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Do you read me?

Hello and welcome to the first ever Insights issue of *Critical Comms*, where we give thought leaders from across the critical communications landscape the chance to offer their perspective on the state of the industry as we head into 2023. I hope you'll agree that it's a suitable way to wrap up what has been a very unusual 12 months, and with any luck we'll be bringing this feature back at the same time next year.

These thoughts leaders are showcased on the cover of this issue alongside a couple of the speakers from Comms Connect Melbourne last month: Jackie Dujmovic from Hover UAV (bottom-left corner of the grid) and Kylie De Courteney, Managing Director of the NSW Telco Authority (top-right). The Authority has very much been taking a leadership role in the nation's critical comms journey of late, with highlights from recent months including a strategic partnership with NEC to build a state-of-the-art 5G innovation lab; the launch of the NSW Connectivity Strategy to improve digital connectivity; and the completion of a proof-of-concept trial to help design a national Public Safety Mobile Broadband (PSMB) capability.

With so much going on, it's a wonder that De Courteney was able to find the time to attend Comms Connect at all, and it was an absolute pleasure to hear from her, Dujmovic and all the other speakers over the course of the event. We are pleased to present a few choice highlights in this issue, covering the conference and exhibition, the ARCIA gala dinner and the pre-conference workshops — though to get the full experience, I would definitely recommend attending future editions of the event in person (and also taking a friend so you can attend one conference stream each and swap notes!). You can also read this issue about some of the leading 5G trends of 2022, the upcoming SouthPAN service for better satellite positioning, in-vehicle networks for public transport and NIST's atomic radio receiver.

See you next year.

Lauren Davis, Editor
cc@wfmedia.com.au

Calendar

November

PMRExpo 2022
22–24 November 2022
Koelnmesse, Germany
www.pmrexpo.de/en/

December

PSCE Winter Conference 2022
5–6 December 2022
Federal Judicial Police Brussels, Belgium
www.psc-europe.eu/psce-conference-in-brussels-2022/

Natural Disasters Expo Asia
7–8 December 2022
Singapore Expo, Singapore
www.naturaldisastersshowasia.com/

January

18th Wireless On-demand Network systems and Services Conference
30 January–1 February 2023
Madonna di Campiglio, Italy
http://2023.wons-conference.org/

February

Mobile World Congress 2023
27 February–2 March 2023
Fira Barcelona Gran Via, Spain
www.mwcbarcelona.com/

March

Bapco 2023
7–8 March 2023
Coventry Building Society Arena, UK
www.bapco-show.co.uk/

Satellite 2023
13–16 March 2023
Walter E. Washington Convention Center, USA
www.satshow.com/

April

EENA Conference & Exhibition 2023
19–21 April 2023
Ljubljana, Slovenia
https://eenaconference.org/

For a full list of industry events, see criticalcomms.com.au/events

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Editor: Lauren Davis
cc@wfmedia.com.au

Publishing Director/MD: Geoff Hird

Art Director/Production Manager: Julie Wright

Art/Production: Linda Klobusiak

Circulation: Dianna Alberry
circulation@wfmedia.com.au

Copy Control: Mitchie Mullins
copy@wfmedia.com.au

Westwick-Farrow Media
A.B.N. 22 152 305 336
www.wfmedia.com.au

Advertising Sales

Tim Thompson Ph 0421 623 958
tthompson@wfmedia.com.au

Liz Wilson Ph 0403 528 558
lwilson@wfmedia.com.au

Head Office
Unit 7, 6-8 Byfield Street, North Ryde
Locked Bag 2226, North Ryde BC NSW 1670
Ph: +61 2 9168 2500

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The Talkpod N5 Smart series is exactly what the Australian PoC radio / Network market has been screaming out for: well-engineered, fast, great looking Android devices that look and feel like traditional two-way radios and function in a way that more than meets consumer expectation. Talkpod devices are extremely well engineered, deliver a great 'in hand' feel and provide a durability level that assures user confidence.

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One of the many qualities that separate Talkpod devices from their competitors is their ability to roam between different cellular sites, bands and technologies for the best signal with the greatest bandwidth to rapidly deliver an optimal level of service. The speed at which this roaming occurs leaves competitors in their wake setting new standards in the Australian PoC market.

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COMMS CONNECT MELBOURNE 2022: CONFERENCE HIGHLIGHTS

Lauren Davis

Comms Connect Melbourne has successfully bounced back from a three-year COVID-induced absence, with a two-day conference and exhibition on 19–20 October plus pre-conference workshops from the Australian Radio Communications Industry Association (ARCIA) and the Australasian Critical Communications Forum (ACCF) on 18 October. It was a triumphant return to form for the Southern Hemisphere's premier critical communications event, with hundreds of visitors attending each day from across our region.

Geoff Hird, MD at WF Media and WF Events, was very pleased at the success of the event. "Clearly the industry was eager to get together in person again, and with such a high-quality conference program and some of the sector's leading suppliers supporting the event, we had some great energy in the building from the moment the doors opened," he said.

Public safety networks

The conference agenda gave attendees a chance to learn about different public safety networks around the world, in various stages of deployment, and the challenges they have faced along the way. Kylie De Courteney, Managing Director of the NSW Telco Authority, spoke about the Authority's role in helping to develop a national Public Safety Mobile Broadband (PSMB) capability to provide the mission-critical levels of availability and coverage that our public safety agencies truly need, wherever they may go. From May 2021 to August 2022, the Authority managed a proof-of-concept trial to help develop and test technologies on behalf of all Australian states and territories, with the findings set to help shape the design of the national PSMB. According to De Courteney, the ideal network would include technologies including live video streaming, location tracking and telemetry, and flood and fire sensors — much of which exists already but now needs to be deployed in a public safety context.

The conference also heard from Neal Richardson, Strategy Manager for Next Generation Critical Communications (NGCC) — New Zealand's leading adviser on delivering a public safety network. Richardson noted that his country's existing LMR networks are nearing their end of life, and are in need of better coverage and resilience. Yet the journey towards a new network has had a few false starts, Richardson admitted — back in 2019 it was thought that PTT over cellular would be appropriate, but it was later deemed not robust enough for emergency services, so there was a shift in focus to digital LMR. He also noted that any new technology must be affordable enough that it won't break the bank for charitable organisations (such as St John New Zealand and Wellington Free Ambulance), and should be rolled out fast enough that governments don't need to keep investing in existing ageing infrastructure — with one option being to overlay critical communications on existing commercial networks.

Finally, attendees heard from Richard Reed, CTO of FirstNet USA — an independent agency contracted by the US Government to deploy a nationwide wireless broadband communications platform dedicated to first responders and public safety. FirstNet emerged from tragic circumstances, calling on Congress to fund and provide spectrum to solve critical communications challenges following the September 11 terrorist attacks. In 2012 Congress passed the Spectrum Act, setting aside 20 MHz of highly desirable spectrum in the 700 MHz frequency band, known as Band 14, which was to be reserved exclusively for emergency communications. Since then, FirstNet has been consulting with public safety agencies and working to build the network through a partnership with AT&T. Over 95% of the radio access network build has now been completed, at an impressive speed which Reed attributes to the fact that FirstNet was able to simply add Band 14 to existing AT&T towers covering 2.8 million square miles. No doubt New Zealand's NGCC would approve of this strategy.

Resilience and natural disasters

So how do you ensure resilience in your network, particularly when faced by natural disasters? As noted by speaker Shane Fitzsimmons, Commissioner of Resilience NSW, in the past three years his state has endured drought, bushfires, storms and floods — and while he does not personally believe this series of events qualifies as the "the new normal", he did describe it as "the new extreme" and said that we need to plan for it.

Hamish Duff, Managing Director of Mastercom, added that you have to plan to fail when building comms networks, because LTE networks fail all the time and comms infrastructure can go down or be lost entirely during natural disasters; this has certainly been the case during the 2022 Lismore floods. He suggested the use of hybridised networks, with LTE complementing and adding broadband capability to LMR — so that if one system is down, users can just switch to the other. Indeed, Simoco CEO Peter Scarlata confirmed that many agencies are reluctant to jump entirely to LTE networks, more likely verging towards a hybrid of LMR, LTE and mesh.

Graham Tait, Mesh Solutions Lead at Hypha by Wireless Innovation, put forth vehicle-as-a-node (Vaan) technology as another option for improving resilience in remote areas — whereby a vehicle or other device (such as a boat, a trailer, an aircraft or even a backpack) can be used to act as a repeater when the user is beyond range of Wi-Fi and other connectivity types. Tait noted that satellite coverage is a key component of VaaN as it's non-terrestrial, and so therefore not affected by disasters; emergency services organisations are thus already fitting their VaaN systems with satellite capability. Furthermore, mesh systems can be used to keep responders connected even when they're away from the vehicle, or to connect multiple VaaN solutions together.

Satellites and drones

Further on the topic of satellite technology, Scott Leyonhjelm from consulting company Nova Systems helmed a panel outlining three different categories of satellite — geostationary (GEO), medium Earth orbit (MEO) and low Earth orbit (LEO) — as well as satellite-to-cellular connectivity. Leyonhjelm noted that the satellite industry is being revolutionised by the likes of Jeff Bezos and Elon Musk, while other satellite operators are also starting to be a lot more proactive in creating an environment with lots of technology innovation; this is evident in the fact that the number of satellites in the sky is expected to increase 20-fold in the next five years, from 5000 to 100,000. And while this is good news in terms of coverage and connectivity, the audience did express some concern about the dangers of these future satellites potentially colliding with space debris — with the panel conceding that while there are strict regulations to prevent that sort of thing, issues could arise in the case of any bad actors who would seek to cause a deliberate collision.

Another emerging technology for mission-critical response is drones. Jackie Dujmovic, founder and CEO of Hover UAV, spoke about how the drones market is expanding significantly, particularly with public safety agencies in the US — an approach she is keen to see replicated in Australia, with potential applications including use by the police and for search and rescue operations at sea. Speaking on the latter, she said the mere sight of a drone is enough to assure a person in distress that help is coming, enabling them to relax rather than to waste energy panicking — and in critical situations, that could be the difference between life and death.

Michael Ryan, Principal Consultant at Titan ICT, added that another application for drone technology is in assessing telecommunication towers, thus replacing human riggers in what was previously a dangerous and time-consuming undertaking. By providing photos, videos and other data, Ryan said drones can enable towers to be maintained efficiently and effectively. Drones can thus be used to support other communications technologies, not just replace them.

Keen for more Comms Connect content? Fear not, as the event will return in 2023 with editions in Christchurch (June) and Melbourne (October). For further updates, keep an eye on https://www.comms-connect.com.au/.

Comms Connect (WFevents)
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NZ MAN PLEADS GUILTY TO BREACHING RADIOCOMMUNICATIONS ACT

A New Zealand man, who has interim name suppression, recently appeared in Whangārei District Court, pleading guilty to breaching the *Radiocommunications Act 1989* by importing prohibited unrestricted two-way radios without a licence. Scheduled for sentencing later this year, he faces a fine of up to NZ$30,000.

The charge is related to a consignment of 50 Baofeng UV-5R and 2 Baofeng UV-82 two-way radios, which were addressed to the man's home and intercepted by the New Zealand Customs Service.

Radio Spectrum Management (RSM) had previously issued warning and infringement notices to the man for offering similar devices for sale via Trade Me. The defendant continued to ignore these notices, which concluded with the interception of the illegal radio transmitters and subsequent charges.

"Prohibited radios such as Baofeng units can cause serious harm to radio services — particularly emergency services — when used inappropriately," said RSM's Investigations Manager, Nathan Schaffer. "We take a serious view on users and importers of these devices who are not authorised to do so. This prosecution highlights the efforts RSM are going to … [in order to] stop the importation of prohibited radios. We will continue to work with NZ Customs to intercept further shipments as well as monitoring the sale within NZ of these devices."

Prohibited unrestricted two-way radios may only be operated by persons holding an amateur certificate and may only be sold by persons who have applied for a licence to supply with the appropriate endorsements. Radio operators need to be aware that devices such as Baofengs should not be used on land mobile or simplex networks as they do not meet the prescribed radio standards. Doing so not only puts the user in breach of the Radiocommunications Regulations but can also cause harmful interference to other licensed users.

The Radio Frequency Users Association of New Zealand (RFUANZ) committee said they were pleased with the result of the case, stating, "While RFUANZ have no issues with these radios in the right hands, we are aware of numerous instances where people have used these radios and created interference either deliberately or unwittingly."

CEA'S RF CHIP ENABLES IoT CONNECTIVITY FOR REMOTE DEVICES

CEA, a French technology-research organisation, and Astrocast, a global satellite Internet of Things network operator, have announced their successful collaboration on a low-cost, bidirectional communication module that enables corporations to communicate with their remote assets in areas not covered by terrestrial networks.

The module's L-band chip, based on a new architecture developed by CEA's Laboratory of Electronics Information Technology (CEA-Leti), is a key hardware component that enables Astrocast customers to benefit from cost-efficient communication with their assets in the field through its network. Completed earlier this year in an expedited project between the research institute and Astrocast, it is embedded in Astrocast's RF module, Astronode S.

The chip's architecture is split over the RF core and digital processing and control units. It is fully optimised to support Astrocast's dedicated bidirectional ground-to-satellite protocol and provides an optimal trade-off between link budget and low-power and low-cost constraints. The chip also embeds all low-Earth orbit (LEO), satellite-specific features such as satellite detection and robustness to Doppler shift.

The miniaturised, surface-mount module communicates with terrestrial devices via Astrocast's constellation of LEO satellites. Using the L-band spectrum, the network primarily targets maritime, oil and gas, agriculture, land transport and environmental applications in which ubiquitous coverage is required.

Image ©Astrocast

"Terrestrial IoT networks cover only about 15%, which leaves vast remote and rural areas where our global satellite network provides coverage that is crucial for our target markets," said Laurent Vieira de Mello, COO, Astrocast. "Leveraging its expertise embedded in a preliminary version of the RF chip, CEA-Leti developed its chip and delivered the final prototype to meet our requirements and time-to-market goals. They managed the chip technology transfer to our industrialisation, qualification and production partner."

The project's critical time-to-market window was managed through a flexible collaboration model covering both prototype and industrialisation phases. As explained by Michel Durr, Business Development Manager at CEA-Leti, "An accelerated time-to-market goal drove this project from the outset. We pioneered this RF technology in 2019, and our team customised it for Astrocast up to production in only three years."

CEA-Leti's industrial tester used for characterisation was key to accelerating from prototype to production, which enabled prototype characterisation in parallel on the tester and in the lab, Durr explained. He said, "This process provided a short-loop debug capability with all skills available at CEA-Leti, and enabled us to deliver fully validated inputs to Astrocast's industrialisation partner for an easier industrial test-program development."

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SPEEDCAST TO HELP UPGRADE BRISTOW GROUP'S REMOTE SITES

Speedcast, a leading communications and IT services provider, has signed a multiyear contract with Bristow Group to deliver technology upgrades and futureproof more than 40 remote sites across the globe, including Australia, Europe, Nigeria, the United Kingdom, and North and South America.

Houston-based Bristow Group is a global leader in innovative and sustainable vertical flight solutions and provides aviation and search and rescue (SAR) solutions to government and civil organisations, with 222 aircraft in its global fleet. As part of the agreement, more than 40 onshore energy and search and rescue office bases will receive technology and system enhancements via Speedcast's Unified Global Platform (UGP) and its software-defined wide area network (SD-WAN) solution. Additionally, all sites will benefit from equipment upgrades.

Speedcast's SD-WAN blends VSAT (very small aperture terminal), LEO and MEO solutions, cellular 4G/5G, wireless and MPLS technologies into a single optimised and secure WAN path that is designed to deliver high-quality uptime — all the time. As a truly multi-path, multi-orbit connectivity solution, Speedcast's SD-WAN provides flexible, intelligent and secure network management so that applications should have the highest availability and performance.

The new contract follows 10 years of connectivity partnership between the organisations, with Speedcast providing 24/7 secure network support for Bristow's operations, managing its WAN, LAN, voice and backup broadband services. The solution supports flight operations, managing a critical lifeline for aircraft to operate safely and efficiently, and enables Bristow personnel to access core enterprise systems and applications such as aircraft maintenance data transfer.

"At Bristow, our mission is to make every flight personal and assure safe, efficient and reliable solutions to deliver superior outcomes to our stakeholders," said Bristow's Chief Information Officer, Noel Malcaba. "Speedcast has been our longstanding connectivity partner serving our fleet operations base stations across the globe. Because of the reliable service and advanced technology Speedcast delivers, our team can conduct their work and ensure flights continue to run seamlessly and stay connected, no matter the flight path or destination."

"As part of this agreement, Speedcast will be conducting technology enhancements and equipment upgrades at many critical base locations, ensuring Bristow benefits from the latest advancements in hybrid connectivity," said Richard Elson, Executive Vice President – Energy at Speedcast. "By futureproofing their network leveraging Speedcast's Unified Global Platform, we're confident Bristow will experience the highest quality connection and redundancy, keeping their operations running smoothly. We look forward to continuing to meet Bristow's requirements for safe and efficient operations."

iStock.com/chameleonseye

NOKIA SELECTED TO MODERNISE RAIL COMMUNICATIONS IN PERTH

Nokia has been selected by the Public Transport Authority of Western Australia (PTA) to design, build and maintain a next-generation railway communication system over the next decade in Perth.

The METRONET infrastructure and public transport program is the long-term blueprint for Perth's future. As a critical element of the METRONET program and as part of the agreement, more than 160 LTE/4.9G radio sites will be built to modernise the railway communication system that includes additional METRONET track and tunnels with a total of 250 km of railway. The solution will be based on Nokia private 4.9G/LTE mission-critical IP/MPLS, Data Center Fabric and microwave backhaul solutions, to support a communications-based train control (CBTC) high-capacity signalling system for greater accuracy and efficiency compared to traditional signalling systems.

Nokia's solution will be used to upgrade the current PTA's narrowband rail radio systems, replacing the existing analog technology with a high-tech 4.9G/LTE digital platform which is necessary for more reliable mission-critical voice, high-speed data and video services. The Radio System Replacement project is subjected to the *Critical Infrastructure Act 2021*, with scope to include a full cybersecurity fabric across all solution elements.

"We are thrilled to partner with PTA for this prestigious project to design, build and maintain the next-generation railway communications network," said Rob McCabe, Head of Enterprise for Oceania at Nokia. "Powered by Nokia's private wireless network solution, the new railway communication system will help enhance the accuracy of the system, leading to improved experience and safety. Nokia is at the forefront of supporting railway networks accelerate digital transformation for more efficient operations while delivering greater value to the passengers."

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For more information visit www.gmecommercial.com.au

STEPHEN MILLAR

MANAGING DIRECTOR AND CEO, GME

What opportunities do you predict for the growth of your industry in 2023?

Given our deep understanding and experience serving the Australian and NZ market, GME is uniquely positioned to deliver a locally engineered and manufactured communication solution. This solution will be tailored to address specific local commercial customer requirements.

In line with our channel partner requests to address local customer requirements, this may include the development of a new communications platform. We anticipate that this important initiative will generate increased demand and growth for the GME brand across the local region.

How are you making your company more resilient to ongoing global supply chain issues?

As an end-to-end designer and Australian manufacturer of radio frequency communication equipment, GME recognises that resilience requires a multifaceted approach. Procurement and supplier management is a key consideration of the initial engineering design process and GME has a highly experienced Australian supply chain team, with long-term and strategic supplier–partner relationships.

Furthermore, we also have a dedicated product life cycle engineering team. This means that we still have the capability to maintain our products, even in the event of component availability shortages.

This, combined with our Australian manufacturing capabilities, ensures that GME can provide our valued partners and their customers a high degree of confidence of supply continuity throughout these unprecedented times.

What are the biggest challenges or threats facing your industry in 2023?

Supply chain component shortages continue to present GME with a series of major challenges. The continuity of supply to our valued partners and their customers requires a strategic whole-of-business approach. As mentioned earlier, GME is exercising extreme vigilance, which includes reviewing communication practices and process improvements, whilst leveraging our collective expertise to help mitigate impacts to our channel partners.

Another major challenge is the extreme volatility of the USD against the AUD, which significantly impacts the material cost of key components. Coupled with sharply increasing labour costs, these two factors add an additional layer of complexity, as we endeavour to maintain pricing stability.

What's on your wish list from governments, innovators and the wider industry in 2023?

Ongoing support of Australian manufacturing is high on our wish list. At GME we have over 60 years of experience in developing product for our market and manufacturing it here. Supply chain insecurity has been highlighted over the last few years and sovereign capability is something we hear about much more frequently. Government and industry can encourage further development of Australia's sovereign capability by buying products made by it. There is also the opportunity for investment at a state or federal level in building some upstream component supply capability that can be leveraged across industry, once again to support Australian sovereign capability and improve our supply chain security.

Stephen Millar joined the GME board of directors in 2019 and became Managing Director in 2021. He is committed to Australian manufacturing and the development of locally engineered communication solutions.

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What opportunities do you predict for the growth of your industry in 2023?

The sustained expansion of Industry 4.0 brings the integration of digital technology into all areas of business and is driving the convergence of information technologies (IT) and operational technologies (OT).

Historically, these two environments have operated quite separately. However, the need for data-driven decision-making is blurring the lines between OT and IT and the Industrial Internet of Things (IIoT) is digitally transforming business around the world. IIoT infrastructure is a critical requirement for any IT/OT convergence strategy, with these technologies largely responsible for collecting, transmitting and processing IT and OT system data.

Many businesses within the industries that Madison Technologies supports, including power and water utilities, resources, transport, smart cities and infrastructure, are either beginning implementation, have pilots underway or are committed to learning more about the adoption of these technologies, so there is great opportunity for us to support these customers on their digital transformation journeys.

How are you making your company more resilient to ongoing global supply chain issues?

As a solutions-focused company backed by global technology brands, we continue to work closely with our customers to understand their current and future demands for technology solutions. This insight directly from our customers helps identify the areas we need to focus on as a business, and we continue to enhance our own supply chain through digitalisation.

As with many businesses around the world, we've moved away from the 'just in time' supply model, and we've been expanding our in-country inventory. We continue to have a mix of emerging technology opportunities and our 'Maintain, Repair, Operate (MRO)' day-to-day stock capability is critical to ensuring we can support our customers.

Additionally, continually deepening our partnership with our suppliers and collaborating on project opportunities enables us to advance lead time commitments and reduce the customer's maximum waiting time.

Following the extreme weather events of 2022, how can critical communications be better deployed to manage similar events in future?

Critical communications and networks enable all of us to stay informed during extreme weather events. Be it first responders staying in contact with each other, the public staying informed through emergency services communications, or friends and family wanting to know the health and safety of their loved ones, we're all wanting to stay connected.

It is evident that critical communications infrastructure needs to evolve. Across all emergency scenarios, a successful response relies on accurate real-time situational awareness combined with accessible and reliable communications. We see the need for mobile and fixed communication technologies such as cellular, satellite and mesh to be deployed and seamlessly work together to provide always-available communications. This uptime of critical communications is vital to managing environments with changing situations resulting from extreme weather events.

With mobile wireless mesh solutions, emergency teams can arrive at a location and, within minutes, have a secure, multi-channel, broadband network up and running, capable of sharing video, audio and data between all invested parties. As the climate changes and extreme weather events become more frequent, these technology solutions will have a crucial role to play in supporting the emergency response.

The team at Madison Technologies has been applying our specialist understanding of critical operational environments to create solutions for use during weather events. Our FloodNode solution has recently received recognition as part of Cisco's Global Digital Sustainability Challenge. Incorporating IIoT technologies, when deployed, the predictive warning system will allow road users to make an informed decision to either continue their journey (if there are alternatives) or turn around, reducing the number of road users caught out in flooding scenarios.

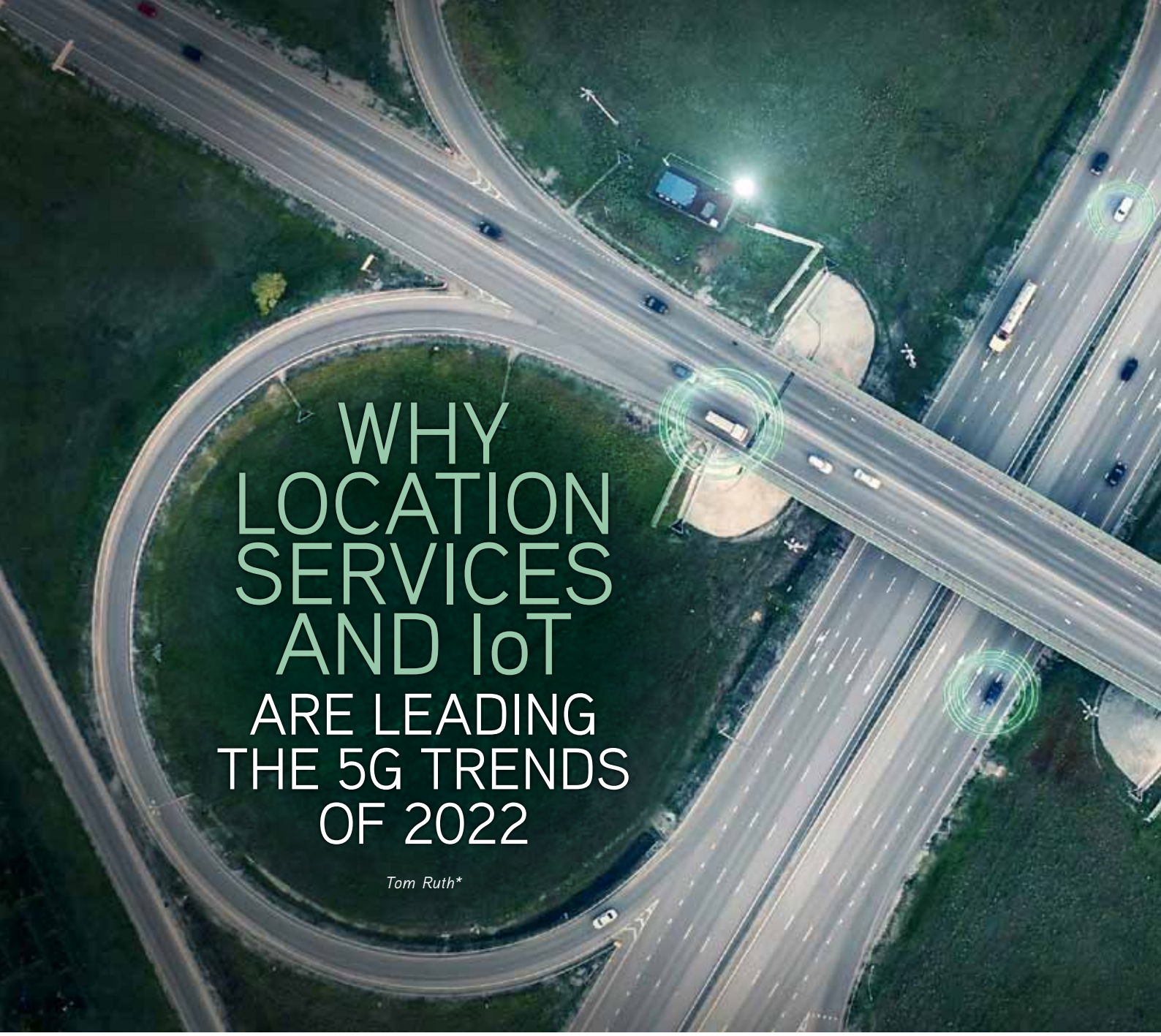
What are the biggest challenges or threats facing your industry in 2023?

As we've recently seen in the news, cybercrime is on the rise in Australia. This poses a significant threat to the sectors our customers are in. According to the Australian Cyber Security Centre (ACSC), cybercrime in Australia has increased by 13% YOY from 2020 to 2021, and a higher proportion of incidents were categorised by the ACSC as 'substantial' in impact. When it comes to cybercrime, the most common industry targets are financial services, education and health; however, the ACSC report found that one in four incidents targeted critical infrastructure and services.

The IT/OT convergence provides many benefits; however, connecting operational technology can leave security gaps, and this is creating more paths for attackers to enter and more opportunities for cyber disruption. The first step towards cyber resilience is visibility of the network and assets, shifting the dial from reactive incident response to proactive management.

Attackers around the world no longer view IT and OT as distinct, partitioned environments, so it is important going forward that both IT and OT security are aligned.

Over the past four years, Paul has headed up the industrial communications-focused Madison Technologies business, as it connects and protects people, assets and the environment by providing technology solutions that digitally transform critical operational environments.



WHY LOCATION SERVICES AND IoT ARE LEADING THE 5G TRENDS OF 2022

*Tom Ruth**

Despite an initially slow start, 5G devices and networks are continuing to come out in increasing numbers every year.

In 2021, the global 5G infrastructure market was valued at $47.3 billion and is projected to reach a value of $1.67 trillion by 2030. Increasing investment, growing demand for reliable connectivity, and the steady rollout of new networks and partnerships are all acting as drivers for this market explosion.

Two particular developments that are leading this trend toward 5G adoption are worthy of mention: IoT in general and location-based services in particular. These technologies were among the first to take advantage of 5G and are already bringing strong investment returns for businesses that have adopted them.

The 5G standard

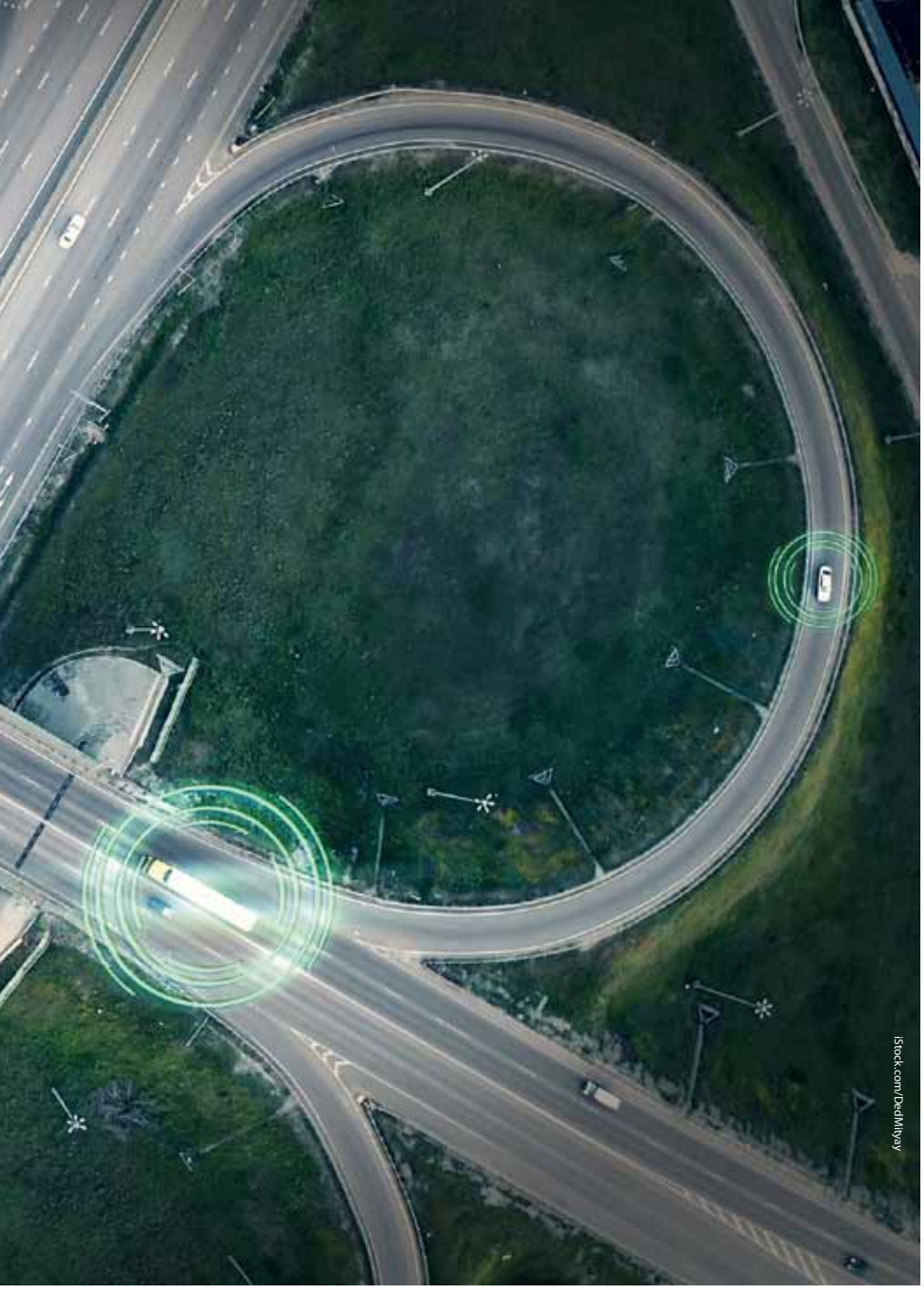
As you may know, 5G is the fifth generation of mobile connectivity. Compared to its 4G predecessor, 5G is up to 10 times faster with speeds as high as 20 Gbps. It also has far greater reliability and little to no latency, meaning it rarely loses a connection and can transfer massive amounts of data with few delays. Another benefit is its ability to allow a large number of devices to connect at once, something that previous mobile generations struggled with.

Of course, not every business handles large amounts of data that require high speeds and little latency. So 4G is likely to remain with us for a while longer, something that the designers of 5G understood by keeping the networks compatible with each other. But for those businesses that do handle large amounts of data, require a high level of accuracy and can't afford any lost connections, 5G has practically become a requirement.

5G and IoT

The Internet of Things (IoT) is also driving the adoption of 5G. IoT connects physical devices through wireless connections. The devices can range from everyday smartphones, tablets and laptops to more advanced industrial and medical tools.

With greater connectivity comes the ability to record, transfer and monitor vast amounts of data for easier cloud computing, automation and machine learning. The number of businesses using IoT is expected to explode in the coming years: the number of IoT de-



vices worldwide is projected to grow from 13.8 billion in 2021 to 30.9 billion by 2025.

However, unlocking the full potential of IoT will mean adopting a 5G-powered network. It's simply not possible to handle the large amounts of data and connected devices generated by IoT on a 4G network. By contrast, a 5G-powered IoT network can allow for:

- **Faster data transfer** — The more quickly IoT devices can communicate with each other, the more efficient the IoT systems that they are connected to will be.
- **Lower latency** — Less delay between sending and receiving information is particularly important for IoT systems that oversee health, safety and security procedures.
- **Increased device capacity** — The higher bandwidths of a 5G network allow for a large number of IoT devices to be connected, far more than could be connected on a 4G network.
- **Improved network reliability** — With 5G, networks have greater stability, meaning there's less chance of connections being lost. This, again, is crucial with IoT systems used in health care or focused on workplace safety and security.

One downside to the increasing number of IoT devices is that the proliferation creates additional attack routes for hackers. This is something cybersecurity experts are working on by developing new security protocols specifically designed to deal with the almost exponential increase of network endpoints involved in an IoT system.

The relationship between 5G and IoT is a reciprocal one: as IoT becomes the norm for most businesses, it will increase the need for upgrading their network to 5G. As 5G becomes more common, it will increase the attraction of developing an IoT infrastructure.

5G and location-based services

One particularly promising IoT sector is location technology, which refers to systems that track assets and people in real time through a network of sending and receiving IoT devices. Location tech has been around for a few years using various existing technologies, such as GPS, Wi-Fi and Bluetooth. However, most current location technologies have various drawbacks regarding accuracy, security or scalability.

For instance, GPS uses a lot of power and doesn't work effectively in indoor environments. Wi-Fi provides higher indoor accuracy, but its short range makes scalability challenging. There are also significant security issues with Wi-Fi, making it vulnerable to attacks.

A 5G-powered location network can overcome most of these challenges through its high bandwidth, reliable connectivity and greater security. Location technology developers have taken notice of these benefits and have begun incorporating 5G capability into their Wi-Fi- or Bluetooth-driven devices. This opens up a world of possibilities by removing the constraints on existing devices while also dramatically boosting their capabilities.

With location-based technology having now become far more accurate and cost-effective, it is pushing many business managers to adopt 5G to enjoy the technology's full benefits. Location-based services can also be incorporated with other IoT infrastructures for a fully connected workplace.

Final thoughts

With connectivity being at the heart of most business operations, 5G will have a major part to play, not just in the evolution of businesses but also in the evolution of society as a whole. We are all moving towards a more interconnected world and 5G presents a faster and more efficient way for us to get there. While further adoption of IoT and location-based technologies are driving the expansion of 5G, they represent only the tip of the iceberg of what's possible.

**Tom Ruth is the Vice President of Quuppa Americas. He brings over 25 years of marketing disruptive technologies and managing smart growth within high-performance organisations. This article was previously posted on the Quuppa blog and has been republished here with permission.*

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JAMES RUTTY

SALES & MARKETING MANAGER, POWERBOX AUSTRALIA

What opportunities do you predict for the growth of your industry in 2023?

We anticipate the continuation and acceleration of expenditure towards infrastructure modernisation across the public and private sector.

DC power and energy storage have always been a significant part of any radio or critical communications network. Traditionally, most equipment was powered by either 12 or 24 VDC; however, we are rapidly seeing the industry adopt -48 VDC as the backbone of modern radio equipment in line with the broader telecommunications industry standards.

With the widespread acceptance of -48 VDC radio equipment, there is generally a requirement to upgrade a site's DC power system. Network operators are using this as an opportunity to integrate a greater proportion of renewable energy such as solar and wind along with the latest in lithium-ion battery technology. This has a two-pronged effect of increasing site resilience and reducing OPEX costs.

At Powerbox, we are embracing this rapid adoption of renewable energy and taking this concept to the next step, offering complete turnkey solutions including modular and expandable DC power, lithium-ion batteries and customer communication equipment into integrated enclosures that can be quickly deployed on site by truck or helicopter. This approach allows for a rapid network deployment, by significantly reducing the amount of civil works required onsite. In addition, this approach reduces a client's risk by ensuring equipment can be thoroughly tested in a controlled workshop environment prior to heading to site. This allows communications companies to focus on what they do best, building communications networks.

How are you making your company more resilient to ongoing global supply chain issues?

As an Australian-based manufacturer and distributor of power conversion and energy storage equipment we are fortunate to have a diverse supply chain, with equipment sourced both locally and internationally.

Despite the worst of the pandemic being behind us, we are all still feeling the ongoing impacts on supply chains from what has been an extremely turbulent period. Whilst these supply challenges may be stabilising, there are many cases of manufacturers still seeing component lead times in some cases exceed more than two years.

As a result, traditional supply chain approaches are being challenged and Powerbox has implemented key initiatives centred around a more transparent and integrated supply chain.

In practice, this means bringing our customers' early planning discussions into our forecasting and demand planning activities and holding higher levels of stock in our Australia and New Zealand warehouses.

Another highly successful initiative implemented by Powerbox is leveraging our in-house engineering and manufacturing capabilities to perform 'last mile' configuration of Enatel Energy's DC power systems. This level of cooperation with a leading global OEM allows us to hold common building blocks locally in Australia, and provide a level of system flexibility and customisation, with much faster delivery times.

That said, this is not always a perfect solution, and we acknowledge the need to work actively with our customers to find alternative products or substitutions to ensure project requirements are met.

Following the extreme weather events of 2022, how can critical communications be better deployed to manage similar events in future?

Australia has a long history of extreme weather events, but the challenges faced across the east coast in 2022 are unprecedented. Flooding has been a regular event across large areas of New South Wales, Queensland and Victoria. These widespread flooding events have placed significant pressure on residents and the emergency and essential services operating in these areas. During these extreme weather events, radio communication and telecommunications infrastructure is often affected by power outages and site access can be restricted for extended periods.

The greater adoption of mobile assets such as cell on wheels (COW), mobile communication trailers and mobile command centres ensures critical communications can be established in these affected areas and operators can continue to work in a safe environment.

The effectiveness of these mobile communications assets often comes down to how they are powered. Over the past five years, we have seen continued development in power generation, power conversion and battery storage allowing for greater site autonomy in a much smaller footprint. We anticipate seeing this trend continue, particularly with emerging battery technology and wider adoption of alternative energy sources such as fuel cells.

What are the biggest challenges or threats facing your industry in 2023?

2023 is a new year, but we are anticipating may of the challenges faced through 2022 to carry over. The pressures around supply chain, the effects of a weakening Australian dollar, and a skills and labour shortage will no doubt continue to be felt for some time into the future.

James Rutty is National Sales & Marketing Manager for Powerbox Australia, with over 10 years' experience in power conversion and energy storage for the telecommunications industry. Throughout his time at Powerbox, James has gained a detailed understanding of available technologies which can be applied to solving real-world business problems for his customers.

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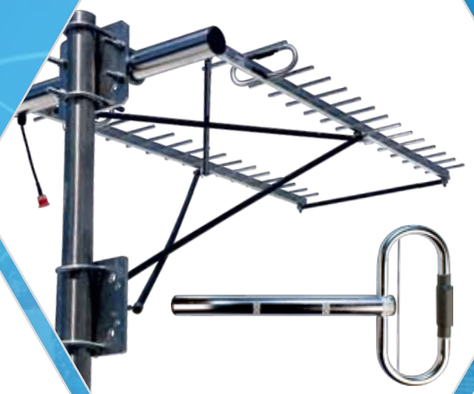

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$1.18BN PLAN TO ADVANCE ANZ SATELLITE POSITIONING

Businesses, communities, farmers and first responders across Australia and New Zealand will soon enjoy greater satellite positioning accuracy, thanks to the awarding of a $1.18 billion, 19-year contract to bring the Southern Positioning Augmentation Network (SouthPAN) to life.

The new service is set to improve positioning from current services, which provide accuracy of between 5 and 10 m, to as little as 10 cm. This 50-fold increase in accuracy should boost economic productivity, serving as the Southern Hemisphere's first satellite navigation augmentation service.

SouthPAN is a partnership between Geoscience Australia and Toitū Te Whenua Land Information New Zealand (LINZ) under the Australia New Zealand Science, Research and Innovation Cooperation Agreement. Minister for Resources and Northern Australia Madeleine King said it is a major commitment between the Australian and New Zealand governments to provide essential satellite positioning services across Australasia.

"SouthPAN will provide instant, accurate and reliable positioning to users across all of Australia and New Zealand's land and maritime zones without the need for a mobile phone signal or internet," King said.

"We've already demonstrated that industry and the community can use this for groundbreaking applications that increase safety, improve productivity and drive innovation across a broad range of industries."

King said the new network will enable mining companies to install more accurate collision avoidance systems on automated mining haul trucks or allow visually impaired citizens to navigate cities with pinpoint assistive technologies. Another benefit will be to allow light aircraft to land more safely in remote rural areas in all weather conditions, bringing benefits for essential services such as The Royal Flying Doctor Service and the communities they serve.

SouthPAN is estimated to generate over $6 billion in benefits to the Australian economy over the next 30 years. Indeed, New Zealand Minister for Land Information Damien O'Connor said the joint Australia–New Zealand initiative will be a game changer for the economies of both nations.

"SouthPAN provides crucial digital infrastructure for the future and we expect the actual benefits to be greater over the project's lifespan," O'Connor said. "Beyond the horizon, new products on the market will use this infrastructure to create value in new ways for businesses and consumers.

"This technology was originally developed to support aviation safety, but as technology has advanced, the applications have expanded. It now has potential uses as varied as enabling accurate vehicle guidance for efficiencies in agriculture and horticulture management, tracking maritime shipments and enabling navigation for drones and other unmanned vehicles."

Geoscience Australia signed the contract with Lockheed Martin Australia in mid-September to provide the service. King said at the time that the system would deliver the first services in the coming weeks, with the aim of being fully operational across the two countries with safety-of-life certification from 2028.

"The SouthPAN project team will work with Lockheed Martin Australia to establish a network of global navigation satellite system reference stations, a corrections processing facility and satellite uplink facilities that will enable accurate and reliable positioning signals to be transmitted from satellites to users," she said.

"We are working hard to ensure users can access the SouthPAN service as soon as possible. The coming weeks will see the release of our first precise, open-access positioning services."

O'Connor added that SouthPAN reflects both governments' shared commitment to growing space capability.

"By providing these capabilities to Australian and New Zealand businesses, we can harness science and technology to help them improve productivity, sustainability, and boost innovation," he said.

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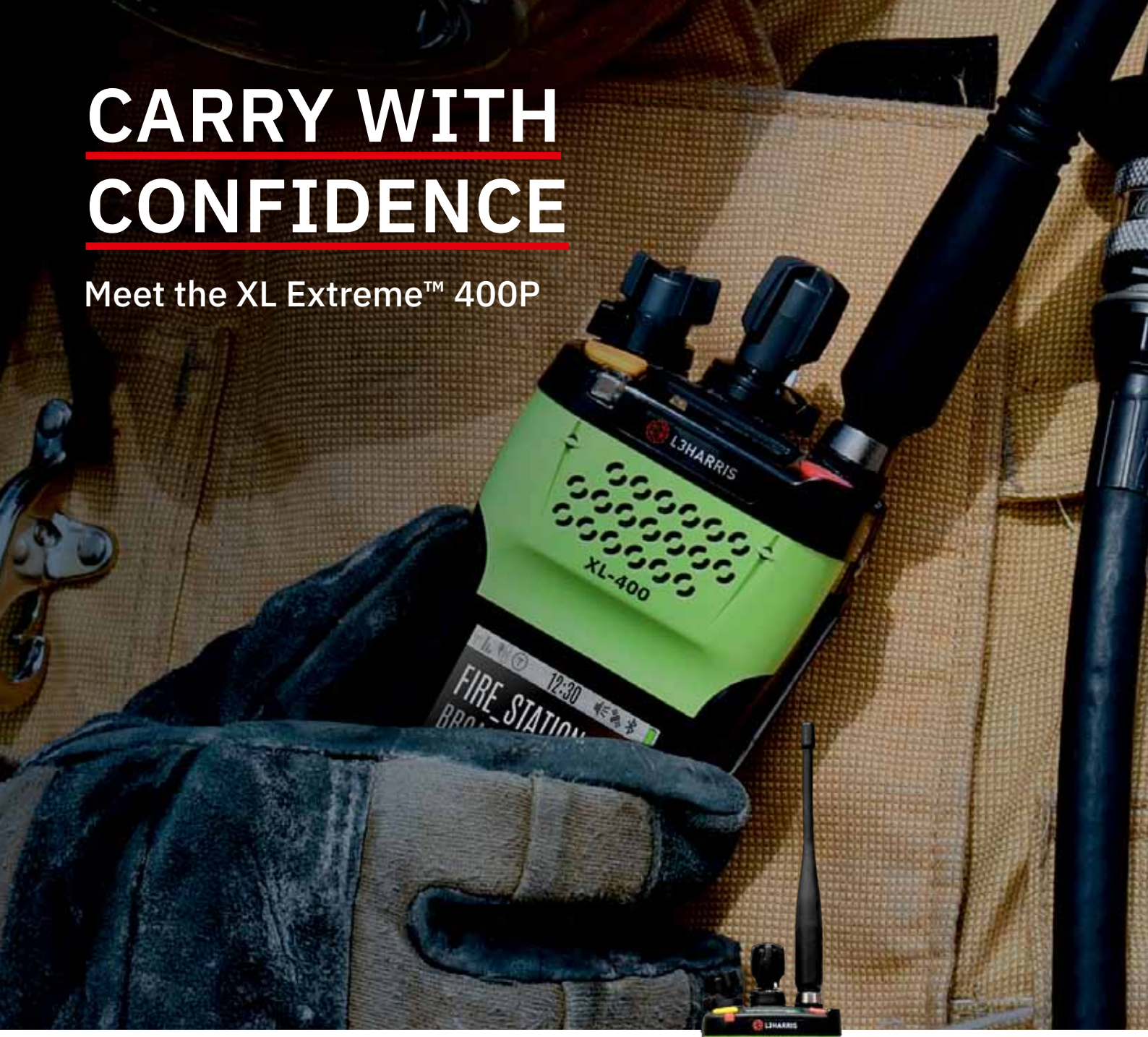

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TIM EVANS

REGIONAL SALES MANAGER FOR ASIA PACIFIC, CRADLEPOINT

What opportunities do you predict for the growth of your industry in 2023?

We expect that wireless or cellular connectivity will continue to grow in emergency services, with a surge in adoption of the next generation of cellular connectivity — 5G. More and more, emergency services vehicles (police cars, fire trucks, ambulances, even drones) will require connectivity and will also carry IoT devices such as sensors, cameras, digital displays and smart devices (connected fire hoses, motion-sensing oxygen masks and more). All of these applications of IoT will need reliable, always-on connectivity to function. So as the complexity and capability of the technology used by emergency services advances, so will the need for more robust, high-bandwidth, low-latency wireless connectivity that 5G offers.

As the number of connected onboard technologies continues to rise, IT and fleet management teams often don't have time for one-off or in-person troubleshooting. Centralised, cloud-based access to online dashboards and the ability to make network adjustments from anywhere will be key to these lean IT organisations managing thousands of connected devices across hundreds of vehicles.

How are you making your company more resilient to ongoing global supply chain issues?

Cradlepoint has been able to continue to meet SLAs in terms of handling its supply chain throughout the pandemic and it has been one of the company's competitive differentiators. Being a software-based company means that what we sell is solutions-based and not tied to a single piece of hardware — which allows for agile hardware deployments when needed. Our subscription-based business prohibits inventory consumption without activation, which enables teams to stay aligned with specific rollout/installation schedules and further increases the efficiency of the inventory that we have.

Following the extreme weather events of 2022, how can critical communications be better deployed to manage similar events in future?

Of course, speed is of the essence in any emergency situation. While emergency response personnel are trained to act quickly, advances in technology can help support critical communications in times of crisis. Wireless connectivity between emergency vehicles and base locations can help with management of resources and dispatch, as well as better real-time route planning as weather events change road conditions. Also, setting up pop-up connectivity at temporary shelter areas — whether from an emergency vehicle or onsite — can mean instant connectivity for evacuated citizens with loved ones and real-time processing of citizen details at disaster relief locations. Better connectivity of course also means better alert systems can be put in place when weather conditions change quickly.

Are there any new or growing sectors that will be particularly reliant on critical communications in 2023 and beyond?

While there is still some way to go before the use of drones becomes common practice in emergency services, as regulations around unmanned drone flights are still highly restricted in Australia, one attribute of drones which makes them such an asset in natural disaster management is their ability to send data in real time. Regulatory restrictions aside, today 5G cellular networks can provide the required wireless connectivity to enable capturing real-time video, sharing data instantly from long ranges and enabling drones to fly beyond visual line of site (BVLOS). Globally, drone use is becoming more widespread across industries, executing tasks like delivering crucial medicine to hard-to-reach places, finding missing persons, and wildfire identification and prevention.

What are the biggest challenges or threats facing your industry in 2023?

Overseas trials show that utilising the bandwidth and reliability of 5G and LTE cellular networks ensures that drones operate as expected using avoidance sensor information and location tracking while delivering tactical data in real time, critical in making quick decisions needed in situations like bushfires or floods. By utilising the latest drone technology, combined with the flexible, secure and powerful cellular routers that make the most of 4G and 5G networks, the future of natural disaster management and emergency services is set to be revolutionised. It will enable responders to share information between themselves and other emergency departments seamlessly, supporting a smooth response to any situation.

What's on your wish list from governments, innovators and the wider industry in 2023?

One challenge with today's in-vehicle connectivity operating in a 5G-enabled environment is that when 5G signals go from an antenna on the roof of a car, down through the cables into the router in the truck, signals lose reception and attenuation. Frequent connection drop-offs make real-time data sharing impossible, which can be disastrous for many applications. These include the transmission of digital sensor feeds with remote ER staff, GPS data for auto vehicle location (AVL) systems and traffic signal priority (TSP) systems. By putting the routers on the roof, you solve many of these issues. We see the growth of more complex technology such as higher performance IoT being used in emergency services and the growing availability of 5G network connectivity as driving demand for new edge devices that meet the evolving needs of the industry. On our wish list for government is greater support (including moving along regulatory hurdles) and incentives for industries, including emergency services, to trial 5G connectivity and develop use cases that can be replicated within and across various public and private industries.

Tim Evans has over 20 years' experience in the telecommunications and IT sector. He was previously a networking and security specialist at Citrix and a strategic account manager (service provider) at Cisco Meraki. He also spent eight years working at Telstra.

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PETER SCARLATA

CEO, SIMOCO AUSTRALASIA

What opportunities do you predict for the growth of your industry in 2023?

Simoco has seen a strong need from the market over the last 12 months or so to have resilient LTE data communications solutions available to service public safety and commercial applications. We have for example released our Velocity and Thorcom range of products which provide resilience via the convergence of radio, LTE, satellite and data delivery protection, where we have devices that bond multiple bearers together to ensure that data gets delivered. We have had a large uptake of these products and I foresee that this will continue strongly over the next 10 years at least. We see the continuation of innovations and developments in transformative technologies such as the Internet of Things (IoT), artificial intelligence (AI) and 5G.

How are you making your company more resilient to ongoing global supply chain issues?

The global supply chain issues have been a tricky issue over the last 12 months that was difficult to predict. However, Simoco has been fortunate where we have been working with our manufacturers for some years now to provide one-to-two-year forecasts, which has really helped the situation. Unlike some of our competitors, we have been able to supply our radio and edge computing equipment without too much interruption, leading to only delays of several weeks in some cases. There is no easy answer to this issue, but what helps is our constant effort in R&D to design out obsolete components and continue working with our suppliers and manufacturing partners to ensure long-range forecasting and that orders are placed early.

Following the extreme weather events of 2022, how can critical communications be better deployed to manage similar events in the future?

Simoco has been well placed to support our customers over the last periods of extreme weather. We are known for our range of 'Fast Deploy' radio networks including suitcase repeaters, battery boxes and more recently, Modular Off-road Radio Facility (MORF) technology. Our suitcase repeaters for example have been used for the last eight years by many fire services across the country to set up local networks for firefighters when the permanent installations have been burnt down. MORF is a sophisticated extension to our suitcase repeaters, where it enables a digital Government Radio Network (GRN) grade P25 or analogue network to be rolled out in a heartbeat. This mobile network solution enables firefighters from different states to bring their own radios on different frequencies and technologies, but still communicate with each other. Furthermore, the MORF units can be daisy-chained to provide a very large network within hours.

Are there any new or growing sectors that will be particularly reliant on critical communications in 2023 and beyond?

Simoco is active in many different sectors, but what I see as a couple of very exciting areas over the next 12–24 months are in the areas of public safety and mining. These aren't necessarily new, but their expectations are rising rapidly. If we take public safety for example, they are thirsty to have data at their fingertips and to have uninterrupted communications no matter where they are. Therefore, we are seeing a large resurgence of activity and interest in products and solutions that can enable these data services to be delivered with very high reliability. We have responded to this demand by developing our own LTE-enabled edge computers and grown our range of intelligent vehicle routers via the acquisition of Thorcom in the UK. Thorcom provides high-performance, reliable and secure communications in vehicle-routing products and MCPTT solutions to the UK Ambulance Services and to the UK Emergency Services Network (ESN).

Furthermore, we are seeing a similar need, but for a different reason, in the mining sector. The need for data and edge computing products is being driven predominantly by OH&S factors, where such technology is saving lives.

What are the biggest challenges or threats facing your industry in 2023?

I would say that the biggest challenge, but also the most exciting part of our work in the next years, is the integration and transition to broadband from narrowband technologies. Like the revolution of electric cars, high-speed broadband is having the same disruption to our industry. As an industry, we now have the challenge to roll out mission-critical LTE networks like FirstNet in the US and develop the terminals in the same technology that provide the same level of reliability that LMR has done for the last 100 years. As an engineering company, we love embracing change, so working on the seamless integration of old and new technologies and providing great solutions especially for our first responders to save lives will be challenging, but also very rewarding when we see the positive effect this technology will have on their day-to-day work.

What's on your wish list from governments, innovators and the wider industry in 2023?

Buy local! Simoco is an Australian company that develops our products in Melbourne, employing local and highly talented engineers. What I would like to see is governments and the wider industry considering what is at home and working closely with local vendors before considering that they need to go abroad for their solutions.

Peter has over 25 years of experience working at senior levels in national and multinational engineering, system integration, product management, sales and marketing, and general management in companies such as Bosch, Intelematics, CNG Systems and most recently Simoco Wireless Solutions. He is the CEO of Simoco Australasia and is responsible for business growth within the Australasia division.

Industry Talking

Finally, ARCIA could return to Melbourne for our annual gala dinner. As part of Comms Connect we welcomed over 400 guests to the Melbourne Convention Centre to showcase our industry. Our guests included representatives from Radio Frequency Users New Zealand (RFUANZ), Wireless Internet Services Providers Association (WISPA), the Australian Critical Communications Forum (ACCF) and many international visitors.

After three years of waiting, the ARCIA committee and executive were thrilled with the response from our members, partners and industry colleagues to attend the event in great spirit. Getting back to some kind of post-COVID normal is not guaranteed and we wanted to ensure that all attendees had an evening to remember. Our guest MC was Julian Morrow of *The Chaser* fame and we really enjoyed his take on vital communications. All the feedback from the annual dinner has been very positive and we look forward to a broader program of events in 2023 around Australia.

We also took the opportunity to formally introduce our new CEO, Paul Davis. He spoke very well, outlining many of the tasks ahead and importantly reaching out to all members and partners for feedback. Watch out for Paul visiting your state and make sure you take the chance to have your say.

ARCIA would like to congratulate all the winners of Industry Awards — in particular the Industry Professional of the Year, Gavin Jenkins, and our latest Johnathon Livingstone Seagull inductee, John la Cava, both thoroughly deserving winners. A full list of all the winners can be found at https://arcia.org.au/2022-arcia-industry-excellence-awards-winners/.

We also need to thank the organising team behind ARCIA for the event — it really felt like the band was back together. Well done team!

We would also like to thank Westwick-Farrow and the entire Comms Connect team for bringing this event back to Melbourne in spectacular fashion. The program was excellent and very well supported by government and international representatives. Listening to many of the speakers, it was refreshing to hear from many perspectives that LMR is alive and well. Australia and New Zealand are continuing to invest in LMR for public safety while at the same time embracing the LTE sector where that makes sense. What we also saw at Comms Connect were many new companies and product options for hybrid LMR/LTE devices, not to mention other technologies such as mesh networking and satellite options.

Finally, ARCIA can report progress on work that has been going on behind the scenes for several years. As wireless broadband technologies become more relevant to our market, ARCIA has been advocating that private industry needs access to acceptable spectrum. Open access to spectrum is a key enabler of a modern economy to allow multiple sectors to design and deploy private systems as they do now with Ethernet, Fibre, Wi-Fi, LMR and other technologies. The full benefits of new 5G and WBB technology are only realised if they are available to everyone.

It is indeed very pleasing to see that the ACMA has not only finally recognised this, but now plans are in place for allocation of spectrum for local area wireless broadband (LA-WBB), the ACMA terminology for private LTE spectrum. The ACMA has announced that spectrum in the 3.4–4.0 GHz band will be available for allocation for LA-WBB by mid-2023, and in a recent meeting with senior ACMA management they confirmed that this will happen. ARCIA has spent several years lobbying on behalf of our industry to have access to spectrum for private LTE systems — after all, we have been supplying private communications networks for close on seven decades. This is our future.

Hamish Duff, President
Australian Radio Communications Industry Association

Rugged industrial accelerometer

The Dytran model 3184F is a rugged IEPE piezoelectric accelerometer with a built-in Faraday shield for electrostatic noise immunity, a sensitivity of 100 mV/g and a good low-frequency response.

The model incorporates a ceramic shear sensing element, packaged in a stainless steel housing with a 2-pin MIL-C-5015 axial connector. It is also directly compatible with the series 6194 Immersion Proof sealing boot. When used together, the sensor remains fully functional in an IP65 environment. Case isolated to avoid EMI/ground loop interference, the product is hermetically sealed for operation in high humidity and dirty environments.

The device has a 50g range and EMI/RFI protection. It weighs 135 g and operates at temperatures from -4.5 to +70°C. Applications include industrial vibration monitoring, turbo engine testing, walkabout data collection and general-purpose vibration monitoring.

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Going further in critical communications

Next-gen DMR radio terminals

Hytera has launched its next-generation H Series of DMR terminals, designed to meet and exceed the complex and demanding communication challenges facing public safety, energy, transportation, utilities, commercial and other industry verticals. The company's hardware platform and software architecture are said to deliver improved radio performance and to optimise the user experience to provide more intuitive, practical and easy-to-use functionality. This should allow users to focus on the task in hand and provide better, safer and more efficient outcomes for the organisations and communities they serve.

The hand-portables comprise the HP7 Series (HP78X/HP70X) and the HP6 Series (HP68X/HP60X) radios, which are compact, light and built to deliver good battery capacity and battery life. The radios provide enhanced audio clarity and loudness, due to a combination of high-performance speakers and a DSP algorithm, while embedded AI noise cancellation makes the audio even clearer.

Other innovations include using the vibration of the speaker to expel water through a specially designed cavity, for clear audio in torrential weather. Direct mode communication range is extended by 25% in open environments, while signal quality is improved at the edge of the network when in trunking mode.

The HM87X mobile radio delivers similar performance enhancements as the portable terminals. Highlights include an optimised control head-mounting solution that supports flexible deployment options. The inclusion of an Ethernet port allows the radio to function as a gateway for narrowband networking, while also supporting the addition of features from third-party companies and platforms.

The HR106X compact digital repeater completes the line-up. Hytera has integrated a telephone gateway, router and power adapter inside the repeater for an all-in-one solution.

Hytera Communications Co. Ltd
www.hytera.com.au

Rugged portable radio

For all those who operate in extreme conditions, L3Harris offers a solution designed by firefighters: the XL Extreme 400P.

Designed to take on the heat and keep users connected, the P25 radio features heat-resistant seals, a thermal display and speaker materials. The rugged radio has been engineered to withstand anything the environment can throw at it.

Harris Corporation
www.harris.com

25 W commercial analog mobile radio

GME's CM50 is a fully featured, 25 W commercial mobile radio that supports up to 2000 private (commercial frequency) channels across 50 zones. The analog radio is available in both UHF (450–520 MHz) and VHF (134–174 MHz versions), with the UHF version also supporting up to 80 CB/PRS channels.

The CM50 is suitable for a wide range of commercial applications, including low transmit power applications as well as high-end safety and large network configurations. Designed, engineered and manufactured in Australia, it is said to be one of the most compact commercial mobiles available on the market and features a high-contrast 11-digit LCD display, a 3 W speaker and a rear B&C connector.

Available in a number of customisable configurations, the CM50 can be supplied with a heavy-duty IP67 dust and waterproof fist microphone, a remote head kit or an OLED controller microphone (available in black or green).

GME Pty Ltd
www.gme.net.au/au-pro/

CASE STUDY

Dyson Group enhances bus driver safety and security

iStock.com/IgorVershinsky

Australian telecommunications carrier Vertel has partnered with Dysons Buses to deliver a communications upgrade, with push-to-talk over cellular (PoC) devices with covert push-to-video duress features for its fleet of buses operating throughout regional Victoria and NSW to enhance driver safety and security.

Dyson Group is a family-owned and -operated bus company that operates more than 650 buses and coaches while employing over 1300 staff, many of which operate in geographic areas that aren't effectively supported by mobile service or traditional radio communications. Following multiple acquisitions, Dyson Group's growing fleet inherited a variety of different communications systems, including mobile and ultrahigh-frequency (UHF) radios, which created challenges for drivers communicating with other drivers, depots and head office.

To consolidate its communications systems and deliver a consistent communications channel to its drivers and employees for improved safety and security, Dyson Group engaged its longstanding partner, Vertel, to discuss possibilities for a PoC communications upgrade.

"Dyson Group has a commitment to its drivers, as well as the general public, to deliver a safe and secure means of transportation," said Roy Dyson, Regional Operations Manager at Dyson Group. "Without reliable communication, our drivers could be put at risk in regional areas without being able to communicate their location or request assistance in the event of an incident or emergency.

"The Vertel team, including one of Vertel's premium channel partners, Combined Communications, listened to our requirements and came back to us with a technical solution that would meet our needs. The team worked closely with us to provide a customised solution that would keep our drivers safe on the roads without risking a loss of communication in unsupported regional areas."

The PoC solution that Vertel put forward for Dyson Group is a sophisticated mobile communications platform that combines the features of traditional two-way radio with the data functionality of smartphones, including underlying GPS tracking capabilities. It looks like a traditional two-way radio and is easily attached to the driver's dashboard with double-sided, heat-activated 3M tape. The solution features a built-in camera and includes covert push-to-video duress features that let Dyson Group's drivers alert head office to an incident while generating real-time video footage without alerting perpetrators.

Vertel's PoC solution can be installed within 30 min, making it a simple-to-use system that Dyson Group can easily install in more vehicles over time as its footprint continues to grow. It can also be managed remotely, which means Dyson Group's IT team can install updates from one location so that each vehicle has access to the most up-to-date communications platform.

"The Vertel PoC solution helps keep mobile workforces safe, in touch and productive, and is ideal for life- and mission-critical applications," said Tony Hudson, Commercial Director at Vertel. "Driver safety is of the utmost importance to Dyson Group, and the Vertel PoC solution with built-in covert duress features was especially customised to meet the company's unique requirements in ensuring driver safety while not alerting potential perpetrators and giving dispatchers and emergency services real-time vision of what is happening on the bus."

Dyson concluded, "Our drivers deal with people from all walks of life in public transport. It would not be an uncommon occurrence for a driver to want to inform head office of what's happening on their vehicle without wanting to inflame a situation. Drivers know that if they activate the duress feature, there is always someone at Dyson that is aware of what's happening on the vehicle and able to provide support as needed. The customisation that Vertel delivered with this feature was essential in meeting our commitment to drivers and the public to deliver our services and upholding our reputation for high standards of safety and reliability."

Vertel
www.vertel.com.au

USING IN-VEHICLE NETWORKS TO SECURELY CONNECT

MODERN PUBLIC TRANSPORTATION TECHNOLOGIES

Nathan McGregor, Senior Vice President Asia Pacific, Cradlepoint

iStock.com/Iya Lukichev

With the return of passengers' regular use of public transportation, there is a new desire for contactless payment options, enhanced security and insights into seat availability and schedules. The increased adoption of 5G and the evolution of public transport technology over the last few years sets the industry up well for continued increases in ridership.

These days, a bus without Wi-Fi might as well be an ancient artefact. By deploying a wireless WAN (WWAN) router that supports Wi-Fi in transit, at stops and in stations, passengers, drivers and agencies can take advantage of 5G speeds, latency and bandwidth — along with the hallmark mobility of cellular broadband — to power a variety of use cases.

In-transit security

Safety and security of passengers and drivers is likely at the top of the list of transport organisations' priorities. 5G connectivity enables cameras inside and outside vehicles to transmit live and recorded HD video footage to headquarters or offload it wirelessly at stations. This footage not only helps to mitigate incidents en route, it can also assist with the validity of accident reporting.

Also, onboard IoT sensors can count the number of passengers getting on and off the vehicle, which can provide life-saving data to first responders in the event of an emergency.

In Australia, Transdev Sydney Ferries deployed 5G cellular routers on board vessels and at wharves, to deliver reliable IP video monitoring and Emergency Help Point services, to enable improved passenger safety and security on board vessels and at wharves. The high bandwidth of the 5G solution means that when streaming footage of CCTV in real time, the images are clear and accurate. Compared to 4G, the reliability and stability of the 5G solution has greatly reduced the effort and repeated attempts to get visibility and access to all the data. Using location-based services within Cradlepoint's NetCloud Manager, admins can easily track and trace vessel locations and routes in real time and determine LTE and 5G cellular coverage over a travelled area.

Digital signage on vehicles

With its low latency and high bandwidth capabilities, 5G delivers multimedia content faster. That means news about routes, stops and schedule changes can be displayed and updated while a ride is in progress to ensure passengers have the most up-to-date information. Digital signs can also display maps and arrival times or showcase advertisements and visual announcements from anywhere along the route.

Fare collection

Mobile ticketing for public transport not only reduces theft by limiting cash transactions, it also virtually eliminates the need for physical contact, which many passengers prefer in a post-COVID world.

Touchless payment systems require high availability and prioritisation over other network traffic. Vehicle WWAN gives agencies the ability to separate payment and fare box transactions from other network traffic on the vehicle, ensuring always-on connectivity.

Customer experience

Reliable, free public Wi-Fi on public transport is a fundamental expectation for passengers aboard buses, ferries, trains and light rail. This — along with the increased adoption of local transit apps and contactless payment solutions — means the cellular broadband network providing connectivity in motion must be robust enough to handle multiple users, as well as support the vital systems in place for the safety and functionality of the vehicle.

Not only does 5G connectivity provide increased bandwidth, but 5G network features also support network slicing, allowing IT administrators to tailor and prioritise security and bandwidth needs based on traffic type, ensuring that drivers, smartphone scrollers and everyone in between stay connected and secure.

Telematics and GPS, GNSS and AVL

5G for public transit is a key element to monitoring location and statistics associated with transportation. Telematics data such as tyre pressure, temperature, oil volume and even driving behaviours (sharp turns, hard breaking, etc) can be monitored remotely via a wireless broadband connection.

Additionally, most public transport vehicles use automatic vehicle locators (AVL) and computer-aided dispatch (CAD) systems that piggyback on the global positioning system/global navigation satellite system to provide exact vehicle coordinates for dispatch. Advanced public transit technologies use this information to automatically notify first responders, share vital information when an accident occurs, update virtual maps and route information, and more.

Security and signage at stops

While most public transport technologies tend to centre on the bells and whistles of an onboard experience, the uses of 5G WWAN also extend to stops and stations. Cellular broadband can provide connectivity for monitoring passenger traffic, updating digital signage with advertisements or schedule information, and connecting surveillance cameras — especially in remote locations that can't benefit from the added security of nearby surveillance. Each of these use cases has the potential to improve rider safety and satisfaction.

One example is from the US, with Seattle-based King County Metro. Riders expected real-time updates about bus locations and arrival times delivered via the website, apps and digital signs, but without a continuous network connection, King County Metro had no way to take advantage of GPS or AVL data to deliver this information. Plus, the lack of reliable in-vehicle connectivity stifled the ability to control traffic priority or use a touchless payment system.

By installing wireless routers on board its fleet of more than 1750 buses, King County Metro was not only able to meet riders' expectations, but it also had access to NetCloud Manager, providing the ability to schedule and deploy updates across the entire fleet, simultaneously and remotely.

Another US example is with Valley Regional Transit in Idaho, which faced similar struggles when its 2G and 3G modems routinely lost connectivity. With each network failure, the ability to communicate with traffic signal priority (TSP) radios also failed, causing buses to fall behind schedule with limited ways to notify passengers of schedule changes. Installing new cellular broadband routers specifically designed for the unique needs of fleets gave Valley Regional Transit reliable connectivity throughout its service area to collect real-time data that improved efficiency and passenger expectations.

Public transportation technology: the future or frivolous?

The popularity of WWANs is in large part due to the flexibility of the network. Paired with the performance of a 5G network, it's the perfect companion for public transportation. Cradlepoint's NetCloud Service and wireless routers unlock the power of LTE and 5G for public transit to transform operations and rider experiences for a new era of public transit.

Cradlepoint Australia Pty Ltd
www.cradlepoint.com/au

Real-time spectrum analyser

Signal Hound, a Washington state (USA) manufacturer of RF test equipment, has announced the release of the SM435C 43.5 GHz real-time spectrum analyser.

The SM435C is a high-performance spectrum analyser and monitoring receiver with a 10 Gigabit Ethernet SFP+ port, which enables the device to communicate with a PC over long distances using fibre-optic cable. Tuning from 100 kHz to 43.5 GHz, the analyser has 160 MHz of instantaneous bandwidth (IBW), 110 dB of dynamic range, 1 THz/s sweep speed at 30 kHz RBW (using Nuttall windowing) and ultralow phase noise to arguably rival the more high-end spectrum analysers on the market.

Signal processing is distributed between a powerful Intel FPGA and an external PC with an Intel Core i7 processor. The spectrum analyser can be readily interfaced, using its local API, to an automated monitoring system or to automated test equipment. The API provides users the access needed to insert their own DSP algorithms into a calibrated stream of I/Q data.

The SM435C follows on from the SM435B, which utilises a USB3 data interface and features otherwise near-identical specifications. It is the latest in Signal Hound's range of spectrum analysers and signal generators which cover a broad range of spectrum from 1 Hz to 43.5 GHz in an assortment of devices which cater to government, industry professionals and hobbyists.

The full range of Signal Hound products is represented in Australia and New Zealand by Silvertone Electronics of Wagga Wagga, NSW.

Silvertone Electronics
www.silvertoneelectronics.com

5G LTE antenna range

RFI Technology Solutions has developed a 5G LTE version of its 7100 Series antenna range. The innovative 8100 Series covers all 3G, 4G LTE, and now the 5G 3400–3800 MHz bands. Offered in a range of gain, and with versatile mounting options, the series is an antenna solution that will now operate across all mobile phone networks globally.

The high performance of the 8100 Series lies in the use of RFI's patented Meander radiating elements, designed to enable consistency in gain, coverage pattern and bandwidth. This makes the antennas suitable for public safety and emergency service applications where a seamless connection is a necessity.

RFI is a global technology solutions company, committed to delivering high-performance antennas, system components and repeater/rebroadcast systems. For over 40 years, the company has supplied locally manufactured innovative, mobile and base station antennas to LMR, public safety and carrier markets globally.

RFI Technology Solutions
www.rfi.com.au

Smart lithium battery

The Polarium SLB48-050-124-2 is a 48 VDC, 50 Ah/2612 Wh, 19″ rack-mountable smart lithium battery specifically designed for telecommunications applications.

With a small form factor of just 440 x 382 x 87 mm (W x D x H) and weighing in at just 23 kg, the battery can be easily accommodated into most equipment racks and enclosures. Additional batteries can be easily connected in parallel configuration via busbars to offer longer site autonomy and redundancy.

The SLB48-050-124-2's smart communication interface can integrate seamlessly with several leading DC power platforms including Enatel, Enetek, Eltek, Vertiv and CE+T. This smart communication interface enables users to monitor critical site data including state of charge (SOC), state of health (SOH), cell voltage, current and temperature.

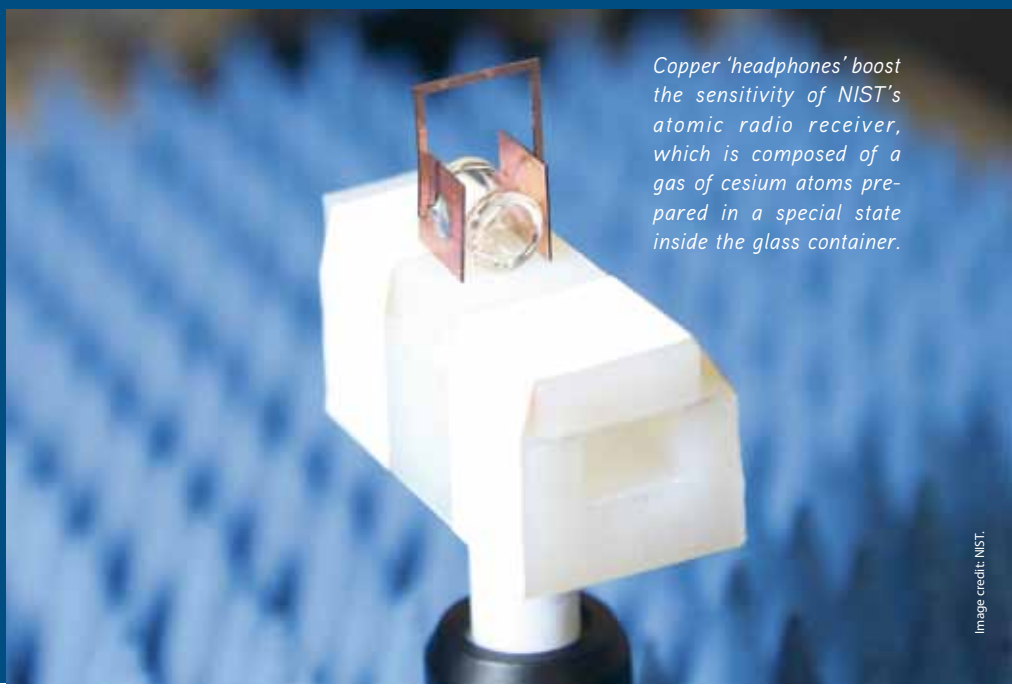
Following the Polarium motto of Safety First, the product is designed to meet not only mandatory requirements but also rigorous safety standards. The battery module contains multiple safety layers as well as redundancy in critical components and processes. By conforming to rigorous functional safety standards and tests (eg, IEC 60730-1), the hardware, software and all safety-related functions should operate safely and as intended, even under abnormal and critical conditions.

The Polarium SLB48-050-124-2 is now available in stock via Powerbox Australia.

Powerbox Australia Pty Ltd
www.powerbox.com.au

TINY COPPER 'HEADPHONES' BOOST ATOMIC RADIO RECEPTION

Researchers at the US National Institute of Standards and Technology (NIST) have boosted the sensitivity of their atomic radio receiver 100-fold by enclosing the small glass cylinder of cesium atoms inside what looks like custom copper 'headphones'. An atomic sensor has the potential to be physically smaller and to work better in noisy environments than conventional radio receivers, among other possible advantages.



Copper 'headphones' boost the sensitivity of NIST's atomic radio receiver, which is composed of a gas of cesium atoms prepared in a special state inside the glass container.

Image credit: NIST.

The team's structure — a square overhead loop connecting two square panels — increases the incoming radio signal, or electric field, applied to the gaseous atoms in the flask (known as a vapour cell) between the panels. This enhancement enables the radio receiver to detect much weaker signals than before. Their work is described in the journal *Applied Physics Letters*.

The headphone structure is technically a split-ring resonator, which acts like a metamaterial — a material engineered with novel structures to produce unusual properties. The vapour cell is about 14 mm long with a diameter of 10 mm, while the resonator's overhead loop is about 16 mm on a side, and the ear covers are about 12 mm on a side.

The NIST radio receiver relies on a special state of the atoms. Researchers use two different colour lasers to prepare atoms contained in the vapour cell into high-energy ('Rydberg') states, which have novel properties such as extreme sensitivity to electromagnetic fields. The frequency and strength of an applied electric field affects the colours of light absorbed by the atoms, and this has the effect of converting the signal strength to an optical frequency that can be measured accurately.

A radio signal applied to the resonator creates currents in the overhead loop, which produces a magnetic flux, or voltage. The dimensions of the copper structure are smaller than the radio signal's wavelength. As a result, this small physical gap between the metal plates has the effect of storing energy around the atoms and enhancing the radio signal. This boosts performance efficiency, or sensitivity.

"The loop captures the incoming magnetic field, creating a voltage across the gaps," NIST project leader Chris Holloway said. "Since the gap separation is small, a large electromagnetic field is developed across the gap."

The loop and gap sizes determine the natural, or resonant, frequency of the copper structure. In the NIST experiments the gap was just over 10 mm, limited by the outside diameter of the available vapour cell. The researchers used a commercial mathematical simulator to determine the loop size needed to create a resonant frequency near 1.312 GHz, where Rydberg atoms switch between energy levels.

Several outside collaborators helped model the resonator design. Modelling suggests the signal could be made 130 times stronger, whereas the measured result was roughly 100-fold, likely due to energy losses and imperfections in the structure. A smaller gap would produce greater amplification. The researchers plan to investigate other resonator designs, smaller vapour cells and different frequencies.

With further development, atom-based receivers may offer many benefits over conventional radio technologies. For example, the atoms act as the antenna, and there is no need for traditional electronics that convert signals to different frequencies for delivery because the atoms do the job automatically. The atom receivers can be physically smaller, with micrometre-scale dimensions. In addition, atom-based systems may be less susceptible to some types of interference and noise.

P25 multiband portable radio

Worker safety and productivity across multiple radio networks and frequency bands can be increased with the TP9800 Multiband Portable — a versatile, lightweight and compact radio designed for maximum interoperability.

Users can connect across all bands from one dynamic portable, as the device is configurable to operate on any combination of VHF (136–174 MHz), UHF (378–520 MHz provided as a single band) and 700/800 MHz (757–870 MHz). It offers flexible and simple ordering and deployment of single, dual and multiband operation at time of purchase, or subsequently in the field using OTAP (over-the-air programming). Bands are not locked and can be reconfigured.

The product is claimed to be the lightest P25 multiband portable radio on the market with a high-capacity battery and compact design. The TP9800 with high-capacity battery weighs 382 g, while the slimline battery version weighs only 324 g. The radio will also perform in harsh working environments with glove-grip controls, water-shedding grill, IP65 and IP68 dust and water protection, shock-absorbing corner protection and MIL-STD-810G ratings.

Users can connect to the range of networks they will encounter in current operations or future technology migrations — conventional analog, P25 conventional digital, and P25 trunking Phase 1 and Phase 2 — with an integrated GNSS option for location services, Bluetooth for wireless voice accessories and Wi-Fi OTAP. Hear and be heard even in the most extreme environments, with a powerful 3 W speaker and dual microphone active noise cancellation that removes background noise in both analog and digital modes.

Tait Communications
www.taitcommunications.com

5G enterprise router and modular modem

Cradlepoint's E300 Series 5G Enterprise Router and MC400 5G Modular Modem are 5G wireless edge networking solutions that are suitable for fixed wireless access (FWA), small sites and mobile use cases that enable a modern, agile and connected enterprise. The products are set to provide enterprises with more options to take advantage of 5G and FWA.

Users worldwide will be able to deploy smaller sites, pop-up deployments, IoT and secondary 5G connections for applications such as public safety vehicles and remote workers. The products are particularly beneficial for those businesses with small site requirements or that have employees working remotely.

The 5G router, for small-footprint sites, is based on second-generation 5G technology. Its all-in-one platform design is suitable for primary and failover connectivity. It also supports Cradlepoint's recently announced NetCloud Exchange software for secure connectivity, SD-WAN and Zero-Trust Networks Access.

The 5G modular modem supports up to two carriers utilising two SIM cards. It allows users to add or field-upgrade a second 5G modem to any Cradlepoint 5G-ready or optimised router. Benefits include the ability to add a second 5G link for high-speed primary and failover connectivity; the combination of 5G with dual-modem, dual-SIM and multi-carrier functionality with Ethernet, and Wi-Fi as WAN; and auto-switching of SIM cards between carriers upon reaching a data plan cap.

The 5G router and modem are controlled and managed by the Cradlepoint NetCloud platform, which also provides cellular intelligence, security, SD-WAN, remote trouble-shooting, and analytics and insights solutions.

Cradlepoint Australia Pty Ltd
www.cradlepoint.com/au

Crystal oscillator

Epson's SG-8201CJA is a crystal oscillator (SPXO) with CMOS output for automotive applications. Offering high stability and low jitter, the product is a simple packaged SPXO that typically measures 2 x 1.6 x 0.6 mm.

Applications in autonomous driving (AD), such as LiDAR and vehicle cameras in advanced driver-assistance systems (ADAS), require a reference clock with a frequency in the 100 MHz range due to the high radio frequencies and high speeds handled. Moreover, improvement in AD and ADAS performance has fuelled rising demand for clocks that offer better stability and jitter performance. Demand is also strong for smaller products in all automotive applications.

Like its predecessor, the SG-8101CGA, the latest crystal oscillator supports output frequencies as high as 170 MHz for automotive applications, but it has 50% better frequency tolerance and approximately 1/25th the phase jitter. The package footprint and cubic volume are also 64% and 55% smaller, respectively. AEC-Q100 compliant, the product operates at ambient temperatures up to 125°C as required for automotive applications and contributes to automotive safety.

Epson Australia Pty Ltd
www.epson.com.au

Radio Matters

I am pleased to announce that on 1 August 2022, Radio Spectrum Management's (RSM) business update announced that the 60 GHz General User Radio Licence for Short Range Devices (GURL) will be extended from 57–66 GHz band to 57–71 GHz. This allows for more non-overlapping channels, room for higher bandwidth modulations and access to the part of the band with the lowest free space path loss for longer distance communications.

The mass use of 60 GHz is a very recent phenomenon and only really happened due to the lowering cost of high-speed chip technology and the introduction of IEEE WiGig standards in 2009. This enabled manufacturers to mass-produce radio equipment that makes use of the band. Mass market adoption of 60 GHz hardware was then seen from around early 2013.

In 2018 we saw the FCC, ACMA and OFCOM start the conversations to expand the general use of the 60 GHz band, while at the same time pressure was being put on them by private operators to have the additional bands assigned to them for commercial use. At this time RFUANZ also decided that it needed to bring this topic up with RSM to ensure the additional valuable band between 66 and 71 GHz would be used for the benefit of all New Zealanders. RFUANZ continued with this position right up to the time of the announcement.

mmWave bands above 30 GHz are becoming a very important part of the radio communications landscape because of their characteristics. They enable wide channel widths, multigigabit data transmission, very high channel/frequency reuse with low interference and small-form-factor, high-gain, narrow-beam-width antennas. The very small wavelengths of 60 GHz have also led to low-cost system-on-chip beamforming antenna arrays, to enhance signal and reduce interference further.

RFUANZ is very happy with this announcement. We can see a future where this band is used by multiple technologies including 5G and delivers extraordinary amounts of bandwidth to New Zealand individuals and businesses, through fixed and mobile wireless technology. We would also like to remind you that if you work with manufacturers or vendors of 60 GHz equipment, that you advise their compliance engineers of the changes to the New Zealand regulations so they can take advantage of the new spectrum available.

On another note, RSM has for several years been actively requesting for licence holders to update site coordinates. This is primarily due to the ability to capture locations using GPS technology and to provide a more accurate representation of antenna locations. Recently, RSM has been issuing infringement warning notices to users "not operating a radio transmitter not in accordance with its radio licence. Reg 37(1)(f)".

Oftentimes a Site ID used for licensing is used by multiple licence holders, and in such circumstances, with approval of all licence holders, RSM should update the coordinates of the Site ID for all affected users. RSM has been requesting this permission through the issuance of the infringement warning notice.

If the Site ID is being used solely for an individual licence, then it will be the licence holder's responsibility to update the licence for the corrected coordinates. It is recommended to use GPS devices providing WGS84 coordinates for site coordinates, if not already provided by RSM, at the location of the licensed antennas.

The use of accurate coordinates dramatically aids the use of computerised software for use of planning, licensing and ensuring services are unaffected by other services. The requirements for licence coordinates are provided in the Radio Spectrum Management Public Information Brochure (PIB 58), Issue 6 (March 2021), 2.7 Geographic Coordinates.

Within PIB 58 it articulates that the mapping system used by the RSM in New Zealand is Topo50 (NZTopo50) and New Zealand Transverse Mercator 2000 (NZTM2000). These are based on the geodetic datum NZDG2000, which is based on the international standard reference WGS84 used by systems such as GPS.

Note: You do not need to use either TOPO50 or NZTM2000 as stated in the PIB for use in registering a site. RSM have been contacted in regard to this wording and have indicated that this should be made to use GPS Lat/Long.

The use of these mapping systems is reinforced by Land Information New Zealand (LINZ) adopting NZGD2000 in 1998 as the official national three-dimensional geodetic datum for New Zealand. This is captured in the LINZ standard LINZS25002, Version 2 (24 July 2008).

That's all from me this issue; more on my trip to the Melbourne Comms Connect conference next time.

John Laughton
Chairman
Radio Frequency Users Association New Zealand

All-in-one industrial secure routers

Cybersecurity incidents are on the rise and industrial control systems are being targeted. Moxa's EDR-G9010 Series of industry-certified all-in-one firewall/NAT/VPN/switch/routers feature advanced security and high performance to safeguard industrial applications.

Flat network designs originally intended to ensure low-latency data communication and to maintain the availability of all systems are now a key security concern in OT networks. It is important to perform proper network segmentation to minimise risk without compromising performance. Moxa's routers protect critical assets with an industrial intrusion prevention system (IPS), virtual patch and hardware bypass. Users can build a security boundary with high bandwidth, redundancy mechanisms and deep packet inspection (DPI) for industrial protocols.

Madison Group Enterprises Pty Ltd
www.madisontech.com

Smart 4G body camera

Hytera Communications has released the SC580 Smart 4G Body Camera and further expanded its body-worn camera series. Weighing only 177 g, the body camera packs advanced video features into a slim and rugged body. It streams videos, audio and photos from the field to the command centre over private LTE networks, cellular networks or WLAN.

Public safety authorities rely on body cameras to capture evidence and maintain law enforcement transparency, while body cameras play an increasingly important role in deterring violence and protecting the officers on duty. The product captures clear videos in challenging scenarios, eg, in low-light and poor visibility conditions. Its low-light sensitivity is made possible by a starlight sensor, which is able to capture HD colourful images with more details such as human faces or car plate numbers at night. With the 6-axis image stabilisation technology, the body camera captures stable and clear videos even when the user is on the move.

The device works with optimised power consumption and lasts beyond a 12-hour shift. A built-in backup battery capable of supporting recording for 3–5 min enables the camera to keep recording even when the officer is replacing the detachable main battery.

With Hytera's push-to-talk over cellular (PTToC or PoC) application, the camera works multi-purposely as a PoC radio. A dedicated push-to-talk (PTT) key supports intuitive voice calls, while the ergonomically arranged video recording key means that users can quickly start the recording amid the hustle of onsite activities.

Hytera Communications Co. Ltd
www.hytera.com.au

EMC EMR SAR SAFETY

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EMC Technologies

www.emctech.com.au

Antenna test chamber

The R&S ATS1500C antenna test system from Rohde & Schwarz now offers an added temperature test option and feed antenna, enabling temperature-controlled measurements in a wide temperature range as well as parallel access to both polarisations, increasing test efficiency and flexibility. The compact antenna test range (CATR)-based antenna test chamber is carefully designed to eliminate ghost targets within the chamber during target simulation tests and includes a positioner for angular measurements.

The R&S ARC-TEMP temperature test option creates a temperature-controlled environment for the radar under test and supports a wide range from -40 to +85°C. The heated or cooled air is provided by an external thermal air stream system that supplies the air to the temperature bubble mounted on the positioner. This changes the temperature without affecting the chamber's measurement performance. This feature makes it possible to automate measurements at different temperatures without a separate climatic chamber, which increases radar testing speed.

The R&S ARC-FX90 universal feed antenna, which supports 60 to 90 GHz, can be added to the test chamber. The antenna includes an orthomode transducer, which enables parallel access to vertical and horizontal polarisations.

With these options for the test chamber, developers can efficiently characterise RF transmitters, calibrate antenna manifolds, measure antenna patterns, test robustness against interference, check compliance with regulations such as ETSI and FCC, and plan testing and calibration procedures for later mass production. The chamber is used as a reference environment before porting the procedures to a production tester.

The test chamber can be used for automotive radar module development, validation, calibration and compliance testing. The universal feed antenna and temperature test option are both hardware extensions to the R&S ATS1500C and can be retrofitted.

Rohde & Schwarz (Australia) Pty Ltd
www.rohde-schwarz.com.au

CASE STUDY

Private 5G and the port of the future

In April 2021, Verizon Business announced it was working with Associated British Ports (ABP) to deploy private 5G at the Port of Southampton. Delivered in partnership with Nokia, Verizon's private 5G platform would provide one of the UK's busiest ports with a secure, low-latency private network connection.

Responsible for £40 billion in exports from the UK every year, the Port of Southampton provides a critical link in supply chains serving businesses and manufacturers throughout the nation. It is also a leading port for cars and cruise, handling approximately 900,000 cars and welcoming millions of cruise passengers annually. With pressure on ports — and the entire supply chain — at its height, ABP knew it needed to streamline processes, get a consistent view of operations and enable new technology.

The Port of Southampton contains 85 ha of land, hundreds of kilometres of service roads, thousands of storage areas and seven-storey parking structures, 45 ship berths and four cruise terminals. Thousands of employees across this vast area need connectivity to do their jobs — but connectivity challenges were forcing staff to log key pieces of information manually. Indeed, with the port a major centre of automobile imports, staff were using handheld devices to scan each car and track its arrival and parking location — but with public 4G, the port often lost out on that data. That led to big inefficiencies, including valuable port real estate not being used optimally.

ABP made the strategic decision to use a Verizon Private 5G Network to help make the Port of Southampton an efficient, global port; in doing so, Southampton became the first UK mainland port with access to a private 5G network. The platform would provide ABP with a secure private wireless data network across selected areas within the east and west docks of the port, enabling data communications to be consolidated onto a single network and reducing previous complexity.

Not only did the deployment address the immediate problem of loss of onsite data communications as a result of poor Wi-Fi connectivity, but the advanced capabilities of private 5G — specifically its reliability, throughput, security and ultralow latency — can help enable the use of new technologies such as real-time analytics, the Internet of Things (IoT) and machine learning. In turn, this can help with the enablement of new service advancements including asset tracking, autonomous guided vehicles, workflow management, predictive maintenance and safety monitoring in the near future.

Fast data exchange and near real-time analytics now allow ABP to update customs with real-time information, whether it's loading or discharging a vehicle, or releasing it to the end customer. More efficient connectivity has also boosted morale — employees no longer fear drops in service that would force them to resort to writing notes on paper. Furthermore, ABP can better keep track of vehicles, allowing the port authority to move products off ships, into parking and out to buyers far more efficiently. The company is now exploring a number of cutting-edge use cases to take advantage of the Verizon Private 5G Network and further improve operations.

"The private 5G network gives us the ability to be creative with technology, and to really test our ability to bring new ideas and innovation through our ports," said Scott Sier, Head of Technology and Digital Experience at ABP.

"The Port of Southampton is Britain's gateway to the world, and a private 5G network can enable us to become the port of the future," added Beatriz Moore, Head of IT Strategy and Architecture at ABP.

Verizon Business
www.verizonbusiness.com

Low-profile 5G and 4G LTE antennas

Synzen Precision Technology has unveiled ALCOR and ATRIA — two low-profile antennas that are suitable for the wearable market or any IoT devices which require an ultraslim design. Both designs deliver high performance at a height of only 1.6 mm.

ALCOR is a 5G low-profile surface mount antenna that has been developed to be compact but still cover bands from 617–6000 MHz, with a small footprint of 40 x 10 x 1.6 mm and a fallback to 4G/3G/2G. ATRIA is even more compact but still covers bands from 698–2690 MHz (it also falls back to 3G/2G); it measures only 30 x 7 x 1.6 mm and requires a small clearance area. The antennas have an elegant design that does not require any external RF switch circuits.

The products are suitable for MIMO applications and are designed to work in compact devices with limited space, making them useful for wearables, health monitoring, smart meters and other slim IoT devices. They form part of Synzen's Galaxy Class, which all feature low-profile design solutions that maintain good performance.

Synzen Precision Technology
www.synzen.com.tw

THE EVOLUTION FROM CRITICAL LMR TO BROADBAND AND CONTROL ROOM OPERATIONS

The Australian Critical Communications Forum (ACCF) hosted a pre-conference Comms Connect workshop on 18 October, titled 'Latest initiatives and innovations in critical LMR, Broadband and Control Centres', covering the future of LMR with LTE, 4G and 5G networks both public and private.

The ACCF, a regional chapter of the TCCA, has a longstanding and successful association with the organisers of the Comms Connect events in support of Australasian mission- and business-critical LMR and broadband users. The workshop was held in cooperation with the Australian Control Room Network Association (ACRNA) — a key industry association representing a diverse range of control room operators — with presentations from ACRNA committee members, Melbourne University CDMPS and Zetron addressing the digital/wireless revolution; the future impacts on control rooms; and the global trends in control room solutions and standards.


Kevin Graham, TCCA CEO

Some 50 delegates were in attendance, with representatives from USA, New Zealand, and most states and territories. The workshop and keynote speakers provided the delegates with the latest LMR/broadband product and technology overviews and case studies addressing the convergence of mission- and business-critical LMR and broadband (ETSI and 3GPP LTE 4G, 5G standards) capabilities serving industry and society.

TCCA CEO Kevin Graham highlighted the necessity of industry, vendors and end users coming together to align. It was also highly pleasing to see presentations from Simoco Wireless Solutions, Sepura, DAMM and Tait Communication all focusing on the LMR/broadband evolution to converge multiple networks, LMR/LTE/satellite devices and applications for P25, DMR and TETRA narrowband standards with clear focus on end user requirements.

When converging with broadband, the user requirements present challenges when it comes to deploying integrated solutions and the evolution from critical narrowband to broadband and dual (hybrid) mode. Standardised narrowband LMR technologies will continue to provide critical communications well into the next decade, but increasingly with mix-and-match capability (eg, interworking gateways, dual mode, hybrids) to include 3GPP-based critical broadband.

Simoco Wireless Solutions, Sepura, DAMM and Tait Communications and a number of other vendors provide interim standard-based solutions, reducing operational risk during the transition period when many business- and mission-critical users such as public safety, rail, utilities and industry demand new functionalities to improve situational awareness and operational efficiency to support their new use cases and service performance. Aqura, a Telstra Purple company, meanwhile addressed 'the closing of the connectivity gap' and the use of private LTE/4G/5G in Australia, and provided a case study of the Pilbara Ports Authority in WA.

As there is an ever-increasing importance of sharing knowledge between organisations, sectors, verticals and nations, to keep advancing critical communications deployments, broadband network challenges, global initiatives and case studies, the workshop addressed some of these. Agencies from Australia, New Zealand and USA presented their unique programs at the workshop, including the Australian PSMB, FirstNet USA and the New Zealand NGCC, including PSMB deployments with mobile network operators.

TCCA provided additional case studies of critical broadband communications deployments and initiatives from around the globe, such as Virve in Finland, ESN UK, SafeNet Korea, PCSTORM in France and a number of EU countries. Countries all appear to be heading in the same direction in the integration of LMR and broadband with focus on public safety and emergency agencies, learning from each other and studying best practices, all striving to put the very best tools for the job in the hands of critical communications users over the coming months, years and decades.

The workshop was a testament to the value of the ACCF, ACRNA and TCCA and the networking strength and knowledge that individuals and organisations can achieve by attending such workshops in the pursuit of rapidly changing business- and mission-critical technologies, standards and operational best practices.

For any further information on the ACCF workshops, webinars, Critical Comms World events, networking opportunities and membership, contact admin@criticalcommsforum.com.au.

The Australasian Critical Communications Forum (ACCF) is the regional chapter of The Critical Communications Association (TCCA), a unique global association where many diverse organisations collaborate and network across the critical communications ecosystem working with standardisation bodies, 3GPP, ETSI, government agencies, mobile operators, manufacturers, solution providers and end users over 160 organisations around the world.

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DAMM frequency sharing functionality

The official launch of the frequency sharing functionality in the DAMM Outdoor Base Station BS422 is here! With this functionality it becomes possible to…

Improve spectrum efficiency

Frequency sharing allows adjacent BS422s to use the same frequencies. This is a significant benefit in low density networks and gives the possibility to cover for example a railway line with just two frequency pairs.

Simplify repeater systems

With frequency sharing an indoor repeater system can be built without optical fibres. The same hardware can be used as base station and repeater unit, increasing redundancy and simplifying the network architecture by having one unified network management system and reduced spare part stock.

Obtain base station geo-redundancy

With the BS422, network availability can be brought to a new level. Two BS422s located at two sites can act as one fully redundant base station, sharing the same frequencies. This will add redundancy not only to the base station, but also to the whole antenna system.

Learn more at the Comms Connect Series or go to **dammcellular.com**

DAMM Australia
Phone: +61 7 5539 4638
Email: info@damm-aus.com.au
www.damm-aus.com.au

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