified and analysed. The actual results are then reported in the Annual Activity Report. These documents are drafted once a year providing stakeholders with an overall picture of the S2R JU progress in the execution of the Programme.

Shift2Rail JU Risk Assessment Reporting Cycle



9 Change Management

The objective of change management is to effectively control changes and emergency maintenance services throughout the execution phase of the projects or programme. This can be done by means of standards and procedures and by outlining the necessities towards the prioritisation and authorisation, impact assessment, tracking, reporting, closure and documentation of changes.

In the context of the S2R JU Programme, changes on scope, schedule and budget are considered. For instance, specific changes to projects can be made, as well as more generic changes to the programme. Change can be required for various reasons, but often act upon service requests, incidents or problems, for example, risk management, unavailability of resources, under- or overestimated workload, technical issues etc.

Possible changes shall be discussed at the lowest operational level and escalated at the correct decision making level, up to the Executive Director, in accordance with the approach defined in the S2R Regulation. The relevant IP/CCA Steering Committee may act as advisory board to the Programme Manager on the proposed change(s).

The following sections, visible in Figure 11, describe a standard procedure which can be applied. After identifying which elements are or need to be changed, it is key to analyse the situation with all relevant stakeholders and to define an appropriate approach. After implementation, the results are monitored via the quality management process.



Figure 8 - Change management process

9.1 Changes to projects

During the project implementation (Project Control Gate or in another period as necessary), or following the “Change Management process for the S2R Common functional Railway System Architecture”, changes to the scope, timing, budget, etc. of the project may become necessary..

Proposed changes shall be brought to the attention of the Programme Manager who, with the assistance of the S2R JU services, will recommend the necessary level of formalization, including a grant amendment as necessary.

If changes entail a change to the Grant Agreement, a formal amendment to the agreement is required. Project participants therefore need to define the nature of the change and on that basis

assess what action is required. It should be noted that for Lump sums Pilot Grant Agreements specific rules apply to amendments,

Detailed guidance on the action required for different categories of changes is available in the following H2020 information:

- https://ec.europa.eu/research/participants/docs/h2020-funding-guide/grants/grant-management/amendments_en.htm
- https://ec.europa.eu/research/participants/data/ref/h2020/other/gm/h2020-guide-amend-types_en.pdf

Project Coordinator is asked to follow the formal steps in the Horizon 2020's 'Funding & tender opportunities' website and to use the amendment request template to explain the changes to the GA (cf. Annex A).

9.2 Changes to the Programme

Possible Changes which may have an impact at Programme level shall be brought to the attention of the SIWG by the IP Coordinator together with the S2R Head of R&I. Where necessary, these changes will be formalized in amendments to the AWP to be proposed by the ED to the GB.

10 Programme closure (1st approach)

The following chapter highlights the most important deadlines in order to close the Programme successfully. However, after Programme closure, a number of obligations may still remain.

10.1 Programme completion

Three dates are linked to the notion of Programme completion:

- Final date of eligibility of ‘calls for proposals’: this date is stated in the Programme Regulation as no later than 31 December 2020 under the Horizon 2020 Research and Innovation Programme (In justified cases, calls for proposals may be launched until 31 December 2021 at the latest).
- Physical Programme completion date: this is when all outputs and deliverables in the project have been completed and all costs have been paid.
- Official Programme completion date: this is the date referred to in Article 1 of the Regulations where the S2R JU shall be established until 31 December 2024.

The programme is completed when the final programme report (FPR) is approved and all outstanding financial obligations are settled. This final programme report will provide an overall assessment of the Programmes results and deliver a final balance. The FPR may not be drafted as long as bilateral activities, closing actions, outstanding issues, etc. are still being implemented.

10.2 Non-completed projects

At the time of the submission of the closing documents, Other Members have to ensure that all projects included in the programme closure are functioning, meaning completed, and in use.

The Other Members may decide, exceptionally and on a case-by-case basis, provided that adequate justification exists, to include expenditure paid for a non-functioning project. In doing so it should take into account the reasons why a project is non-functioning and it should verify that the financial impact of the project justifies this special treatment.

By including a non-functioning project in the closing documents, the Member agrees to complete the project after the initial deadline, within a timeframe which is to be decided by the GB. The Project Coordinator should ensure funds are made available to complete the project in a timely manner. If after this new deadline the project is still reported as incomplete, the Project Coordinator will reimburse the funds granted.

In the final programme report a list of all non-functioning projects will be included in order to be able to closely monitor these projects.

10.3 Final Closure

In order to fully close the Programme and submit the final programme report some administrative and operational tasks, i.e. financial obligations, reporting, communication, etc. need to be finalised first.

10.3.1 Financial obligations

A calculation of the final balance will be included in the FPR which implies that all administrative tasks must be completed beforehand. This means that all final payment claims must be filed, payments settled, funds reimbursed and management costs must be completed.

The Central Audit Service shall submit a final audit report and closure declaration to assess the validity of payments in the final balance.

10.3.2 Documenting and reporting

The ED must ensure that the completed Programme information is submitted. This information includes the summary of all project results (functioning and non-functioning), bilateral results as well as all financial information. The ED will ensure that:

- Information about the programme, the objectives, the implementation, results and the overall impact of the programme is made know to the citizens, beneficiaries and relevant stakeholders;
- Information on results and impact from the programme must be presented on the programme's website;
- The information and publicity measures are implemented in accordance with the Communication Plan;
- Project Coordinators have fulfilled their information and publicity obligations.

10.3.3 Final Programme Report

The S2R JU has the overall responsibility for reaching the goals and objectives as stated in Article 2 of the Regulations. The final report will provide an overview of the financial statements and implementation arrangements. In particular the final report should include following information:

- the number and type of funds granted during the Programme;
- an overall assessment of fund performance in terms of its contribution to the achievements of the objectives of the programme;
- a summary description of the Programme, the different projects, the IP results, deliverables and objectives reached;
- follow-up on irregularities;
- best practices;
- list of non-functioning projects;
- closure declaration from Central Audit Service;
- the overall Programmes result and acceptance.

Annex A: Templates

- Templates for the Other Members' annual IKOP declaration
<https://shift2rail.org/wp-content/uploads/2017/12/Templates-for-the-Other-Members-annual-IKOP-declaration.xlsx>
- Templates for the Other Members' annual IKAA declaration
<https://shift2rail.org/wp-content/uploads/2017/12/Templates-for-the-Other-Members-annual-IKAA-declaration.xlsx>
- Collaboration agreement
<https://shift2rail.org/wp-content/uploads/2020/06/Collaboration-agreement.docx>
- Meeting Minutes
<https://shift2rail.org/wp-content/uploads/2020/06/Meeting-Minutes.docx>
- Deliverable templates:
<https://shift2rail.org/wp-content/uploads/2021/03/S2R-deliverable-template.docx>
- Project reporting to the IP SteCo

Project: https://shift2rail.org/wp-content/uploads/2020/03/Template-Project_reporting_2020.pptx

Technical Demonstrator: <https://shift2rail.org/wp-content/uploads/2020/03/Template-TD-leaders--SteCo.pptx>

- S2R template for Technical Periodic Report
https://shift2rail.org/wp-content/uploads/2020/06/NameOfTheProject-PartB_periodic_report_template_final.docx
- S2R template for Technical Periodic Report **Lump Sum only**
<https://shift2rail.org/wp-content/uploads/2020/06/S2R-template-for-Technical-Periodic-Report-Lump-Sum-2020-01-24.docx>
- S2R template for Amendment explanation
https://shift2rail.org/wp-content/uploads/2020/06/Explanation_Amendment_Template_v2.docx

Annex B: Technical Demonstrators of each Innovation Programme and Work Areas of Cross-Cutting Activities

IP1 is built up 7 Technical Demonstrators (TDs), covering all the Research & Innovation areas indicated in the Shift2Rail Masterplan:

- TD1.1 Traction systems
- TD1.2 Train control and monitoring system (TCMS)
- TD1.3 Carbody shell
- TD1.4 Running gear
- TD1.5 Brakes systems
- TD1.6 Doors and access systems
- TD1.7 Train modularity in use (TMIU)
- TD1.8 Heating, Ventilation and Air-Conditioning (HVAC)

IP2 is structured around the following 11 Technical Demonstrators (TDs):

- TD2.1 Adaptable communications for all railways
- TD2.2 Railway network capacity increase (ATO up to GoA4 – UTO)
- TD2.3 Moving Block
- TD2.4 Fail-Safe Train Positioning
- TD2.5 On-board Train Integrity
- TD2.6 Zero on-site testing
- TD2.7 Formal methods and standardisation
- TD2.8 Virtually Coupled Train Sets
- TD2.9 Traffic Management evolution
- TD2.10 Smart radio-connected all-in-all wayside objects
- TD2.11 Cyber Security

IP3 consists of following 11 Technical Demonstrators (TDs):

- TD3.1 Enhanced Switch & Crossing System
- TD3.2 Next Generation Switch & Crossing System
- TD3.3 Optimised Track System
- TD3.4 Next Generation Track System
- TD3.5 Proactive Bridge and Tunnel Assessment, Repair and Upgrade
- TD3.6 Dynamic Railway Information Management System (DRIMS)
- TD3.7 Railway Integrated Measuring and Monitoring System (RIMMS)
- TD3.8 Intelligent Asset Management Strategies (IAMS)
- TD3.9 Smart Power Supply
- TD3.10 Smart Metering for Railway Distributed Energy Resource Management System

- TD3.11 Future Stations

The work in **IP4** Programme is structured around 6 Technical Demonstrators (TDs) which cover the three areas: Technical Framework, Customer Experience Applications and Multimodal Travel Services and 1 Integrated Technical Demonstrator (ITD) for the overall IP4 coordination and demonstration.

- TD4.1 Interoperability Framework
- TD4.2 Travel Shopping
- TD4.3 Booking & Ticketing
- TD4.4 Trip Tracker
- TD4.5 Travel Companion
- TD4.6 Business Analytics
- ITD4.7 Integration and Demonstration

IP5 is structured around the following 6 Technical Demonstrators (TDs):

- TD5.1 Fleet Digitalisation and Automation
- TD5.2 Digital Transport Management
- TD5.3 Smart freight Wagon Concepts
- TD5.4 New Freight Propulsion Concepts
- TD5.5 Business analytics and implementation strategies

CCA is structured around the following 6 Work Areas (WAs):

- WA 1 Socio Economics
- WA 2 Key Performance Indicators (KPI)
- WA 3 Safety, Standardisation and Smart Maintenance
- WA 4 Smart Mobility
- WA 5 Energy and Sustainability
- WA 6 Human Capital

Annex C: Contact persons of S2R JU

	R&I	Administration and Finance
ALL	Travaini Giorgio	Vincent Declerfayt
IP1	Javier Ibanez de Yrigoyen	Nadia Debza Sandro Benidio Cosmina Junjan
IP2	Léa Paties	
IP3	Sébastien Denis	
IP5	Manuel Alarcon Espinosa	
IP4	Ester Bravo Barquero	
CCA	Judit Sándor	
IPX	Gorazd Marinic	
Transversal	Van Wortel Monique	

To contact us : <https://shift2rail.org/about-shift2rail/contact/>

Annex D: S2R Cooperation Tool guidelines

S2R Multi-projects cooperation tool – MEMO on the use of the internal components of the tool:

https://shift2rail.org/wp-content/uploads/2017/11/Annex-D-20170213_Cooperation-Tool-S2R-memo.pdf

Shift2Rail Communication Guidelines for S2R Members and Projects:

https://www.cooperationtool.eu/projects/documentation/Communications_Guidelines.pdf

Cooperation Tool 4 (CT) – Guidelines for Shift2rail publication and approval of CT objects:

https://www.cooperationtool.eu/projects/documentation/Publications_User_Manual.pdf

Guidelines for implementation of Collaboration Agreements in the S2R Cooperation Tool

https://www.cooperationtool.eu/projects/documentation/Guidelines_for_implementation_of_Collaboration_Agreements_v1_0.docx.pdf

TPC(IKOP)/IKAA Management:

[https://www.cooperationtool.eu/projects/documentation/Cooperation_Tool_4_TPC\(IKOP\)-IKAA_Guide_Consolidated_20170117_v04.pdf](https://www.cooperationtool.eu/projects/documentation/Cooperation_Tool_4_TPC(IKOP)-IKAA_Guide_Consolidated_20170117_v04.pdf)

Annex E: IP/CCA Rules of Procedure

Example IP1

https://shift2rail.org/wp-content/uploads/2017/11/Annex-E-IP_CCA-Rules-of-Procedure.pdf

Annex F: ED Decision 2016/017, Guidance for members and their appointed auditors_20161118 final

https://shift2rail.org/wp-content/uploads/2017/11/Annex-F-ED-Decision-2016017-Guidance-for-members-and-their-appointed-auditors_20161118-final.pdf

Annex G: list of official S2R technical positions and names of official S2R representatives in external working group

Official S2R representatives in external working group:

- Olivier Eudes, KONTRON: IP2 representative in the European Union Agency for Railways' Coordination Working Party on Evolution of GSM-R.
- François Haussman, observer at EU Rail Security Platform (RAILSEC).

Official S2R technical positions:

- ATO over ETCS – GoA2 specifications provided to ERA, accessible here:
 - o <https://projects.shift2rail.org/download.aspx?id=06adfb88-4d31-4938-ae3a-ba783a371b9b>
- Moving Block specifications provided to ERA, accessible here:
 - o System Specification : <https://projects.shift2rail.org/download.aspx?id=f47a9d56-29d7-437f-9697-e914699297cf>
 - o Operational and Engineering Rules : <https://projects.shift2rail.org/download.aspx?id=46b32389-0173-4072-889f-bdeb66e9d71e>
 - o Preliminary Safety Analysis : <https://projects.shift2rail.org/download.aspx?id=d7b58dc3-d6e0-4606-91fa-2452ad91914a>

Annex H: List of projects with level of ERA desired involvement

PROJECT NAME	ERA Level of involvement
IN2RAIL	1
Smart Rail	1
ROLL2RAIL	1
IT2RAIL	1
PINTA	1
SAFE4RAIL	1
CONNECTA	2
X2RAIL1	1 to 3
CYRail	
MISTRAL	2
IN2TRACK	2
In2SMART	1
S-Code	1
Coactive	1
ATTRACKTIVE	
GoF4R	2
ST4RT	1
FFL4E	1
FR8RAIL	1
DYNAFREIGHT	1
INNOWAG	1
IMPACT1	3
NEAR2050	3
FINE 1	1
OPEUS	1
DESTINATE	1
Go-SAFE RAIL	2
X2Rail2	2 to 3
ASTRail	1 to 2
ETALON	1
My-TRAC	2
OPTIYARD	2
IN2STEMPO	2
IN2DREAMS	2
IMPACT-2	3
CONNECTIVE	2

SMaRTE	2
MOMIT	1
PLASA-2	3
PINTA2	1
CONNECTA-2	2
X2Rail-3	3
IN2TRACK2	2
MaaSive	1
FR8RAIL II	2
Safe4RAIL-2	2
MOVINGRAIL	2 or 3
GATE4RAIL	1
EMULRADIO4RAIL	2
Assets4Rail	1
SPRINT	1
Shift2MaaS	2 or 3
M2O	2
FLEX-RAIL	2
TER4RAIL	2
FINE-2	1
PIVOT2	2
X2RAIL-4	3
IN2SMART2	2
FR8RAIL III	2
LINX4RAIL	3
TRANSIT	1
CARBODIN	2
NEXTGEAR	2
4SECURAIL	1
OPTIMA	2
FUNDRES	2
RIDE2RAIL	2
LOCATE	2
SMART2	1
RAILS	2
Translate4Rail	3

Annex I: Shift2Rail Executive Director Programme Board change management process

https://shift2rail.org/wp-content/uploads/2020/01/20191219_ED-PB-Change-Management-process_final.pdf