

VIAVI Solutions

5 Tips for Monitoring & Troubleshooting the Migration from GSM-R to FRMCS

By **Max Beccuti**, Railway Product Line Manager, VIAVI Solutions

The transition from GSM-R to the new Future Radio Mobile Communication System, FRMCS, is set to digitally transform the railway industry.

As GSM-R is due to become obsolete in Europe in 2035, FRMCS offers a future-proofed solution, with greater efficiency and safety advantages, thanks to more modern technology.

Several European operators have already started work on this huge undertaking and many more plan to do so, very soon, as the first national FRMCS tests are scheduled for 2026.

5 Takeaways

Drawing on over 20 years' experience in GSM-R and practical expertise in mission critical networks running over 4G and 5G, these tips will be useful for anyone working on the journey to FRMCS.

1. Start Planning Now

GSM-R obsolescence may still be a decade away but as we know, that's not long in railway lifecycle management.

The closer we get to the deadline, the harder it may be to find replacement parts and retain skills in GSM-R technology. These will be vital given the 5-year transition period, where both GSM-R and FRMCS will need to operate simultaneously.



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Therefore, it's worth taking stock now of both physical and human assets and developing a plan for how these can be assured until the deadline is met and handover successfully done. For example, we are working with local higher education centres to ensure that GSM-R remains on the railway engineering syllabus, to continue to feed our talent pool.

2. Choose an Interoperable Application

Railway telecoms networks are an essential backbone of ERTMS operations. Emergency calls, voice calls and group calls for example, are all vital for safety; if the GSM-R fails, data calls cannot be made and the train cannot start or proceed.

Many rail operators use drive test tools to validate the telecoms network and check it periodically. Monitoring solutions via probes are also used to ensure that service assurance KPIs are met, ideally triggering alarms if levels fall below agreed standards.

As the train's dependence on the network applies to GSM-R and FRMCS (especially in the 5-year handover period), it makes sense to use solutions that can monitor and troubleshoot both networks.

Using different solutions to test and monitor the GSM-R and FRMCS frequency domains may prove challenging, requiring internal calibration between the two, likely discrepancies between features and outputs, and duplication on training time.

However, using a single solution that can ‘switch’ between domains that utilises the same testing and monitoring equipment. This provides a more consistent user experience, makes it much easier to compare KPIs, identifies interference challenges and shows handover effectiveness. It should also prove more cost effective with regards to licences and upskilling.

3. Include OT Cyber Security Tools

The introduction of NIS2 and the Cyber Resilience Act and impending embodiment into national laws means that almost every system needs to be considered for vulnerabilities.

The same applies to railway networks, not just IT (ticketing etc), but also the OT, such as interlocking infrastructure, signalling and telecoms, as well as the RAN and core networks, and mission critical (MCx) application layers.

There are several solutions available but again, if you can choose a reputable one that’s integrated with existing tools and services, this will no doubt save you time and money, both in the short and long-term.

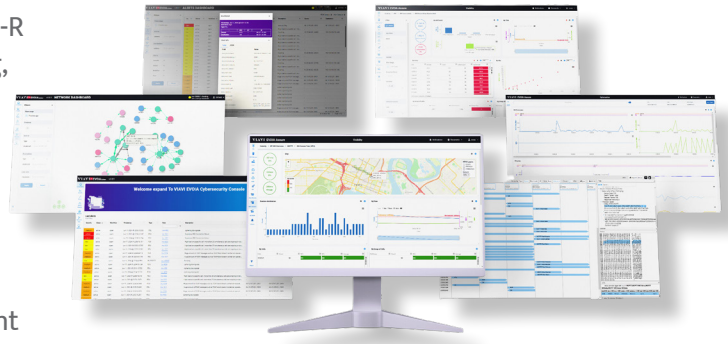
A newer start-up may have all the talk and impressive outputs, but as we have discussed, the railway has long lifecycles, so solutions with proven technology and services, may be a better overall proposition.

4. Consider a Long-Term Maintenance Agreement

This brings us to my penultimate tip, a long-term maintenance agreement. Over the next 15 years or so, as GSM-R technology transitions to FRMCS, hardware may become increasingly hard to source or repair, and engineering expertise in the field will become scarcer.

After all, who wants to learn about technology that’s already over 20 years old, when digitalisation offers so many more exciting opportunities?

Tools providers using monitoring probes and drive test



hardware need to ensure their solutions remain fit for purpose today and for the many years to come.

A long-term GSM-R maintenance agreement is a useful way of ensuring that the monitoring and troubleshooting provider is committed to providing their services throughout this transition period.

A commitment such as this ensures the operator will have access to hardware and software technology that remains up to date, as well as that the necessary engineering expertise and skills will be available.

5. Talk to Industry Peers

Finally, for my last tip, please remember that you are not alone! Many engineers, managers and executives are already working hard planning how to make the move from GSM-R to FRMCS.

There are lots of conferences and user groups where this is regularly covered, so please sign up and join in. Fees are often reduced for national operators, making it gentler on the budget.

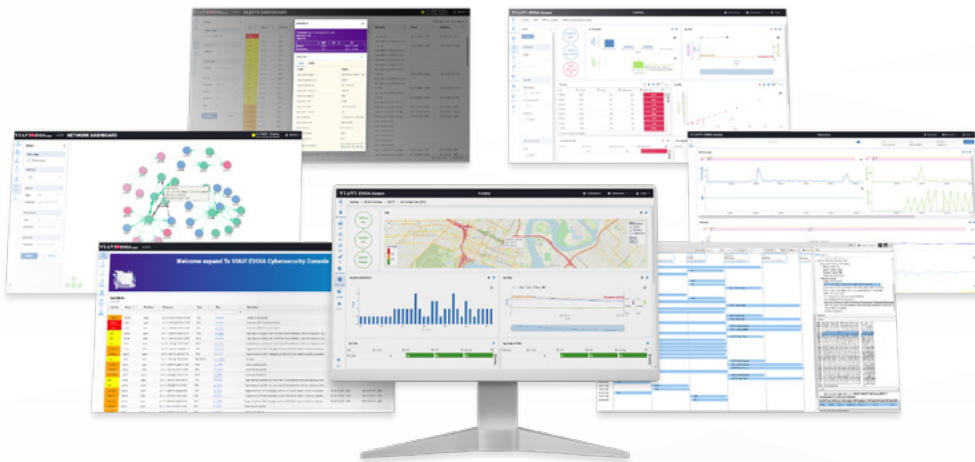
And for those who can’t travel, please do use LinkedIn groups to raise issues and join any webinars you can! We are all in this together and for a long time to come!

Join us on Hall 6.1 Booth 215 at InnoTrans 2024.

Click [here](#) to sign up for our webinar Thursday 19 September 9.30 BST/ 10.30 CET: Introduction to MCPTT Drive Tests for Mission Critical Communications



Test, Monitor & Troubleshoot Telecom Networks & Mission Critical Systems Performance With Confidence



VIAVI Solutions offers market-leading tools for railway and other **mission-critical** operators. Our products support network technologies from 2G to 5G, **ERTMS** (GSM-R & ETCS), and the upcoming **FRMCS** networks. We prioritize safety with advanced railway cybersecurity solutions, ensuring protection against cyber threats and maintaining communication integrity.

Our sophisticated drive testing capabilities, whether onboard, mobile, fully **autonomous**, or designed to support radio engineers, enable thorough assessment and optimization of network **performance** across extensive railway routes. This ensures reliable connectivity and seamless communication, crucial for **resilient** railway networks.

Discover our solutions and meet our team of experts at InnoTrans 2024, Hall 6.1, Booth #215.



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