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| ToR STF 647 (Ref. Body RT) |
| Version: 1.5 |
| Author: Pierre TANE – Date: 2022-07-28 |
| Last updated by: ETSI Secretariat – Date: 2022-11-08 |
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Terms of Reference –Specialist Task Force Proposal

STF 647 (TC RT)

Future Rail Mobile Communication System (FRMCS) -Phase 1

Summary information

|  |  |  |  |
| --- | --- | --- | --- |
| Approval status | Approved by Ref. Body TC RT (doc ref: RT(22)087028r1r2) | | **YES** |
| Approved by Board#139a (October 2022) | | **YES** |
| Reference Body | TC RT | | |
| ETSI Funding | **Maximum budget : 97 600 EUR** | | |
| Minimum of 4 ETSI Members Support | **YES** | | |
| Time scale | **From** | 2023-01-09 | |
| **To** | 2024-04-30 | |
| Work Items | WI DTS/RT-0070 created on the2021-01-14 | | |
| Board priority | [ETSI STF funding criteria](https://portal.etsi.org/STF/STFs/Funding/ETSIbudget.aspx)   |  |  | | --- | --- | | **Priority Criteria** | **X** | | Maintenance of standards in mature domains |  | | Innovation in mature domains | X | | Emerging domains for ETSI |  | | Horizontal activities (quality, security, etc.) |  | | Societal good / environmental | X | | | |

Part I – STF Technical Proposal

# Rationale & Objectives

## Rationale

The Future Railway Mobile Communication System (FRMCS) will succeed GSM-R radio mobile communication system 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 which is based on 2G radio system, 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 monitoring and control of critical infrastructure, new (critical and non-critical applications) will be developed gradually.

TC RT has been working on FRMCS for quite some time and has developed a pre-study on the FRMCS system architecture (TR 103 459) as well as 2 reports on radio performance simulations (TR 103 554-1 and TR 103 554-2) based on two different RATs. 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). Annex I of this standardisation request provides the list of technical specifications to be developed. Considering the substantial effort needed for the development of these standards and the limited time to complete the work, a financial support was needed. Early in 2020, it was intended to request for a financial effort for standardisation. The setting time of EISMEA as agency for DG GROW delayed the process until early 2022. When the possibility of such request was opened, TC RT started the process and prepared a proposal which was submitted to DG GROW. However, due to lack of internal coordination between DG GROW and DG MOVE, FRMCS was not included in the first invitation received from EISMEA. FRMCS was finally included in the second invitation received from EISMEA by end of June 2022 but the amount of funding allocated to this task was much lower (less than 50%) than what TC RT required. Indeed, TC RT members have been working for quite some time on FRMCS on a voluntary basis but, since the topic is quite complex and the amount of work to be done is considerable, additional funds are urgently needed.

The present STF addresses the interworking between GSM-R and FRMCS, a key enabler of the migration to FRMCS.

## Objectives of the work to be executed

This first phase of the FRMCS standardisation work intends to produce one technical specification related to the GSM-R/FRMCS interworking and is very important for the definition of the overall FRMCS architecture. The following deliverable will be produced:

* DTS/RT-0070 (TS 103 792): “Rail Telecommunications (RT); Future Rail Mobile Communication System (FRMCS); Interworking with GSM-R”

This work will be based on the outcome of the GSM-R/FRMCS interworking study which has been recently finalized (TR 103 768).

In order to have a consistent set of FRMCS specifications to be referred to in the Control Command and Signalling (CCS) Technical Specification for Interoperability (TSI)[[1]](#footnote-2), this work is expected to be finalized by mid-2024. This would assure that all the FRMCS specifications are aligned and consistent with each other before being referred to in the CCS TSI.

## Previous funded activities in the same domain

N/A

## Market impact

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, a delay in the 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.

## Consequences if not agreed

Given the amount of work linked to the FRMCS standardisation request and the limited budget allocated by the EC to this work, it will be very likely that the FRMCS standardisation tasks will not be finalized in due time if this STF proposal is not approved. A delay in the 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.

# Relation with ETSI strategy and priorities

|  |  |
| --- | --- |
| **Priority Criteria** | **Rationale** |
| Maintenance of standards in mature domains |  |
| Innovation in mature domains | FRMCS will be based on 5G and will be the successor of GSM-R which is currently the worldwide rail radiocommunication system. |
| Emerging domains for ETSI |  |
| Horizontal activities (quality, security, etc.) |  |
| Societal good / environmental | Rail transport is recognized in EU as a big contributor to provide clean and green transport means |

# ETSI Members Support

|  |  |  |
| --- | --- | --- |
| **#** | **ETSI Member** | **Supporting delegate** |
| 1 | UIC | Pierre Tane |
| 2 | Kontron | Olivier Eudes |
| 3 | NOKIA | Gabor Zsigmond |
| 4 | SNCF | Sara Akbarzadeh |
| 5 | DB | Fang-Chun Kuo |
| 6 | SBB | Ingo Wendler |
| 7 | Funkwerk | Alexander Ende |
| 8 | Ericsson | David Rothbaum |
| 9 | Mitsubishi Electric | Hervé Bonneville |
| 10 | Frequentis | Markus Myslivec |
| 11 | Triorail | Johann Garstenauer |
| 12 | Ervocom | Fabian Knutti |
| 13 | Infrabel | Bart Gijssels |
| 14 | Trafikverket | Fred Nasstrom |

# Deliverables

## Base documents

|  |  |  |
| --- | --- | --- |
| **Document** | **Title** | **Status** |
| ETSI TR 103 459 | Rail Telecommunications (RT); Future Rail Mobile Communication System (FRMCS); Study on system architecture | Published |
| ETSI TR 103 768 V1.1.1 | Rail Telecommunications (RT); Future Rail Mobile Communication System (FRMCS); Interworking study with legacy systems GSM-R/FRMCS Interworking | Published |
| ETSI EN 301 515 | Global System for Mobile communication (GSM);  Requirements for GSM operation on railways | Published |
| ETSI TS 102 281 | Rail Telecommunications (RT); Global System for Mobile communications (GSM); Detailed requirements for GSM operation on Railways | Published |
| UIC FRS for FRMCS | Functional Requirements Specifications | In publication phase |
| UIC SRS for FRMCS | System Requirements Specifications | In publication phase |

## New deliverables

|  |  |  |  |
| --- | --- | --- | --- |
| **Deliv.** | **Work Item code**  **Standard number** | **Working title**  **Scope** | **Expected date for approval** |
| **D1** | DTS/RT-0070 | Working title: FRMCS/GSM-R Interworking  Scope: To specify the necessary service interworking with GSM-R | March 2024 |

# Maximum budget

## Task summary/Manpower Budget

|  |  |
| --- | --- |
| **Task short description** | Budget (EUR) |
|
| **T0** Project Management | 5.200 |
| **T1** Specify interworking scenarios | 30.800 |
| T**2** Specify mapping rules | 30.800 |
| **T3** Specify reference points of the IWF | 30.800 |
| **TOTAL** | **97.600** |

## Travel budget

Travel budget is not requested as the STF leader could attend the RT Plenary Meetings remotely to discuss the achieved progress or already cover its travel costs as part of attendance of the RT Plenary Meetings for other topics. No additional budget is required.

## Other budget line

None

Part II – Details on STF Technical Proposal

# Tasks, Technical Bodies and other stakeholders

## Organization of the work

The STF work will be performed under the guidance of TC RT. It is anticipated that most of the work will be performed remotely in dedicated virtual sessions. The STF leader will be responsible for:

* coordinating the overall work
* making sure that the work progresses according to the agreed timeline
* providing the required (progress) reports to TC RT

No steering committee will be needed, although TC RT will supervise the STF work and will validate results. Coordination with relevant FRMCS related 3GPP (if any) work will take place in TC RT.

## Tasks for which the STF support is necessary

The complexity of the work requires additional committed resources with in-depth knowledge of rail communications in order to make sure the whole FRMCS package of technical specifications can be delivered in due time so as to be included in the CCS TSI.

## Other interested ETSI Technical Bodies

None

## Other stakeholders

None

Part III: Execution of Work

# Work plan, time scale and resources

## Task description

|  |  |
| --- | --- |
| **Task 0 (T0)** | **Project Management** |
| **Objectives** | Overall management of the STF project |
| **Input** | ETSI secretariat for the STF management, TC RT for the supervision of the work, review and approval of the output |
| **Output** | STF progress reports and final report to TC RT, management of the STF activities and priorities, deadlines, quality check |
| **Interactions** | ETSI Secretariat, TC RT stakeholders |
| **Resources required** | One expert with management skills and knowledge of the ETSI STF processes. |

|  |  |
| --- | --- |
| **Task 1 (T1)** | **Specify interworking scenarios** |
| **Objectives** | Specify the interworking scenarios to be supported by the IWF |
| **Input** | Most of the documents identified above for GSM-R are already published. The TR 103 768 produced by RT will be the basis for this task. |
| **Output** | Interworking scenarios |
| **Interactions** | In our case, TC RT constant consultation and guidance will be required for the work completion in accordance with the requirements. The approval will be performed by TC RT. |
| **Resources required** | The type of resources and expertise required shall be aimed at know-how on Rail Operation, GSM-R and 3GPP 5G technology  The estimated effort is summarized in the task table below. |

|  |  |
| --- | --- |
| **Task 2 (T2)** | **Specify mapping rules** |
| **Objectives** | Specify the mapping rules (addressing, …) |
| **Input** | Most of the documents identified above for GSM-R are already published. The TR 103 768 produced by RT will be an input for this task. |
| **Output** | Mapping rules (addressing, …) |
| **Interactions** | TC RT constant consultation and guidance will be required for the work completion in accordance with the requirements. The approval will be performed by TC RT. |
| **Resources required** | The type of resources and expertise required shall be aimed at know-how on Rail Operation, GSM-R and 3GPP 5G technology  The estimated effort is summarized in the task table below. |

|  |  |
| --- | --- |
| **Task 3 (T3)** | **Specify reference points of the IWF** |
| **Objectives** | Specify the IWF reference points and applicable procedures |
| **Input** | Most of the documents identified above for GSM-R are already published. The TR 103 768 produced by RT will be an input for this task. |
| **Output** | Specified reference points and applicable procedures  Address in particular the key issues. |
| **Interactions** | TC RT constant consultation and guidance will be required for the work completion in accordance with the requirements. The approval will be performed by TC RT. |
| **Resources required** | The type of resources and expertise required shall be aimed at know-how on Rail Operation, GSM-R and 3GPP 5G technology  The estimated effort is summarized in the task table below. |

## Milestones

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **A** | T1 completed | 2023-05-15 |
| Reference Body Deliverable | Early Draft DTS/RT-0070 available for review by TC RT. |
| ETSI Deliverable | STF Progress Report#1 approved by TC RT |

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **B** | T2 completed | 2023-11-17 |
| Reference Body Deliverable | Stable Draft DTS/RT-0070 available for review by TC RT |
| ETSI Deliverable | STF Progress Report#2 approved by TC RT |

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **C** | T3 completed | 2024-03-31 |
| Reference Body Deliverable | Final Draft DTS/RT-0070 approved by TC RT and accepted by the ETSI Secretariat for publication |
| ETSI Deliverable | STF Final Report approved by TC RT |

## Task summary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Code** | **Task / Milestone** | Target Date | | Estimated Cost (EUR) |
| From | To |
|  | Start of work |  |  |  |
| T0 | Overall management of the STF project | 2023-01-09 | 2024-04-30 | 5.200 |
| T1 | Specify interworking scenario | 2023-01-09 | 2023-05-15 | 30.800 |
| Milestone A | TS 103 792 Early Draft |  | 2023-05-15 |  |
| T2 | Specify mapping rules | 2023-04-15 | 2023-11-17 | 30.800 |
| Milestone B | TS 103 792 Stable Draft |  | 2023-11-17 |  |
| T3 | Specify reference points of the IWF | 2023-10-18 | 2024-03-31 | 30.800 |
| Milestone  C | TS 103 792Final Draft  Approved for publication |  | 2024-03-31 |  |
| Milestone  D | Deliverable published, STF closed |  | 2024-04-30 |  |
|  | | | | **97.600** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **2022** | | | | |  | **2023** | | | | | | | | | | | |  | **2024** | | | |
| **Task/ Mil.** | **J** | **A** | **S** | **O** | **N** | **D** |  | **J** | **F** | **M** | **A** | **M** | **J** | **J** | **A** | **S** | **O** | **N** | **D** |  | **J** | **F** | **M** | **A** |
| T0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| T1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MA |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| T2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MB |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| T3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MC |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MD |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

# Expertise required

## Team structure

(Up to) 4 participants to ensure the following mix of competences:

|  |  |
| --- | --- |
| **Priority** | **Qualifications and competences** |
| High | Experience in the drafting of ETSI standards |
| High | Experience in ETSI procedures and STF operations for the overall management of the STF |
| High | Knowledge of rail communication technologies |
| High | Knowledge of rail system operation |
| High | Knowledge in GSM-R and 5G |

Part IV: STF performance evaluation criteria

# Performance Indicators

|  |  |
| --- | --- |
| **Select relevant Performance indicators applicable for these ToR (X)** | |
| **Contribution from ETSI Members to STF work** | |
| Direct financial contribution (co-funding) |  |
| Support to the STF work (e.g., provision of test–beds, organization of workshops, events) |  |
| Steering Group meetings (number of meetings / participants / duration) |  |
| Number of delegates directly involved in the review of the deliverables | X |
| Contributions/comments received from the Reference Bodies | X |
| Contributions/comments received from other Reference Bodies |  |
|  |  |
| **Contribution from the STF to ETSI work** | |
| Contributions to Reference Body meetings (number of documents / meetings / participants) | X |
| Contributions to other Reference Bodies |  |
| Presentations in workshops, conferences, stakeholder meetings |  |
|  |  |
| **Liaison with other stakeholders** | |
| Stakeholder participation in the project (category, business area) |  |
| Cooperation with other standardization bodies |  |
| Potential interest of new members to join ETSI |  |
| Liaison to identify requirements and raise awareness on ETSI deliverables |  |
| Comments received on drafts (e.g. on WEB site, mailing lists, etc.) |  |
|  |  |
| **Quality of deliverables** | |
| Approval of deliverables according to schedule | X |
| Respect of time scale, with reference to start/end dates in the approved ToR | X |
| Comments from Quality review by Reference Body | X |
| Comments from Quality review by ETSI Secretariat | X |
|  |  |

Time recording

For reporting purposes, the STF experts shall fill in the time sheet provided by ETSI with the days spent for the performance of the services.

During the activity, the STF Leader shall collect the relevant information, as necessary to measure the performance indicators. The result will be presented in the Final Report.

# Document history

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Date** | **Author** | **Status** | **Comments** |
| 0.0 | 2022-07-27 | Pierre TANE | Draft |  |
| 1.0 | 2022-07-28 | Pierre TANE | Final Draft |  |
| 1.1 | 2022-07-28 | Pierre TANE | Final |  |
| 1.2 | 2022-08-03 | ETSI Secretariat | Final | Update before Board#139 submission |
| 1.3 | 2022-11-07 | Pierre TANE | Final | Revised following budget and timeline updates. |
| 1.4 | 2022-11-07 | Pierre TANE | Final | Revised following discussion in RT#87. |
| 1.5 | 2022-11-08 | ETSI Secretariat | Final | Update before CL publication |

1. The Technical Specifications for Interoperability (TSIs) define the technical and operational standards which must be met by each subsystem or part of subsystem in order to meet the essential requirements and ensure the interoperability of the railway system of the European Union. See <https://www.era.europa.eu/activities/technical-specifications-interoperability_en> for more info. [↑](#footnote-ref-2)