RailBusinessDaily

Future Rail Mobile Communication System (FRMCS) and why upgrading from GSM-R is crucial

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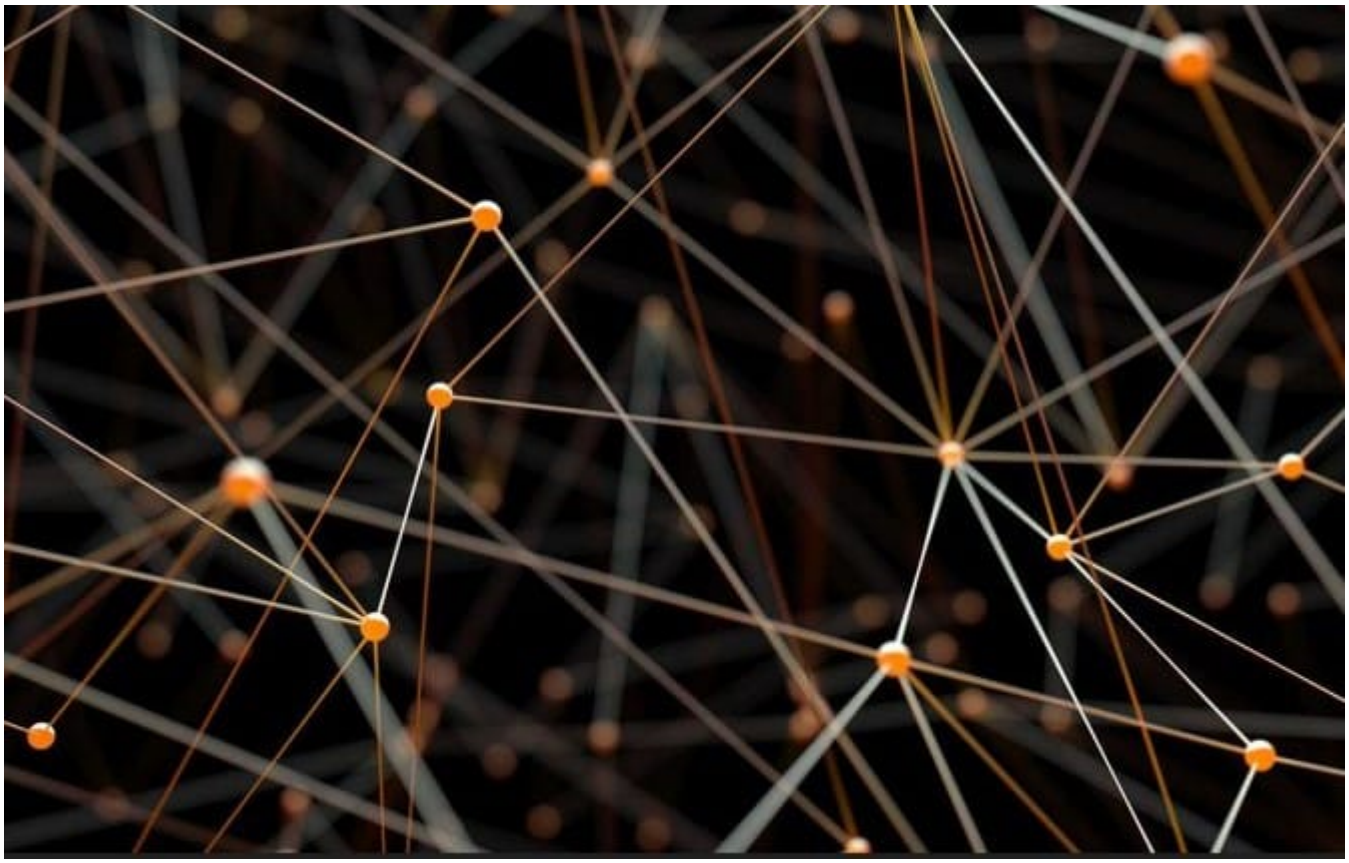

By Onwave

FRMCS (Future Railway Mobile Communication System) is the future worldwide telecommunication system designed by UIC, (The International Union of Railways) in close cooperation with the different stakeholders from the rail sector, as the successor of GSM-R but also as a key enabler for rail transport digitalisation – Source uic.org

Almost 80 per cent of railway executives who were interviewed in a recent European study undertaken by the IDC (International Data Corporation) are already piloting, planning, or implementing FRMCS to transform the way they operate, plan, and maintain rail infrastructure – this article will explore the main reasons and the key considerations when looking at moving forward with FRMCS solutions.

Replacing GSM-R was first explored back in 2012

The replacement of legacy GSM-R technology is strategically important, it is driven by the adoption of

advanced technologies, including the Internet of Things (IoT), remote monitoring, high-speed rail networks, automated and driverless trains, and communication-based train control systems. These technologies demand robust and reliable connectivity solutions capable of collecting, transmitting, and processing vast amounts of data in real-time.

Why upgrading GSM-R is being prioritised

There are three main reasons that GSM-R is typically viewed as a legacy method of connectivity that needs replacing and these all stem around three primary pain points:

- User requirements such as signalling and safety applications
- System Architecture covering both hardware and software that is required
- Frequency spectrum requirements the capacity and ability for each use case to be catered for

GSM-R suppliers have committed to support systems until at least 2030 – however this is no reason to be complacent. The time needed to design and deliver of new systems and having a skilled workforce are all key considerations for those looking to future-proof the railway.

The fact remains that in Europe alone over 100,000Km of lines utilise the GSM-R network and this level of critical infrastructure works will take a long time to complete.

This article written back in 2018 adds the difficulty of translating the many use cases which are harder to interpret for non-rail suppliers due to the complexity, level of specialism and rail terminology that is used.

5G Slicing

One solution being explored as a FRMCS solution is 5G slicing. 5G slicing enables flexible, scalable private networks with elevated levels of control in terms of security.

5G slicing enables fit for purpose virtual networks to be created with use cases in mind such as machine to machine communications or video streaming for example. The specific use cases will be dependent on the speed, latency and more importantly for rail, the hierarchy of importance in terms of task – with network priority given to technology facilitating critical tasks as well as safety technology.

Onwave – A Proven Partner for Connectivity

The rapid evolution of connectivity requirements in the rail industry is crucial for supporting digital transformation and advanced technologies like IoT, high-speed rail, and automated trains. These technologies generate massive data, necessitating scalable, low-latency, and reliable connectivity solutions. It is a unique challenge that rail operators and contractors should partner with a specialist connectivity provider with sector experience to achieve.

Onwave is a leading connectivity provider, offering bespoke, reliable solutions tailored to each operator’s needs, including satellite, cellular, and radio-frequency systems. We prioritise cybersecurity and energy

efficiency while addressing the rail industry's inimitable challenges.

By partnering with Onwave, you will gain a dependable connectivity solution to support your ambitious technology initiatives, boosting operational efficiency and customer experience. Contact Onwave today for a tailored, reliable connectivity solution from an experienced, proven rail partner.

Contact Onwave here.

Further reading

FRMCS | UIC – International union of railways

Future Railway Mobile Communication System (FRMCS) | Nokia

Future Railway Mobile Communications System (FRMCS) (globalrailwayreview.com)

GSM-R FRMCS rail replacement – Critical Communications Today (criticalcomms.com)

3GPP – The Mobile Broadband Standard

UNIFE-Postion-Paper_Successful-Transition-to-FRMCS_v28092021Final.pdf