WHITE PAPER

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Velocity: A Competitive Edge to Power Digital Transformation in Critical Communications

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INTRODUCTION

How often have you watched an action movie where police or special forces commanders can monitor an unfolding situation, anywhere in the world with perfect voice and video communication between the heroes on the ground and the control centre? You don't really think about the practicalities of how the signal is getting through. We take it for granted and, to be honest, we've come to watch a movie, so we don't really care. In the world of mission critical communications real life is following hard on the heels of fiction as sectors like public safety, transportation and utilities start to realise the benefits of an always on, always connected, always intelligent future.

While voice is, and always will be, the cornerstone of mission critical communications, intelligent applications are coming on stream based IoT (Internet of Things) technology that allow us to do things differently. Applications are being developed that improve safety and efficiency in a whole range of sectors; be that security or body worn cameras streaming live video to a control centre, provision of high-speed Wi-Fi on our trains and buses that don't break down as often because vehicle health is constantly being monitored in real time.

And now we are moving beyond passive monitoring to applications that can take actions based on changes on the ground. A refrigerated lorry could feed back temperature data to a control room, and, in the event of a malfunction, this could save the loss of a valuable cargo. Imagine a cash and valuables van suddenly veering off its planned route where GPS picks up the change in behaviour and automatically switches on the cameras to give a live feed of what is going on. This kind of digital transformation in mission critical communications requires not only a more robust and integrated technology solution but also the in-built intelligence to enable these applications.

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CHALLENGE

While the future we paint here is exciting, the nature of mission critical communications is that people overlook the technical challenges of delivering 'all you can eat' data any time anywhere with the sort of intelligence needed to join everything up and deliver the benefits of digital transformation.

As you move out of range of cellular coverage to need to pick up your Land Mobile Radio (LMR) radio so you're juggling two devices. And LMR only offers narrowband communications so, to access real time video applications, which require broadband capacity, you need the higher bandwidth offered by Long Term Evolution (LTE). Then you might be able to switch LTE data, but you need another piece of kit to be able to switch voice.

And with all the extra workarounds you encounter problems like how do you manage all the different devices? And how can you be sure that routing devices intended for a nice, air-conditioned office environment will stand up to the rough treatment they will get in the hand of emergency services, on public transport or on top of a remote mountain top or on a wind turbine at sea? And let's not forget, for most people in the mission critical world, the mobile LMR radio handset is still their go-to device. So there has to be way to bring legacy radio technologies like DMR, TETRA and P25 along on the digital journey.

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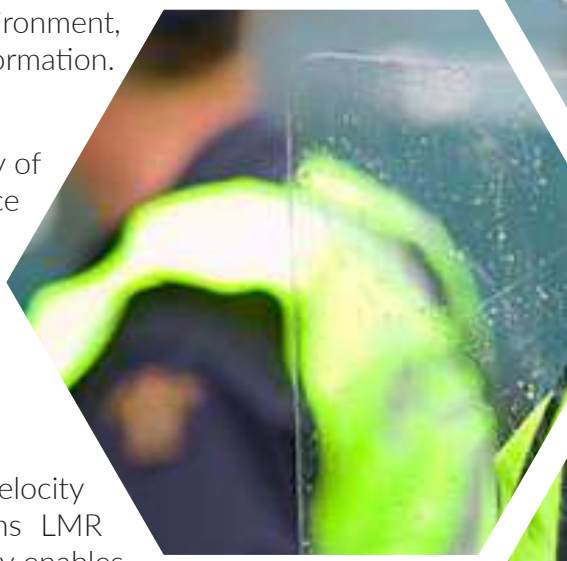
SO HOW CAN VELOCITY HELP?



Velocity is an intelligent 'edge computing' device for mission critical applications. What makes it different from other edge devices is that is it specifically designed to meet the challenges of the mission critical environment, while also providing the connectivity and tools to drive digital transformation.

First of all, it's an integrated single box solution that combines many of the mission critical technologies you will need and that includes voice as well as broadband data. For areas outside the range of LTE or LMR it can even seamlessly integrate with satellite communications. So it cuts down on complexity of multiple devices and it's built to survive the rough treatment it is likely to be exposed to in the real world be that on a bus, an ambulance or a police car.

Creating a mobile in-vehicle intelligent communications platform, Velocity starts bringing everything into a digital eco-system. That means LMR radios, smartphones, tablets, laptops and Bluetooth devices. Velocity enables a range of bearer technologies both within and around the vehicle such as Ethernet, Wi-Fi and Bluetooth with network access to LTE for data intensive applications and LMR for narrowband voice. All controlled by a single digital user interface such as a tablet.

As you would expect, mission critical voice is a given and this can be delivered via push to talk over cellular (PoC) over LTE or LMR or a combination of both. Velocity switches seamlessly between PoC and LMR with the vehicle on the move, to the extent that the user will not be able to spot the difference. And that continuity of voice can be a life and death matter.

This ability to seamlessly switch between PoC or LMR over LTE and narrowband LMR is especially valuable where you are dealing with remote areas, beyond the reach of LTE.

While a telco's LTE network may be the preferred carrier for LMR in urban areas it is not cost effective to provide broadband communications in remote areas of low population density. For these outlying areas you still need mission critical communications and technologies like DMR or P25 radio that provide the narrowband radio coverage over a wide geographic area. In this case in-vehicle Velocity units act as the glue allowing roaming across areas of LTE coverage into areas that only have LMR coverage.

The really exciting part of Velocity is its intelligence, born out the fact that is both a communications platform and an intelligent device with its on board edge computer. With access to broadband data a whole world of possibilities opens up to completely change the way you run your operations. The ability to connect in devices like security cameras, engine management systems, environmental sensors within the vehicle means that Velocity is not just 'always on' but 'always thinking.'

As well as just monitoring vital signs Velocity comes equipped with Node-RED which is an extremely intuitive programming tool to allow you to define a set of rules to take certain actions in the event of changing parameters. That means, for example, you can build a simple function that says, "if the vehicle veers from a pre-planned route, then switch on the security cameras." Equally a fleet of vehicles could have their maintenance schedule managed in an intelligent way, based on real time feedback from an engine management system. Or a vehicle could be called in for immediate attention if the braking system was showing dangerous levels of wear. This kind of functionality means that Velocity is taking us beyond the conventional scope of mission critical communications into the world of IoT.

And as you would expect from an IoT device, Velocity can be managed remotely over a wireless connection. Velocity Remote Manager allows you to manage your whole fleet of in-vehicle devices from a central location. Fleet managers can manage data utilisation of the network and send firmware updates to the devices without having to recall vehicles to a depot. There is also a powerful security element to the Velocity Remote Manager in that it allows network managers to create DMZs, also known as perimeter networks or a 'buffer zone' between the public internet and the private network. This effectively protects sensitive internal resources from external threat actors. So users can safely access external websites without compromising internal security.

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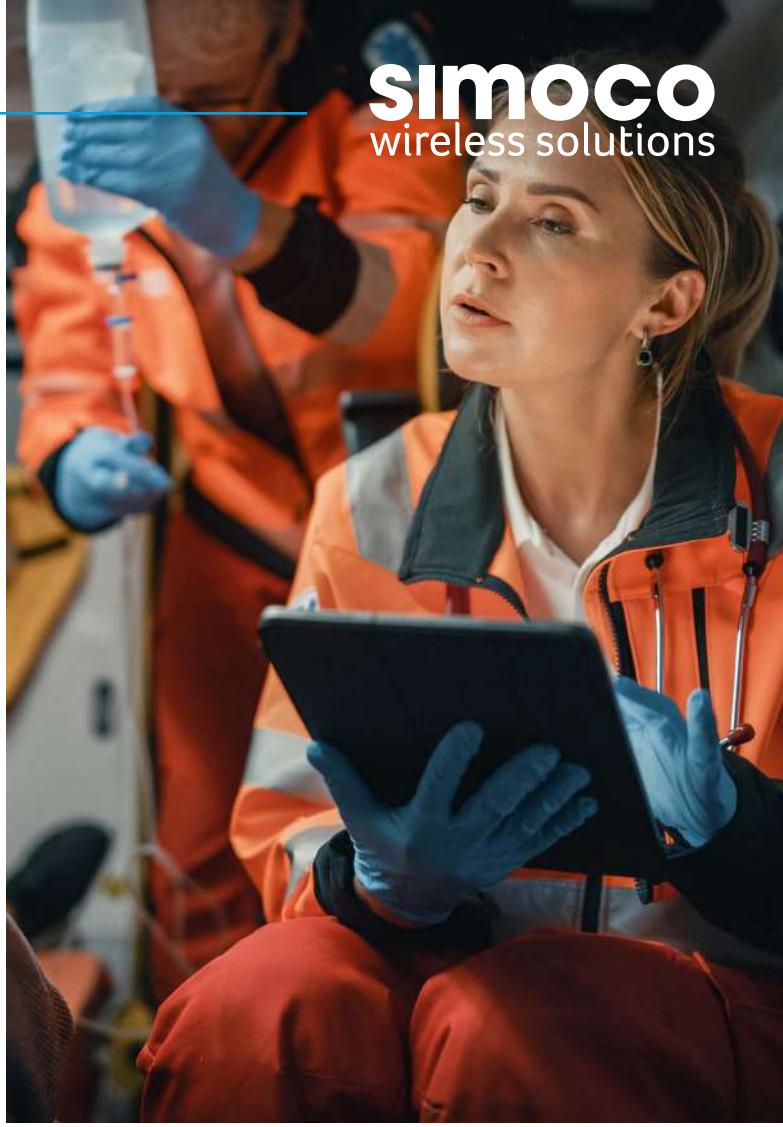
Ambulance as network node

In the healthcare world ambulances are increasingly being expected to act as an extension to the hospital. For this to happen not only do crews need reliable voice communication but they will need secure access to patient medical records in order to provide emergency care in transit and best prepare A&E teams to receive the patient efficiently and safely.

During the pandemic ICU beds were often not available for emergencies and a seamless approach to communications could enable smart re-routing of an ambulance to a hospital that had ICU availability, saving valuable minutes for patients in need of urgent care.

With higher bandwidth technologies like 5G enabling high-definition real time video, it will become increasingly common for more complex procedures or emergency operations to be carried on in the vehicle that would normally have to wait until the patient arrives at hospital.



Connected Police Officers

The mobile radio is still the essential ally for police officers around the world. Voice can relay urgency, complexity and even location and it's reliable; it just works, even when public mobile networks are down. But increasingly the police are coming to rely on a range of other intelligent devices for safety, compliance and efficiency.

Body worn cameras protect both officers and the public, for example, but to be truly effective they need to be able to relay live video feed to a control room and this is not possible without the right carrier in place. The same applies to the use of drones which are increasingly critical in crimes like terrorism, public order offences and even house burglaries. The operator on the ground can see video footage but the control room, without sufficient communications, is reliant on a call on the police radio to let them know what's going on.

The same applies to innovations like wearable biometric devices that can monitor breathing or heart rate and activate the radio emergency button when the officer on the ground may be under duress or incapacitated.

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Fire command and control

Fire crews are increasingly reliant on tablets and other mobile devices in the field to view personnel on a map, access to pre-fire plans, allow storage of photos, complex building maps and much more. As with the police there is an increase in the use of video cameras and drone surveillance but to date no means to relay this information to command-and-control centres.

Equally fire crews in places like Australia and North America will be working out of range of LMR or mobile phone masts and need a solution for connectivity both within the team on the ground and the control centre.

The availability of a fire appliance equipped with Velocity means they have their one local network for connectivity on the fireground plus access to a range of wide area connectivity such as LMR, LTE or satellite communications.

Velocity's ability to integrate the different carriers means that fire fighters can maintain voice and data communication regardless of carrier when in transit and at the scene of the fire.

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