



INTERNATIONAL UNION
OF RAILWAYS



Specification & Program Status

ERA ERTMS Conference, 24/04/2024

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FRMCS : Both an Obligation and a Game Changer

- **The necessity to replace GSM-R**
 - Covering today ~130,000 Km in Europe (~210,000 Km worldwide)
 - Ensuring day-to-day communications for train operations and ETCS telecom support when available
 - 2G-based telecom system specified (start in 1997) and maintained by UIC, including hubs for cross-borders
 - But 2G stop in telecom and **GSM-R obsolescence expected by 2035** (some bilateral contracts till 2040)
- **Future Railway Mobile Communication System: a Digitalization Enabler**
 - New system based on latest 5G architecture (for lifecycle) - Program structured by UIC in 2018
 - New concepts (TOBA “hub” in the cabin)
 - More bandwidth, more quality, more potentialities, ... (5G spectrum & technology performance)
 - Bearer independency (decorrelation telecom / signalling) and bearer flexibility (evolution over time)

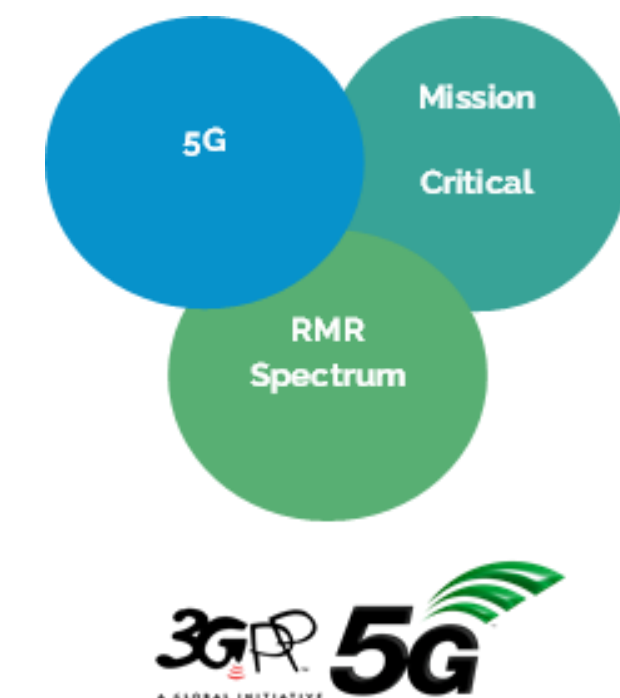
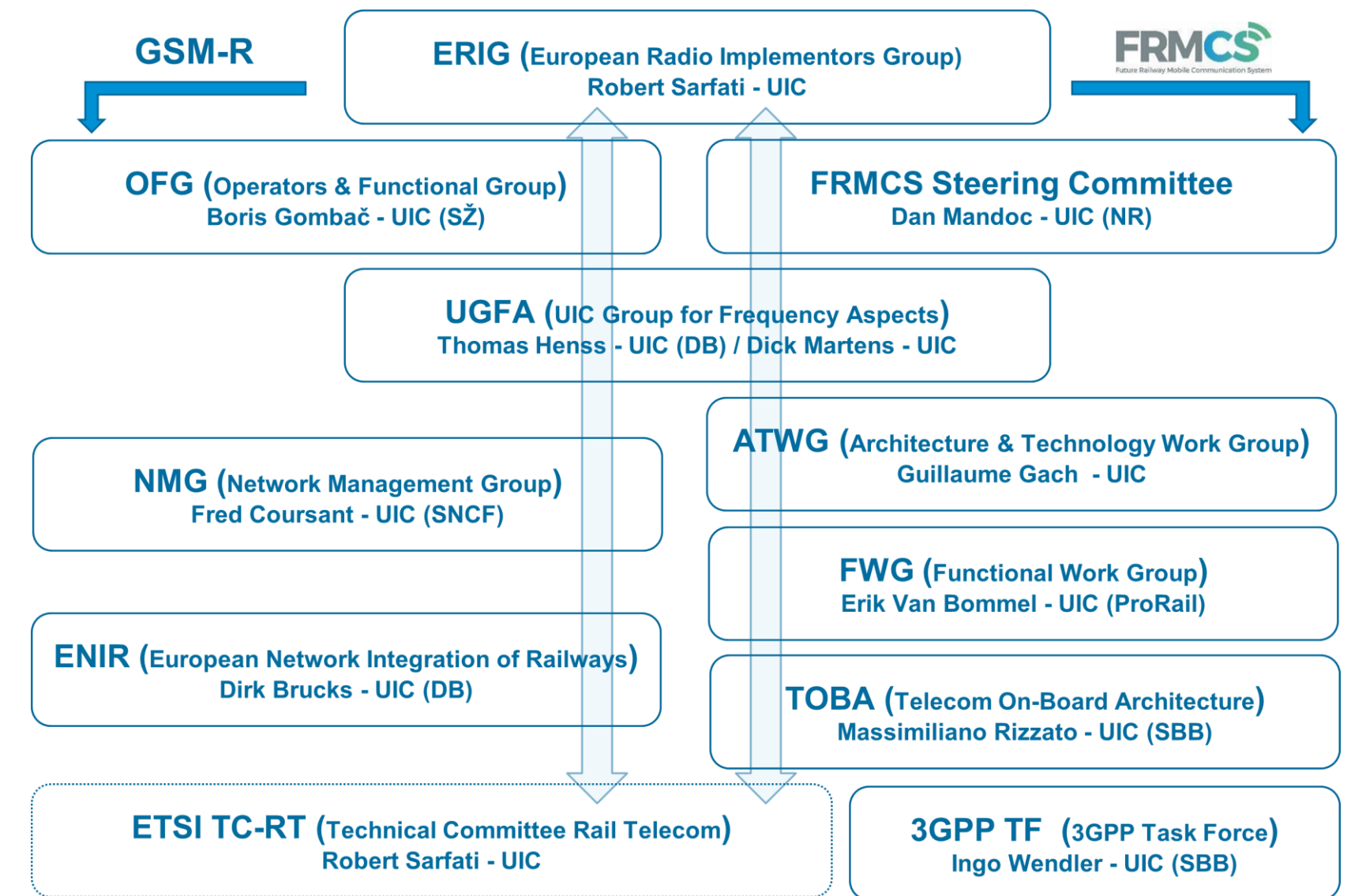
⇒ **Digitalization Enabler for new services** (ATOs, TCMS, video, etc.)

European Migrations will take 10-15+ years : Race against the Clock

FRMCS : Context & Main Players

Future Railway Mobile Communication System

- UIC / Railways: Leader for Specifications (GSM-R Continuity)**
 - Focused groups structured through UIC projects as per 2018
 - Governance body: ERIG, 23 railways (Railway Telecom managers)
- ETSI: European Standardization Telecom Body (ETSI TC-RT)**
 - The “building blocks” of GSM-R and FRMCS (ad-hoc railway committee)
- UNITEL (UNIFE Committee): True Collaborative Partner**
 - 20 years of successful collaboration with GSM-R and now FRMCS
- 3GPP: Worldwide Standards for Mobile Telecoms**
 - FRMCS embedded by UIC in 3GPP standards (competition, evolution, ...)
- ERA: Responsible for Delivering CCS TSI**
 - Long-lasting & efficient collaboration between ERA & UIC (structured through MoU)
- ERJU & EC: Strategic Alignment & Project Financing**
 - S2R then ERJU: Support to ERA CCS TSI activities + ERJU-UIC MoU + current “Morane 2” open call (€13.5M financing)
 - DG Connect: 5GRail project for FRMCS industrial prototyping (€10M financing - achieved)



FRMCS : Main Achievements to Date

Future Railway Mobile Communication System

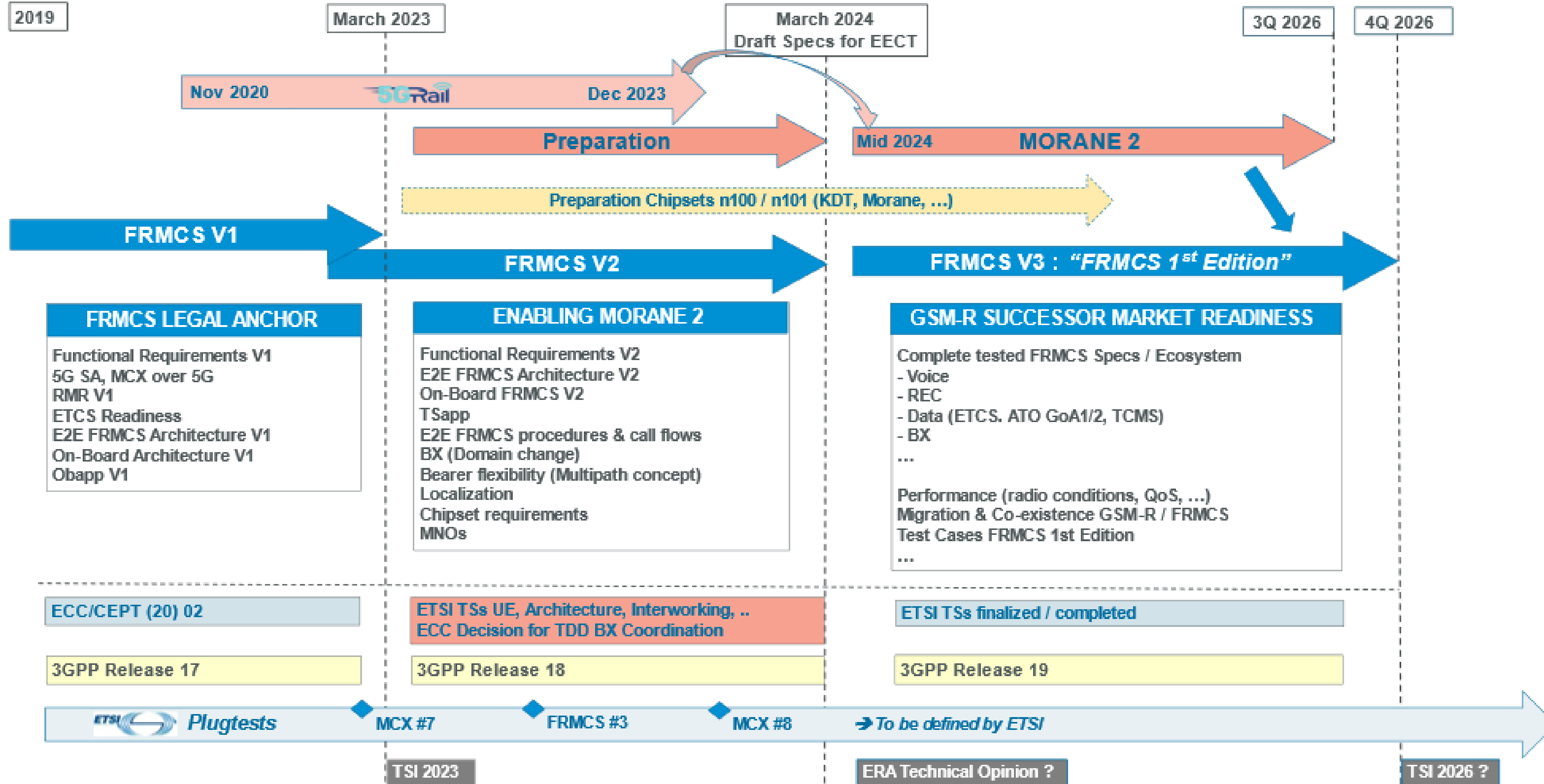
- 2019 - **FRMCS Architecture & Concepts** (5G SA Core, TOBA Telecom Hub, Bearer Independency, etc.)
- 2021-2023 - **5GRail Industrial Project** (prototypes, FRMCS V1 check) led by UIC - Green light to keep on going
- 2022 - Obtention of **ECC-CEPT decision on frequency harmonization for railways** (5 MHz in 900, 10 in 1900)
- 2022 - Remit of stable draft documents for **UIC FRMCS V1** to ERA
- 2023 - Inclusion of **UIC FRMCS V1 in CCS TSI** as a “legal anchor”
- 2023 - Provision to ERJU of a **European Plan for FRMCS Specifications**, endorsed by whole sector
- 2023 - Decision from ERJU to include **FRMCS in Work Plan** as an essential item
- 2023 - Launch of the **UIC Rail Academy / Telecom Section** (training programs for GSM-R, 5G, FRMCS, etc.)
- 2024 - **ERJU Open call** for FRMCS V2 testing (on-going response with ad-hoc consortium)
- 2024 - Remit of stable draft documents for **UIC FRMCS V2** to ERA (**done in March**) for EECT process

FRMCS : European Plan *(extract from ERJU Report - mid-2023)*

Future Railway Mobile Communication System



Roadmap to FRMCS 1st Edition (*Market Readiness*)



- **FRMCS FRS (Functional Requirements Specification) - FU 7120 v1.1.0**
 - ~ 1,500 user requirements & usage descriptions... But also including future versions of FRMCS
- **FRMCS SRS (Functional System Specification) - FW AT-7800 v1.1.0**
 - All system description for FRMCS (on-board & trackside): principles, architecture, mechanisms, quality, ...
- **FRMCS TOBA FRS (Functional Requirements Specification) - TOBA-7510 v1.1.0**
 - Functions and interfaces for TOBA (Telecom On-Board Architecture)
- **FRMCS FIS (Functional Interface Specification) - FIS-7970 v1.1.0**
 - Transaction and communication flows at the level of interfaces (for applications as ETCS, etc. for instance)
- **FRMCS FFFIS (Form Fit Functional Interfaces Specification) - FFFIS-7950 v1.1.0**
 - Parameters and APIs for interfaces

A Complete Set of Specifications for FRMCS, Relying on Telecom Standards (3GPP MCX, ETSI, ...)

- 2024 (October) - End of ERA EECT process for **UIC FRMCS V2**, leading to final version
- 2024 (October) - Remit of **ETSI TC-RT** corresponding standardization elements (“building blocks”) for **FRMCS V2**
- 2024-2026 (Tentative) - “**Destination 2 Morane**” project to validate FRMCS V3 / (“1st Edition”, market readiness)
 - Industrial project - Commitment from 4 European railway & 10+ railway telecom key suppliers
 - Currently setting the consortium - UIC coordination
 - Lab tests then field tests with full functional, system and measurements checking
- 2026 (Tentative, Morane dependency) - Remit of **UIC FRMCS V3** to ERA for EECT process
- 2027 (Tentative, EC dependency) - Inclusion of **FRMCS 1st Edition in CCS TSI**
- **2027 (“The Objective”)** - **First Pilots for FRMCS 1st Edition deployments in certain European countries**
- 2027 Onwards - **FRMCS Completion** (ATO GoA3/4, Hybrid Hubs for European cross-border management, ...)

Global Plan is on its Way, with Full Respect on Timing as of Today !