FRMCS Deployment Questionnaire 2025

Including

Analysis and Key Points

Reference:

20250909_FRMCS Deployment Questionnaire 2025 Report_V1.0

Content

1. Introduction

European FRMCS Deployment subgroup

European FRMCS Deployment Subgroup

Provide advice and recommendations to the High-Level Deployment Group and sector on the best way to deploy FRMCS (business driven: cost efficient, simple, fast)

Deliverables

- Analyse (current) Infra, rolling stock, industry and workshop capacity for (fast, easy and cost effective) deployment. Estimate necessary capacities
- Support to accelerate and simplify authorisation,
- Perform cost analyses, CBA and risk assessments
- Develop toolbox with diverse migration scenario's (greenfield and brownfield situations)
- Provide dedicated cross-border (installation) alignment analyses and public-private mobile network interface analyses
- Alignment with other major Rail programmes (ERTMS, DAC, …) and stakeholders

- Implementation programmes are and stay responsibility of RUs/IMs/lessors and Member States (inclusive financing).
- In alignment with: UIC development programme; MORANE2 test programme; ERA EECT process; ETSI standardisation

European FRMCS Deployment Subgroup

European FRMCS Deployment Subgroup

- European FRMCS Deployment subgroup aims to gather information and provide advice for the deployment of FRMCS in Europe.

- This group is made up of following groups:
  - The Management Group which coordinates the activities,
  - Working Group 1, technical deployment aspects (Cross-border, use of frequencies, …)
  - Working Group 2, financial and legal aspects (Cost estimations, autorisation process, …)
  - Working Group 3, deployment and migration scenario's (Different deployment scenarios – timing, risks- …)

ERA Technical Opinion: Recommendation #6

European FRMCS Deployment Subgroup

- In the ERA Technical Opinion released in December 2024, the FRMCS European Deployment Group is invited to provide advice for the use of RMR/MNO, the necessity to have some non-safety related features and the possibility to deploy non-standard solutions.

- To prepare its advice, the EU-RAIL European FRMCS Deployment Group decided to distribute a questionnaire to gather information to understand the 2025 stakeholders' view on the deployment.

- In addition, during its first observations, the group noted -in general and in small companies- little awareness of the upcoming FRMCS Deployment in the sector. The questionnaire is also meant to create this awareness and start thinking of the consequences and approach.

EU-RAIL FRMCS Deployment Questionnaire

European FRMCS Deployment Subgroup

- Under the supervision of Working Group 3 (WG 3), and with the support of WG 1 and WG 2, a questionnaire has been prepared.

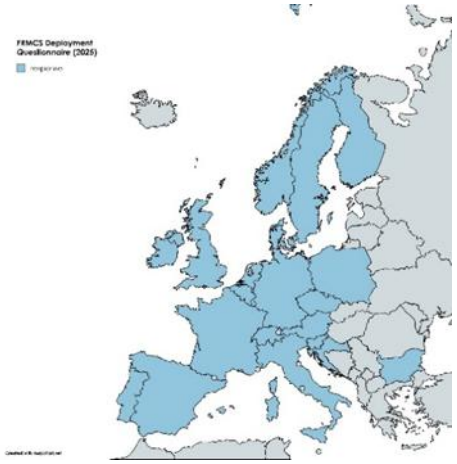
- The questionnaire contains several sections :
  - Infrastructure Managers
  - Railway Undertakings
  - Trackside Suppliers
  - Onboard Suppliers
  - Authorization Authorities

Mapping questionnaire respondents

European FRMCS Deployment Subgroup

- With the support of several associations, the questionnaire has been distributed and over 60 answers have been received.

- The distribution of respondents is :
  - 19 Infrastructure Managers from 19 countries,
  - 26 Railway Undertakings from 12 countries,
  - 5 Trackside Providers,
  - 5 Onboard Providers,
  - 11 NSA’s from 11 countries.



- The respondents are from 20 different countries (including UK, Switzerland and Norway)

Use of the questionnaire material

European FRMCS Deployment Subgroup

- Thanks to the big number of respondents and to the valuable comments added in the answers, the questionnaire will be used to propose advice to the Recommendation #6 of the ERA Technical Opinion but will also enable some discussions with key stakeholders on actions that could be taken to ease the deployment of FRMCS in Europe.

Disclaimer

The information in this report is distracted from the responses to the questionnaire on FRMCS Deployment. EU Rail cannot be held responsible for the input given by the respondents.

Answers
Infrastructure Managers

Current situation with GSM-R

European FRMCS Deployment Subgroup

- The coverage of GSM-R varies depending on the countries.
  - Some countries (Mostly North Europe) have a coverage close to 100%.
  - Several countries have a coverage varying from 60 to 70%,
  - Some countries (Eastern Europe) have no GSM-R coverage.

- Countries using ETCS are using GSM-R radio.

- GSM-R is currently under deployment in some areas (Greenfield deployment).

FRMCS Deployment: RMR and MNO

European FRMCS Deployment Subgroup

- A large majority of respondents either intend to use MNO or are investigating the use of MNO.

- The use of RMR and MNO is intended in different ways :
  - MNO as a backup of RMR in case of RMR disruption,
  - MNO in parallel to RMR,
  - MNO as a complement to RMR.
  - One country intends to deploy MNO only network (Non-MCX).

- Some respondents are concerned on whether the CCS TSI will allow the use of MNO.

- The number of scenarios will interrogate the Multipath completion.

FRMCS Deployment with GSM-R

European FRMCS Deployment Subgroup

- The deployment of FRMCS Voice only with ETCS running on GSM-R is a mentioned by several Infrastructure Managers.
- The availability of onboard ETCS equipment compatible with FRMCS is expected to be later than the possibility to deploy FRMCS Voice only.

Deployment Schedule

European FRMCS Deployment Subgroup

- One country intends to deploy re-FRMCS (i.e. 5G with no MCX) without waiting for the FRMCS specifications.
- Half the respondents intend to deploy FRMCS as quick as possible (Full deployment in 2033 to 2037) but indicate that this may be limited to Voice applications.
- Half of the respondents foresee a deployment completion date later that 2040.

Financing

European FRMCS Deployment Subgroup

- A large majority of the Infrastructure Managers has no strong financial scheme for the deployment of FRMCS.

Answers
Railway Undertakings

Variety of respondents

European FRMCS Deployment Subgroup

- The railway undertakings which responded to the questionnaire cover a large variety,
- Some are large companies that own, run, maintain their trainsets and manage modifications.
- Some are smaller companies that are leasing their machines and do not manage the trainset configurations.
- Some are lessors.
- So, the variety of responses is important. However, the main concerns are the same.

Deploying FRMCS and ETCS

European FRMCS Deployment Subgroup

- The deployment of FRMCS and ETCS in parallel can be performed in different ways.
- Most railway undertakings indicate that they would prefer to modify the machines for FRMCS and ETCS at the same time to save train availability time.
- Most of the companies intend to install FRMCS during maintenance operations (i.e. no stop for FRMCS installation only).
- The late availability of FRMCS-compatible ETCS equipment may create difficulties in the deployment.

Workshops

European FRMCS Deployment Subgroup

- A few “big’ railway undertakings have started industrial operations to prepare the deployment of FRMCS.
- Most of the railway undertakings intend to use external resources to deploy FRMCS.
- As no contract has been negotiated so far, the availability of industrial resources can not be estimated.

Authorisation

European FRMCS Deployment Subgroup

- A few “big” railway undertakings intend to manage the authorization process on their own assuming that the onboard components will be approved.
- Most of the railway undertakings (Some “big” and all the “smalls”) intend to use the support of the train manufacturers to manage the authorization.
- Some railway undertakings express concerns about the software update that will inevitably be necessary and the impact on the authorization of the trainsets equipped with previous software versions.

Authorisation - 2

European FRMCS Deployment Subgroup

- Railway Undertakings are globally concerned by the workload and the cost of the authorization.
- They are also concerned by the time a machine can be stopped waiting for authorization (Up to 1 year ?).

Request for Quotation Process (RFQ)

European FRMCS Deployment Subgroup

- Most of the railway undertakings either want to wait for the First Edition Specifications or for the CCS TSI to start the Request For Quotation process or have not started to think about the RFQ process.

Financing

European FRMCS Deployment Subgroup

- A very large majority of the railway undertakings have no financing scheme.
- Most of them indicate the need for a financial support from their countries or from the European Commission.

Handsets

European FRMCS Deployment Subgroup

- The number of current handsets is higher than 100.000.
- Some figures in the questionnaires indicate that the number could be over 300.000 but this needs double-checking.
- Based on the possibilities of the FRMCS handsets based on a more precise localisation, the figure of these new equipment could be even higher.
- The availability of FRMCS handsets is mentioned as a must to start FRMCS operations.

Information

European FRMCS Deployment Subgroup

- The « big » railway undertakings are informed through contacts they have with the infrastructure managers.
- The “small” railway undertakings are getting information through social medias and websites.

Answers
Trackside Suppliers

First availability of components

European FRMCS Deployment Subgroup

- Trackside suppliers indicate that they foresee availability of the first systems 6 to 12 months after the edition of the specifications (based on the assumption that the specifications will not be modified through the CCS TSI process).

- The authorization lead-time of the systems is unclear as the process for the authorization needs to be clarified (CE Marking ?).

Chipset / modem

European FRMCS Deployment Subgroup

- The availability of technical solutions for the radio frequencies is questioned.
- Some providers are questioning the availability of modems in the necessary quantities.

Production Capacity

European FRMCS Deployment Subgroup

- The servers that will support the trackside applications are standard systems. So, no capacity issue is expected for the core systems.

- The production capacity of antennas and site systems has not been answered by the respondents.

Answers
Onboard Suppliers

First system availability

European FRMCS Deployment Subgroup

- Onboard suppliers indicate that the content of the specifications is not clear at that it generates some difficulties for them to commit on a first system availability date.
- As they have not received any order for their customers, they also face a financial problem to fund the development of the products.
- The first availability of the TOBA box is indicated to be one to two years after specifications of First Edition FRMCS.
- The availability of test & validation sites is a concern for the authorization of the systems.

Chipset / modem

European FRMCS Deployment Subgroup

- The availability of technical solutions for the radio frequencies is questioned.
- Some providers are questioning the availability of modems in the necessary quantities.

Production capacity

European FRMCS Deployment Subgroup

- Onboard suppliers indicate they have already performed capacity analysis and that they are ready to invest. The current capacity is not sufficient.
- The final test of the TOBA box at the end of the production process is expected to be the bottleneck.
- The onboard suppliers express their concern about investment. As they have not received any orders and delivery plans, they can not estimate the necessary capacity and thus prepare their industrial investment to fulfil the demand.

Cybersecurity

European FRMCS Deployment Subgroup

- Several providers mention that cybersecurity may be a concern as the rules for this topic are still under investigation for the railway sector.

- They interrogate the strength of the FRMCS specifications regarding this topic.

Answers
National Safety Authorities

Readiness

European FRMCS Deployment Subgroup

- Some National Safety Authorities (NSA's) do not foresee any difficulty in starting the authorization process for FRMCS trackside or onboard.

- Some do not know whether the process will be the same as for GSM-R and are waiting for further information.

Capacity

European FRMCS Deployment Subgroup

- Some National Safety Authorities do not foresee capacity issue with their teams as they will rely on the analysis performed by NOBO’s.

- Some National Safety Authorities mention that they need to perform analysis on top of the ones performed by NOBOs and that they are not sure yet that they have the necessary expertise available.

Analysis

Warning – Analysis Process

European FRMCS Deployment Subgroup

- The information provided in the previous slides are based on a fact –based review of the questionnaires.
- The purpose of the conclusion section is to provide a first analysis of the answers and to indicate major points.
- **<u>This analysis is only an indication and can not be taken as an action plan.</u>**

Infrastructure and onboard schedules

European FRMCS Deployment Subgroup

- Based on the questionnaires, it appears some discrepancies between the schedule mentioned by some infrastructure managers and the schedule mentioned by the railway undertakings.
- The railway undertakings schedules are globally later than the ones from the infrastructure managers.
- Some infrastructure managers have started commercial discussions with suppliers where most of the railway undertakings are waiting for the CCS TSI (or First Edition specifications) to start the RFQ process.
- The situation is even more critical when ETCS is considered.

Competences

European FRMCS Deployment Subgroup

- In the comment sections, many respondents expressed concerns on the availability of competent resources whatever the job is concerned (Design, integration, authorization, …).
- The current trainings available seem not to fulfil the demand as they are very generic and high-level.
- The need for the development of a European FRMCS competency center should be investigated.

2040 ?

European FRMCS Deployment Subgroup

- Several countries indicate that they foresee the extinction of GSM-R later than 2040.
- The understanding of the obsolescence of GSM-R seems different depending on the countries and on the stakeholders.
- A clarification on this topic may be useful.

Financing

European FRMCS Deployment Subgroup

- A big majority of the respondents have no financing plan and are expecting support from their countries or from the European Commission.
- Some companies indicate that the deployment of new technologies imposed by TSI may endanger their business.

Authorisation process

European FRMCS Deployment Subgroup

- The numbers of trackside approvals, of train type approvals (Over 1.500?) and trainset authorization (Over 60.000?) questions the existing authorization process both because of the cost and because of the time for approval.

- Many of the respondents are mentioning the authorization process is a factor slowing down the deployment of FRMCS and ETCS.

Future proofness

European FRMCS Deployment Subgroup

- Some railway undertakings interrogate the future proofness of FRMCS.
- FRMCS is seen by many companies, mainly railway undertakings, as a “sunk cost” if it is a GSM-R replacement only.
- These companies would like to get the confirmation that the FRMCS specifications are preparing a future-proof system that will support new functionalities without hardware changes and with easy to implement software.

Handsets

European FRMCS Deployment Subgroup

- Handsets are necessary for some infrastructure managers to start commercial operations of FRMCS.
- Specifications availability, quantities and availability should be monitored.

Cybersecurity

European FRMCS Deployment Subgroup

- Cybersecurity is mentioned by several onboard providers as a key concern.
- The cybersecurity of FRMCS should be investigated as the FRMCS specifications will not cover the full scope (Cybersecurity of the trackside servers, people accreditations, …).

Deployment of several technologies in parallel

European FRMCS Deployment Subgroup

- Most of the railway undertakings have mentioned that they will deploy FRMCS, ETCS, ATO and/or DAC in the future.
- Infrastructure managers have been questioned on FRMCS only.
- It seems important to understand how the several deployments will be synchronized and whether the technical aspects of the interfaces between the systems are adequately managed.

Information dissemination

European FRMCS Deployment Subgroup

- Because of the huge number of new players in the railway sectors, especially on the railway undertaking side, it is important to reconsider the information dissemination flows.
- “Small” companies do not have regular contacts with infrastructure managers and/or national authorities.
- As FRMCS is an important investment, it is important to create a wide-spread awareness of the deployment of FRMCS.

Test and validation sites

European FRMCS Deployment Subgroup

- Availability of the test and validation sites is mentioned by several industrial stakeholders.
- The need to check the compliance of the systems to the specifications and to check the interoperability is key and requires dedicated human and technical resources.
- The process for the validation should be clarified. Will there be laboratories equivalent to the ones that are checking the ETCS equipment?

Capacity for NSA’s

European FRMCS Deployment Subgroup

- NOBO’s will have to be interviewed in the next questionnaire as their capacity may be a key point for the authorization process and have an impact on the deployment

Summary – Key points

European FRMCS Deployment Subgroup

1. Most of the Infrastructure Managers intend to use MNO and there are multiple intended ways of using RMR and MNO.
2. There is globally no financing plan.

3. Infrastructure Managers' schedules and Railway Undertakings' schedules generally do not match. We note very little awareness of the FRMCS deployment in great parts of the Railway Undertakings (e.g. smaller companies)
4. Deployment will not/is not foreseen to be completed before the 2040 deadline in several countries. Despite global obsolescence and fade out of 2G technology, railways are still deploying on new (TEN-T) and retrofitted lines.

5. Railway Undertakings are expecting more than "GSM-R replacement". The future proofness of FRMCS shall/must be considered because of business economic reasons.
6. There are significant concerns about availability of resources and competences for the deployment.
7. IM's and RU's wait for TSI before starting Request for Quotation processes.

Questions?

European FRMCS Deployment Subgroup

pascal.desaunay@sncf.fr
pipsa.hallner@trafikverket.se
karel.vangils@rail-research.europa.eu

Founding Members

adif

ALSTOM

mermec
AN ANGEL COMPANY

AZD

CAF

ceit
MEMBER OF
BASQUE RESEARCH
& TECHNOLOGY ALLIANCE

CD

DB

DLR

eSGR
European Smart Green Rail

Faiveley Transport
A Wabtec Company

FERROVIE DELLO STATO ITALIANE

HITACHI
Inspire the Next

indra
Talgo

Jernbane-direktoratet

KNORR-BREMSE

ÖBB

PKP
POLSKIE KOLEJE PAŃSTWOWE
Spółka Akcyjna

ProRail

SIEMENS

SNCF

Strukton
Rail

THALES
Together • Safer • Everywhere

TRAFIKVERKET

RAILWAY SYSTEMS
by voestalpine