

**FRMCS-P - 101112959**

**Technical Description (Part B)**

(SMP STAND Standard)

**Version 1.1**

**13 October 2023**

**PROJECT FACT SHEET**

**STF 639** – FRMCS-P

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| Reference Body | TC RT |
| EC/EFTA Funding | Manpower: 435 840€  Travels (estimated): 15 000€  Other costs:                                          5 000€  **Total Budget (estimated):               455 840€** |
| Project Duration | **21 months** |
| |  |  |  |  | | --- | --- | --- | --- | | **WP1: Project management and coordination** | T0 | Project Management | 23 040€ | | **WP2: FRMCS System Architecture** | T1 | Specifications and architecture | 83 200€ | | **WP3: FRMCS Transport Stratum** | T2 | Transport Stratum features | 70 400€ | | **WP4: FRMCS Service Stratum** | T3 | Service Stratum features | 92 800€ | | **WP5: FRMCS Trackside functions and Interfaces** | T4 | FRMCS Trackside function and Interfaces and security mechanisms toward applications | 76 800€ | | **WP6: FRMCS radio characteristic** | T5 | FRMCS radio characteristics based on the applicable ECC Decision, features and specifications | 89 600€ | | |

# TECHNICAL DESCRIPTION (PART B)

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| **HISTORY OF CHANGES** | | |
| VERSION | PUBLICATION DATE | CHANGE |
| 1.0 | 28.02.2023 | Part B for EISMEA Portal and Grant Agreement preparation  WP 1: Deliverable D1.2 removed as it is a contractual document.  WP2 to WP6: additional information on the Deliverables status.  Following Evaluation Summary Report:   * More description for the subcontracting process has been added. |
| 1.1 | 13.10.2023 | Part B for EISMEA Portal and Grant Agreement preparation following reopening of the session and EISMEA PMO comments:   * Subcontracting:   + Subcontracted project tasks/activities added and explanation why the subcontracting goes beyond 30% of the total eligible costs * 6. Declarations - Financial support to third parties table: text deleted * Part 1.1 / 1.2 / 1.3 & 3.3: Change of text with FRMCS Standardization Request under finalization (following expiry of M/570) * Part 2.2: Youssouf Sakho removed: not part of ETSI anymore. * Point 3.2: Presentation to RASCOP deleted as it is no longer a committee. * Alignment of dates with FRMCS Standardization Request under finalization (following expiry of M/570) in Parts 4.1 and in WP1/WP2/WP3/WP4/WP5 & WP6   + Change of delivery dates for M5 / D2.1 / D3.1 / D4.1 / D5.1 and D6.1 and note added related to the WI numbers * Gantt chart updated |

## COVER PAGE

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| **PROJECT** | |
| **Project name:** | Development of a set of Technical Specifications related to the Future Railway Mobile Communication System |
| **Project acronym:** | FRMCS-P |
| **Coordinator contact:** | Luis Jorge Romero, ETSI |

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## PROJECT SUMMARY

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| The Future Railway Mobile Communication System (FRMCS) will succeed GSM-R as one of the essential elements of the European Railway Traffic Management System (ERTMS). It will support railway digitalisation and service innovation.  This proposal is linked to the standardisation request under finalization (following expiry of M/570) regarding the definition of system specification requirements for the Future Railway Mobile Communication System (FRMCS) in support of Directive (EU) 2016/797. The objective of this proposal is to develop a set of Technical Specifications in response to this standardisation request as follows:   1. A Technical Specification on the FRMCS System Architecture 2. A Technical Specification on the FRMCS Transport Stratum 3. A Technical Specification on the FRMCS Service Stratum 4. A Technical Specification on the FRMCS trackside functions and interfaces 5. A Technical Specification on the FRMCS radio parameters and related conformance testing   Given the complexity of the topic, this proposal does not constitute a complete response to the FRMCS Standardisation Request under finalization (following expiry of M/570). Additional specifications covering the interworking with GSM-R as well as the train onboard functions are required and are developed outside of the present proposal. All the work shall remain under the supervision of the ETSI Technical Committee on Rail Telecommunications (TC RT).  This proposal would provide a subset of the global specifications enabling the initiation of the FRMCS purchasing process, a key step towards the migration from legacy GSM-R to FRMCS and the continuation of the successful deployment in Europe of interoperable wireless systems for critical train communications spearheaded by GSM-R more than twenty years ago. |

## 1. RELEVANCE

### 1.1 Background and general objectives

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| The Future Railway Mobile Communication System (FRMCS) will succeed GSM-R as one of the essential elements of the European Railway Traffic Management System (ERTMS). It will support railway digitalisation and service innovation. Compared to GSM-R, FRMCS intends to offer a higher quality of service, use spectrum more efficiently and be more cost effective. The Future Railway Mobile Communication System (FRMCS) will be based on the 5G worldwide standard for railway operational communications, conforming to European regulation as well as responding to the needs and obligations of rail organisations outside of Europe.  In addition to a more efficient operation of existing critical applications such as the support of railway emergency call essential to safe rail operations and the support to control, command and signaling between trains and trackside infrastructure as part of ERTMS, new (critical and non-critical) applications will be developed gradually, taking advantage of the enablers specified as part of this proposal and railway application-oriented APIs.  The activity hereby proposed is in support to the Standardisation Request (under finalisation following expiry of M/570) to the European Telecommunications Standards Institute (ETSI) as regards the definition of system specification requirements for the Future Railway Mobile Communication System (FRMCS) in support of Directive (EU) 2016/797.  The proposed activities are also in response to the 2022 Annual Union Work Program, action 48:  Graphical user interface, text  Description automatically generated    This proposal is also aligned with the “COMMISSION IMPLEMENTING DECISION (EU) 2021/1730 of 28 September 2021 on the harmonised use of the paired frequency bands 874,4-880,0 MHz and 919,4-925,0 MHz and of the unpaired frequency band 1 900-1 910MHz for Railway Mobile Radio” and is in support of the rail transport policy for the creation of a Single European Rail Area.  In respect to the Regulation in force for the Single Market Programme ([EUR-Lex](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R0690)) the activities hereby proposed will address the following objectives:   * “to support the development of high-quality Union and international standards and rule-making, including through broad stakeholder involvement, which underpin the implementation of Union legislation” – Introductory Clauses – Clause (8) * as “European standards play an important role in the internal market”, to improve in the “speed and timeliness of the elaboration of standards” as well as “to better involve all relevant stakeholders” – Introductory Clauses – Clause (38) * “enhancing cooperation between the competent authorities of Member States and between the competent authorities of Member States and the Commission and the decentralised Union agencies” - Article 3, Clause 1.(d) * “ensuring the effective functioning of the internal market” through standardisation processes: i.e. in relation to the participation of stakeholders and integration of reporting best practices in financial and non-financial reporting - Article 3, Clause 2.(c)   This project is in response to **Topic 10-2022-STA** (“Technical Specifications for Future Railway Mobile Communications System (FRMCS)”) as described in the invitation to submit proposals for EU **action grants.** The call relies onEuropean Standardisation actions under the Internal Market, Standardisation, Consumers and other end-user financial services, part of the **Single Market Programme (SMP-STAND-2022-ESOS-02-IBA).** FRMCS addresses the objectives described in this call with the development of a set of technical specifications falling under the FRMCS Standardization Request under finalisation (following expiry of M/570) for the Future Railway Mobile Communication System. With the development of these Technical Specifications related to a 5G-based FRMCS, this project will contribute to the EU Agenda for the digital single market.  This project is in line with the European Commission objectives on 5G to the extent that in several areas (in particular around the MCX standard) the 5G global standard evolves towards cross-industry views, e.g. on Functional Addressing or service migration where railways and other vertical industries (such as PPDR) cooperate.  The project is also in line with multiple priorities identified by DG MOVE as part of its strategic plan for 2020-24:   * **A European Green Deal**: rail transport is recognized as a significant contributor to provide clean and green transport means. Digitalisation enabled by FRMCS will contribute to lower costs and increase reliability. * **A Europe fit for the digital age**: FRMCS will enable digitalisation and increased grades of automation in support of evolutions of ERTMS technologies. * **An economy that works for people**: As stated in DG MOVE strategic plan, “*Transport has always played and continues to play an essential role in the life of Europeans as the backbone of the internal market. […] Transport also enables people to enjoy the benefits of decades of successful European integration by providing them with the goods they need, the means to go to work or to travel.*”. FRMCS is a key enabler of vision of a sustainable and safe railway system without frontiers in service of European passengers and goods. |

### 1.2 Needs analysis and specific objectives

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| ETSI Technical Committee on Rail (TC RT) since its creation in 2001 has been developing standards for rail telecommunications in support of the GSM-R specifications. GSM-R, while based on the ETSI GSM standard, required extensions to the standard to enable railway operational requirements in several areas, be it on emergency voice calls, location-based or functional addressing or resilient geo-redundant architectures. In the process, through a gap analysis performed in TC RT, railways have also been able to raise relevant specific requirements to the 3GPP global standardization process.  ETSI Technical Committee on Rail (TC RT) has been working on FRMCS for quite some time and published a pre-study on the FRMCS system architecture (TR 103 459) already in August 2020. In October 2020, ETSI received and accepted a standardisation request for the definition of system specification requirements for FRMCS in support of Directive (EU) 2016/797 (M/570). After expiry of M/570, a new FRMCS Standardization Request is under finalisation (planned for end of 2023/ beginning of 2024). Since then, ETSI TC RT has been working on a number of preliminary activities very important for the normative definition of the FRMCS system and developed 2 technical reports on radio performance simulations: TR 103 554-1 (V1.3.1 published in October 2020) on radio performance simulations for the usage of LTE in the rail environment and TR 103 554-2 (V1.1.1 published in February 2021) on the same topic but focused on the usage of 5G (NR). ETSI TC RT has also been involved in the definition of FRMCS use cases and related requirements (in coordination with the UIC and 3GPP), which can be considered preliminary to the FRMCS standardisation activities in response to the FRMCS Standardization Request under finalisation (following expiry of M/570). ETSI TC RT has also recently finalized a Technical Report (TR 103 768) related to the interworking between FRMCS and GSM-R, which is also preliminary to the related normative work (also part of the FRMCS Standardization Request under finalisation).  Given the complexity of the topic, this proposal does not constitute a complete response to the FRMCS Standardisation request under finalization following expiry of M/570. Additional specifications covering the interworking with GSM-R as well as the train onboard functions are required and are developed outside of the present proposal.  This proposal would provide a subset of the global specifications enabling the initiation of the FRMCS purchasing process, a key step towards the migration from legacy GSM-R to FRMCS and the continuation of the successful deployment in Europe of interoperable wireless systems for critical train communications spearheaded by GSM-R more than twenty years ago.  The objectives of this project will be the following:   1. Development of a Technical Specification on the FRMCS System Architecture 2. Development of a Technical Specification on the FRMCS Transport Stratum based on 3GPP building blocks and functions for Future Railway Mobile Communication System. On- network mode of operation will be addressed. 3. Development of a Technical Specification on the FRMCS Service Stratum based on 3GPP building blocks and functions for Future Rail Mobile Communication System. On- network mode of operation will be addressed. 4. Development of a Technical Specification on the FRMCS trackside functions and interfaces 5. Development of a Technical Specification on the FRMCS radio parameters and related conformance testing based on the applicable ECC Decision (20)02 and the applicable regulatory requirements   The effectiveness of the project will be measured by the following set of Performance Indicators:   * *On-time delivery – development of the technical specifications in line with the planned schedule*: early drafts, stable drafts, final drafts for approval. The project will be considered successful if the approval dates by the responsible ETSI Technical Committee (TC RT) for the 5 Technical Specifications will not exceed by more than 30 days the original planned schedule (with respect to the kick-off meeting of this project) * Presentations on the activity progress will be done at the ETSI technical meetings. In addition, a presentation will be conducted at an ETSI event, allowing the widest dissemination channel for the project. * The number of drafts for consultation, including early draft, stable draft, final draft (for approval) of the 5 technical deliverables, for a total of 15 consultations with ETSI TC RT. |

### 1.3 Complementarity with other actions and innovation

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| FRMCS, like its GSM-R predecessor, is at the heart of an industrial plan to enable interoperable critical train communication throughout Europe and is a key enabler to realize the vision of a Single European Railway Area (SERA) through the provision of safe rail operation supported by the European Rail Traffic Management System (ERTMS).  The present project comes as a complement to:   * User, functional and system requirements produced within UIC * Several EU projects, in particular Shift2Rail, the 5Grail project and the upcoming Europe Rail’s Joint Undertaking, * Activities performed at a regulatory level, in particular in the context of CEPT’s FM56 “Radio Spectrum for Railway Applications” * Work done in a standardization context, in particular at ETSI within TC RT and at 3GPP   UIC specifications  Since 2012, UIC has been leading the development of various specifications for FRMCS, notably the FRMCS User Requirements Specifications (URS), the FRMCS Functional Requirements Specifications (FRS) and the FRMCS System Requirements Specifications (SRS). With GSM-R, the development process involved reviews with stakeholders (European Union Agency for Railways, railway infrastructure managers, railway undertakings, railway telecom and signalling industry…) and where relevant the development of Technical Reports and Technical Specifications in order to provide standard solutions in response to railway requirements.  EU projects  Several European research projects allowed the investigation of potential technical approaches to railway-identified requirements, such as for example within the Shift2Rail project with research items like the adaptable communication system (ACS) which shares some principles with the FRMCS Multipath function. The specification of the standards element underpinning the FRMCS Multipath will be specified as part of the present project.  Likewise, the main objective of 5GRAIL (<https://5grail.eu>) is to validate the first set of FRMCS specifications (also called FRMCS V1) that shall be part of the update by the European Railway Agency of the Technical Specification for Interoperability of Control Command and Signalling (CCS TSI) planned for the end of 2022. By developing and testing prototypes of the FRMCS ecosystem, for both trackside infrastructure and on-board, the 5Grail project is and will be a key source of inputs to help guide the specifications work that will be performed as part of the present project.  Last but not least, the FRMCS project is considered as a key enabler in the context of the upcoming Europe Rail’s Joint Undertaking, in support of railway operational voice communication and of ERTMS like GSM-R was but in more general terms as a vector to support railway digitalization. The architecture and functionalities specified as part of the present project support in general terms ERA’s vision for a sustainable and safe railway system without frontiers and enable the digital future of the rail industry in support of mobile communications backed by 5G technology.  EU regulation  As identified above, the present project will deliver key aspects for upcoming versions of ERA’s Technical Specification for Interoperability for CCS beyond 2022 and paves the way towards the migration of European railways from GSM-R towards FRMCS. Besides the TSI, from a regulatory standpoint, it shall be noted that the present project features the development of a Technical Specification on the FRMCS radio parameters and related conformance testing based on the applicable ECC Decision (20)02 resulting from CEPT FM56 work and reflected in the Commission Implementing Decision (EU) 2021/1730 of 28 September 2021.  Standardization context (ETSI, 3GPP)  The present project comes as a complement to two other ETSI projects related to FRMCS within ETSI TC RT: one (started in January 2023) on the normative work on the interworking with GSM-R (based on the result of ETSI TR 103 768) and another one (currently not specifically funded) on the train onboard functions (including the interfaces interworking with the ground functions) and the FRMCS UE capabilities. More generally, ETSI TC RT developed and is developing specifications work that will feed the present project, be it for example the Technical Reports on architecture (TR 103 459), on radio performance simulations (TR 103 554-1 and TR 103 554-2) or on radio performance features (TR 103 865). In return, the present project will deliver important building blocks complementing the aforementioned TC RT projects to constitute a comprehensive set of specifications for FRMCS.  FRMCS likewise relies on work performed within 3GPP, for example to cater to the results of a gap analysis between railway requirements and 3GPP standards but also by the specifications of the frequency bands harmonized at a European level (n100 for 900 MHz, n101 for 1900 MHz), including peculiarities of the rail operational conditions such as the High Power UE (aka 31 dBm) permitted by the European regulation for onboard equipment. Such features, alongside for example specific features of the 3GPP Mission Critical framework (MCX) to enable amongst others critical applications, will be leveraged in the present project.  As outlined above, the FRMCS project and associated aforementioned activities are part of an industrial plan aiming at serving the operational needs of European railways and beyond, drawing expertise from a variety of stakeholders going from railway organizations to European agencies and including the European rail industry. The required coordination and cooperation of these various activities with the present project will be greatly facilitated by the fact that several partners of ETSI TC RT are also members or contributors for all the projects or activities listed above. |

## 2. QUALITY

### 2.1 Concept and methodology

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| Any standard is a collection of requirements which, if implemented correctly, achieve certain objectives in a product or in a service. These requirements need to be unambiguous, precise and consistent.  Standards should follow established principles of standards writing, as follows:   * a well-defined and precise terminology should be used consistently in the standard; * requirements should be clearly identified as mandatory, optional or conditional; * different configurations and their associated parameters should be well-defined; * the means of conforming to the standard should be clearly identified; * definitions and requirements should not conflict with each other.   The purpose of validation is to ensure as far as possible that the requirements expressed in the standard do meet the objectives. Even a simple validation of a standard will identify specification errors that can be easily rectified and that, when corrected, will improve the overall quality of the document. Such improvements make the standard easier to understand and to implement in a product or a service, thus reducing the number of potential interoperability problems that might occur.  Problems found during validation can be classified as editorial or technical. Editorial issues can be easily resolved and they do not usually have an impact on the overall technical content of the standard.  Technical issues are more damaging than editorial problems and it is important to find and correct them prior to real deployments. Examples include:   * Requirements that are incomplete or omitted from the specification; * Requirements that are implied rather than expressly specified; * Requirements that conflict with other requirements in the same or a referenced standard; * Incorrect semantics used in a specification language; * Requirements that cannot be achieved practically.   In order to improve the quality of the deliverables, the validation process shown in the Figure below will be used for all of the Technical Specifications falling under this project proposal:    Four different phases can be envisaged:   1. *Planning*   A leader for the review process will be assigned by the project leader. A date for the review will be scheduled when the deliverable under validation reached the status “stable draft”   1. *Preparation for the review*   All the reviewers will scrutinize the deliverable and prepare comments and questions to be addressed to the drafting team (i.e. to those who contributed to the deliverable under validation)   1. *Document review meeting*   All the comments/questions will be discussed and change proposals will be prepared/agreed   1. *Processing change proposals*   change proposals will be implemented and the so modified deliverable will be reviewed.  Since the deliverables that will be produced under this proposal will be the first versions and no implementation of the whole FRMCS system will be available at the time of publication of the project proposal deliverables, this is the most suitable validation method aiming at minimizing the technical errors and improve the overall quality of the project deliverables.  Where deemed useful as part of a review cycle by the project manager, non-final versions of the deliverables may be submitted to specific stakeholders not directly participating to the project, as part of established quality assurance processes used in the rail ecosystem, further contributing to ensuring timely and appropriate feedback from the FRMCS stakeholders during the development of the deliverables of the present project. |

### 2.2 Consortium set-up

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| Not Applicable for ETSI |

### 2.3 Project teams, staff and experts

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| Name and function | Organisation | Role/tasks/professional profile and expertise |
| Léa Belloulou  Head of Funded Activities | ETSI | Head of ETSI funded Projects planning and control |
| Andrea Lorelli  Technical Officer | ETSI | ETSI Technical officer for the Technical Committee Rail Telecommunications (TC RT) |

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| **Outside resources (subcontracting, seconded staff, etc)** |
| The project will be performed by a group of maximum 10 Companies/Organisations (Service Providers), that will collectively ensure the following mix of skills:   * Experience in the drafting of ETSI standards * Knowledge of rail communication technologies * Knowledge of rail system operation * Knowledge in GSM-R and 5G   The total combined effort is detailed in the “Total Project Costs” section later in this document.  A project manager will be appointed from one of the Service Providers and will be responsible for co-ordinating the execution of the tasks assigned to the individual Service Providers, according to the project requirements and following the technical direction given by ETSI TC RT.  The project manager will possess project management experience, report-writing skills, experience of consensus building, presentation skills, experience of working in an international environment, and in liaising with other international organisations. |

### 2.4 Consortium management and decision-making

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| Not applicable for ETSI |

### 2.5 Project management, quality assurance and monitoring and evaluation strategy

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| According to ETSI Technical working procedure on the selection of the service providers, ETSI will issue a call for expertise to get the necessary skills and resources as described below.  Timeline  Description automatically generated  FRMCS-P is a project aimed at developing a set of Technical Specifications related to the Future Railway Mobile Communication System (to be listed in the CCS TSI) under the supervision of ETSI TC RT. Coordinating such a project as well as opening to external stakeholders is a composite task that requires an efficient management and decision-making structure to ensure the:  • Consolidation of a unified view of the overall FRMCS approach and objectives, at all times.   * Alignment with FRMCS related activities developed in 3GPP as well as UIC   • Oversight & completion of objectives (within agreed calendar, budget and quality of deliverables) both internally (within the consortium commitments) and externally (with respect to EISMEA, EU, the stakeholder community, the general audience).  • Early identification, management and mitigation of risks.  • Efficient and effective collaboration and synergistic effects between and among involved entities.  FRMCS-P proponents have committed to collaborate for the timely implementation of the work plan, preparation of the deliverables and quality of results. Next to the risk management, the quality assurance is essential for reaching the overall project targets. The main target is to monitor the achievements of the project, i.e. the deliverables and milestones, and to establish adequate processes to get an optimum of high-quality results.  A combination of frequent on-line progress meetings, face-to-face meetings and internal progress reports will create a clear view of the progress. Over and above the management of individual WPs, a lean, yet rigorous management framework linking all project components will be implemented.  From previous projects in ETSI, a formal internal review process has proven to be the most effective way to ensure a high-quality orientation throughout the project. The main instrument will be the peer-review by at least two technical experts from within the project, the formal check of the deliverables by the ETSI secretariat and a final check by the FRMCS-P Coordinator and WP1 leader.  In the initial phase the WP1 leader takes care for a harmonised peer-review process, i.e., the evaluation against defined scientific criteria and quality standards as proposed in the table below.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Criteria | Definitely | Satisfactorily | Somewhat | Not at all | Not applicable | | Deliverable matches the expected requirements |  |  |  |  |  | | Objectives are clear and in line with the planned activities? |  |  |  |  |  | | Issues at project level are properly treated? |  |  |  |  |  | | Author responds to readers’ needs? |  |  |  |  |  | | Technical approaches used are appropriate? |  |  |  |  |  | | Content is well organised? |  |  |  |  |  | | Issues raised are relevant? |  |  |  |  |  | | Contents contribute to the state of the art? |  |  |  |  |  | | Conclusions (if any) are valid? |  |  |  |  |  | | Deliverable is complete (no major parts missing)? |  |  |  |  |  | | Deliverable is formally correct. |  |  |  |  |  |   The deliverables will be presented at the regular status meetings of the FRMCS-P and at ETSI TC RT. The compliance to the plan will be reported in the Periodic Reports.  Quality assurance: All the 5 deliverables (Technical Specifications) linked to this project will be developed according to the ETSI Technical Working Procedures defined in the ETSI Directives. The drafts approved and adopted by TC RT will be submitted to the ETSI Secretariat within fourteen 14 days of the TC RT approval. Providing that the drafts comply with the ETSI Drafting Rules and following a quality check, the Secretariat will publish the deliverables within 30 days. The ETSI drafting rules are specified rules for the structure and drafting of documents intended to become ETSI deliverables and are intended to ensure that all ETSI deliverables are drafted in as uniform a manner as is practicable, irrespective of the technical content. The quality check of a deliverable is related to the overall structure of the document, the completeness and the accuracy of all the requirements necessary to achieve its objectives and the consistency of its content. A quality check together with the application of the ETSI drafting rules will guarantee that the published deliverables will be of high quality (world class standards).  The evaluation methods will be as follows:  For the 5 objectives indicated in Section 1.2, since the indicator is equal to the “on-time delivery”, the progress of the work will be monitored based on internal Intermediate Milestones (IMs) for the Work Items linked to the project deliverables as follows:   * IM1: early draft target date; * IM2: stable draft target date; * IM3: final draft for approval target date.   The Intermediate Milestones for the project deliverables will be visible on the ETSI Portal. |

### 2.6 Cost effectiveness and financial management

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| The estimates for the project costs are drawing from experience accrued on similar standardization work and enable a realistic evaluation of the complexity of the respective tasks. Further, the estimates take into account an initial phase of Technical Reports within TC RT.  In addition, specification work undertaken in UIC with an in-depth review cycle with major stakeholders (including users and industry) and under the supervision of the European Union Agency for Railways has also been factored in and allows the proposed results and objectives to be achieved in the budgetary most cost-effective way.  Taking into account the needed expertise, the daily rate is assumed to be 640 EUR and is based on the average market price.  Travels are strongly reduced as teleconferences will be the most common tool for organising technical meetings. Anyway travels are accounted to consider the participation to the ETSI TC RT meetings as well as to conduct the dissemination activities described in Section 3.2. More specifically, considering the cost of travel in EU equal to 1K EUR, a total of 15 individual travels will be supported with the breakdown detailed in Section 4.  Each subcontractor is allocated to specific tasks with an expected level of contribution. The financial resources allocated to the subcontractor are calculated on this principle.  At the start of the project, ETSI develops a baseline cost plan. It is calculated with the cost of the tasks and the scheduled progress of task at each milestone cut-off date. This baseline cost plan provides the costs at each milestone cut-off date.  The milestone payment schedule for each subcontractor is then calculated by taking into account the baseline cost plan and the expected level of contribution. The milestone payment schedule is contractual  The subcontractors payment are submitted to the validation of the project milestones. The ISG and ETSI proceed to the validation of the milestone. |

### 2.7 Risk management

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| Risk No | Description | Work package No | Proposed risk-mitigation measures |
| **1** | Project delays  Likelihood[[1]](#footnote-2): Medium  Impact [[2]](#footnote-3): Medium | **WP1** | All technical activities will be constantly monitored by ETSI TC RT and the project leader. If a given objective is delayed with respect to the original schedule, which means that an IM is not achieved in due time, TC RT members will contribute on a voluntary basis so as to minimise the delay.  The start of the project shall be as early as possible in order to optimize collaboration with related activities and facilitate the management of delays. |
| **2** | Technical work diverges from project initial goals. Essential technical items not adequately addressed to meet the project objectives  Likelihood: Low  Impact: Medium | **WP1**  **WP2**  **WP3**  **WP4**  **WP5**  **WP6** | Frequent communication between the WP1 leader and the other WP leaders will be essential to minimize the risks of inconsistencies and incompatibility between the different objectives. The progress of the work for the different deliverables (objectives) will be monitored step-by-step by the project leader as well as TC RT. TC RT will review the deliverables each time an IM is reached so as to make sure there is no deviation with respect to the scope, no overlapping between deliverables and the scope of the work is well understood.  Appropriate use of the feedback with stakeholders as identified in 2.1 to assess adequacy to project objectives and fitness for purpose to the stakeholders. |
| **3** | Technical work is not aligned with FRMCS standardisation activities not part of the project  Likelihood: Low  Impact: Severe | **WP1**  **WP2**  **WP3**  **WP4**  **WP5**  **WP6** | The FRMCS Technical Specifications set has to be consistent. WP1 Leader as well as RT will constantly monitor the project work as well as the other FRMCS standardisation activities (taking place not only in TC RT but also in 3GPP) so as to be sure all technical aspects are covered and there are no missing elements and/or inconsistencies. |
| **4** | Financial Resources not sufficient to complete the work  Likelihood: Medium  Impact: Medium | **WP2**  **WP3**  **WP4**  **WP5**  **WP6** | The work will be completed on a voluntary basis with the support of TC RT delegates. |
| **5** | Coronavirus Pandemic impacts travel and meetings  Likelihood: Medium  Impact: Low | **WP1**  **WP2**  **WP3**  **WP4**  **WP5**  **WP6** | The experts will work mainly in remote. ETSI has already demonstrated its ability to perform in these conditions, moving all events online during 2020-2021. |

## 3. IMPACT

### 3.1 Impact and ambition

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| As identified in 1.3, the project is expected to deliver specifications which constitute essential building blocks of an overall industrial plan aimed at the European rail ecosystem in particular but also to serve global needs of the rail sector for wireless communications for rail operations.  Short term, the project outputs complement other specification needs such as interworking with GSM-R, train onboard functions and FRMCS UE capabilities in support of the FRMCS requirements specifications developed at UIC.  Mid-term, the project outputs constitute an important element of the FRMCS V2 package which is expected to be used to trigger the procurement process of FRMCS networks and the necessary migration between the GSM-R systems and FRMCS in light of the planned obsolescence of GSM-R. Directive 2016/797 establishes the conditions to be met to achieve interoperability within the union of rail system in order to define an optimal level of technical harmonisation, to make it possible to facilitate, improve and develop rail transport services within the Union and with third countries and to contribute to the completion of the single European railway area and the progressive achievement of the internal market. Each subsystem defined in Annex II of this directive will be covered by a technical specification for interoperability (TSI) which, in turn, require European standardisation deliverables for their support. One of these TSI is the CCS TSI which will take into account the Future Railway Mobile Communication System (FRMCS). It is therefore of paramount importance to speed up the development process of the FRMCS related standardisation so as not to delay the FRMCS deployment. As far as this last point is concerned, the non-availability of the required specifications could result in a non-harmonized deployment, lack of interoperability, integration problems and consequently to the need for reinvestments at a later stage in order to upgrade or re-engineer the deployed solutions to the required standards with obvious consequences in terms of costs. This could also lead to the impossibility to become operational and deliver the expected benefits.  Long term, the project outputs are essential to the realization of the overall industrial plan enabling a sustainable and safe railway system without frontiers within Europe and supporting the larger challenge of railway digitalization. Rail transport is recognized as a key enabler to address the challenge of climate change and the needs of sustainable mobility solutions for European citizens and goods. |

### 3.2 Communication, dissemination and visibility

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| Information will be provided on the effectiveness of activities related to the dissemination of project deliverables and efforts made to raise industry awareness of the activity. The project intends to disseminate results as follows:   * At least 1 presentation to ETSI group TC ERM on FRMCS radio aspects; * At least one news release (for example on the ETSI web site) on the work, detailing the achievement of important results; * At least one article in the ETSI official magazine, Enjoy!;At least one presentation to JPC-Rail (SFR) * Organisation of an ETSI FRMCS Workshop where the results of the project will be presented   In all dissemination activities, we will make evident the funding coming from the EC to FRMCS-P project, and a reference to the overarching FRMCS-P project funded by the EC: more specifically the EU flag logo and the FRMCS-P grant number will be highlighted in all official presentations and press releases. |

### 3.3 Sustainability and continuation

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| The 5 deliverables (Technical Specifications) linked to this project are a subset of the full set of deliverables in response to the FRMCS Standardisation Request under finalization (following expiry of M/570). Once the deliverables linked to the project are published, there might be the need to update them if:   1. the overall FRMCS architecture evolves 2. one or more of the building blocks of the architecture need to be changed as a result of the introduction of new services and/or requirements 3. technical and/or editorial errors are discovered.   Since the FRMCS architecture is based on 5G building blocks developed by 3GPP, its evolution (for instance due to the introduction of 6G technology) will depend on a number of factors to be evaluated once the FRMCS network is in operation: impact on the existing infrastructure, overall cost for the upgrade, expected advantages for the end users, etc. Therefore, it is not possible at this time to quantify the effort needed (if worthwhile) in order to update the FRMCS standards as a result of a possible evolution of the architecture. This is also the case if new requirements and/or services based on the standardised architecture will need to be introduced after the publication of V1.1.1 of the FRMCS specification (point b.)  As for point c.:   * subsequent versions containing only editorial changes may be published by the ETSI Secretariat following confirmation by the TC RT Chair and therefore with a minimal additional effort. * subsequent versions containing technical updates are approved and adopted by TC RT according to the ETSI decision-making procedures defined in the ETSI Directives.   An update of the technical specifications due to errors is expected to occur when these errors are discovered during the implementation and/or testing of the FRMCS. It would be therefore beneficial to develop also conformance test specifications for presumption of conformity against the requirements in the FRMCS specifications.  If different implementations from different manufacturers are available, it would be advisable to organise one or more interoperability events (Plugtests™) which have the purpose to test the interoperability of different implementations. Since interoperability events have also the purpose to validate the standards, this will further improve the quality of the standardisation deliverables.  It is also worth mentioning that the 2022 Annual Union Work Program for European standardisation includes an action related to Space traffic management and market uptake of space data (Ref 13 in the ANNEX to the Commission Notice) requesting to “Develop European standards for space traffic management. Develop European standards to support user and market uptake of space data and services provided by the EU Space Programme (Galileo, EGNOS, Copernicus, SSA, GOVSATCOM).” With which this proposal has some synergies (FRMCS is also satellite-based). |

## 4. WORKPLAN, WORK PACKAGES, ACTIVITIES, RESOURCES AND TIMING

### 4.1 Work plan

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| FRMCS-P is planned as 21 months project. The project will be implemented in Work Packages (WP) each of them managed by ETSI and subcontracted specialists. The work plan is organized in 5 technical WPs and a management WP. Each technical WP will be related to the development of a Technical Specification. Please note that the deliverable of WP2 will address the dependencies between deliverables.  WP1 deals with the implementation of the project plan (including the management of the open calls and the selection of the best candidatures).  The other WPs will be organised as follows:   * WP2 will be related to the development of a Technical Specification on the FRMCS System Architecture * WP3 will be related to the development of a Technical Specification on the FRMCS Transport Stratum * WP4 will be related to the development of a Technical Specification on the FRMCS Service Stratum * WP5 will be related to the development of a Technical Specification on the FRMCS trackside functions and interfaces * WP6 will be related to the development of a Technical Specification on the FRMCS radio parameters and related conformance testing   The effectiveness of the proposed timing will be guaranteed considering the Risk Assessment and Contingency Plan (see Section 2.7). |

### 4.2 Work packages, activities, resources and timing

#### Work Package 1

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| **Work Package 1: Project management and coordination** | | | | | | | | | | | | | | | |
| **Duration:** | | | M1 – M21 | | | **Lead Beneficiary:** | | | **ETSI** | | | | | | |
| **Objectives**  *List the specific objectives to which this work package is linked.* | | | | | | | | | | | | | | | |
| * This WP is related to the management of the FRMCS-P project and therefore its duration covers the whole duration of this proposal | | | | | | | | | | | | | | | |
| **Activities and division of work (WP description)** | | | | | | | | | | | | | | | |
| Task No  (continuous numbering linked to WP) | Task Name | | | Description | | | | | | | Participants - NA | | | | In-kind Contributions and Subcontracting  (Yes/No and which) |
| Name | | Role  (COO, BEN, AE, AP, OTHER) | |
| T1.1 | Project Setup | | | ETSI TC RT chair will interview the potential candidates and select those to best meet the work plan, including the assignment of the Project Leader  ETSI Staff will make arrangements for project members (service contracts, etc.).  The ETSI TC RT chair (with the help of the assigned Project Leader) checks that the objectives of all WPs are clearly recognised by the participants. The corresponding milestone is therefore set at Month 2 (MS1) in alignment with standard ETSI procedures. | | | | | | | ETSI | | COO | | YES (In-kind) |
| T1.2 | Project Management | | | The overall management of the project will be under the responsibility of the project Leader. He will ensure an effective coordination among the different Tasks, working in close collaboration with the different Task Leaders and supervising them if needed, but also with ETSI TC RT representatives.  The overall management of the project consists in:   * Planning the work of the project members, ensuring that the timescales of the project deliverables are met * Organising meetings to discuss the drafts, recording any major issues and resolutions of issues * Reporting to TC RT on the progress of work * Presenting the project results in other external meetings as appropriate * providing the project Reports to the ETSI Secretariat: the Progress Report (to be submitted to EISMEA after 12 months) and the Final Report (to be submitted to EISMEA at the end of the project). | | | | | | | ETSI | | OTHER | | YES (subcontracting) |
| **Milestones and deliverables (outputs/outcomes)** | | | | | | | | | | | | | | | |
| Milestone No  (continuous numbering not linked to WP) | | Milestone Name | | | Work Package No | | Lead Beneficiary  NA | Description | | | | Due Date  (month number) | | Means of Verification | |
| MS1 | | All technical activities started | | | 1 | | ETSI | The coordinator (with the help of the project leader) checks that the objectives of all WPs are clearly recognised by the participants and that the technical activities have started | | | | M2 | | Project meeting | |
| MS3 | | Intermediate results have been delivered | | | 1 | | ETSI | Progress Report with the achieved results approved by TC RT and sent to EISMEA | | | | M12 | | Report by coordinator to EISMEA | |
| MS5 | | Final results have been delivered | | | 1 | | ETSI | Final Report approved by TC RT and sent to EISMEA | | | | M21 | | Report by coordinator to EISMEA | |
| Deliverable No  (continuous numbering linked to WP) | | Deliverable Name | | | Work Package No | | Lead Beneficiary | Type | | Dissemination Level | | Due Date  (month number) | | Description  (including format and language) | |
| D1.1 | | EISMEA Interim Report | | | 1 | | ETSI | R — Document, report | | SEN — Sensitive | | M12 | | * The activities performed until month 12, the coordination work of the activities and the production of the expected deliverables anticipated in the work-plan. * The latest drafts of the deliverables are available according to the time plan. * Overview of ad-hoc meetings if necessary. * The plan for the future activities to complete the deliverables and further expected (coordination) meetings. * Quality intermediate report. | |

#### Work Package 2

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Work Package 2: FRMCS System Architecture** | | | | | | | | |
| **Duration:** | | M3 – M15 | | **Lead Beneficiary:** | | **ETSI** | | |
| **Objectives**  *List the specific objectives to which this work package is linked.* | | | | | | | | |
| WP2 is focused on the production of the FRMCS System Architecture Technical Specification.  Key areas of specifications include:   * Logical architecture building blocks and reference points * Specification of the respective administrative domains (Application, Service, Transport) within a FRMCS Operator domain and outside (including the GSM-R administrative domain) * Specification of basic inter-domain transitions, including for border-crossing operation and from / towards GSM-R systems | | | | | | | | |
| **Activities (what, how, where) and division of work** | | | | | | | | |
| Task No (continuous numbering linked to WP) | Task Name | | Description | | Participants | | | In-kind Contributions and Subcontracting (Yes/No and which) |
| Name | | Role (COO, BEN, AE, AP, OTHER) |
| T2.1 | Building blocks and reference points | | Logical architecture building blocks and reference points | | ETSI | | OTHER | YES (subcontracting) |
| T2.2 | Administrative domains | | Specification of the respective administrative domains (Application, Service, Transport) within a FRMCS Operator domain and outside (including the GSM-R administrative domain) | | ETSI | | OTHER | YES (subcontracting) |
| T2.3 | Inter-domain transitions | | Specification of basic inter-domain transitions, including for border-crossing operation and from / towards GSM-R systems | | ETSI | | OTHER | YES (subcontracting) |

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| **Milestones and deliverables (outputs/outcomes)** | | | | | | | |
| Milestone No (continuous numbering not linked to WP) | Milestone Name | Work Package No | Lead Beneficiary | Description | | Due Date  (month number) | Means of Verification |
|  |  |  |  |  | |  |  |
| Deliverable No (continuous numbering linked to WP) | Deliverable Name | Work Package No | Lead Beneficiary | Type | Dissemination Level | Due Date  (month number) | Description (including format and language) |
| D2.1 | Rail Telecommunications (RT);  Future Railway Mobile Communication System (FRMCS);  System Architecture  TS 103 764 V2.1.1 (\*) | 2 | ETSI | R — Document, report | PU - Public | M15 | Following a final check by the project team, the ETSI TC RT members as well as the ETSI Secretariat, the final draft of the deliverable will be sent to the National Standardisation Bodies Group (NSBG) at M12 for formal approval  Published version expected at M15  (\*) Due to the new process to follow for standardisation work falling under a standardisation request (see  Regulation (EU) 2022/2480 Article 1 , recital (2)(b)),  work Item numbers and/or versions might be modified once the new FRMCS standardisation request under finalization is accepted by the National Standardisation Bodies, which is expected to take place in Q1 2024. |

#### Work Package 3

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| **Work Package 3: FRMCS Transport Stratum** | | | | | | | | |
| **Duration:** | | M3 – M21 | | **Lead Beneficiary:** | | **ETSI** | | |
| **Objectives**  *List the specific objectives to which this work package is linked.* | | | | | | | | |
| WP3 is focused on the production of the FRMCS Transport Stratum Technical Specification.  Key areas of specifications include:   * Necessary and sufficient features for FRMCS operation at the Transport Stratum level within a FRMCS operator domain   + Authentication and authorization   + QoS and policy control   + Positioning mechanisms * Necessary and sufficient features for FRMCS operation at the Transport Stratum level to enable mobility and interconnection * Necessary and sufficient features for FRMCS operation at the Transport Stratum level to enable interworking with GSM-R * Specification of the FRMCS Multipath function | | | | | | | | |
| **Activities (what, how, where) and division of work** | | | | | | | | |
| Task No (continuous numbering linked to WP) | Task Name | | Description | | Participants | | | In-kind Contributions and Subcontracting (Yes/No and which) |
| Name | | Role (COO, BEN, AE, AP, OTHER) |
| T3.1 | Transport Stratum features within a FRMCS operator domain | | Necessary and sufficient features for FRMCS operation at the Transport Stratum level within a FRMCS operator domain | | ETSI | | OTHER | YES (subcontracting) |
| T3.2 | Transport Stratum features for mobility and interconnection | | Necessary and sufficient features for FRMCS operation at the Transport Stratum level to enable mobility and interconnection | | ETSI | | OTHER | YES (subcontracting) |
| T3.3 | Transport Stratum features for interworking with GSM-R | | Necessary and sufficient features for FRMCS operation at the Transport Stratum level to enable interworking with GSM-R | | ETSI | | OTHER | YES (subcontracting) |
| T3.4 | Transport Stratum features for FRMCS Multipath | | Specification of the FRMCS Multipath function | | ETSI | | OTHER | YES (subcontracting) |

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| **Milestones and deliverables (outputs/outcomes)** | | | | | | | |
| Milestone No (continuous numbering not linked to WP) | Milestone Name | Work Package No | Lead Beneficiary | Description | | Due Date  (month number) | Means of Verification |
|  |  |  |  |  | |  |  |
| Deliverable No (continuous numbering linked to WP) | Deliverable Name | Work Package No | Lead Beneficiary | Type | Dissemination Level | Due Date  (month number) | Description (including format and language) |
| D3.1 | Rail Telecommunications (RT);  Future Railway Mobile Communication System (FRMCS);  Building Blocks and Functions; Part 1: Transport Stratum  TS 103 765-1 V1.1.1 (\*) | 3 | ETSI | R — Document, report | PU - Public | M21 | Following a final check by the project team, the ETSI TC RT members as well as the ETSI Secretariat, the final draft of the deliverable will be sent to the National Standardisation Bodies Group (NSBG) at M18  Published version expected at M21.  (\*) Due to the new process to follow for standardisation work falling under a standardisation request (see  Regulation (EU) 2022/2480 Article 1 , recital (2)(b)),  work Item numbers and/or versions might be modified once the new FRMCS standardisation request under finalization is accepted by the National Standardisation Bodies, which is expected to take place in Q1 2024. |

#### Work Package 4

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| **Work Package 4: FRMCS Service Stratum** | | | | | | | | |
| *Ensure consistence with the detailed budget table (if applicable).* | | | | | | | | |
| **Duration:** | | M3 – M21 | | **Lead Beneficiary:** | | **ETSI** | | |
| **Objectives**  *List the specific objectives to which this work package is linked.* | | | | | | | | |
| WP4 is focused on the production of the FRMCS Service Stratum Technical Specification.  Key areas of specifications include:   * Necessary and sufficient features for FRMCS operation at the Service Stratum level within a FRMCS operator domain   + QoS and priority management,   + authentication and authorisation for the use of the service stratum,   + communication security aspects   + location management,   + service identification scheme   + alternative user addressing schemes (e.g. functional aliasing) * Necessary and sufficient features for FRMCS operation at the Service Stratum level to enable mobility and interconnection between FRMCS Service Domains | | | | | | | | |
|  | | | | | | | | |
| **Activities (what, how, where) and division of work**  *Provide a concise overview of the work (planned tasks). Be specific and give a short name and number for each task.*  *Show who is participating in each task: Coordinator (COO), Beneficiaries (BEN), Affiliated Entities (AE), Associated Partners (AP), indicating* ***in bold*** *the task leader. Add information on other participants’ involvement in the project e.g. subcontractors, in-kind contributions.*  ***Note:***  *In-kind contributions: In-kind contributions for free are cost-neutral, i.e. cannot be declared as cost. Please indicate the in-kind contributions that are provided in the context of this work package. The Coordinator remains fully responsible for the coordination tasks, even if they are delegated to someone else. Coordinator tasks cannot be subcontracted.*  *If there is subcontracting, please also complete the table below.* | | | | | | | | |
| Task No (continuous numbering linked to WP) | Task Name | | Description | | Participants | | | In-kind Contributions and Subcontracting (Yes/No and which) |
| Name | | Role (COO, BEN, AE, AP, OTHER) |
| T4.1 | Service Stratum features within a FRMCS operator domain | | Necessary and sufficient features for FRMCS operation at the Service Stratum level within a FRMCS operator domain | | ETSI | | OTHER | YES (subcontracting) |
| T4.2 | Service Stratum features for mobility and interconnection | | Necessary and sufficient features for FRMCS operation at the Service Stratum level to enable mobility and interconnection between FRMCS Service Domains | | ETSI | | OTHER | YES (subcontracting) |
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| **Milestones and deliverables (outputs/outcomes)** | | | | | | | |
| Milestone No (continuous numbering not linked to WP) | Milestone Name | Work Package No | Lead Beneficiary | Description | | Due Date  (month number) | Means of Verification |
|  |  |  |  |  | |  |  |
| Deliverable No (continuous numbering linked to WP) | Deliverable Name | Work Package No | Lead Beneficiary | Type | Dissemination Level | Due Date  (month number) | Description (including format and language) |
| D4.1 | Rail Telecommunications (RT);  Future Railway Mobile Communication System (FRMCS);  Building Blocks and Functions; Part 2: Service Stratum  TS 103 765-2 V1.1.1 (\*) | 4 | ETSI | R — Document, report | PU - Public | M21 | Following a final check by the project team, the ETSI TC RT members as well as the ETSI Secretariat, the deliverable the final draft of the deliverable will be sent to the National Standardisation Bodies Group (NSBG)at M18  Published version expected at M21  (\*) Due to the new process to follow for standardisation work falling under a standardisation request (see  Regulation (EU) 2022/2480 Article 1 , recital (2)(b)),  work Item numbers and/or versions might be modified once the new FRMCS standardisation request under finalization is accepted by the National Standardisation Bodies, which is expected to take place in Q1 2024. |

#### Work Package 5

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| **Work Package 5: FRMCS Trackside functions and Interfaces** | | | | | | | | |
| **Duration:** | | M3 – M21 | | **Lead Beneficiary:** | | **ETSI** | | |
| **Objectives**  *List the specific objectives to which this work package is linked.* | | | | | | | | |
| WP5 is focused on the production of the FRMCS Trackside functions and Interfaces Technical Specification.  Key areas of specifications include:   * Specification of the FRMCS Trackside functions and Interfaces * Security mechanisms towards applications * Impact, if any, of the FRMCS Multipath | | | | | | | | |
| **Activities (what, how, where) and division of work** | | | | | | | | |
| Task No (continuous numbering linked to WP) | Task Name | | Description | | Participants | | | In-kind Contributions and Subcontracting (Yes/No and which) |
| Name | | Role (COO, BEN, AE, AP, OTHER) |
| T5.1 | FRMCS Trackside functions and Interfaces | | FRMCS Trackside functions and Interfaces | | ETSI | | OTHER | YES (subcontracting) |
| T5.2 | Security mechanisms towards applications | | Security mechanisms towards applications | | ETSI | | OTHER | YES (subcontracting) |
| T5.3 | Impact, if any, of the FRMCS Multipath | | Impact, if any, of the FRMCS Multipath | | ETSI | | OTHER | YES (subcontracting) |

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| **Milestones and deliverables (outputs/outcomes)** | | | | | | | |
| Milestone No (continuous numbering not linked to WP) | Milestone Name | Work Package No | Lead Beneficiary | Description | | Due Date  (month number) | Means of Verification |
|  |  |  |  |  | |  |  |
| Deliverable No (continuous numbering linked to WP) | Deliverable Name | Work Package No | Lead Beneficiary | Type | Dissemination Level | Due Date  (month number) | Description (including format and language) |
| D5.1 | Rail Telecommunications (RT);  Future Railway Mobile Communication System (FRMCS); Building Blocks and Functions;  Part 4: trackside functions and interfaces  TS 103 765-4 V1.1.1 (\*) | 5 | ETSI | R — Document, report | PU - Public | M21 | Following a final check by the project team, the ETSI TC RT members as well as the ETSI Secretariat, the the final draft of the deliverable will be sent to the National Standardisation Bodies Group (NSBG)at M18  Published version expected at M21.  (\*) Due to the new process to follow for standardisation work falling under a standardisation request (see  Regulation (EU) 2022/2480 Article 1 , recital (2)(b)),  work Item numbers and/or versions might be modified once the new FRMCS standardisation request under finalization is accepted by the National Standardisation Bodies, which is expected to take place in Q1 2024. |

#### Work Package 6

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| **Work Package 6: FRMCS radio characteristics** | | | | | | | | |
| **Duration:** | | M3 – M21 | | **Lead Beneficiary:** | | **ETSI** | | |
| **Objectives**  *List the specific objectives to which this work package is linked.* | | | | | | | | |
| WP6 is focused on the production of the FRMCS radio characteristics Technical Specification.  Key areas of specifications include:   * specification of FRMCS radio characteristics based on the applicable ECC Decision (20)02 and the applicable regulatory requirements * Necessary and sufficient features of FRMCS radio characteristics required for FRMCS operation * specification of conformance testing associated to the FRMCS radio characteristics | | | | | | | | |
| **Activities (what, how, where) and division of work** | | | | | | | | |
| Task No (continuous numbering linked to WP) | Task Name | | Description | | Participants | | | In-kind Contributions and Subcontracting (Yes/No and which) |
| Name | | Role (COO, BEN, AE, AP, OTHER) |
| T6.1 | FRMCS radio characteristics based on ECC Decision (20)02 | | Specification of FRMCS radio characteristics based on the applicable ECC Decision (20)02 and the applicable regulatory requirements | | ETSI | | OTHER | YES (subcontracting) |
| T6.2 | FRMCS radio characteristics required for FRMCS operation | | Necessary and sufficient features of FRMCS radio characteristics required for FRMCS operation | | ETSI | | OTHER | YES (subcontracting) |
| T6.3 | Conformance testing | | Specification of conformance testing associated to the FRMCS radio characteristics | | ETSI | | OTHER | YES (subcontracting) |

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| **Milestones and deliverables (outputs/outcomes)** | | | | | | | |
| Milestone No (continuous numbering not linked to WP) | Milestone Name | Work Package No | Lead Beneficiary | Description | | Due Date  (month number) | Means of Verification |
|  |  |  |  |  | |  |  |
| Deliverable No (continuous numbering linked to WP) | Deliverable Name | Work Package No | Lead Beneficiary | Type | Dissemination Level | Due Date  (month number) | Description (including format and language) |
| D6.1 | Rail Telecommunications (RT);  Future Railway Mobile Communication System (FRMCS);  Radio Characteristics  TS 103 793 V1.1.1 (\*) | 6 | ETSI | R — Document, report | PU - Public | M21 | Following a final check by the project team, the ETSI TC RT members as well as the ETSI Secretariat, the final draft of the deliverable will be sent to the National Standardisation Bodies Group (NSBG) at M18.  Published version expected at M21.  (\*) Due to the new process to follow for standardisation work falling under a standardisation request (see  Regulation (EU) 2022/2480 Article 1 , recital (2)(b)),  work Item numbers and/or versions might be modified once the new FRMCS standardisation request under finalization is accepted by the National Standardisation Bodies, which is expected to take place in Q1 2024. |

## Total Project costs

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| --- |
| Provide detailed project costs according to the project breakdown structure and the resources estimated |
| *Travel*  To guarantee the full success 15 travels are planned (each one quoted for a cost of 1000 EUR, all having a duration of 2 full days) for the project leader and the experts to participate to technical activities and dissemination purposes.  *Overall budget requests*  The FRMCS-P project requires a total budget of eligible costs of about 450 KEuros. This is the proposed budget breakdown:   * 97% is considered for Human Resources devoted to technical activities and project management / coordination; * 3% is allocated to travels for F2F technical meetings and for communication and dissemination events as detailed in Section 3.2;     Please consider that an interactive calculator is included as Appendix 1. |

### Subcontracting

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Work Package No | Subcontract No  (continuous numbering linked to WP) | Subcontract Name  (subcontracted action tasks) | Description  (including task number and BEN to which it is linked) | | Estimated Costs  (EUR) | Justification  (why is subcontracting necessary?) | Best-Value-for-Money  (how do you intend to ensure it?) |
| 1-6 | N/A | N/A | T1.1 to T6.3 | | 450 840,00 | Expertise not available - in ETSI Secretariat | Subcontractors are selected on a case-by-case basis in the context of an open call through a clearly defined process (typically one or more of the following, publication of the call through ETSI Collective letters to the membership, Technical Body mailing lists or explicit calls for tender).  Travel cost included. |
| Other issues:  *If subcontracting for the project goes beyond 30% of the total eligible costs, give specific reasons.* | | | | Each subcontractor/expert is allocated to specific tasks with an expected level of contribution. The financial resources allocated to the subcontractor are calculated on this principle.  ETSI Secretariat (Funded Activities, Technical officers…) will ensure the project planning and controlling with the Technical Committee without charging the related costs to the project whereas subcontractors will perform the development and technical execution of the project.  ETSI Secretariat has no expert as staff. Thus, the technical project management (WP1) will be handled by the selected subcontractor as Project Leader to ensure the technical tasks execution and quality by the other subcontractors | | | |

### Timetable

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Timetable (projects up to 2 years)**  *Fill in cells in beige to show the duration of activities. Repeat lines/columns as necessary.*  ***Note:*** *Use the project month numbers instead of calendar months. Month 1 marks always the start of the project. In the timeline you should indicate the timing of each activity per WP.* | | | | | | | | | | | | | | | | | | | | | | | | |
| **ACTIVITY** | **MONTHS** | | | | | | | | | | | | | | | | | | | | | | | |
| **M 1** | **M 2** | **M 3** | **M 4** | **M 5** | **M 6** | **M 7** | **M 8** | **M 9** | **M 10** | **M 11** | **M 12** | **M 13** | **M 14** | **M 15** | **M 16** | **M 17** | **M 18** | **M 19** | **M 20** | **M 21** | **M 22** | **M 23** | **M 24** |
| **Task 1.1** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Task 1.2** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Task 2.1** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Task 2.2** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Task 2.3** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Task 3.1** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Task 3.2** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Task 3.3** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Task 3.4** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Task 4.1** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Task 4.2** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Task 5.1** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Task 5.2** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Task 5.3** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Task 6.1** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Task 6.2** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Task 6.3** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

## 5. OTHER

### 5.1 Ethics

|  |
| --- |
| Not applicable. |

### 5.2 Security

|  |
| --- |
| Not applicable. |

## 6. DECLARATIONS

|  |  |
| --- | --- |
| **Double funding** | |
| **Information concerning other EU grants for this project** | **YES/NO** |
| We confirm that to our best knowledge neither the project as a whole nor any parts of it have benefitted from any other EU grant *(including EU funding managed by authorities in EU Member States or other funding bodies, e.g. Erasmus, EU Regional Funds, EU Agricultural Funds, European Investment Bank, etc)*. If NO, explain and provide details. | YES |
| We confirm that to our best knowledge neither the project as a whole nor any parts of it are (nor will be) submitted for any other EU grant *(including EU funding managed by authorities in EU Member States or other funding bodies, e.g. Erasmus, EU Regional Funds, EU Agricultural Funds, European Investment Bank, etc)*. If NO, explain and provide details. | YES |

|  |
| --- |
| **Financial support to third parties (if applicable)** |
|  |

Annex I Response to the Request for Proposals  
CfE – STF 639 (REFERENCE BODY RT)

Deadline: 29 November 2023

**If you are an ETSI Member \***

**ETSI membership status (Indicate your status):**

 Full

 Associate

 Observer

**If you are not an ETSI Member \***

Please indicate:

**Full name of the ETSI member supporting the application (list of ETSI members on etsi.org):**

-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Official contact name of the ETSI member supporting the application:**

-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Note: A formal confirmation of the support from the Official contact is required (e.g. by e-mail sent to STFLINK@etsi.org) and an “ETSI Member Support Letter” will be required if you are selected.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Contractor information \*** | | | | |
|  | | | | |
| **Contractor name \*:**  *Indicate the Company/Organization Name* | |  | | |
|  | | | | |
| **Contact person for the technical aspects** | | **Contact person for Decision on ETSI financial offer to this project (if any)** | | |
| Title |  | Title |  | |
| First name |  | First name |  | |
| Last name |  | Last name |  | |
| Role |  | Role |  | |
| e-mail |  | e-mail |  | |
| Phone |  | Phone |  | |
|  | | | | |
|  | | **Yes** | | **No** |
| Do you or any employee of your Company/Organization hold an elected or appointed position in the Reference Body requesting the STF 639 creation? | | o  Indicate in which position:  ----------------------------------- | | o |
| **If you are self-employed candidate:**  Do you currently have other contracts in progress with ETSI? | | o | | o |

All fields marked with an asterix (\*) are mandatory

**1.1 Introduction**

A short presentation of the technical structure responsible for this activity, e.g.:

* Business area, number of employees, link to WEB site,
* Department(s)/team(s)/experts in charge of the technical activities related to this Project,
* Reference to products/services of your Company/Organization or supporting Member to which the standards developed by this Project will apply,
* Motivation for your Company/Organization or supporting Member to participate in this Project.

**1.2 Proposed approach**

**Proposed contribution to tasks & related cost**

Identify the tasks to which your Company/Organization is proposing to contribute by filling-in the table below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tasks\_No** | **Tasks\_Description** | **Max\_Budget\_Allocated\_in\_Euro** | **Amount\_in\_Euro\_(mandatory)** | **%\_of\_whole\_Task\_(mandatory)** |
| 00 | Project Management | 23040 | . | . |
| 01 | Specifications and architecture | 83200 | . | . |
| 02 | Transport Stratum features | 70400 | . | . |
| 03 | Service Stratum features | 92800 | . | . |
| 04 | FRMCS Trackside function and Interfaces and security mechanisms toward applications | 76800 | . | . |
| 05 | FRMCS radio characteristics based on the applicable ECC Decision, features and specifications | 89600 | . | . |
|  | **TOTAL** | **435840** |  |  |

**Amount in Euro (mandatory)**: Indicate the price offered for your contribution to the task(s)

**% of whole task (mandatory)**: Indicate to which percentage of the execution of the whole task your offer corresponds

Provide a description of the proposed approach, competences, reference to related activities:

* Explain which part of the task is corresponding to the requested percentage that your Company/Organization will handle,
* Explain the scope that your Company/Organization will cover,
* Explain your approach to the management of the quality and,
* Explain your approach to the management of the risks and their mitigation,
* Describe and justify the proposed costs to achieve this project objectives.

Annex II Terms and Conditions  
CfE – STF 639 (REFERENCE BODY RT)

Deadline: 29 November 2023

**2.1 Submission of Proposals**

All proposals in response to this CfE shall be submitted before the deadline indicated in thisCollective Letter, using exclusively the WEB application on the ETSI Portal at the following address: <https://portal.etsi.org/cfe>.

Proposals shall be composed of Curriculum Vitae of the proposed service providers’ personnel and the Annex I of this CfE duly filled-out.

Proposals that will be partial or incomplete at the deadline will not be accepted.

The Terms and Conditions in this Annex will apply.

**2.2 Modification and Withdrawal of Proposals**

Applicants may, without prejudice to themselves, modify or withdraw their proposal by written request, provided that the request is received by ETSI prior to the due date and time, at the address to which their proposal was submitted. The applicant may submit a new proposal provided that such new proposal is received prior to the deadline for responding which is specified in this Collective Letter.

**2.3 Assessment of Proposals**

The ETSI Director-General, in consultation with the Reference Body Chairman, is responsible for the selection of the service providers that will be contracted to perform this Project work. The ETSI Director-General and the Reference Body Chairman may be assisted by a Selection Panel to assess the applications received and make the final decision.

As per article 1.10.4 of the ETSI Directives, the Director-General may discard proposals that could be identified as creating potential conflict of interest.

The ETSI Secretariat will only communicate to the applicants the result of the selection (accepted or not accepted). Should applicants need more information on the rationale for the selection, they must address a formal request to the ETSI Director-General.

The following evaluation criteria will be applied to all proposals, in order of priority:

* Evidence that the applicant has the necessary structure and expertise to ensure delivery
* Reference to current or previous activities in the specific technical domain of this project
* Critical review of the most efficient way to achieve the objectives in this Project ToR
* Effective proposed approach/methodology for the execution of the tasks
* Implementation schedule
* Clear pricing policy

Compliance with the first two (2) criteria is mandatory.

Proposals that are not considered compliant with these criteria will be discarded.

Priority will be given to technical quality of the proposals. Pricing considerations will be taken into account to ensure that the best value for money is achieved. Compatibility with the maximum budget allocated to this Project will be verified before placing a Service Contract.

Following the assessment process, ETSI reserves the right to grant contracts to other than the cheapest proposals, to accept or reject any offer completely or in part, or to reject all proposals, without providing the reasons. If no offer is accepted, ETSI may decide to abandon the work or proceed in any other manner ETSI may select.

**2.4 IPR and confidentiality Agreements**

The information provided in this CfE, as well as the fact that the applicant has received the CfE, is considered confidential and protected under copyright laws. The applicant may not discuss, share, or use the information in this CfE for any purpose other than the response to this CfE.

ETSI will not disclose the content of any proposals to other applicants or any other party, with the exception of the persons involved in the assessment process described in §2.3 above.

However, ETSI reserves the right to make use of the information provided in this proposal to improve this project definition for the purpose of this CfE or any other manner in which ETSI may decide to proceed to select the service providers.

If successful, the applicant will be required to sign a Service Contract, which includes IPR and Confidentiality clauses aligned with the relevant policies in the ETSI Directives.

**2.5 Preparation cost**

ETSI will not be responsible for any costs or expenses that the applicant may incur in preparing and/or submitting the proposal.

**2.6 Service Contract**

A Service Contract will be proposed to the applicants that will be selected to perform the work.

Details on the Terms and Conditions of this contract can be found on the ETSI Portal, at the following address: <https://portal.etsi.org/STF/STFs/Contracts.aspx>

1. Levels: Low / Moderate / High [↑](#footnote-ref-2)
2. Levels: Mild / Medium / Severe [↑](#footnote-ref-3)