# Change management

Frequentis is working with rail operators around the globe to ensure that the adoption of next generation communication systems does not compromise safety and operational continuity.

Australian railways and rail operators are embarking on programs to modernise their safety-critical communications systems. Largely replacing analogue radio communication with digital systems over broadband networks, this has required the deployment of new technologies in the field and in consolidated control centres.

Frequentis, an Austrian communication and information systems provider along with its subsidiary in Australia, will provide its Operations Communication Manager (OCM) product to rail operators around the globe to bring together communications into a single hub. The company expanded its expertise in this area in August 2020 with the acquisition of a share in Spanish mission critical services technology provider Nemergent solutions. According to head of public transport solutions at Frequentis, Markus Myslivec, this will enable Frequentis to provide a comprehensive and integrated solution for the rail control room of the future.

"Nemergent are a cutting-edge provider for mission critical application services and mission critical clients. Together with them we

Frequentis provides a number of technologies and services to operators.
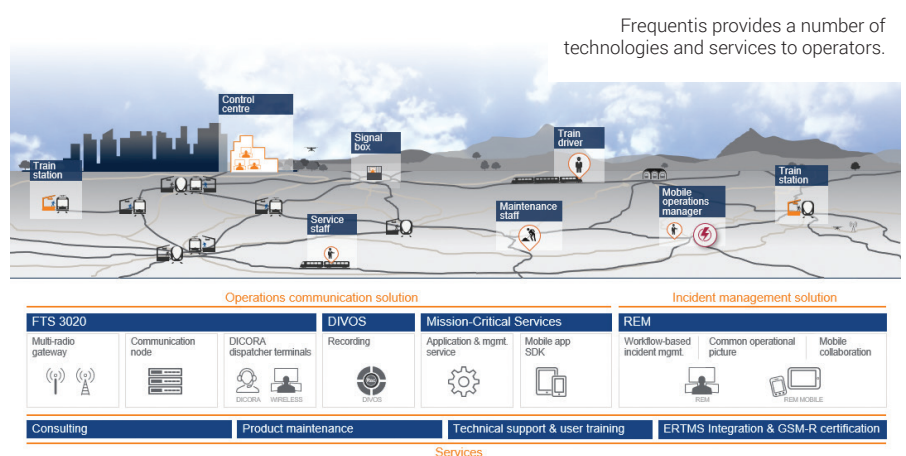
can broaden our portfolio, so we are now not only offering solutions for the control room as such but also the mission critical services which the control room needs and uses from the network."

As Myslivec explains, these services are an array of essential communications methods.

"Mission critical services are in general composed of push to talk voice communication, data communication and video, and for either of the three you get group communication so where a group of specific participants can exchange information and one within the group is allowed to send. Then you get broadcast communication, similar to group communication but it's not possible to change who provides the information, who talks, it's just a broadcast. You also get point-to-point communication between two common participants."

Adding these applications to Frequentis' OCM will provide Australasian railway operators the platform to communicate across their chosen future rail communications methods.

"Mission critical services will form the basis for the success of Future Railway Mobile Communication Sytem (FRMCS), replacing GSM-R," said Myslivec. "Frequentis is now an end-to-end application provider. Today we offer the solution for the control room and, together with Nemergent, we provide all the applications on mobile devices, communication networks and in the control room."

THE FUTURE OF RAILWAY COMMUNICATIONS

The GSM-R system that Myslivec is referring to is the Global System for Mobile Communications – Railway, the standard for digital communications in railway systems, as organisations moved away from analogue systems. In Australia, many operators use this
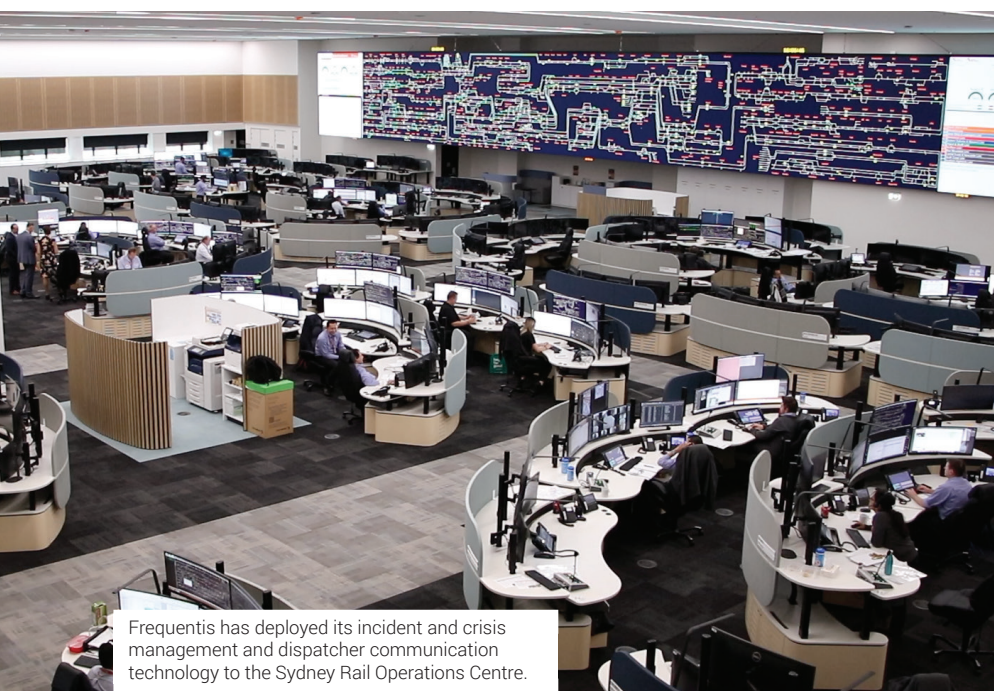
Frequentis has deployed its incident and crisis management and dispatcher communication technology to the Sydney Rail Operations Centre.

standard, however it relies upon 2G technology, and the horizon of obsolescence is approaching, as Michael Hsu, head of public safety and transport – business development at Frequentis Australasia, explained.

"There are a number of large railway operations in Australia that are currently utilising the GSM-R technology but at some stage they will look forward to the next standardisation, the next generation of railway communication functionalities, and in that space, we're looking at FRMCS as the future standard to adopt."

FRMCS, or Future Railway Mobile Communication System is shaping up to be the replacement to GSM-R and is expected to use 5G communications as the bearer technology. However, transitioning to the new technology will be complicated while ensuring operational continuity. Frequentis is ready to partner with railways to enable them to shift from a legacy to future system with minimal disruption.

"An emerging requirement for rail radio systems is the transition from legacy systems, that can be an analogue system, or GSM-R or another digital system to the new system," said Myslivec. "In future, this could be the FRMCS or any broadband based communication system, and one critical requirement is to do the transition from the old world to the new world with minimum operational impact."

Having had experience transitioning rail networks from older analogue systems to GSM-R or Tetra technology, Frequentis is set up for the next wave of technological advancement. Myslivec explains that this is done through what is called "bearer independent communication".

"We can provide our services over various communications networks," he said. "This is how we want to take care of these lifecycle issues. We are independent from the underlying network, so for us lifecycle is easy, as it's purely a software solution which is just running on servers and IT equipment, so we don't have a big issue with lifecycle in terms of hardware, or base stations, for example."

Hsu concurs, highlighting what this means for rail operators.

"Our technology is capable of working with various different radio bearers, and it can give customers a very streamlined single platform approach."

Practically, from a train controller's perspective, the communication method between the control room and the on-board staff remains the same, even as the underlying infrastructure is updated.

Rail networks around the globe have chosen Frequentis for mission critical communications systems.

"The user doesn't need to bother with whether they are communicating with a train over analogue radio or GSM-R or a public network or mission critical services because the user interface always looks the same," said Myslivec. "The signaller presses a button or dials a specific train number and will be connected to that very specific train and our system in the background takes care of whether it has to call out that train on the analogue line or GSM-R or whether it has to establish a session initiation protocol (SIP) via a mission critical server. This is, to our mind, very important because with that measure you can enable a very smooth, almost seamless transition for the end user in the control room."

Underpinning the application of these emergent technologies, Frequentis has a committed corporate focus on system security. Key national infrastructure, such as rail transport, requires concerted efforts to ensure key systems are designed, built, deployed, tested and maintained to ensure that the increasing array of cyber security threats are managed in a robust and timely manner. Frequentis Australasia also has significant expertise with Defence and Air Traffic systems and is a Defence Industry Security Program (DISP) member that requires compliance with Australian government legislative/regulatory/guidance, including the Information Security Manual (ISM) and the Protective Security Policy Framework (PSPF). In addition, Frequentis intends to join the partnership arrangements with the Australian Cyber Security Centre (ACSC), where private sector organisations will team with government to deal with the quickly evolving cyber threat landscape.

The Frequentis security/cyber organisation, systems and processes include utilisation of the appropriate accreditation framework, design of hardware/software architecture, focus on

procedures for management of information assets within the system, such as change management, configuration management and testing and release management.

Services include security monitoring of countermeasures against malicious code, intrusion detection strategies and detection mechanisms, audit and event log analysis and alerting, system integrity checking vulnerability monitoring, assessments and patching, a periodic audit of intrusion detection procedures and systematic user training and awareness programs. A system-based network and communications security, with high level business continuity, disaster recovery and system redundancy measures combine with a system compliance plan identifying industry, regulatory and legislative compliance requirements.

"On the one hand, if you think about the end user device, which is basically a PC running on Windows IoT, then of course you would like to have all your security patches always up to date so your system will be super secure. On the other hand, we all know a nice Windows upgrade on your home PC and the pain this can cause you. There's always a trade-off to our mind between security and safety, and I'm still convinced that we have to learn together with the authorities, the railways, how to handle this.

"Currently, I see a trend in all the tenders to make it as secure as possible. It is then our job to tell the customers that this will have an impact on the operations and your safety. For this reason we will work with our customers to find the the optimal position between the two," said Myslivec.

Navigating this balance will require a clear focus on operational continuity while transitioning to the latest technology, something that Frequentis continues to support global customers with. 🚆