



## D1.1: Quality Plan

**WP1: Project Management, Communication, Dissemination and Exploitation**

**Version 1.0**

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# Disclaimer

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# 1 Executive Summary

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This document constitutes the deliverable D1.1 of the MaDe4Rail project and describes the Quality Plan. The aim of this deliverable is to provide all necessary information related to the management of the project to ensure the highest quality of project outcomes. This document includes the definition of the governance of the project with all related roles and responsibilities, the means and processes to execute all activities foreseen within this project, the communication within the consortium as well as with external stakeholders and Europe's Rail Joint Undertaking (ERJU), the quality management plan, the risk management plan and the financial management plan.

This report serves also as a project handbook for project partners, offering structured processes and methods for the day-to-day operations of the MaDe4Rail project, including the continuous management of the sub project teams, defined according to the Europe's Rail Joint Undertaking Governance and Process Handbook, the Grant Agreement (GA) and the Consortium Agreement (CA). The plan is effective throughout the lifetime of the project but is open to revision if necessary. Responsibilities for quality planning, control and assurance are shared among all partners in order to reach the optimal outcome.

**Keywords:** Quality Assurance; Quality Control; Quality Management; Project Management, Risk Management; Financial Management

## 2 Abbreviations and Acronyms

Abbreviation/Acronym	Description
<b>AE</b>	Affiliated Entity
<b>CA</b>	Consortium Agreement
<b>CDEP</b>	Communication, Dissemination and Exploitation Plan
<b>DITS</b>	Development and Innovation in Transport Systems
<b>DLR</b>	Deutsches Zentrum für Luft- und Raumfahrt
<b>DMP</b>	Data Management Plan
<b>EC</b>	European Commission
<b>ERJU</b>	Europe's Rail Joint Undertaking
<b>EU</b>	European Union
<b>FA</b>	Flagship Area
<b>FPSC</b>	Flagship Project Steering Committee
<b>FSI</b>	Ferrovie dello Stato Italiane
<b>GA</b>	Grant Agreement
<b>IM</b>	Infrastructure Manager
<b>ITF</b>	Italferr
<b>MaDe4Rail</b>	Maglev-Derived Systems for Rail
<b>Maglev</b>	Magnetic levitation
<b>MDS</b>	Maglev-Derived Systems
<b>PM</b>	Person Months
<b>RFI</b>	Rete Ferroviaria Italiana
<b>SME</b>	Small and Medium-sized Enterprise



<b>SP</b>	System Pillar
<b>TMT</b>	Technical Management Team
<b>TRV</b>	Trafikverket
<b>TSI</b>	Technical Specifications for Interoperability
<b>TU Delft</b>	Technische Universiteit Delft
<b>Uni.Eiffel</b>	Université Gustave Eiffel
<b>UPM</b>	Universidad Politécnica de Madrid
<b>WP</b>	Work Package
<b>WPMM</b>	Work Packages Meeting Management
<b>WS</b>	Work Stream

### 3 Introduction and Objective

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MaDe4Rail: Maglev-derived Systems for Rail is one of the projects of Europe's Rail Flagship Area (FA) 7 that is part of the Innovation Pillar and is described in the ERJU Multi-Annual Work Programme (MAWP). The project aims to explore non-traditional and emerging Maglev-Derived Systems (MDS), which can be defined as innovative, fast track-bound transportation systems for rail application that use maglev-based technologies, such as linear motors with magnetic/pneumatic levitation, as their foundation. They can be stand-alone systems with their own dedicated infrastructure or can be, in principle, integrated within the existing railway infrastructure.

The project will identify technical enablers and technologies for MDS defining a common system architecture, analyse risks and needs for standardisation on safety and security, elaborate the design concept and prototype for a MDS vehicle, and evaluate the technical and economic feasibility and effectiveness of introducing MDS in Europe. The MaDe4Rail project is expected to have significant impacts such as contributing to the development of MDS, promoting more sustainable passenger and freight transport and reinforcing the role of railway as the backbone of a multimodal, sustainable, efficient and advanced mobility network by possibly, upgrading the existing railway lines/facilities through the adoption of maglev-derived technologies.

The main objective of the Quality Plan is to ensure the execution of a quality assurance process throughout the project. The Quality Plan describes all procedures adopted for the development of the project (including Gantt tables, deliverables, risks, and milestones) and provides guidelines on the day-to-day management of the project and practical aspects of its development, including procedures for report writing and review of deliverables. In addition, the tasks and responsibilities of the different partners in the production of deliverables and milestones are also specified. Other specific procedures will be detailed in this document.

The Quality Plan of the MaDe4Rail project considers the different components of quality management – quality planning, quality control and quality assurance – which are also taken into account in executing the different activities foreseen in the whole duration of the project.

- Quality planning is the first step, which refers to identification of the goals of each task and each WP. It also includes the schedule of different types of meetings (depending on the type of consortium body), definition of responsibilities, and establishment of guidelines to be followed such as setting up internal deadlines. In this report, the project platform has also been specified, which could facilitate document sharing.
- Quality control refers to the process of verifying if all the key elements necessary to proceed with the activity are available and obtainable. Therefore, if there are some errors or mishaps identified, then it should be corrected in this phase before finalising the outcomes.
- Quality assurance is considered the last step in this process, wherein it involves the review of the outcomes before being published or submitted to the ERJU. Mistakes can be identified and deliverables can be finetuned in this phase before reaching the final reader (e.g., ERJU or readers of scientific publications). This task is usually performed by the Project Coordinator. In this phase, the goals identified in the quality planning could be verified and confirmed as well.

The Quality Plan of the MaDe4Rail Project also includes Risk Management and Mitigation, which should aid in identifying risks and controlling them to avoid negatively affecting the progress of the project. Furthermore, it contains the Financial Management, which describes the process of control of resources and distribution of funds from the ERJU.

## 4 Description of the Project

### 4.1 Project Scope and Objectives

The MaDe4Rail project aims to explore non-traditional and emerging MDS and to evaluate the technical feasibility and effectiveness to introduce MDS in Europe under safety aspects and technical-economic performance.

Identification and benchmarking of the different maglev-derived technologies for transportation systems and their state of development, definition of a common architecture and specification of the subsystems and technologies needed for its commercialization are expected in the MaDe4Rail Project. Moreover, a risk analysis and identification of needs for standardization on safety and security in operations of MDS will be performed. Also, the assessment of the technical and economic feasibility to introduce these systems into the common European mobility network will be implemented as well as the development of a European roadmap for the possible future implementation of MDS. Lastly, the design of the concept for an MDS vehicle subsystem and a prototype of a sample vehicle for a European use case are foreseen in this project.

The MaDe4Rail project is expected to have significant impacts such as contributing to the development of MDS, promoting more sustainable passenger and freight transport and initiating a path towards the reinforcement of railway as the backbone of a multimodal, sustainable, and efficient mobility network by possibly, upgrading the existing railway lines/facilities through the adoption of maglev-derived technologies. Moreover, the project fosters information exchange and growth and diffusion of knowledge.

MaDe4Rail brings together a multidisciplinary group of experts from diverse backgrounds with a wide range of competences and expertise that would contribute to the success of the project, such as Infrastructure Managers, Transport Authorities, Engineering and Consultancy Companies, Technological Developers and Research Centres and Universities.

### 4.2 Project Overview

The MaDe4Rail Consortium is composed of 16 organisations – 5 Founding Members, 4 Affiliated Entities and 7 External Partners – from different sectors such as research centres, universities, technological developers, Small and Medium-sized Enterprises (SMEs), Infrastructure Managers (IM), and transport authorities. RFI is the coordinator of the Project.

Number	Partner	Country
<b>1</b>	Rete Ferroviaria Italiana (RFI)	Italy
<b>1.1</b>	Ferrovie dello Stato Italiane SPA (FSI)	Italy
<b>1.2</b>	Italferr SPA (ITF)	Italy
<b>2</b>	Development & Innovation in Transport Systems SRL (DITS)	Italy
<b>3</b>	Deutsches Zentrum Fur Luft - Und Raumfahrt EV (DLR)	Germany
<b>4</b>	IRONBOX S.R.L. (IRONLEV)	Italy

<b>5</b>	MER MEC SPA (MER MEC)	Italy
<b>6</b>	Nevomo Poland Spolka Z Ograniczona Odpowiedzialnoscia (NEVOMO)	Poland
<b>7</b>	Prorail BV (Prorail)	Netherlands
<b>7.1</b>	Technische Universiteit Delft (TU Delft)	Netherlands
<b>8</b>	TACV LAB	France
<b>9</b>	Trafikverket (TRV)	Sweden
<b>9.1</b>	Kungliga Tekniska Hoegskolan (KTH)	Sweden
<b>10</b>	Universite Gustave Eiffel (Uni. Eiffel)	France
<b>11</b>	Universidad Politecnica De Madrid (UPM)	Spain
<b>12</b>	GESTE Engineering SA (GESTE) <sup>1</sup>	Switzerland

*Table 1: List of Partners of the MaDe4Rail Project*

These organisations come from Switzerland and from 7 European Union (EU) Member States – France, Germany, Italy, Netherlands, Poland, Spain, and Sweden.

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<sup>1</sup> GESTE is an Associated Partner

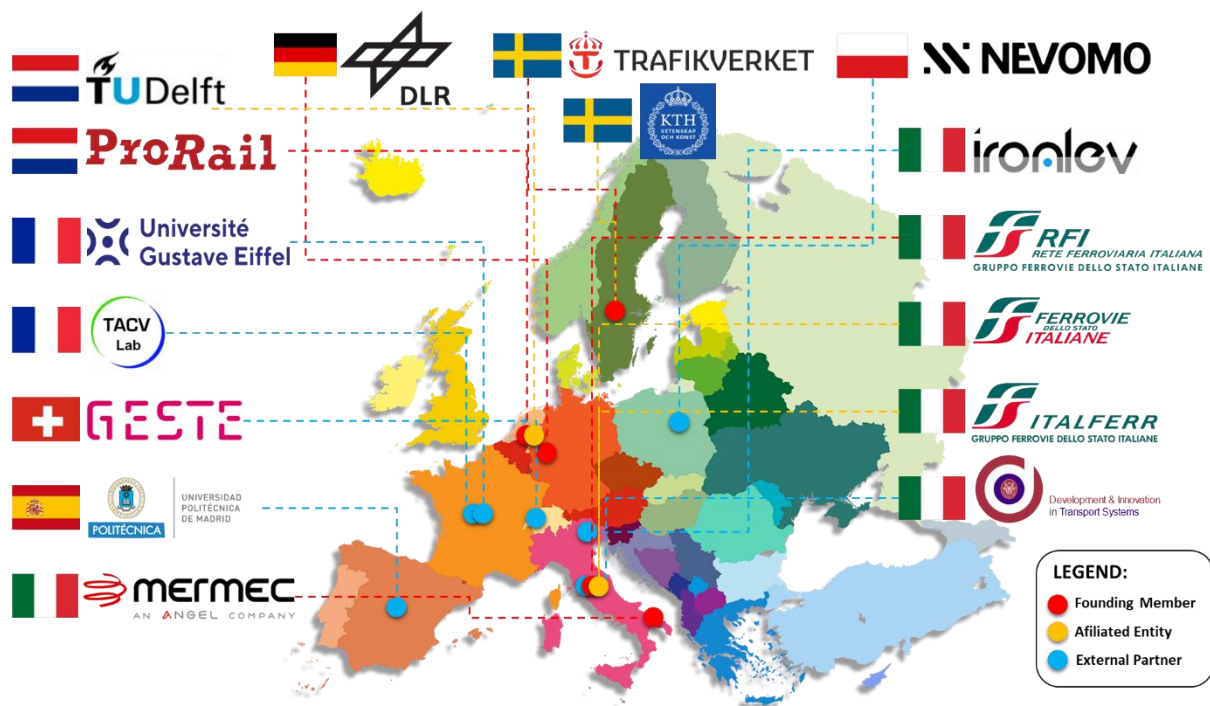


Figure 1: Distribution of Partners across Europe

The participants of the consortium have various competences and expertise and have a remarkable experience in previous European Projects and as well as in other Flagship Areas that are necessary to achieve the objectives of the project. The consortium is composed of two IMs – RFI (Italy) and Prorail (Netherlands), one Transport Administration – TRV (Sweden) and two engineering and consultancy companies – ITF (Italy) and GESTE Engineering (Switzerland). The consortium has also involved four technological developers, including MERMEC (Italy), IRONLEV (Italy), NEVOMO (Poland) and TACV Lab (France). Lastly, there are six research centres and universities participating in the consortium – UPM (Spain), Uni. Eiffel (France), DLR (Germany), TU Delft (Netherlands), KTH (Sweden) and DITS (Italy).

### 4.3 Project Deliverables

The outcomes of the MaDe4Rail project will be documented in 19 deliverables, which are represented in Table 2, including the due dates and the responsible partners for each deliverable.

Due Date	Deliverable Number	Deliverable Name	Related WP	Responsible Partner
M1	D1.1	Quality Plan	1	RFI
M1	D1.2	Data Management Plan (DMP)	1	RFI
M4	D1.3	Communication, Dissemination and Exploitation Plan (CDEP)	1	RFI
M4	D2.1	Functional, technical, operational and economical overview of conventional rail systems, traditional maglev systems and innovative maglev-derived systems	2	NEVOMO

<b>M5</b>	D4.1	Document on the MDS vehicle subsystem including subsystem definition, system-level interface identification, and methods of integration into the overall common-architecture MDS	4	ITF
<b>M5</b>	D6.1	Technology Readiness Assessment of maglev-derived systems	6	UPM
<b>M5</b>	D7.1	Use case Analysis	7	RFI
<b>M6</b>	D2.2	Potential benefits to the railway system derived from maglev and maglev-derived systems	2	DITS
<b>M6</b>	D4.2	Project requirements and technical specifications for MDS bogies/vehicles	4	ITF
<b>M8</b>	D6.2	MDS operations and maintenance overview and evaluation	6	UPM
<b>M10</b>	D3.1	Hazard identification, impacts evaluations and risk acceptance	3	DITS
<b>M11</b>	D3.2	Study of Railway standards potentially applicable to MDS and identification of new standardisation needs	3	Uni.Eiffel
<b>M12</b>	D1.4	Communication, Dissemination and Exploitation Report (CDER)	1	RFI
<b>M12</b>	D5.1	Documentation of maglev-based transport system use cases, operational, system, standardisation and regulatory requirements generated by the introduction of the technology in the European Rail system	5	RFI
<b>M12</b>	D5.2	Document proposal for coordinated Innovation Pillar and System Pillar work programs	5	DITS
<b>M12</b>	D7.2	Technical feasibility study	7	RFI
<b>M12</b>	D7.3	Cost-Benefit and financial Analysis	7	RFI
<b>M12</b>	D7.4	Roadmap for maglev-derived systems	7	RFI
<b>M12</b>	D8.1	Vehicle Prototype – Design Package	8	IRONLEV

Table 2: List of Deliverables

## 4.4 Project Milestones

The MaDe4Rail project has set 8 milestones throughout the project duration, which are summarised in Table 3.

Due Date	Milestone Number	Milestone Name	Related WP(s)	Responsible Partner
<b>M6</b>	MS1	Design concept of the vehicle with a Maglev-Derived System including vehicle equipment	WP4	ITF
<b>M8</b>	MS2	Initial results of the cost benefit analysis on the use cases identified at the WP7 for the definition of the vehicle prototype	WP7	ITF
<b>M8</b>	MS3	Selection for each use case the technologies and systems to be used, based on the technological maturity assessment, and as well as operating procedures for each selected MDS	WP6	UPM
<b>M9</b>	MS4	Identification of needs for standardization on safety and security with regards to selected couple system/technologies and preliminary identification of regulation impacts.	WP3	Uni.Eiffel
<b>M12</b>	MS5	High-level Cost-Benefit and financial Analysis (Public version of D7.3 which will be published on the project website)	WP7	RFI
<b>M12</b>	MS6	Generalized Roadmap for Maglev-Derived Systems (Public version of D7.4 which will be published on the project website)	WP7	RFI
<b>M12</b>	MS7	Vehicle Prototype: Overview of the general public information about the vehicle prototype in an accessible and simple way	WP8	GESTE
<b>M12</b>	MS8	Final event of MaDe4Rail Project	All WPs	RFI

Table 3: List of Milestones

## 4.5 Project Work Plan and Breakdown

The overall methodology of the MaDe4Rail project is divided into two major Work Streams (WS): WS1 – Technical definitions and WS2 – Development of business case analysis, including feasibility studies and use cases. Each WS is divided into WPs that organize different activities in homogeneous tasks and gather the right competences.

The overall organization foresees WP1 as transversal to WS1 and WS2 that covers project management, communication, dissemination, and exploitation.

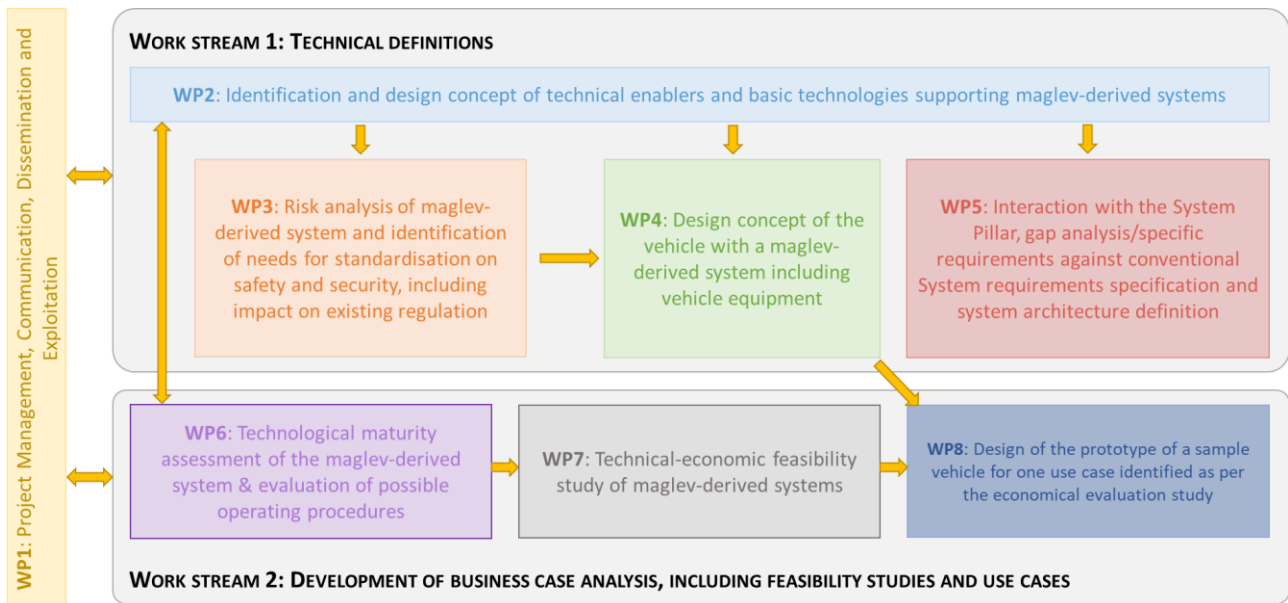


Figure 2: Project Overview

As illustrated in Figure 2, the Work Plan of the project is organised in 8 Work Packages (WP) presented in Table 4, showing the lead beneficiary and the overall assigned effort in Person Months (PM) dedicated to each WP. The Work Plan will be conducted from M1 – M12.

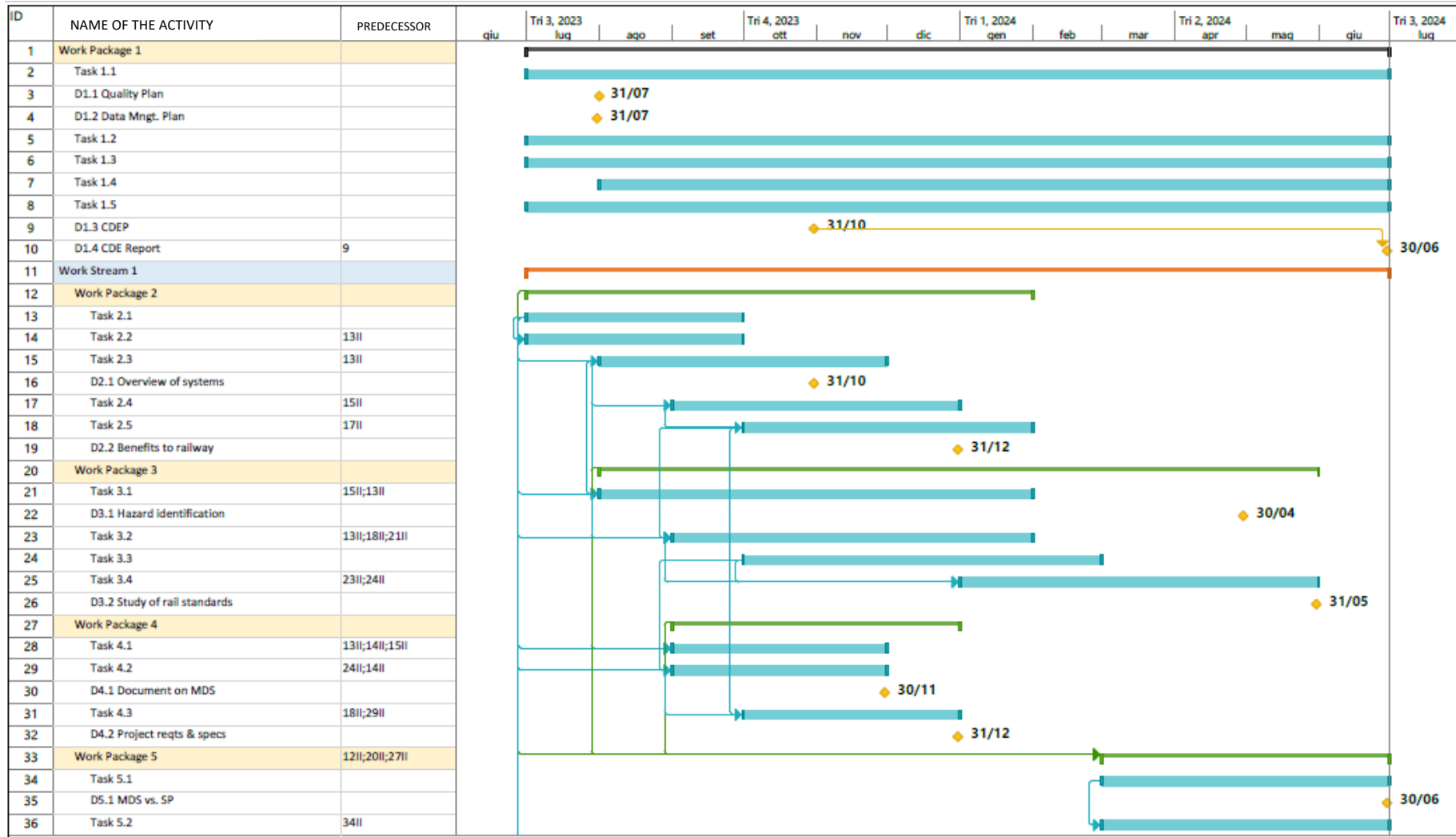
WP	WP Title	Lead Beneficiary	Person Months (PM)	Start Month	End Month
WP1	Project Management, Communication, Dissemination and Exploitation	RFI	11.1	M1	M12
WP2	Identification and design concept of technical enablers and basic technologies supporting MDS	DITS	38.0	M1	M7
WP3	Risk analysis of MDS and identification of needs for standardisation on safety and security, including impact on existing regulation	Uni. Eiffel	44.0	M2	M11
WP4	Design concept of the vehicle with a maglev-derived system including vehicle equipment	RFI	22.2	M3	M6
WP5	Interaction with the System Pillar, gap analysis/specific requirements against conventional system requirements	RFI	8.8	M9	M12



	specification and system architecture definition				
WP6	Technological maturity assessment for passenger and freight applications of the MDS & Evaluation of possible operating procedures for driving operations, CCS, TMS, Station management	UPM	20.1	M2	M8
WP7	Technical-economic feasibility study of MDS	RFI	50.9	M3	M12
WP8	Design of the prototype of a sample vehicle for one use case identified as per the economical evaluation study	GESTE	24.2	M7	M12

*Table 4: List of Work Packages*

## 4.5.1 Gantt Chart



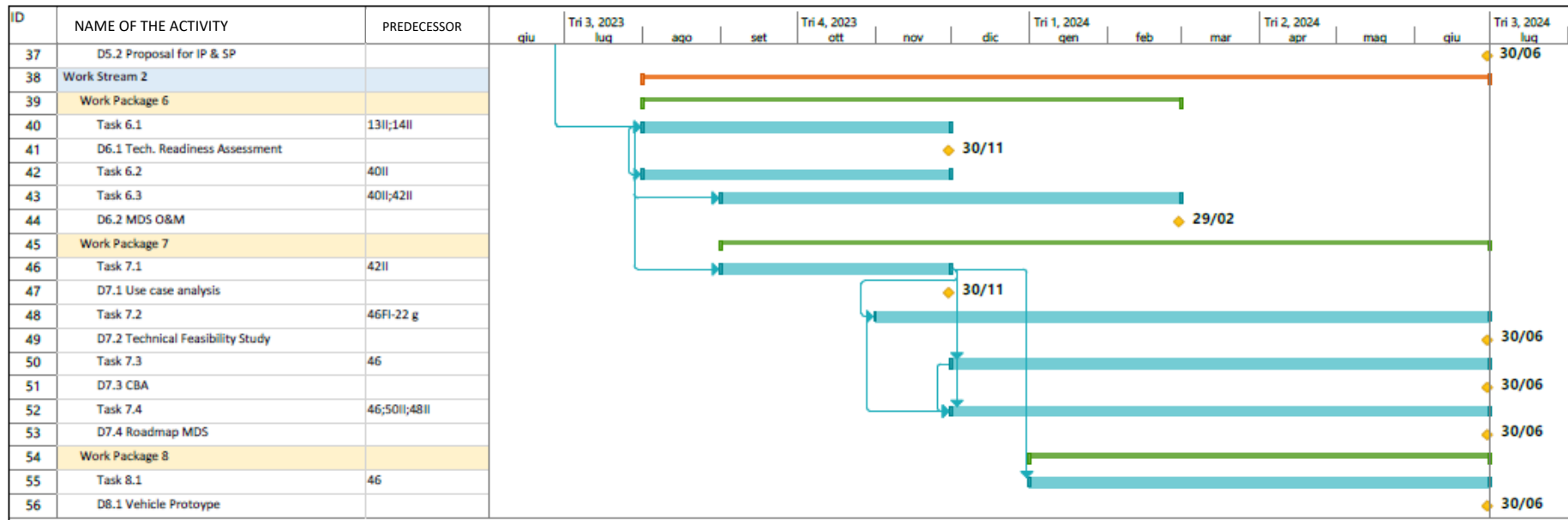


Figure 3: Project Gantt Chart

## 5 Project Management and Governance

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### 5.1 Project Management Strategy

WP1: Project Management, Communication, Dissemination and Exploitation, led by RFI, aims to provide appropriate coordination of the project, efficient and smooth management and proper dissemination of the results achieved by the consortium.

Project Management activities of the MaDe4Rail project include the overall project strategy implementation and project planning, performance and financial control, quality assurance, risk management, contingency planning, and administration of the EU funding.

The goals and objectives of the project, of each WP, and of each Task must be clearly defined and communicated to the consortium and the steps to carry these out must be achievable. In some cases, changes and improvements are necessary to achieve these objectives, which should be taken in accordance with the members of the consortium. Hence, clear communication is essential as well.

Efficient communication tools and practices are key to a good collaboration. This ensures the proper flow of conversations, feedback, ideas and most importantly, that needed information and tasks reach the appropriate partners on time. Therefore, this results as well to an efficient decision making among partners.

Quality management ensures the quality planning, quality control and quality assurance of the tasks and outcomes of the project, while following the schedule established. Along with this, risk management is necessary as well to minimise the project risks – already foreseen by the consortium and stated in the GA – and to monitor and mitigate them ensuring project completion on time and within the budget.

### 5.2 Project Management Structure

Project Management/Coordination will be led by RFI with strategic support from all the partners, especially WSs Leaders and WPs Leaders. More specifically, the Project Management Structure is composed of the Flagship Project Steering Committee (FPSC), General Assembly and Technical Management Teams (TMT).

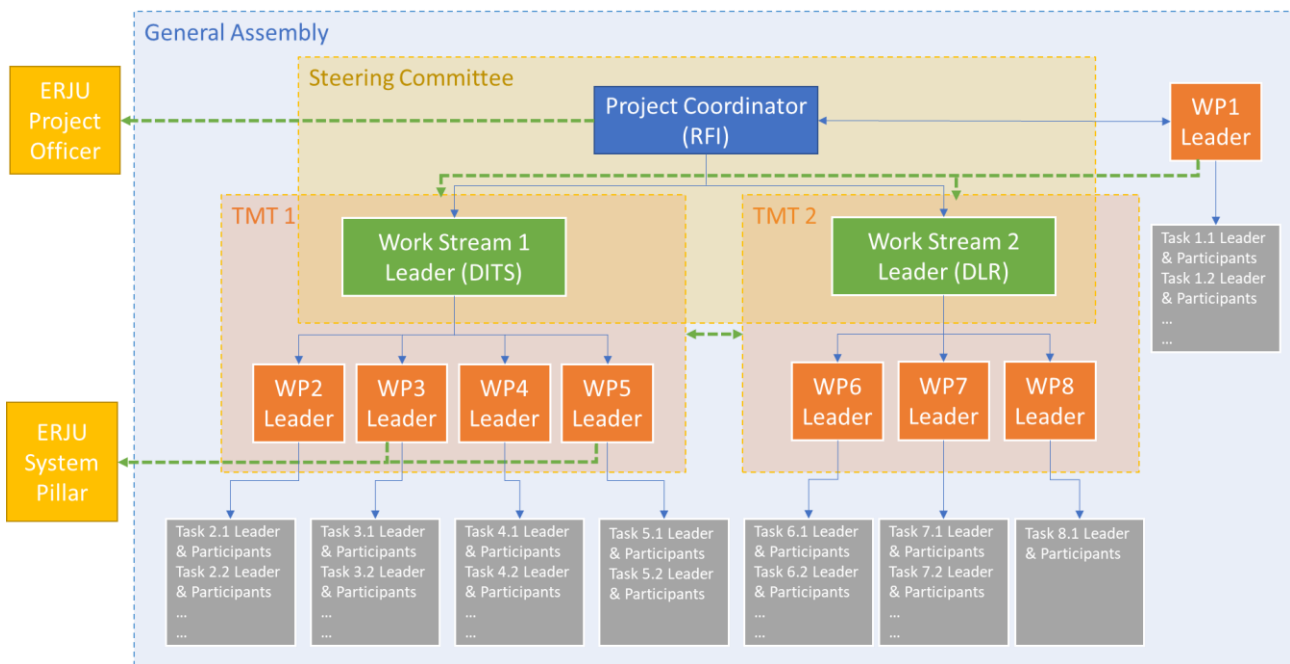


Figure 4: Project Management Organisational Chart

First of all, the Project Coordinator – RFI – is the legal entity acting as the intermediary between the Parties and the Funding Authority and responsible for the overall execution of the Project through the Task Leaders, who are in charge of producing the deliverables, with the support of WP and WS leaders. The Project Coordinator shall report to and be accountable to the General Assembly. The Project Coordinator shall, in addition to its responsibilities as a Party, perform the tasks assigned to it as described in the GA and the CA.

The FPSC is constituted by the Project Coordinator and the two WSs Leaders – DITS and DLR. It has the objective of defining strategic goals and ensuring the coherence and harmonization among technical evaluations and strategic decisions across WSs and WPs. The FPSC is therefore the ultimate decision-making body of the consortium chaired by the Project Coordinator. The FPSC will be set up for overall strategic and managerial decisions to address and synchronize high-level management and coordination activities of the Project, which will include technical guidance, financial, exploitation and dissemination issues, taking into account, when possible, any non-binding feedback, input or advice gathered from the General Assembly.

The General Assembly is constituted by one representative of each Beneficiary and Associated Partner. The General Assembly makes the decisions set out in section 6.3.2 of the CA. It also provides non-binding feedback, input or advice to the FPSC on main findings and eventual critical issues.

The TMT is constituted by the WSs Leader and WPs Leaders belonging to the Work Stream for each WS. The TMT monitors project progress, makes appropriate decisions, resolves conflicts in strict cooperation with the Project Coordinator and ensures coherence and harmonization among technical evaluations and strategic decisions across WPs.

## 6 Management Processes and Tools

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### 6.1 Reporting to the European Commission

MaDe4Rail Project has one (1) reporting period from M1 to M12. The periodic report must be prepared with the contribution of all the partners, which should be submitted by the Project Coordinator onto the Portal 60 days after the end of reporting period.

### 6.2 Project Platform

A project working place platform, Microsoft SharePoint Online, has been set up by the Project Coordinator to facilitate internal collaboration and documents distribution.

### 6.3 Conflict Resolution

As agreed in the Consortium Agreement, each consortium body has their roles and responsibilities, wherein in some circumstances, decision making is necessary. It is expected as well that in the whole duration of the project, issues may arise, hence, agreements need to be reached. However, it is inevitable that conflicts may occur. Therefore, the members of the Consortium have agreed to solve such conflicts. More specifically, the TMT makes appropriate decision and resolves conflicts in strict cooperation and collaboration with the Project Coordinator with the objective of ensuring harmonisation within the consortium. Nevertheless, the general principle is to solve the conflicts at lower level possible starting from the task level, considering the use of good communication and negotiation skills. Higher level of decision making shall be involved according to the Project Management Organisational Chart with the roles defined in detail in the Consortium Agreement.

## 7 Communication Processes and Tools

### 7.1 Internal Communication and Monitoring

Communication processes and tools are necessary to ensure effective and seamless flow of communication during the whole duration of the project. The Project Coordinator has an active role in guaranteeing the partners such efficient communication. In addition, a schedule of TMT and other types of meetings is defined, as illustrated in Table 5, in order to implement the work plan and achieve all its objectives on time ensuring proactive communication and decisions.

#### 7.1.1 Emails

##### 7.1.1.1 Mailing List and Email Etiquette

The address list of the consortium, subdivided in each WP and each task, is made available in the shared folder of the project in Microsoft SharePoint Online.

In all emails, the subject should be followed by a more specific description of the necessity and the deadline for response and/or actions should be specified.

If possible, file attachments should be avoided to not exceed the email size of the project participants; in this case, the email should surely arrive to the recipients. Necessary files to be transmitted to the recipients could be uploaded on the shared folder and provide the direct link instead.

#### 7.1.2 Project Meetings

Aside from the face-to-face kick-off meeting of the project, most meetings will be held virtually, considering the short duration of the project. These meetings will serve to organise and monitor the progress of the project and the different WPs and Tasks and to plan next steps to proceed with the successive activities.

The frequency of the meetings depending on the consortium body has been defined in the CA. Table 5 represents the different types of meeting foreseen during the whole duration of the project, including the organiser, participants, location and deliverables.

	Ordinary meeting	Extraordinary meeting	Organiser	Participants	Location	Deliverables
<b>Kick-off Meeting</b>	M1 (6 <sup>th</sup> of July 2023)	N/A	Project Coordinator	All project partners	Face-to-face and virtual event	Agenda Meeting Presentations
<b>FPSC</b>	Monthly	At any time upon written request of the Project Coordinator or one of the Members of the FPSC	Project Coordinator	Project Coordinator, WS1 and WS2 Leaders	Virtual event	Agenda Minutes – Action Plan

<b>General Assembly</b>	Quarterly	At any time upon written request of the Project Coordinator or 1/3 of the Members of the General Assembly	Project Coordinator	All project participants	Virtual event	Agenda Minutes – Action Plan
<b>TMT</b>	Fortnightly	At any time upon written request of any of the WS leaders	WS leader	WP leaders belonging to the specific WS	Virtual event	Agenda Minutes – Action Plan
<b>WPMM<sup>2</sup></b>	Weekly	At any time upon written request of any of the WP leaders	WP leader	Task leaders belong to the specific WP.	Virtual event	Agenda Minutes – Action Plan
<b>Ad hoc meeting</b>	N/A	Whenever needed	All project partners based on topic and need	Project partners based on topic and needs	Virtual event	Agenda Minutes – Action Plan

Table 5: Frequency of Meetings per Consortium Body

### 7.1.2.1 Organisation of Meetings

For the organisation of meetings, considering the different commitments of the members of the consortium outside this project, an online poll will be sent to the consortium to define the date and time of the first meeting. As defined in Section 6 of the CA, the date of the following ordinary meeting will be scheduled during each meeting. Any request for re-scheduling should be made not later than 10 calendar days in advance, and the chairperson of the Consortium Body will approve the proposed date if it results in a larger attendance for the meeting.

<sup>2</sup> **Work Packages Meeting Management (WPMM)** – The Work Packages Meetings will be managed by each WP Leader and involve all the Task Leaders and the Consortium Members participating in the WP. The outcomes after the weekly meeting should be a document with the overall status of the WP including schedule/timeline (foreseen delays), recent technical achievements, main deviation (including Risks and Mitigations), next steps. This will be sent to the Project Coordinator and the TMT.

The decision-making process will be done in the WP meetings and presented to the TMT when a decision could affect the project (affecting the Grant Agreement and an amendment is needed or affecting WP to which the work is related to). If consensus is not reached, the issue will be presented to the FPSC.



### 7.1.2.2 Online Meetings Platform

As illustrated in Table 5, most of the meetings will be held virtually. Organisers are free to choose the most appropriate platform depending on the possibility and availability to utilise them e.g., Google Meet, Skype, Zoom, etc. Online meetings organised by the Project Coordinator will be held over Microsoft Teams.

## 7.2 External Communication

For external communications, the consortium will be provided by the ERJU its own website, wherein the deliverables and other information regarding the project will be published, and will communicate to external stakeholders via email, social media accounts and social platforms (e.g., LinkedIn, Twitter, etc.).

All partners should produce high quality scientific papers and documents expected from this project suited for publications and/or presentations in different conferences and journals. Moreover, simple press releases are also foreseen to provide updates on the impacts of this project.

In all external communications, as stated in Article 17 of the GA, communication activities related to the action (e.g., media relations, conferences, seminars, information material such as brochures, leaflets, etc.) must specify that the project has been funded by the ERJU. More specifically, the documents must acknowledge EU support and display the European flag (emblem) and funding statement (translated into local languages, where appropriate). Moreover, for completeness, the project acronym (MaDe4Rail) and the Grant Agreement no.: 101121851 must also be indicated.

Further information related to communication will be presented in the Deliverable 1.3: Communication, Dissemination and Exploitation Plan (CDEP), which is due on M4.

## 7.3 Communication with Europe's Rail Joint Undertaking (ERJU)

Taking into consideration the project overview illustrated in Figure 4, the Project Coordinator is the responsible point of contact between the Consortium and the ERJU. The Project Coordinator is also responsible of updating the information on the Portal, including the communication activities and reporting of milestones achievements, submission of deliverables and progress report. The Project Coordinator is also in charge of providing information and/or documents requested by the ERJU and of transmitting to the partners any information and/or communication from the ERJU.

The partners can communicate to the ERJU through the Project Coordinator. The Partners can contact directly the ERJU in certain cases, only if requested by the Funding Authority and agreed upon with the Project Coordinator. In any case, the Project Coordinator should always be in copy in the emails.

Moreover, in reference to Figure 4, WP3 and WP5 leaders will also communicate to the ERJU's System Pillar (SP). These WPs are expected to produce documents and reports as an input to the SP Standardisation and Technical Specifications for Interoperability (TSI) Input Plan.

## 8 Quality Management

All partners are responsible of producing outputs of the highest quality within the MaDe4Rail project. Quality of the activities and documents produced will be monitored and verified by the Task leaders, WP leaders, WS leaders and Project Coordinator.

More importantly, WP and WS leaders shall constantly oversee the implementation of the different tasks assigned to them and assure quality in the outcomes to be produced; hence, achieving the goals set in the GA per WP taking into consideration the due dates (see Table 2).

In addition, as the Project Coordinator has the task of uploading the documents on the Portal, he should also be responsible of verifying the contents being coherent with objectives established and completeness of the final documents and guaranteeing their proper storage and back up in the shared folder of the Consortium.

### 8.1 Deliverable Preparation

The Project Coordinator shall inform and remind the partners regarding the upcoming deliverables that are expected to be submitted within 60 calendar days from the day of communication.

The Leader of the Deliverables, which are specified in Table 2, shall be responsible of the preparation, necessary modifications and fine tuning and finalisation of the deliverable.

According to the Governance Structure, the TMT – in charge of ensuring coherence and harmonization among technical evaluations and strategic decisions across WPs – shall be responsible of reviewing<sup>3</sup> the deliverables before being uploaded to the Portal.

The deliverables of WP1 shall be reviewed by the members of the FPSC, in exception of the WP1 Leader.

Related WP	Deliverable No.	Reviewer
1	D1.1	DITS + DLR
1	D1.2	DITS + DLR
1	D1.3	DITS + DLR
1	D1.4	DITS + DLR
2	D2.1	DITS, Uni.Eiffel, RFI (ITF), RFI (FSI)
2	D2.2	Uni.Eiffel, RFI (ITF), RFI (FSI)
3	D3.1	Uni.Eiffel, RFI (ITF), RFI (FSI)
3	D3.2	DITS, RFI (ITF), RFI (FSI)

<sup>3</sup> If the Leader of the Deliverable is also the WP or WS Leader, then it is exempted from the team of reviewers (i.e., TMT). In the review of the reports/documents of the deliverables, the beneficiaries can perform this task through its Affiliated Entity/ies that is/are involved in the execution of the WP.

4	D4.1	DITS, Uni.Eiffel, RFI (FSI)
4	D4.2	DITS, Uni.Eiffel, RFI (FSI)
5	D5.1	DITS, Uni.Eiffel, RFI (ITF)
5	D5.2	Uni.Eiffel, RFI (ITF), RFI (FSI)
6	D6.1	DLR, RFI (ITF), GESTE
6	D6.2	DLR, RFI (ITF), GESTE
7	D7.1	DLR, UPM, GESTE
7	D7.2	DLR, UPM, GESTE
7	D7.3	DLR, UPM, GESTE
7	D7.4	DLR, UPM, GESTE
8	D8.1	DLR, RFI (ITF), UPM, GESTE

*Table 6: List of Reviewers per Deliverable*

The Leader of the Deliverable of WS1 and WS2 will share the final draft of the deliverable to the reviewer at latest 15 calendar days before the due date, putting in copy the Project Coordinator. Each reviewer is responsible of executing an exhaustive verification of the deliverable taking into consideration the following conditions are respected:

- The content is coherent with the Description of Action (DoA).
- The content shall reflect coherence and harmonization among technical evaluations and strategic decisions.
- The objectives of the deliverable are clearly stated in the document/report and the objectives stated in the DoA have been reached.
- The content is accurate, complete, scientifically correct and of high quality.
- All references utilised and citations mentioned in the document/report are provided in the bibliography.
- The content is correctly written in English.
- The document/report is easily readable and understandable.
- The document/report is written considering the formatting rules and templates set in the project, which are specified in D1.2: Data Management Plan (DMP).

The reviewer should always modify the document/report in track-changes mode. In this way, the author of the deliverable may evaluate the modifications and observations made by the reviewer. If the author believes that such changes are not acceptable, the author may discuss these with the reviewer.

Each reviewer should respond to the Leader of the deliverable, putting in copy the Project Coordinator and the other reviewers that are listed in Table 6, within 7 calendar days from the receipt of the document/report, specifying the changes to made, if there are any, or indicating if the deliverable is ready for submission. If

there are modifications to be made, the revision process shall start over and be repeated, if necessary, until the final approval is obtained, taking into consideration the shorter time left to revise the document/report.

Upon the final approval of the reviewers of the deliverable, the Project Coordinator shall be responsible of uploading the document/report on the Portal, of providing a copy of the file on the shared folder in Microsoft Sharepoint Online, and of informing the Partners regarding the submission of the deliverable to the ERJU, through an email.

Time	Action	Responsible Partner
60 calendar days before the deadline	Reminder to partners of the upcoming deliverable	Project Coordinator
30 calendar days before the deadline		
20 calendar days before the deadline	Submission of the draft of the deliverable to the Reviewer, Project Coordinator, WS leader and WP leader	Leader of the Deliverable
13 calendar days before the deadline	Transmission of the revised document/report with eventual comments and observations or communication of the final approval to the Leader of the Deliverable, Project Coordinator, WS leader and WP leader	Reviewer
5 calendar days before the submission	Submission of the final document to the Project Coordinator	Leader of the Deliverable
Deadline	Final verification and submission of the document/report to the ERJU (through the Portal)	Project Coordinator

Table 7: Timeline for the deliverable preparation

## 8.2 Milestones and Quality Controls

According to the Horizon Europe (HORIZON) Programme Guide (2023), milestones are referred to “control points in the project that help to chart the progress.” Milestones may also refer to the achievement of key results that are necessary to proceed to the next phase or steps of the project. These may also concern intermediate checks of the expected outcomes of the project. In the event that some problems may occur, corrective measures may be adopted in this phase.

Eight (8) milestones have been identified in the MaDe4Rail project, which must be fulfilled during the whole duration of the project. The list of all milestones is presented in Table 2 and means of verification are specified in Annex 1 of the GA.

The WP Leaders of each milestone are responsible of achieving such milestones in a timely manner, to avoid delays in developing the deliverables that may depend on these intermediate checks and/or reports. The

Project Coordinator is accountable of reminding the WP leaders 30 calendar days before the due date and of monitoring the progress of the milestone.

In case of possible delays, the WP Leader shall communicate this to the Project Coordinator and together with the WS Leader, they shall produce a contingency plan.

Once the milestone has been reached, the WP Leader shall communicate the exact date of completion to the Project Coordinator and the WS Leader, which shall proceed with the verification of the achievement of the milestone. After such, the Project Coordinator shall update the European Commission (EC) Portal specifying the accomplishment of the milestone.

## 9 Risk Management and Mitigation

### 9.1 Risk Management Plan

Risk management is the process of identifying, assessing, and controlling the possible threats and/or risks that may occur and may result to the possible delay and/or failure of the project and/or its objectives and outcomes.

The consortium has already foreseen possible risks that may occur in the course of the project and has reported them in the Annex 1 of the GA, where the descriptions of the risks were stated, as well as the likelihood and severity of the risks considering the scale illustrated in Figure 5, the WP(s) involved and the proposed mitigation measures.

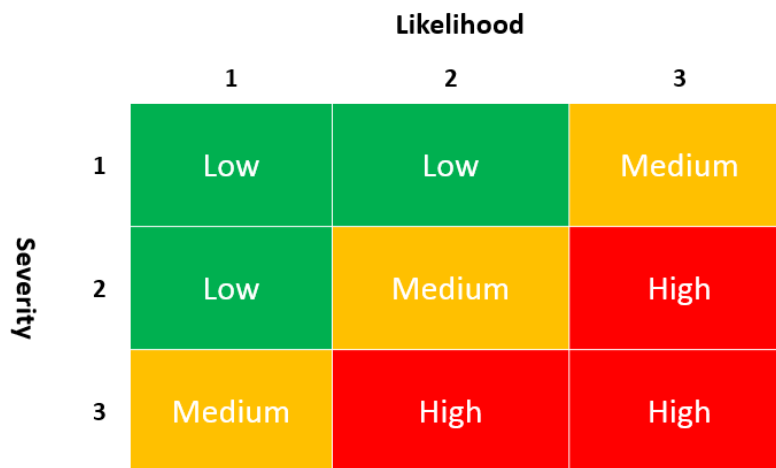


Figure 5: Risk Assessment (Source: [stakeholdermap.com](http://stakeholdermap.com))

After the risk assessment carried out by the consortium in the Grant Agreement Preparation phase, risk management shall be performed for the whole duration of the project by the FPSC and the respective TMT involved. The FPSC and the TMT shall continuously monitor and update the risks identified (with the support of the Task Leaders) and shall take proper actions to mitigate them promptly at lower level possible starting from the TMT. If necessary, the FPSC shall intervene.

### 9.2 Identified Risks

As previously stated, risks have been previously identified by the consortium and are reported in Annex 1 of the GA.

Description of risk	WP(s) involved	Proposed risk-mitigation measures
Lack of operational and architecture integration of Maglev-based transport into Rail System as a whole <ul style="list-style-type: none"> <li>▪ Likelihood: Low</li> <li>▪ Severity: High</li> </ul>	WP2, WP4 and WP 5.	A dedicated Work Package 5 is designed to identify and document requirements for coordinated Innovation and System Pillar actions to guarantee a fully interoperable and seamlessly operated maglev-based transportation system as an integral part of the European Rail

		'System of Systems' as defined by the System Pillar
<p>The state of technology and/or operational procedures in a selected use case makes the choice of use case hardly feasible:</p> <ul style="list-style-type: none"> <li>▪ Likelihood: Medium</li> <li>▪ Severity: High</li> </ul>	WP6 and WP7	Reconfigure the use case by selecting technology and/or operating procedures that, while not optimal, make the use case feasible in the short term.
<p>Lack of information and data concerning Maglev and Maglev-derived systems operated or under development due to their confidentiality</p> <ul style="list-style-type: none"> <li>▪ Likelihood: Low</li> <li>▪ Severity: Medium</li> </ul>	WP2 and WP6	<p>1) Building a large, rich and robust state-of-the art based on public information and data</p> <p>2) Preparation of papers and presentations explaining to owners, operators and developers the potential market implementation perspectives deriving from MaDe4Rail project and its follow-ups</p> <p>3) Call operators or technological developers for systems already in commercial use or under development, the consortium is composed of two of the key players of the sector.</p>
<p>Delay in collection and analysis of information due to the very tight schedule and the large amount of involved partners</p> <ul style="list-style-type: none"> <li>▪ Likelihood: Medium</li> <li>▪ Severity: Medium</li> </ul>	WP2	<p>1) Preparing a robust scheduling of activities including buffer times and parallel investigations to collect data in due time from different sources</p> <p>2) Strict coordination with following WPs to detect the key data and information and properly prioritizing the WP2 data collection and analysis</p>
<p>Late input from other WPs to select use cases and develop the feasibility study</p> <ul style="list-style-type: none"> <li>▪ Likelihood: Low</li> <li>▪ Severity: Low</li> </ul>	WP6 and WP7	Continuous monitoring of the progress of the project to early identify potential delay. Some of the partners have already previous works, which could be readily used in the project.
<p>Delay in the production of the outcomes and deliverables due to tight schedule and short duration of the project.</p> <ul style="list-style-type: none"> <li>▪ Likelihood: Medium</li> <li>▪ Severity: Medium</li> </ul>	All WPS	<p>Continuous monitoring of the progress of the project to early identify potential delay.</p> <p>In case one of the Partners fails to deliver their contribution, the TMTs will identify suitable partners to complete the work and the General Assembly will execute</p>

		the reallocation of work and budget upon the mutual agreement of the concerned partners.
<p>Interdependencies between the different WPs and tasks affect the task implementation and the overall schedule of the project.</p> <ul style="list-style-type: none"> <li>▪ Likelihood: Medium</li> <li>▪ Severity: Medium</li> </ul>	WP2, WP3, WP4, WP5 and WP6	<p>Continuous updating of information on task progress/completion among all the WPs with interdependencies.</p> <p>Preliminary outcomes should be provided to the leaders of the WPs/Tasks with interdependencies.</p>
<p>Qualified resources from partners are not sufficient due to other priorities or projects.</p> <ul style="list-style-type: none"> <li>▪ Likelihood: Low</li> <li>▪ Severity: Low</li> </ul>	All WPs	<p>Early assessment of the qualified resources that are supporting the actions of the project to prevent their possible unavailability to accomplish the tasks.</p> <p>In case one of the Partners fails to deliver their contribution, the TMTs will identify suitable partners to complete the work and the General Assembly will execute the reallocation of work and budget upon the mutual agreement of the concerned partners.</p>
<p>High project management efforts are needed, which request capacity that is not planned within the WPs and tasks.</p> <ul style="list-style-type: none"> <li>▪ Likelihood: Medium</li> <li>▪ Severity: Medium</li> </ul>	All WPs	Specify clear responsibilities for WS and WP leaders from the start of the project with a focus on the deliverable's completion.

Table 8: List of Critical Risks



## 10 Financial Management

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The maximum grant amount for the MaDe4Rail project is € 1,499,328.12 and is distributed among the partners according to the Data Sheet and in the estimated budget (lump sum breakdown) indicated in Annex 2 of the Grant Agreement. These costs are subdivided in direct and indirect costs per each partner, which are specified in the Description of Action.

The Project Coordinator is responsible of monitoring the use of resources of the entire consortium and is also in charge of necessary reallocation of funding and resources among partners; the reallocation decision shall be taken by the General Assembly and will entail an amendment of the GA.

The Project Coordinator will handle the distribution of payments to the beneficiaries through bank transfer. The beneficiaries should be accountable of transferring such funds to their Affiliated Entities, if there are any. Hence, the beneficiaries should be responsible in providing the necessary and correct bank details to proceed with this process. The prefinancing has been received by the Project Coordinator from the ERJU, equivalent to 45%<sup>4</sup> of the total funding, and will be transferred to the partners in August 2023. The final payment will be received 90 days after receiving the periodic report.

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<sup>4</sup> The prefinancing payment is expected to be € 749,664.06 (50% of the Maximum Grant Amount). However, the contribution to the Mutual Insurance Mechanism, equivalent to € 74,966.41 (5% of the Maximum Grant Amount) has been kept back from the stated amount and paid to the Mechanism, as stated in Point 4.2 of the Grant Agreement.

## 11 Conclusions

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The deliverable D1.1 presents the Quality Plan for the MaDe4Rail project. It summarises all information related to the management of the project and the quality assurance proposed for the development of the project's activities. The report includes the description of the project, the project management and governance structure, the processes and tools for project management and for communication, the quality management plan, the risk management and mitigation plan and the financial management plan.

The report focuses on the application of different quality assurance and risk management measures that undertake all aspects of the project's day to day operations. It is meant to serve all the participants of the MaDe4Rail project from planning to delivering the highest-quality outcomes throughout the whole duration of the project. In assuring quality of implemented technical and administrative work within the project duration, quality management aspects are considered in almost every activity foreseen. All the procedures and guidelines will be applied during the entire project to achieve the goal of successful delivery of expected outcomes and results, which are necessary for the next steps of the development of the MDS.

## 12 References

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1. Europe's Rail Joint Undertaking Governance and Process Handbook, September 2022, Version 2.5
2. Horizon Europe (HORIZON) Programme Guide, European Commission, April 2023, Version 3.0
3. MaDe4Rail Grant Agreement (GA Nr. 101121851), available to all Consortium partners
4. MaDe4Rail Consortium Agreement, available to all Consortium partners
5. Regulation (EU) 2021/695 of the European Parliament and of the Council of 28 April 2021 establishing Horizon Europe, April 2021
6. Risk Assessment, Stakeholder Map (stakeholdermap.com)
7. Europe's Rail Joint Undertaking Multi-Annual Work Programme, March 2022, Version 2.0