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July/August 2025

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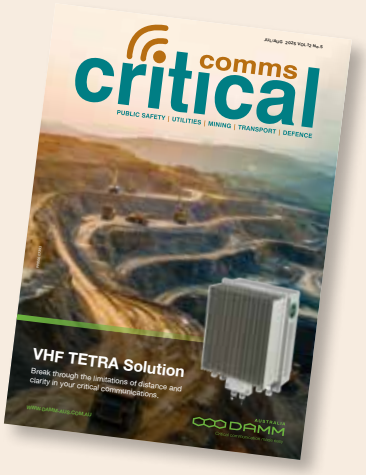

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Do you read me?

The Australian Communications and Media Authority (ACMA) appears to have been rather busy in recent weeks, having told off both Telstra and TPG Telecom for separate failures relating to the emergency call service.

In early June, an ACMA investigation found the 106 emergency call service number — a text-based service used by people with hearing and speech impairments — was inadvertently made unavailable by Telstra for 12 hours and 46 minutes between 5 and 6 July 2024, following a server migration process (fortunately, records show no one attempted to use the service for an emergency during this time). In response, Telstra said it would engage an independent reviewer to look at the range of operational arrangements that support reliable delivery of the service; the company has also paid a penalty of $18,780.

Less than a month later, the ACMA revealed the TPG network was down for 80 minutes between 12.40 am and 2 am on 15 August 2024, leaving most of its 4G mobile customers unable to make voice calls — including emergency service calls. The investigation found that while TPG became aware of the issue at 1.22 am, it did not report the problem to Telstra until 9.07 am, in contravention of emergency call service rules. The majority of calls made to Triple Zero during the outage were able to 'camp on' to other networks, so there is no evidence that TPG customers suffered any harm; nevertheless, the company has received a formal warning.

Connectivity for emergency services was just one of the topics covered at Comms Connect New Zealand, which was held in Christchurch in early June. The show saw great turnouts on both days — both on the expo floor and in the conference theatres — but if you missed it, you can read our wrap-up of the event on page 6 (with highlights from the RFUANZ Gala Dinner on page 27). Other article highlights this issue include new technology to advance mobile connectivity in remote locations (page 11); advancements in tackling network congestion (page 32); and the advantages of AI-powered bushfire detection systems (page 14). AI is further covered in our Spectrum opinion column on page 34, which proposes the use of this technology to increase public safety at the Brisbane Olympics. Let's check back in seven years' time to see if this ended up happening, shall we?

Lauren Davis, Editor
cc@wfmedia.com.au

wfmedia
connecting industry

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

Editor: Lauren Davis
cc@wfmedia.com.au

Publishing Director/MD:
Janice Williams

Art Director/Production Manager:
Linda Klobusiak

Art/Production:
Marija Tutkovska

Circulation: Alex Dalland
circulation@wfmedia.com.au

Copy Control: Ashna Mehta
copy@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 5, 6-8 Byfield Street, North Ryde
Locked Bag 2226,
North Ryde BC NSW 1670
Ph: +61 2 9168 2500

Print Post Approved PP100007393
ISSN No. 2202-882X
Printed and bound by Ive Group

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Calendar

July

Qld Critical Communications Conference and State Networking Dinner
23–24 July 2025
The Greek Club, Brisbane
arcia.org.au/events/critical-communications-conference-brisbane-july-2025-2

APCO 2025
27–30 July 2025
Baltimore Convention Center, USA
apco2025.org

August

AP-RASC 2025: URSI Asia-Pacific Radio Science Conference
17–22 August 2025
ICC Sydney
ap-rasc.com/home.php

September

SA Critical Communications Conference and State Networking Dinner
11 September 2025
The National Wine Centre of Australia, Adelaide
arcia.org.au/events/critical-communications-conference-adelaide-11-september-2025

October

Comms Connect Melbourne
14–16 October 2025
Melbourne Convention & Exhibition Centre
melbourne.comms-connect.com.au

ARCIA 2025 Gala Dinner & Excellence Awards
15 October 2025
Sofitel Melbourne on Collins
arcia.org.au/events/arcia-gala-dinner-2025-melbourne

2025 ACRNA Conference
28–29 October 2025
The Fullerton Hotel Sydney
acrna.org/save-the-date-2025-acrna-conference-sydney-28-29-october

November

PMRExpo 2025
25–27 November 2025
Koelnmesse, Germany
www.pmrexpo.com/en

December

2025 IEEE Global Communications Conference
8–12 December 2025
Taipei International Convention Center, Taiwan
globecom2025.ieee-globecom.org

Further event information can be found at criticalcomms.com.au/events

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COMMS CONNECT NZ DISCUSSES PUBLIC SAFETY MILESTONES, EMERGING TECHNOLOGIES AND MORE

Lauren Davis

The Southern Hemisphere's premier critical communications event, Comms Connect, recently returned to the Land of the Long White Cloud, with the 10th edition of the New Zealand show held at Te Pae Christchurch Convention Centre from 4–5 June.

Over 500 visitors attended over the course of the event, which saw over 40 exhibitors and sponsors showcase their products and services on the expo floor while 35 expert speakers shared their insights across two conference streams. And on the evening of 4 June, attendees of the RFUANZ gala dinner celebrated the achievements of their peers while being entertained by MC Mike McRoberts, a respected journalist and news anchor who captivated his audience with stories from his days as a war correspondent.

Local milestones

Since the last Comms Connect NZ event in June 2024, the country has been busy with various connectivity projects — the biggest of these being the Public Safety Network (PSN) for New Zealand's frontline emergency services. Matthew Hansen, Senior Project Manager for the PSN Program from Next Generation Critical Communications (NGCC), noted that the network's Cellular Priority service launched in late 2024, providing emergency services with access to the Spark and One NZ cellular networks ahead of other users in cases of congestion or degradation on those networks (111 callers themselves get highest priority). As part of the service, it is now possible to capture data during outages confirming which areas have degraded networks — with Hansen noting that during such outages events, PSN Cellular Roaming enables emergency services to shift between the Spark and One NZ networks depending on which has the most reliable coverage. Meanwhile, a small-scale pilot area was last year launched in South Canterbury to trial the PSN's new land mobile radio (LMR) network — which will provide emergency services with modern, resilient, secure radio technology — with the network proper set to roll out throughout 2025 and 2026.

Regarding connectivity for consumers, One NZ's GM Network Services, Sharina Nisha, spoke on the recent launch of her company's satellite-to-mobile coverage — which came about as a way to bypass land-based infrastructure, vulnerable as it is to natural disasters such as Cyclone Gabrielle. Nisha explained that One NZ Satellite was made possible through a partnership with SpaceX's Starlink Direct to Cell — the second such partnership in the world and the first to actually go live, launching in December last year. The service enables text messaging across the entirety of New Zealand and 12 miles into territorial waters, anywhere with line of sight to the sky, so long as the user has an eligible One NZ mobile plan and compatible device — and has already seen more than 1.5 million messages sent at the time of writing. Here in Australia, Telstra recently launched its own satellite-to-mobile text messaging product using Starlink Direct to Cell, so it's sure to be only a matter of time before we reach this milestone as well.

Inspector Kerei Gray reveals what's next for P25 in New Zealand.

Locating and tracking our most vulnerable

Satellite-to-mobile is sure to be an important service for people travelling outside mobile networks in regional and remote areas, enabling them to stay in touch with loved ones as well as to reach out for assistance if needed. But what about more vulnerable people, such as those with cognitive or neurodevelopmental conditions, who may find themselves lost and be unwilling or unable to seek help? In these scenarios, Kiwis may find themselves turning to WanderSearch — a simple radio frequency tracking system that is utilised by New Zealand Police and Land Search & Rescue.

As explained by Jono Sands, Managing Director of Ignition Networks, WanderSearch makes use of radio direction finding (RDF), or the use of radio waves to determine the direction to a radio source. The vulnerable person is given a small, lightweight and robust signal transmitter, about the size of a button battery, to wear as part of a necklace, bracelet or keyring. If that person goes missing, trained Police and/or Land Search & Rescue volunteers will go out with an antenna and receiver to detect the radio-frequency number of the device by waiting for a 'ping' — a signal from the transmitter indicating the direction it's coming from. They then pick another point, wait for another ping, and triangulate like this until they find the source of the signal. The technology does not use the cellular network, meaning it does not require any additional infrastructure to work, and the transmitter has a battery life of six months, which Ignition Networks is looking to extend even further. Other goals for the future include the addition of automatic direc- ›

AS MISSION-CRITICAL COMMUNICATIONS (MCX) TECHNOLOGY EVOLVES, ANY NEW NETWORKS MUST BE TESTED FOR COMPLIANCE AND INTEROPERABILITY.

One NZ's Sharina Nisha spoke on the recent launch of her company's satellite-to-mobile coverage.

tion finding with KrakenSDR software-defined radio; the ability to send a precise location based on the Internet of Things; and the development of a mobile app.

Another group of people who might find themselves in vulnerable situations is field workers, noted GetHomeSafe CEO and founder Boyd Peacock. Peacock explained that his company offers a comprehensive product suite for managing safety in various work scenarios — including working alone, remote work, and situations where coverage may be limited. Live GPS location sharing means supervisors can track the real-time whereabouts of staff when they're out and about — and with features such as scheduled check-ins, a panic button and man-down/motion monitoring, supervisors are in the position to promptly send assistance if and when required. In a world that places increasing importance on worker safety, products such as this are likely to become more and more common.

Emerging technologies

In a panel session that closed out the first day of the conference, several of the speakers came together to discuss emerging technologies and their impact on critical communications. Artificial intelligence (AI) was a key talking point, with Fraser Paine, Head of AI at Aware Group, noting that AI agents can be used for everything from supporting frontline call staff to monitoring infrastructure for predictive maintenance. However, Paine emphasised that humans need to be kept in the loop when it comes to AI — it should not be given all the responsibility in a given situation, and it should only be automated once it has been thoroughly tested, with any faults removed. Furthermore, Paine stated that the rise of AI agents risks creating network bottlenecks due to high demand, so we need to make sure this demand is managed.

Also on the panel was Terence Wong, Head of APAC 5G Industry & IoT at non-profit trade association GSMA, who said 5G is benefiting areas including education, manufacturing and even health care — in part by working in tandem with other emerging technologies. For example, clinicians at Singapore's National University Hospital have been using Microsoft's mixed-reality headset, known as HoloLens 2, to view 3D hologram visualisations of images such as CT scans in order to plan and guide brain tumour extraction, resulting in faster, more accurate surgery. The initiative has been supported by Singaporean telco Singtel, which worked with the hospital to design and deploy a 5G Standalone network using the 3.5 GHz band. The resulting network, with edge cloud and network slicing capabilities, provided doctors with the bandwidth and performance they need to enhance healthcare delivery with mixed reality, and could in future be leveraged beyond the hospital premises for applications including remote patient monitoring and connected smart ambulances.

It should be noted that, as mission-critical communications (MCX) technology evolves, any new networks must be tested for compliance and interoperability. As explained by Sentil Sundram, Head of Telecommunications at Rohde & Schwarz, performance testing evaluates a system under various load and stress tests, ensures stability under extreme conditions, and identifies weaknesses before deployment — because any errors or incompatibilities discovered post-deployment can lead to costly rework, downtime or legal consequences. So, in the case of broadband MCX networks, Sundram said these should be able to communicate flawlessly with diverse devices, networks and platforms, with the ability to deliver high data rates, low latency, and consistent quality of service for applications like video transmission and real-time data transfer as well as voice. Following deployment, security risks to networks will also need to be addressed, through the use of threat detection tools and regular monitoring.

With another New Zealand show done and dusted, Comms Connect will be heading back to Australia on 15–16 October (plus pre-conference workshops on 14 October) with its flagship event at the Melbourne Convention & Exhibition Centre — and the floorplan is already filling fast. For more information — including visitor registration, the call for papers and exhibition/sponsorship opportunities — visit melbourne.comms-connect.com.au.

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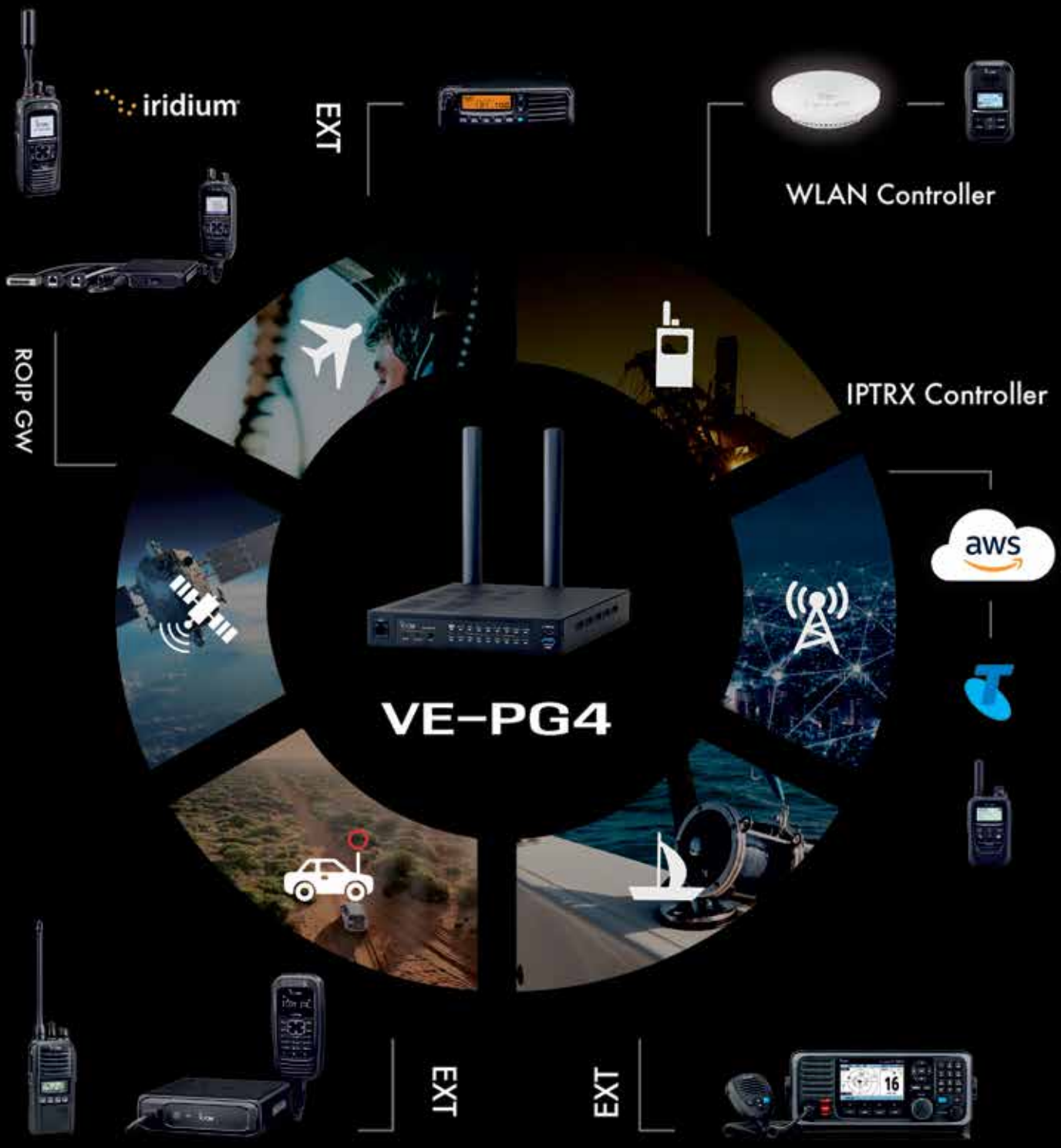

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NT GOVT UPGRADING CRITICAL INFRASTRUCTURE FOR EMERGENCY COMMS

The Northern Territory Government has announced a $6.6 million investment to upgrade critical infrastructure at the Joint Emergency Services Communications Centre (JESCC) and CCTV Unit at the Peter McAulay Centre. An additional $9.5 million over three years — and $1.5 million ongoing — will deliver vital technology and systems upgrades to support the enhanced operations of the centre.

The investment is set to boost the Northern Territory Police Force's emergency response capabilities by modernising critical communications infrastructure and expanding digital technology used to coordinate frontline policing and monitor crime. Chief Minister Lia Finocchiaro said the upgrade would ensure the Territory's core emergency communications systems are fit for purpose and future-ready.

"This is about giving police the tools they need to respond faster, smarter and stronger," Finocchiaro said.

"Last year, we saw more than 380,000 calls to the JESCC and on any given day, its call-takers handled on average more than 940 calls per day.

"We are investing in the backbone of emergency coordination and surveillance because when seconds count, technology matters."

The new project will:

- upgrade and relocate essential digital technology to increase capacity and resilience;
- improve the reliability and capability of dispatch systems used by NT Police;
- enhance the critical infrastructure supporting the JESCC and Government Data Centre; and
- expand the operations of the CCTV Unit to improve crime prevention and real-time monitoring.

The communications centre is a vital hub for coordinating Territory-wide emergency response, including police, fire and ambulance services. The upgrade addresses longstanding infrastructure risks and should ensure the Territory has a robust, secure platform to support community safety now and into the future.

"We are restoring law and order with the strongest bail laws in the country, a record police budget, and the digital infrastructure to match," Finocchiaro said.

In addition to the $6.6 million upgrade at the JESCC in Berrimah, the government is allocating a further $2 million to boost emergency communications in Central Australia. This funding will support the establishment of a pilot Police Communications Centre in Alice Springs, aimed at enhancing local coordination and support for police operations in Central Australia.

The new centre will focus on call taking and CCTV monitoring for the Alice Springs and Barkly regions, complementing existing capability at JESCC in Darwin. The six-month pilot will help assess whether a regionally based model improves response coordination, situational awareness, and outcomes for the community.


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NSW AMBULANCE TRIALS DRONES FOR SEARCH AND RESCUE

NSW Ambulance has recently trialled the use of drones to enhance its aeromedical and special operations capabilities during search and rescue missions, with a focus on improving both the speed and safety of operations in remote and difficult-to-reach locations.

The two-month Remotely Piloted Aeromedical Clinical Systems (RPACS) trial utilised cutting-edge technology to enhance patient care, operational safety and efficiency. It saw seven critical care paramedics and special operations team paramedics specially trained to operate, maintain and deploy RPACS drones as part of search and rescue missions.

The RPACS drones can provide real-time aerial surveillance to improve situational awareness and support decision-making on critical incidents, leading to better patient outcomes. They feature thermal imaging, high-intensity search lights, the ability to carry essential items, and a loudspeaker to communicate with patients.

Most importantly, each drone can live stream to a secure link so a medical response can be managed from a remote location. This response can include the delivery of lifesaving medical supplies — including blood products, anti-venoms and external defibrillators — directly to patients up to 7 km away in isolated environments, where immediate access by conventional means may not be possible.

"RPACS drones can cover vast and challenging terrain rapidly and efficiently, ensuring that paramedics on the ground have access to real-time data that can help save lives," said NSW Ambulance Chief Executive Dr Dominic Morgan.

A full evaluation of the trial is now underway, looking at environmental sustainability, operational outcomes, and future benefits of this technology to patient care and aeromedical operations. The RPACS technology is expected to not only advance operational capabilities, but also contribute to more sustainable practices through reducing demand on aeromedical helicopters.

"By integrating drones into our operations, this initiative allows us to innovate and reduce environmental impact while maintaining the high standards of emergency care our communities expect," Morgan said.

5G SATELLITE TECH ADVANCES CONNECTIVITY IN REMOTE LOCATIONS

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Satellite phones and devices are currently the main modes of communication with the rest of the world for remote regions like Antarctica — but regular mobile phones may soon be able to achieve connectivity in such areas, thanks to a collaborative research and development effort between industry and academia.

The Singapore University of Technology and Design (SUTD), SKY Perfect JSAT (JSAT), TMY Technology, Inc. (TMYTEK), Rohde & Schwarz and VIAVI Solutions have jointly developed new 5G non-terrestrial network (NTN) satellite technology to advance mobile connectivity in remote locations. The research team recently conducted a live demonstration at Expo 2025 in Osaka, Japan, showcasing the deployment of an end-to-end cross-country 5G New Radio (NR) NTN. This is understood to be the first such transmission between the two countries.

Imagine a scenario where a ship is sailing in a remote location, when a crew member suddenly encounters an emergency health issue. With traditional satellite communication, the crew can only send a text message to the shore for assistance. However, with the new technology showcased at the live demonstration, real-time communication via video call becomes possible.

The demonstration showed that a 5G signal can be transmitted via a satellite antenna from end-user equipment (UE), such as a communication device located at SUTD in Singapore, to a geostationary (GEO) satellite operated by JSAT. This signal was then forwarded from the satellite to a ground station at JSAT in Japan, which connects to a 5G base station and 5G core network emulator, demonstrating the feasibility of communications between NTN and terrestrial networks (TN).

The live demonstration successfully showed that an existing GEO satellite can reliably support the 5G NR standards as defined by the 3rd Generation Partnership Project (3GPP), which is a consortium that develops global standards for mobile telecommunications. Although current 5G deployments primarily rely on TN, upcoming 6G networks are expected to be a convergence of both TN and NTN to achieve global coverage and resilient connectivity. The demonstration thus lays the foundation for future extensions to medium-Earth orbit (MEO) and low-Earth orbit (LEO) satellites, as well as 6G-converged TN and NTN.

"We are proud to have participated in the world's first demonstration using our geostationary satellite and 5G NTN Lab at the prestigious World Expo, under the leadership of SUTD," said Eiichi Yonekura, Representative Director, President and CEO of SKY Perfect JSAT.

"Moving forward, we will continue to contribute to the advancement of telecommunications technology through collaboration and engagement with stakeholders in Singapore and beyond. Additionally, we will provide a highly reliable communication environment through the Universal NTN, an innovative multi-layered communication platform, aiming to establish technologies that enable seamless connectivity between mobile and satellite networks."

The collaboration is also among the first in the world to integrate an electronically steered antenna (ESA) for 5G NTN GEO communications. This enables NTN technology to be more suitable for challenging use cases, such as in the maritime and autonomous vehicles industries; or connecting 5G UE to high-speed moving satellites such as LEO or MEO. The ESA technology was contributed to the collaboration by TMYTEK.

Satellite operators, mobile network operators, equipment vendors and end-user application providers need to be able to evaluate the performance of NTN networks and the traffic that runs across them. Rohde & Schwarz and VIAVI developed an NTN digital twin testbed covering LEO, MEO and GEO, and this was used in the testing and validation of the end-to-end connectivity and performance in the live demonstration.

"This breakthrough in 5G NTN technology marks a pivotal moment — not only proving that seamless mobile communication over satellite is achievable, but also laying the groundwork for resilient, borderless 6G networks," said Dr Sameh Yamany, Chief Technology Officer of VIAVI Solutions. "We are proud to contribute our test and validation expertise alongside global partners to turn this vision into reality."

5G TECH TRIALLED DURING NORWEGIAN MILITARY EXERCISE

Nokia, in collaboration with industry partners, recently tested 5G technology in a defence scenario during Joint Viking 2025, a Norwegian military exercise. Throughout the trial, Nokia's 5G technology was said to provide field personnel from multiple nations with advanced defence applications, enhancing situational awareness and facilitating seamless cooperation across military units.

Joint Viking 2025 took place in Bardufoss, located in northern Norway, above the Arctic Circle. It included more than 10,000 soldiers from Belgium, Canada, Finland, France, Germany, the US, the UK, the Netherlands and Norway. Occurring every two years, the exercise aims to enhance military cooperation, support protection of NATO's northern flank and test Norway's ability to receive allied reinforcements.

Nokia's solutions included 5G AirScale radio products and 5G Standalone Core technology tuned for defence applications, to enhance tactical communication and information systems among participating nations. Nokia's 5G communications platform gave military personnel access to real-time battlefield intelligence, facilitating faster decision-making. The Joint Viking command and control leadership leveraged this data to improve situational awareness, streamline operations, and enhance both safety and efficiency throughout the exercise.

"We collaborate with the industry to develop innovative defence solutions based on commercial technologies," said Kennet Nomeland, Radio Architect and Norway's Ministry of Defense liaison for the 5G COMPAD program. "A prime example is advanced software functionality, which enables Nokia's 5G systems to operate in GNSS-denied environments, along with their next-generation radio equipment, engineered for reduced size, weight and power. Nokia's 5G technology was instrumental in the success of the Joint Viking exercise, enhancing the Norwegian Armed Forces' readiness for complex joint operations in challenging conditions."

Giuseppe Targia, Head of Space and Defense at Nokia, added, "The scalable, secure and reliable connectivity that 5G provides has an important role in strengthening the tactical communication capabilities of defence forces. The successful trial of 5G in the field at Joint Viking exercise is evidence of Nokia's continued progress in the defence sector and highlights Norwegian Armed Forces' position as a leader in deploying advanced communication technologies for tactical operations."

UNSEENLABS' NEW SATELLITE STRENGTHENS MARITIME SURVEILLANCE

French company Unseenlabs, a leader in space-based radio frequency (RF) detection, has announced the launch of its latest satellite, BRO-18. Launched from Vandenberg Space Force Base in California, aboard SpaceX's Transporter-14 mission, the asset is set to expand the company's existing constellation and further strengthen its operational capabilities in tracking illegal and unreported maritime activity.

With the ability to precisely detect RF signals, even without cooperative transponders, Unseenlabs provides decision-makers with the capability to monitor, identify and anticipate suspicious behaviours at sea — covering areas including maritime security, illegal fishing, piracy and more. The company's proprietary single-satellite technology enables it to detect and geolocate RF emitters at sea with high precision, day or night, regardless of weather conditions — enabling it to provide governments, NGOs, insurers and maritime operators with fast and immediately actionable data to inform their operational systems.

BRO-18 reinforces Unseenlabs' already operational 16-satellite constellation — which is operational across key strategic maritime zones worldwide — expanding its geographical coverage while increasing the precision of the RF data collected. The result is a surveillance capability better able to detect, locate and analyse RF signals emitted by ships — even those attempting to remain undetected by switching off their automatic identification system (AIS).

"This new satellite strengthens our commitment to delivering high-quality, independent and actionable data that supports strategic decision-making in an increasingly complex maritime environment," said Clément Galic, CEO and co-founder of Unseenlabs. "BRO-18 is part of our continued scale-up strategy, designed to support maritime actors facing critical challenges of sovereignty, security and transparency."

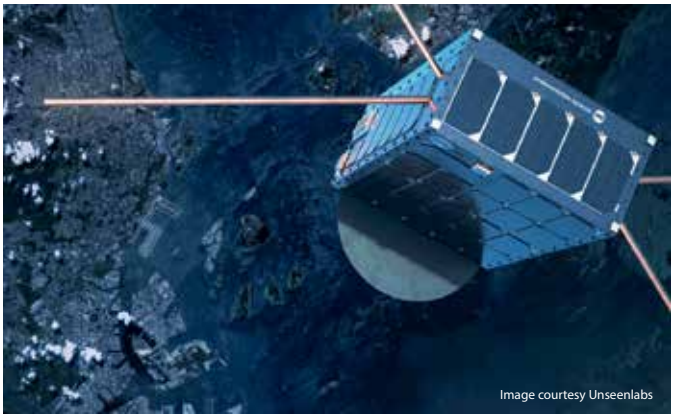


Image courtesy Unseenlabs

In 2026, Unseenlabs will continue its expansion with the development of a second multi-domain surveillance constellation — covering maritime, land, air and space — to meet the growing global challenges of security and sovereignty. This is anticipated to broaden operational use cases and establish Unseenlabs as a key provider of multi-domain electromagnetic intelligence.

TCCA CEO Kevin Graham and Thomas Jäger, Senior Vice President, Global Connectivity and ITS Technologies at DEKRA, sign the new contract.

TCCA NAMES NEW TETRA INTEROPERABILITY CERTIFICATION PARTNER

TCCA has announced the appointment of DEKRA, described as the world's largest independent, non-listed expert organisation in the field of standards-based testing, inspection and certification, as the new TETRA Certification Body that will oversee the interoperability (IOP) testing process and issue the certificates.

TCCA's TETRA IOP process underpins the ongoing success of the TETRA standard, and the independence of the process ensures the ongoing strength of the market. DEKRA was chosen from a number of bidding companies after evaluation by TCCA and its TETRA manufacturer members, with several DEKRA offices around the world set to be involved in supporting the TETRA IOP process.

Test targets and priorities for the IOP process are set jointly between TETRA users, operators and manufacturers. For each feature to be certified, a TETRA Interoperability Profile (TIP) specification is created within TCCA's Technical Forum Working Groups. Once approved in the Technical Forum, a detailed Interoperability Test Plan document is produced. The certification testing is based on these Test Plans.

With these official test documents, test sessions can be conducted between manufacturers' infrastructure and devices at a host manufacturer premises. DEKRA will witness the testing sessions, analyse the results, and issue the detailed official Interoperability Certificates and Test Reports. Certificates are available to anyone looking to verify the interoperability of TETRA infrastructure and devices across multiple manufacturers and to inform purchasing decisions.

"DEKRA's expertise in cellular communication technologies goes back to the times when GSM and TETRA were developed more than 35 years ago," said Thomas Jäger, Senior Vice President, Global Connectivity and ITS Technologies at DEKRA. "Since these days, our teams have been part of all further standardisation activities, including conformance, interoperability and functional testing.

"Safety is part of our DNA and we are delighted to be the partner of TCCA."

TCCA has offered its thanks to DGTCSI-ISCTI (The General Directorate for Communications Technology and Information Security – Higher Institute for Communications and Information Technology), a division of the Government of Italy, which has provided TETRA IOP certification services for TCCA for more than 20 years.

"It is clear that TETRA will remain as the world-leading digital trunking solution for many years, and therefore the need for ongoing IOP testing and certification, especially as the TETRA standard, continues to be enhanced," said TCCA CEO Kevin Graham. "We are pleased to have DEKRA, an expert global organisation, continue these important independent certification services."

Industry Talking

Since the last update ARCIA has held our annual NSW events in Sydney over two days, including conference, training workshops and networking dinner. The conference and workshops were again well attended, with a broad range of radio and critical communications topics covered. This year's recipient of the NSW State Professional of the Year Award, presented at the dinner, was Robert Glover from Mastercom — who was selected from a very strong line-up of nominees for his dedication, professionalism and commitment to the LMR sector over more than 30 years.

In early June the industry gathered in Christchurch for Comms Connect NZ and from all reports it was another excellent event, with both local and international stakeholders gathering to ensure collaboration, education and the building of personal networks continues for all those attending. It was great to see our team, represented by CEO Paul Davis, meet with our RFUANZ colleagues and attend their AGM, continuing our longstanding collaboration, including on training and education.

Many ARCIA members also attended Critical Communications World, put on by TCCA. This year the event was held in Brussels, with many new announcements from suppliers at the premier European event for critical communication technologies, as expected.

Most recently, we held our second Sundowner in Tasmania for 2025 in Launceston, and while numbers were a little lower than they were in the capital, it was a good night, with new contacts made for members who were able to attend, which is a key part of their success. And bookings are now open for our upcoming Queensland events, to be held at South Brisbane's Greek Club across 23–24 July, including three training workshops, our conference and the state networking dinner.

During all these events we witness the affirmation that land mobile radio is still important and indeed around the globe the market is growing. I believe that one of the reasons for this is all the new use cases and options to connect LMR to broadband. You might say that broadband is bringing new life to LMR.

The ARCIA Spectrum committee is currently working on a revised CBRS consultation paper. There have also been Association discussions re: 4.9 GHz spectrum use and a possible plan for coordination and management. ARCIA is concerned that, without coordination, public safety users won't get the full benefit of broadband technology in emergency situations.

Finally, our AGM will be held on 27 August. If you have some time and would like to find out what makes the association tick, reach out to our CEO for more information on how you can help on the committee.

Hamish Duff

President (Hon),
ARCIA – Australia's Radio & Critical Communications Association

AI-POWERED BUSHFIRE DETECTION

CAN PROTECT FORESTS AND COMMUNITIES

Dryad Networks

Bushfires pose a significant threat to Australia and New Zealand's environment, economy and communities, with traditional detection methods often failing to provide timely warnings.

Artificial intelligence (AI)-powered bushfire detection systems are now emerging as a vital tool to enhance early intervention, protect forests, and safeguard lives and infrastructure in response to this challenge. These smart systems use advanced technology to identify fires at their initial smouldering stage, giving emergency services and communities crucial minutes that can significantly change the outcome of bushfire events.

"AI-powered bushfire detection systems with ultra-early detection capabilities give emergency responders a decisive head start in the event of a bushfire," said Sohan Domingo, VP of Sales, Technology and Operations at Dryad Networks. "This lets them mobilise more rapidly and strategically to the precise location of the burn. This means that response teams can contain outbreaks at their nascent stage, preventing them from escalating into uncontrollable blazes that devastate large areas of wilderness and inhabited regions, and directly contributes to the safety and preservation of Australia and New Zealand's diverse ecosystems and communities."

AI-powered systems begin monitoring long before fires are visibly established, unlike conventional detection methods that rely on visible flames or satellite imagery. The core of this capability is distributed networks of solar-powered sensors placed across bushland, which detect the chemical signatures of fire during its earliest smouldering stage. This raises the alert well in advance of visible flames, giving emergency services more time to act.

Smart sensor networks help land managers cover vast areas that would otherwise go unwatched by monitoring even remote and rugged landscapes continuously so that no region remains unprotected. This is crucial in areas where accessibility and visibility are limited. The result is faster, more localised intervention that can stop bushfires before they spread out of control.

Smart sensor networks are strengthened by complementing autonomous drones equipped with advanced AI, which can respond rapidly to detected threats and further enhance the effectiveness of emergency operations. Drones arrive at the precise location of the fire swiftly once alerted, giving responders an accurate, real-time view of the situation. This immediate insight lets firefighting teams act decisively, preventing fires from spreading and causing widespread devastation. Future drone advancements will actively suppress fires through innovative methods such as foam dispersal or acoustic technology. This will further decrease the reliance on human crews in high-risk situations, improving the safety and effectiveness of bushfire management.

"The environmental implications of adopting AI-powered bushfire detection systems are significant," Domingo said. "Early bushfire containment protects people and communities, preserves biodiversity and ecosystems, and curtails carbon emissions associated with widespread bushfires significantly. Reducing emissions through effective fire management becomes increasingly critical as climate change continues to exacerbate fire conditions across Australia and New Zealand. AI-driven systems can play an instrumental role in both countries' broader climate mitigation and adaptation strategies by preventing extensive environmental destruction."

These detection and response technologies also integrate seamlessly with existing emergency management frameworks. Data from AI sensors and drone surveillance systems feed directly into emergency response platforms and fire analytics tools, creating a cohesive operational picture for firefighting authorities. This seamless integration supports efficient coordination among multiple response units, including ground crews and aerial firefighting teams, enhancing the effectiveness of fire suppression efforts.

iStock.com/slowgrowe

The Australian and New Zealand federal governments have both recognised the need for greater disaster preparedness. The Australian Government committed $28.8 million to disaster preparedness in the 2025–2026 federal Budget, including $17.7 million for the Bushfire Community Recovery and Resilience Program.[1] In New Zealand, the government has committed $70 million over seven years (2024–2031) to the Natural Hazards and Resilience Platform, an initiative designed to strengthen national resilience to natural disasters by supporting science across the four Rs: reduction, readiness, response and recovery.[2]

AI-powered bushfire detection technologies align closely with Australia and New Zealand's commitment to proactive disaster resilience. Reducing reaction times and improving accuracy in identifying and locating fire threats gives communities a vital protective barrier against increasingly frequent and severe bushfire events. Businesses and critical infrastructure operators also benefit directly from improved asset protection, minimising the disruption and financial impact associated with large-scale bushfires.

AI detection systems can be customised to accommodate specific regional conditions and management strategies, incorporating local expertise into broader technological solutions. Collaborating with local communities and Indigenous groups, especially those with traditional knowledge of land management and fire practices, can make the rollout of detection technologies more adaptive and effective in practice.

"The integration of AI technology into bushfire detection and suppression systems represents a critical advancement toward a more resilient Australasia," Domingo said. "Authorities and communities can reduce the destructive impacts of bushfires significantly by embracing these innovations to better protect lives, ecosystems and economic assets. Continued investment and development in these AI-driven solutions will remain essential in shaping a safer, more sustainable future for the forests and communities of Australia and New Zealand as climate challenges intensify."

1. https://budget.gov.au/
2. https://www.mbie.govt.nz/science-and-technology/science-and-innovation/funding-information-and-opportunities/investment-funds/strategic-science-investment-fund/ssif-funded-programmes/natural-hazards-and-resilience-platform

CASE STUDY

Body cameras reduce violence and theft for UK retailer

Motorola Solutions has announced the successful deployment of its VT100 body cameras to employees across Poundland stores in the UK. Since the pilot, Poundland has reported a decrease in incidents, including an 11% drop in violence against store employees and a marked reduction in shoplifting and theft.

Retail workers in the UK are increasingly concerned for their personal safety, with one in four considering quitting their job, according to Motorola Solutions' 2024 report on the state of UK retail worker safety, conducted by YouGov. Over half (56%) of retail workers surveyed said they witnessed petty theft in the last year, while 31% have encountered organised crime rings and 50% have experienced hostile customer interactions in the last 12 months.

Earlier this year, the UK Government announced a retail crime crackdown, which includes investments in new technology to prevent shoplifting. Indeed, 70% of shop workers believe body cameras effectively de-escalate dangerous or hostile situations, according to the Motorola report.

Part of Motorola Solutions' ecosystem of safety and security technologies for enterprises, the VT100 is a small, lightweight and unobtrusive device with a standby battery life of up to six months. The device can live stream for up to 90 min and streams audio and video to a security operations centre or video management software.

In addition to the drop in incidents, Poundland's Security and Loss Prevention team is reportedly benefiting from having an objective record

of events to help conduct investigations. The retailer is using Motorola Solutions' VideoManager digital evidence management solution to prepare, store and process video data, including the ability to tag and match body camera videos with CCTV footage and other incident data.

"A safer environment for frontline workers and shoppers alike underpins everything retailers do," said Neil Thomas, Corporate Vice President of Enterprise Sales at Motorola Solutions. "The VT100 empowers in-store staff with the information they need to decisively protect their employees, customers and stores."

Motorola Solutions

www.motorolasolutions.com.au

Signal and spectrum analyser

Rohde & Schwarz's FSWX is a signal and spectrum analyser with multiple input ports and a cutting-edge internal multi-path architecture. It also features low phase noise for high signal purity and a spurious-free dynamic range, enabling high RF performance.

The instrument's wide internal bandwidth of 8 GHz allows for comprehensive analysis even of complex waveforms and modulation schemes. It has a high measurement speed and analysis tools tailored to the user's needs, making it suitable for modern RF applications.

The multichannel device offers the ability to measure multiple signal sources simultaneously, regardless of whether they operate at the same or different frequencies. With synchronous input ports, each featuring 4 GHz analysis bandwidth, users can seamlessly analyse the interactions between diverse signals. This opens up a multitude of measurement scenarios.

Its internal multi-path architecture allows for cross-correlation mode, a novel feature of the device. A single signal input is internally split into two independent signal paths, each equipped with its own local oscillator and ADC. Advanced cross-correlation algorithms can thus be applied in the digital backend, effectively removing the inherent noise of the measurement instrument. This feature reveals spurs not easily seen without cross-correlation, and is especially helpful when measuring error vector magnitude (EVM). The architecture also means users can apply an IF or RF power trigger at distinct frequencies, easily revealing the effects between two RF signals.

Traditionally, for preselection in the microwave range, spectrum analysers rely on YIG filters, which need to be bypassed for wideband signal analysis. The product employs broadband ADCs in conjunction with filter banks that span the entire operating frequency range, allowing for pre-selected signal analysis while eliminating the need for YIG filters. For users requiring narrowband applications, a YIG filter can still be added optionally.

The CrossACT (Cross Application Control and Triggering) firmware feature synchronises various measurements across different input channels, allowing for simultaneous analysis with multiple tools. The Linux-based operating system meanwhile provides a high level of security and long-term support, for users in security-sensitive environments.

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

P25 radios

Icom has announced that its P25 digital radio solutions are joining the land mobile radio (LMR) category in Australia. Designed to meet the mission-critical needs of public safety, mining, utilities, transport and government sectors, and based on the globally recognised Project 25 (P25) standard, Icom radios offer secure, interoperable two-way communications across agencies and systems.

Available in VHF and UHF bands, Icom's P25 line-up supports conventional and trunked operation (Phase 1 and Phase 2), with seamless analog–digital mixed mode for flexible fleet migration. With rugged construction, MIL-STD environmental compliance and high ingress protection ratings, the radios provide long-lasting performance in harsh environments.

The IC-F7000 series handhelds and IC-F7500 series mobiles feature loud, clear audio, intuitive colour displays with day/night modes, and a compact, ergonomic design. Enhanced safety features — including emergency call, lone worker alerts and voice recording — support critical user protection in the field. Built-in Bluetooth, microSD card storage, USB connectivity, and accessory options like dual-head controllers and CommandMic provide operational flexibility for mobile teams.

Icom's P25 radios offer a balance of durability, ease of use and future-ready capability, which should allow agencies to upgrade at their own pace without compromising safety or performance. With a strong global reputation for quality, the company says it is committed to supporting Australia's evolving public safety and industrial communication needs.

Models include the IC-F7010 and IC-F7020 series P25 portable transceivers, and the IC-F7510 and IC-F7520 series P25 mobile transceivers.

Icom Australia Pty Ltd
www.icom.net.au

RF planning tool

Aviat Design is a full-featured, cloud-based RF planning solution for both point-to-point (PTP) and point-to-multipoint (PTMP) networks. Built by Aviat Networks, the tool is designed to deliver modern features and effortless collaboration to RF engineers, all in one place.

The tool is free to use, with no paid licence or subscription needed, so users can just register and go. It offers cloud-based convenience, with no installations or updates, meaning users can log in and start planning from anywhere. It provides the option to plan and model both PTP and PTMP networks — something many other tools don't support.

The product's engineering tools include antenna height optimisation; LOS MIMO modelling; bulk site import; Google Maps, LiDAR terrain and FCC tower data integration; and multi-vendor support. It is built for teams, meaning users can share projects, manage permissions and collaborate in real time.

Aviat Networks
aviatnetworks.com

High reliability and efficient DC Power in challenging environments

Engineered for industrial control, electrical switching and telecommunications applications, Eaton's Industrial DC Systems solution package provides an energy efficient, highly reliable and flexible back-up power solution to support customers' mission-critical infrastructure.

The fully customisable solutions are designed and assembled by local engineering specialists in Australia and New Zealand who are experienced in local conditions and eccentricities. The system offering ranges from compact wall mount indoor systems up to marine-grade outdoor cabinets, fitted with the necessary infrastructure to grow from <1 kW/55 Ah to >27 kW/1500 Ah. Optional upgrades such as higher capacity, dual A+B infrastructure and battery expansion, as well as various battery technologies including smart lithium, are available to deliver the best fit for purpose solution.

Ideal for industrial control and electrical switching boards

Eaton's wall mount power system (WMPS) is a low-profile panel mount design solution, requiring minimal space, and has a form factor that typically best suits industrial control and electrical switching boards where a full free-standing cabinet is not suitable. The WMPS has sophisticated monitoring and control capabilities via the Eaton SC300 advanced system controller. Typical loads the WMPS would support are 12Vdc, 24Vdc and 48Vdc via the various Eaton hot-swappable Rectifiers and PV Solar Chargers.

IP rated solution

For higher power applications, the Eaton IP4x industrial cabinets can be supplied in varying heights and IP ratings to suit the environment. The systems are designed with a minimum of N+1 redundancy to support critical loads requiring 125Vdc, 110Vdc, 48Vdc, 24Vdc, 12Vdc and/or 230Vac secure power. With in-built cooling fan and filters, the cooling draws bare minimal power and delivers a low maintenance solution. Paired with Eaton long life batteries, the solution is easy to commission and operate.

Engineered for extreme weather conditions

The Eaton ExoCab fully sealed outdoor enclosures are used to protect vital electronic equipment in challenging outdoor environments, where there is no existing infrastructure, and the systems needs to withstand extreme weather conditions. From above the snow line in the NZ mountain ranges to hot dusty minefields in Western Australia, Eaton successfully delivered and installed the ExoCab solution and exceed customers' expectations.

Using integrated cabinet cooling solutions that require either low or no maintenance, the critical equipment is well protected from the environment in challenging and extreme surroundings. Easily adapted to specific needs, these cabinets can help protect remote networks and related equipment with minimal external support, and full remote visibility to ensure that the equipment remain up and running around the clock.

As load requirements grow, users can add hot-swap plug-in rectifiers, DCDC converters, inverters, and/or solar chargers to the solution, ensuring power requirements are always met. Each system can be engineered to user specification, or users can select from predesigned options.

All solutions come with an in-built advanced system controller, delivering full remote monitoring and control, including ethernet, RS232 (TCP/IP or Modbus), RS485 (Modbus) and voltage-free relay contacts.

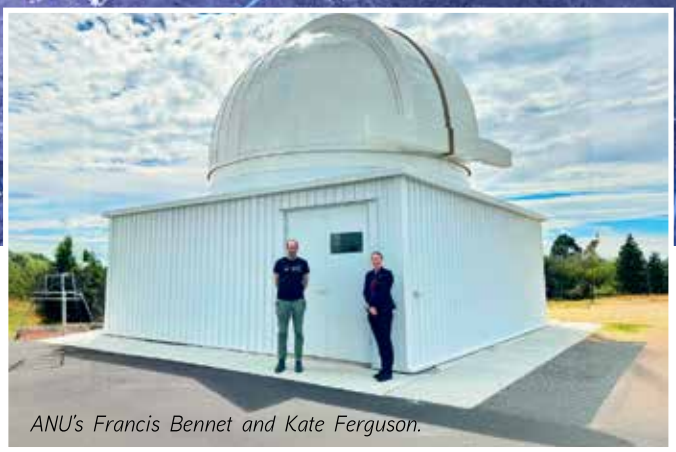
To learn more about Eaton's Industrial DC Power Systems, please visit Eaton.com/au/dc, or email us at EatonANZ@eaton.com

Written by Chris Barson, Product Manager Power Quality/DC Power Solutions

EATON
Powering Business Worldwide

Eaton Electrical (Australia) Pty Ltd
www.eaton.com/au/dc

IMPROVING DATA TRANSMISSION WITH OPTICAL SATELLITE COMMS



ANU's Francis Bennet and Kate Ferguson.

The iLAuNCH Trailblazer program is setting out to revolutionise satellite communications, thanks to a new project that will develop technologies to give Australians faster and more affordable access to data.

Our growing data demands are creating a strain on traditional radio satellite communication systems, which are already at full capacity. In 2022 alone, the average home internet user consumed 257 GB of data per month, and this figure is only set to rise. Australia, which relies on subsea cables and satellite communications through the radio spectrum for its international data exchange, faces mounting pressure to meet these increasing data demands.

A new project from the Australian Government's iLAuNCH (Innovative Launch, Automation, Novel Materials, Communications and Hypersonic) Trailblazer program, led by The Australian National University (ANU) with key partners Optus and Leonardo UK, will see the team working together to build smaller, lower-cost laser communications ground stations that will bypass the radio bottleneck. Once in operation, these compact, low-cost ground stations and miniaturised, low-power on-board terminals will make downlink-to-Earth communications commercially viable.

"This project is redefining the way things have always been done, demonstrating how Australian innovation and collaboration is unlocking new opportunities in the global space industry," said iLAuNCH Trailblazer Executive Director Darin Lovett.

"It's a clear demonstration of how iLAuNCH are building sovereign capability in the critical field of global communications, while providing valuable support for local companies and researchers that will ultimately lead to exports and commercialisation."

Optical satellite communication technology has the potential to significantly increase data transmission rates, enabling a substantial increase in data return directly to Earth. However, a current challenge with the effectiveness of getting data through lasers from space to the ground is atmospheric interference — the same effect that causes stars to twinkle. This degrades the ability to transmit data.

The new project will use stargazing techniques that 'de-twinkle' stars at ground-based observatories to ensure that laser communication terminals can achieve maximum bandwidth. The project will also see the development of a highly sensitive, high-bandwidth optical data receiver, designed for photon-starved environments. This technology will support quantum key distribution (QKD) and other high-performance communication protocols.

"Australian National University's extensive experience in building complex optical instruments is currently being applied in the construction of an optical ground station (OGS) at the Mount Stromlo Observatory in Canberra, demonstrating Australia's capability to lead in this field," said Associate Professor Francis Bennet, from the ANU Research School of Astronomy and Astrophysics.

"Leveraging the university's expertise in adaptive optics, optical communications and instrumentation, the project will design and scale adaptive optics (AO) systems for commercial and military satellite operators with significant market potential."

ANU will also site-test Optus's Belrose Space Operations Centre to inform potential future laser optical ground station options. Additionally, the project will support two PhD

positions at ANU, providing researchers with hands-on experience in advanced optical communication technologies and contributing to the development of Australia's space capabilities.

For its part in the project, Leonardo UK is contributing compact optical detectors capable of acquisition, tracking and communication in photon-starved conditions. These detectors will be integrated with the AO systems to create advanced optical data receivers for space platforms. Optus will demonstrate both the AO and detector systems using current and future satellite infrastructure, enabling new commercial pathways in optical communications.

"Leonardo UK is developing detectors suitable for optical communications including a compact detector, the SAPHIRA, which will combine the function of initial acquisition and tracking as well as communications receiver in the photon-starved regime," said Matthew Hicks, Space Programme Manager at Leonardo. "This project will accelerate the development of these detectors, by integrating and packaging them with compatible optics into an advanced optical data receiver instrument to demonstrate optical communications from a space platform."

Nick Leake, Head of Satellite and Space Systems at Optus, added, "Australia is full of innovation, particularly in the space industry, and it's critical that established players like Optus continue to collaborate with other local companies and universities to push the boundaries beyond where they currently sit. Australia's large land mass makes it an ideal place for much activity in the space ecosystem, particularly hosting satellite ground stations. As more technology moves beyond our atmosphere, research like this will become key in how industry keeps up with innovation."

Ultimately, the project aims to develop a space-to-Earth laser communication ground station capable of data transmission rates vastly exceeding the current capabilities of radio-based satellite systems, with the potential to reach terabits per second. The technology could thus provide Australians with more options for connectivity, with laser communications also offering inherent advantages such as high security, immunity to jamming, and the ability to serve remote and rural areas with high-speed internet.

With smaller ground stations that can be spaced closer together, laser communications have the potential to transform Australia's connectivity landscape, with implications for industries such as defence, telecommunications and beyond. By collaborating with leading global and national partners, iLAuNCH and ANU are poised to position Australia at the forefront of optical satellite communications innovation.

Two-way radio with body camera and AI

Motorola Solutions has released SVX, a video remote speaker microphone that converges secure voice, video and AI. It is designed for the company's APX NEXT flagship radio, and is launching alongside Motorola's Assist AI software. Converging a body camera with a radio replaces the need for multiple devices, while the AI provides contextual and actionable information that's personalised for the time, person and place where decisions need to be made.

As a converged and wireless device, SVX effectively halves the number of devices and reduces maintenance, while everyday shifts are covered with the swappable battery. The convergence of radio, video and AI should serve as a force multiplier, capturing and synthesising a greater diversity of data throughout an incident for more accurate police reporting and verified evidence.

Integrated with the APX NEXT radio, SVX features ambient noise reduction, allowing officers to communicate with clarity or ask Assist for support despite background noise. At the same time, high-definition video retains all ambient sound to protect the objective integrity of everything an officer sees and hears through the camera. Capturing dual streams through both radio and video communications, which Assist can unify in evidence, means the product offers context and clarity for a comprehensive timeline of events.

Assist's AI can actively support officers in real time, enabling SVX to query a number plate or driver's licence and automatically search for associated records or warnings. It can also detect key words in radio traffic, alerting nearby officers and command centre staff while making it possible to see and hear what's going on through SVX to support a response. It can turn SVX into a live language translator between an officer and a community member, or guide officers with instructions for administering a lifesaving EpiPen.

The convergence of radio, video and AI means Assist can collate data from every stage of an incident, including radio conversations, officer's location, call information, dispatch records, other body or street camera footage, community inputs and more. Its access to more sources thus enables more cross-referencing and verification.

Motorola Solutions

www.motorolasolutions.com.au

Connected fleets

Supporting utility field workers with the right technology

Tim Karamitos, Regional Sales Manager ANZ, Enterprise Wireless Solutions at Ericsson

As utilities continue to adopt modern technologies to support the delivery of services and meet their customers' requirements, there's also a need to look at how technology can help overcome challenges in the field.

Field workers who are out working to fix critical infrastructure and systems often face productivity and safety challenges. For example, crews that are trying to resolve a power outage or a service interruption after natural disasters like the recent floods in New South Wales need to do so as quickly as possible to meet restoration service level agreements (SLAs) while also ensuring crew members' personal safety.

While having access to the right technology around the clock can make all the difference for field workers, productivity is dependent upon that technology being accessible and reliable. With that in mind, as more technology finds its way into worker vehicles — from cell phones and two-way radios to mounted laptops — utilities need to take a closer look at how they are supporting connectivity on service vehicles.

In-vehicle connectivity

Whether they're replacing high-voltage lines, performing repairs, or installing transformers and underground cables, workers need access to a myriad of corporate applications and devices that are used in service trucks and vans, which rely on a dependable network connection that's on par with a well-connected office, no matter the vehicle's location. At times this can be difficult — for example, workers who are servicing remote areas where there might not be steady cellular service could find themselves without a connection.

This scenario is common in parts of Australia, with some utilities organisations opting to use a combined cellular and satellite solution.

In South Australia, SA Power Networks is using in-vehicle Ericsson 5G and satellite connectivity, which provides time-saving live status updates to improve customer service. The solution includes Cradlepoint NetCloud, which is used to manage Cradlepoint R1900 and R920 ruggedised routers. Using Starlink LEO satellite as the primary connection due to the remote locations where maintenance work takes place, SA Power Networks service vehicles can failover to cellular connectivity where satellite connections are poor.

Technology built for the field

To withstand extreme temperatures and weather conditions, utilities service providers need ruggedised routers. These are built to continue working even in extremely high and low temperatures, with the ability to withstand intense amounts of humidity, movement/shock, dust, and water splash. Offering high performance roof-mounted antennas, a utilities vehicle fleet can achieve secure, reliable, and versatile cellular and Wi-Fi connectivity — both inside and outside of vehicles — that can also be easily managed by the IT team.

Which comes first — cellular or satellite?

The combination of cellular and satellite connectivity for field workers provides options for how and when each type of connectivity solution is used. A utility's fleet can use ruggedised routers for satellite connectivity as its primary WAN connection, ensuring crews in remote areas can connect when and where they need to. However, if degraded satellite performance is detected by the router, or if there is another issue affecting the signal, service vehicle networks can fail over to a cellular connection to ensure uninterrupted connectivity. For other companies, the inverse could be true. While servicing areas with good cellular coverage, the routers primarily connect to the 5G network. However, failover to satellite can support them when they lose 5G connectivity in remote locations.

Reliable and constant network uptime for field crews enables just some of the following:

- More digital tasks can be completed, and on-site decisions made
- Travel time and the use of cell phones as hot spots is reduced or eliminated
- Customer restoration times are sped up
- Contact with field crews in remote areas is more reliable, ensuring their safety

Wireless-to-wireless failover

The ability to connect to two carriers at the same time is the only way to provide true wireless-to-wireless — or cellular-to-cellular — failover. The automatic switch from one carrier to another occurs almost instantaneously, making a dual modem router particularly beneficial for those

driving connected vehicles that travel in and out of coverage areas

Beyond the router

In addition to the right hardware and devices to empower workers, another imperative consideration when looking at a connected fleet solution is management and network support. In particular, utilities should look for technology providers that offer cloud-based network management platforms and portals, which can seamlessly support IT teams and empower them to be more efficient. For example, through a portal, they could push out firmware updates across the entire fleet at once, as opposed to doing this manually, one vehicle at a time.

These tools also offer the ability to monitor dashboards, create detailed reports, and even quickly diagnose a tech issue — and resolve it — from anywhere. While on call in remote locations, Australian utilities company Icon Water's field support teams rely on push-to-talk radios, but these devices have been experiencing frequent downtime leading to poor communication and operational inefficiencies. Dated technology was preventing patrol workers from consistently accessing their most important digital tools — including connected laptops, tablets, and phones — in and around their vehicles. Icon Water worked with their partner, Vertel, who deployed Ericsson Cradlepoint routers in Icon Water's vehicle fleet and designed a fully integrated, end-to-end communication system that includes mobile broadcast platforms, satellite links, and advanced group communication tools.

Icon Water's IT team saves a lot of time by remotely monitoring and managing network uptime and performance from anywhere through Ericsson NetCloud Manager. This is essential for a company with more than 100 vehicles and dozens of field representatives out in remote Australian areas. Ericsson's smart routing solution onboard the vehicles is able to check the performance of both the connected 4G/5G mobile carrier network and the LEO satellite network, using multiple criteria. When the performance of the primary network drops below the specified criteria, the smart router will analyse the performance of all available networks and automatically switch to the best performing network, with regular rechecking of all network performance.

Wireless connectivity is at the heart of empowering utility field crew workers with the right support they need to do their jobs quickly, effectively, and safely. Finding a partner who will understand your pain points and be able to offer a solution that will not only improve your current situation, but prepare your fleet for the future, is the best first step.

ERICSSON

Ericsson Enterprise Wireless Solutions Australia Pty Ltd
www.cradlepoint.com/au

End-to-end solution for mission-critical comms

Frequentis MissionX enables secure, high-performance communication across 4G/5G, satellite and hybrid networks. It is built for public safety, railway and mining operations, offering defence-grade cybersecurity.

From field teams to control rooms, the solution supports real-time voice, video and data, even in crisis or remote scenarios.

Designed for interoperability, high availability and full multimedia integration, MCX helps to keep teams connected when it counts — no matter the environment — across Australia, New Zealand and beyond.

Frequentis Australasia
www.frequentis.com

Energy storage solutions for critical communications continuity

Power continuity is non-negotiable in public safety and critical communications. Intelepower delivers engineered systems and certified battery solutions designed to perform in the real-world operating conditions of New Zealand's infrastructure networks.

As a compliant partner for solutions that meet industry standards, the company supports radio networks with 48 V and higher-voltage power system configurations, integrated with Yuasa FXH, UXH and UXL battery technologies for long-duration resilience and thermal stability.

From hub sites to remote deployments, every system is customised to meet safety standards, reduce electrical imbalance, and maintain uptime under peak loads. Advanced charge control, system-level monitoring, and site-specific design all contribute to risk mitigation and asset protection.

Trusted by utilities, telcos and emergency services, the systems are engineered for compliance, continuity and audit-readiness — backed by a national service network.

Century Yuasa Batteries
www.cyb.co.nz

Telescopic mast solutions

ZCG Scalar, a provider of Australian-made RF communication infrastructure, has expanded its capabilities in deployable mast systems with the acquisition of NBS Masts & Accessories.

The NBS legacy, now continued under ZCG's manufacturing umbrella, delivers a full suite of modular mast solutions to meet the demands of Australia's mining, broadcasting, emergency services and telecommunications sectors. At the core of the range is the clear anodised aluminium telescopic mast, available in models from 3.4 to 16 m, each designed to support antenna mast loads of up to 13 kg. These lightweight masts are designed for quick deployment in the field with minimal tools, offering a durable, compact solution for mobile base stations, temporary RF links and emergency set-ups.

Built with simplicity and strength in mind, each section securely locks in place for elevated stability. With guying kits available, they are suitable for harsh terrain or long-term applications, from mining telemetry to mobile command posts, as well as weather and conservation tracking. Whether the customer is operating in remote locations, setting up rapid communications infrastructure, or raising surveillance or meteorological equipment, ZCG's telescopic masts offer high strength-to-weight performance, resistance to corrosion, and fast pack-down for transport.

All ZCG mast solutions are designed and built in-house at the company's East Gippsland facility in Victoria and come with responsive technical support. Customers can also combine the masts with ZCG's own antenna, cable and mounting ranges to complete a fully integrated RF system, optimised for performance, transport and ease of installation.

Whether used for broadcasting, mining, emergency communications or remote monitoring, ZCG's expanded mast range delivers elevation solutions that are scalable and engineered for Australian conditions.

ZCG
www.zcg.com.au

Connectivity That Just Works

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PMP 450v is an ultra-high performance and cost-effective, fixed wireless broadband solution

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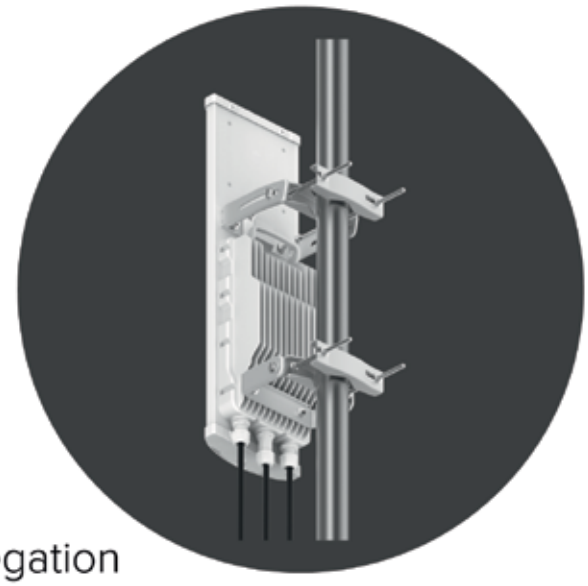


- Backward and Forward Compatible
- Operates from 5.15 to 7.125 GHz
- Ultra-Wide-Band Support (Up to 2x100 MHz channels)
- Dual Sector Mode and Carrier Aggregation

Streakwave Australia

PMP 450v 4x4 Fixed Wireless Subscriber Module and PTP Backhaul

- Operates from 5.15 to 7.125 GHz
- Ultra-Wide-Band Support (Up to 2x100 MHz channels)
- Flexible Frequency
- Up to 40 miles in PMP Mode
  Up to 124 miles in PTP Mode

03 9001 4295

sales@streakwave.com.au

TETRA handheld terminal

Teltronic is expanding its portfolio of terminals with the launch of the EHT-200. This portable radio device is designed to meet the needs of professionals in sectors such as public safety, emergency services, transportation and mining, where communication reliability is essential.

One of the key innovations of the TETRA handheld terminal is its dual-frequency GPS positioning technology, designed to improve user location accuracy by reducing the margin of error to less than 1 m. This capability allows command centres to respond quickly, enhancing safety and operational efficiency. Additionally, its 3 W transmission power and high sensitivity provide stable coverage, even in challenging environments or at the edge of coverage areas.

Equipped with a powerful speaker and AI-based noise cancellation technology, the device eliminates ambient interference by reducing background noise, for clear communication even in extreme situations. Its design also optimises sound projection and neutralises wind noise, providing a good listening experience even in particularly noisy environments.

The terminal is built for demanding workdays, and its low-power technology allows up to 33 h of battery life. Fast charging at 18 W enables a full charge in a very short time. Charging can be done via a charger or through the USB Type-C port, which also supports programming and updates.

With a compact, rugged and ergonomic design, the product combines functionality and safety in a single device. It complies with Directive 2014/53/EU (RED) and Canadian regulations (ISED), and has been tested according to MIL-STD-810H and ETSI EN 300 019 for mechanical and environmental requirements, among others.

Teltronic SA Unipersonal
www.teltronic.es

Arbitrary waveform generators

Spectrum Instrumentation has released its 63xx series of high-performance arbitrary waveform generators (AWGs). Designed for demanding applications in radio frequency (RF) and microwave signal generation, they are aimed at engineers and scientists working in cutting-edge fields such as wireless communications, radar system development, quantum research and aerospace testing.

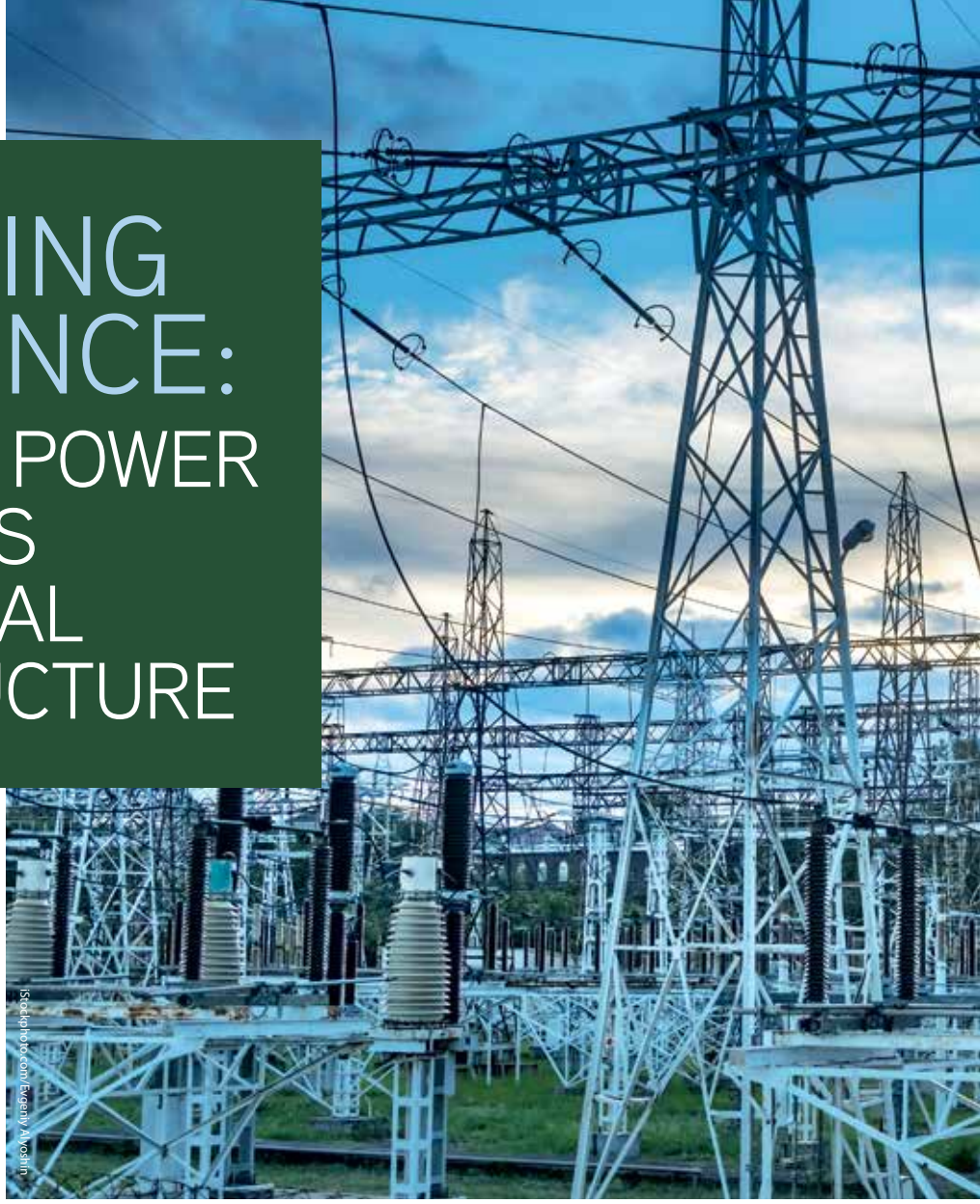
The AWGs deliver output rates up to 10 GS/s with 16-bit vertical resolution and bandwidths reaching up to 3.9 GHz, enabling true-to-life reproduction of wideband RF and microwave signals. Other features include single-ended or differential outputs with up to 4 V output swings; multichannel synchronisation for complex signal simulations across multiple outputs; and up to 8 GSample memory per channel for flexibility in waveform generation. These features make the AWGs particularly suited to applications that demand high signal quality over wide bandwidths, such as testing of communication standards like 5G and 6G, simulating radar echoes, or generating waveforms for experimental physics and quantum systems.

The flagship AWGs are available as PCIe cards with up to 10 GBps streaming, as well as standalone NETBOX units with easy control via Ethernet, connecting directly to laptops, PCs or company networks. In addition to their powerful hardware, they are supported by Spectrum's comprehensive software suite, including drivers for Windows and Linux, as well as programming examples for languages like C/C++, Python, MATLAB and LabVIEW, plus Spectrum's SBench 6 software for interactive operation.

The AWGs include a five-year warranty, free lifetime software/firmware updates, and support directly from Spectrum's design engineers. They are suitable for integration into automated test systems.

Spectrum Instrumentation Asia
www.spectrum-instrumentation.com

DESIGNING RESILIENCE: ADVANCED POWER STRATEGIES FOR CRITICAL INFRASTRUCTURE



iStockphoto.com/Evgeniy Alyoshin

Intelepower explains the importance of integrating compliance, thermal management and predictive diagnostics in modern power systems.

In public safety and critical communications, uptime isn't a feature — it's a requirement. From emergency response centres to networked utility sites, infrastructure providers face growing expectations around continuity, compliance and visibility. As these systems evolve, so do the power strategies required to support them — strategies that must integrate not only performance but also thermal stability, diagnostics, and national compliance standards.

Designing power systems for critical infrastructure now involves more than capacity — it requires foresight.

Architecture in transition: matching system topology to risk profile

Power systems in essential networks are shifting from monolithic, centralised models to site-specific architectures. Remote locations typically deploy 48 V DC systems, chosen for their simplicity, redundancy and compatibility with existing telecom infrastructure. These systems often support continuous loads between 100 and 300 W, with autonomy targets of 6–24 hours, depending on site criticality and accessibility.

In contrast, central hubs — such as data exchanges, operations centres or multi-site aggregation nodes — may employ higher-voltage modular DC systems (eg, ±120 or 240 V configurations) to manage larger, more dynamic load profiles and to reduce voltage drop over distance.

Architectural choices must consider:

- load distribution and projected growth
- physical site constraints and footprint
- grid availability and outage frequency
- environmental and service access conditions.

No single topology suits every site. System design must reflect the role and risk profile of the location.

Designing for compliance: meeting AS 4044:2024 in practice

The recently updated AS 4044:2024 standard sets new benchmarks for battery charger safety and performance in stationary applications — a major concern for asset managers and engineers alike.

Key technical features of the standard include:

- **Neutral current limitation (≤10% of nominal load):** This is to reduce heat build-up and system imbalance in three-phase systems.
- **Integrated charge regulation:** This includes float voltage accuracy within ±1% and compensation for ambient temperature to extend VRLA battery life.
- **EMC compliance (AS/NZS CISPR 11 Class A):** This ensures operational safety in dense RF environments, especially near transmission sites.
- **Cable colour consistency:** Standardised marking of DC positive, negative and earth for improved field safety.
- **Mandatory diagnostics:** Fault detection for input failure, charger fault, output overvoltage, battery disconnect and high temperature.

Meeting these parameters requires coordination across system design, component selection and installation practices — not just product certification. Engineers should engage compliance at the design phase, not as a post-installation obligation.

Thermal design and battery selection: engineering for real-world conditions

Batteries in field-deployed systems are exposed to fluctuating environmental conditions that dramatically affect lifespan, charge efficiency and safety. Thermal derating is no longer an optional design consideration — it's a necessity. >

Key design considerations include:

- **Ambient temperature ranges:** Systems should be validated for operation in -10 to +45˚C environments, with battery thermal management strategies above 35˚C.
- **Float service life vs cyclic performance:** Selecting batteries rated for ≥12-year float service and tested for >260 cycles at 80% depth of discharge if frequent cycling is expected.
- **C-rate compatibility:** Ensure batteries can support typical site discharge rates of 0.1–0.25C while maintaining voltage above minimum system cutoff.
- **Enclosure design:** This must provide passive ventilation and/or insulation to maintain internal temperatures within ±5˚C of rated ambient.

As one example, Yuasa's VRLA batteries are commonly deployed in telecommunications and utility sites for their stability in elevated temperatures and predictable float behaviour — reflecting the company's engineering standard of 'Performance, Every Time'.

Intelligent diagnostics: from data collection to predictive maintenance

Predictive diagnostics are now an essential component of power resilience — especially in networks with decentralised assets.

Modern systems should include:

- **Real-time telemetry** of input/output voltage, battery voltage, internal temperature and current draw.
- **State-of-health algorithms** to estimate capacity loss based on charge acceptance, impedance trends and temperature correlation.

- **Failure mode alerts**, including overcharge detection, thermal excursions, cell imbalance and fuse open/failure.

These diagnostics integrate with SNMP or Modbus TCP/IP protocols and are increasingly being tied into centralised asset management systems. Not only do they support compliance audits, they reduce downtime by providing failure prediction rather than simple alerts.

Case example: multi-site hybrid deployment in critical comms

In a recent deployment led by Intelepower, a regional public safety agency upgraded its power infrastructure across 14 sites. Remote locations utilised 48 V systems with long-duration autonomy and battery-level telemetry. Central hub locations implemented ±120 V rack-mounted DC systems with integrated monitoring and predictive diagnostics linked to a central dashboard.

Battery strings were selected based on ambient temperature modelling, and charging profiles were adjusted for altitude and thermal deviation. All systems were designed in accordance with AS 4044:2024 and delivered with traceable commissioning data and maintenance plans.

This approach reflected a performance-driven ethos built on engineering precision and risk alignment — a testament to Intelepower's commitment to 'Trusted Power. Unmatched Reliability'.

Designing for what's next

For critical infrastructure, power continuity is more than just runtime — it's about long-term compliance, data visibility and thermal resilience. As standards tighten and operational risk increases, power systems must be designed with adaptability and insight at their core.

Key principles for engineers and project leads to follow include:

- Match system voltage and architecture to operational risk.
- Select batteries not only on capacity, but on thermal behaviour, cycle profile, and environment.
- Incorporate diagnostics early — not as a retrofit.
- Design for compliance and auditable traceability, not just output.

Ultimately, resilient power is engineered — not improvised.

Multi-GNSS record and replay simulators

RACELOGIC's LabSat 4 multi-GNSS simulator is a compact solution designed for bench and field testing of GNSS equipment. The product features multi-constellation and multi-frequency GNSS signal recording and replay, with 10–60 MHz variable bandwidth and three configurable RF channels.

The company has released two additional variants of the device — the LabSat 4 Lite and LabSat 4 Core — meaning the LabSat 4 range now supports quantisation from 2–12 bits and options for external signal recording such as dual-CAN, CAN-FD and RS232. This enables a wider variety of applications that should be suitable for any budget, from receiver sensitivity testing to simulating harsh multipath environments.

Following Jammertest 2024, RACELOGIC's 12-bit environment recordings are available to all LabSat 4 owners. Users can experience a full range of preconfigured jamming and spoofing scenarios, allowing them to prepare and test equipment against real-world threats.

Step Global Pty Ltd

www.stepglobal.com

Cellular IoT routers

Webdyn's MTX-Router-Titan II can be used as a remote link to PLCs, data loggers and energy meters — while also providing for SMS and/or email alarm requirements, all in the one easy-to-use device.

SMS and/or email alarms can be triggered by onboard digital inputs, or via the reading of Modbus (RTU/TCP) registers in external devices such as PLCs, energy meters, sensors or variable frequency drives. The unit can also be used to adjust setpoints in Modbus devices by SMS, or via a server using MQTT or another IP connectivity method.

The MTX-Router-EOS is meanwhile a basic 4G modem/router that provides three Ethernet ports, plus Wi-Fi, in a rugged, compact package. Simple to operate and configure, the product includes some useful features — such as a data usage monitor with SMS alarm, should data usage levels be breached.

With dual SIM, and remote control/configuration by SMS, the device is suitable for basic cellular connectivity requirements.

Australis M2M Pty Ltd

australism2m.com.au

Radio Matters

On 4 June, RFUANZ hosted a sold-out event, uniting the brightest minds and key players in the industry at the stunning Te Pae Christchurch Convention Centre. The annual Gala Dinner and Awards evening was an exceptional celebration of innovation, dedication and excellence across the sector. Guests were treated to a brilliant night of entertainment, networking and recognition — all MCed by the ever-charismatic and well-respected Mike McRoberts, whose engaging style and smooth flow kept the night lively and seamless.

The vibrant photobooth proved a crowd favourite, capturing endless moments of laughter. Te Pae's culinary team impressed with a brilliant menu that had guests raving, while cocktails on arrival set the tone for a vibrant atmosphere and excellent opportunity to network. The awards, a highlight of the night, showcased the incredible talent and commitment within the industry. Thoughtfully judged by Bart Rushton (Owner, Storm Spectrum), Neville Digby (Senior Systems Engineer, Orion NZ) and Soren Low (RFUANZ Chairman), the award winners were announced and celebrated throughout the evening.

Lifetime Service Award Winner: Ian Gardiner (Tait Communications)

Ian Gardiner was honoured for decades of leadership, mentorship and lasting contributions that have shaped the radio communications industry. His legacy is one of passion, service and transformative impact across generations.

Project Excellence Award Winner: Thomas Bennett

Thomas Bennett was acknowledged for 'Smart Farms', a complex project with innovation, precision and outstanding leadership — setting new standards for project excellence and project delivery.

Health and Safety Award Winner: Hamish Morton (Ashley Communications)

Hamish Morton was recognised for championing safety culture, reducing risk, and improving workplace health and safety standards.

Customer Service Award Winner: Ryan Warner (Complete-Coms)

Ryan Warner was commended for exceptional, reliable service with a customer-first mindset, building trust and exceeding expectations in every interaction.

Young Achiever Award Winner: Charlie Bosworth (Outback Communications)

Charlie Bosworth was recognised for exceptional promise, initiative and dedication, quickly becoming a valuable contributor with leadership potential.

Standout Performer Award Winner: Andrew McTaggart (Tait Communications)

Andrew McTaggart was acknowledged for consistently excelling through reliability, professionalism and a positive influence — a top contributor across all areas.

The evening wouldn't have been possible without the generous support of sponsors, including Platinum Sponsor Storm Spectrum, whose partnership helped elevate the event to new heights. Gold Sponsors Go Wifi and Tait Communications, and Silver Sponsor Logic Wireless, also played a vital role in supporting the night. Bronze Sponsors Ashley Communications, Outback Communications, Nelspecs, Motorola, Mount Campbell Communications, Tait Mobile Radio (WLGN), Dove Communications, Cambium Networks, Zetron and Hi-Tec Aerials all helped make the celebration possible. Special mention also goes to Remote Networks, RFUANZ Coffee Cart Sponsor.

With every seat filled, every award well-earned and every detail carefully executed, the 2025 RFUANZ Gala Dinner and Awards was a night to remember. Congratulations to all the award winners — your work continues to shape and inspire the future of radio communications in New Zealand.

Mikaela Robinson

Events Coordinator, Radio Frequency Users Association of New Zealand

Hearing protection headset

Communicating in high-noise environments isn't easy, but there's no need to turn up the volume and shout. The Tait TH3 is a hearing protection headset designed to help users communicate safely in high-noise environments including mining, utilities and rail operations.

The product can be attached to a wide range of hard hats and safety helmets, including 3M, Petzl, Uvex, Kask and MSA V-Gard; a comfortable padded headband option is also available for people who don't need to wear helmets. The large, padded ear cups are designed for comfort, with adjustable height, and meet international hearing protection standards.

The push-to-talk (PTT) button is located on the ear cup. With other headsets, users have to locate the PTT button on the cable attached to the radio, but the ear cup makes it quick and easy for users to locate the PTT button every time they need it. This also makes it easier to wear the cable behind the back or under a vest to keep it out of the way.

The boom microphone is adjustable in length and direction, designed to focus on the user's voice instead of ambient noise. Clear communications in high-noise environments can be enhanced with the use of Tait Tough TP9000 series portables with Dual Mic Active Noise Cancellation (ANC).

Tait Communications
www.taitcommunications.com

Tactical radio and intercom controller

As the complexity of tactical operations increases, so does the need for faster, more reliable information flow. Until now, relaying real-time mission-critical data to dismounted operatives has remained a significant challenge. Savox Communications' Savox Bridge platform is designed to address this gap, creating a wireless bridge to seamlessly connect tactical teams and individuals to command centres, enabling enhanced situational awareness in rapidly evolving environments.

The first innovation under the platform is the Savox TRICS Ci4 — a tactical radio and intercom controller featuring advanced intelligence capabilities. The product offers integrated control of radio, satellite and data traffic; ATAK access for real-time digital situational awareness; remote radio control of input devices; dynamic audio routing and a voice-prompted user interface; and software-configurable architecture for future scalability.

Built to MIL-STD 810G standards and featuring Bluetooth capability, the device offers rugged performance across demanding operational environments. It connects up to four individual input devices or two dual-channel radios, alongside EUDs and SATCOM systems, and enables remote access to radios via a TAK Plug-in software — including volume, channel control, texting and situational visualisation.

With integrated SATCOM backhaul, users can achieve extended audio and data reach, supporting one-to-many communications over vast distances. With body-worn audio and data bridging, the device enhances interoperability and range extension by linking multiple frequency devices without increasing operator burden.

The product is compatible with Savox tactical headsets or third-party accessories due to a headset-agnostic modular design.

It is compact, rugged and energy-efficient for extended field use, designed with intuitive training and operation in mind. Future-ready with Savox Bridge, the device is fully software-definable and programmable, offering adaptability to evolving mission needs.

Savox Communications
www.savox.com

Linear 5G high-gain, high-drive amplifier

Qorvo has released its QPA9822 linear 5G high-gain, high-drive amplifier. The product is engineered specifically for 32-node massive multiple-input and multiple-output (mMIMO) systems found in wideband 5G, new radio (NR), instantaneous signal bandwidths, and mobile infrastructure applications.

The amplifier is designed to enable wideband 5G, NR, instantaneous signal bandwidths of up to 530 MHz, making it suitable for the N77 band critical for 5G deployment and other mMIMO applications. It provides a 39 dB gain at 3.5 GHz and achieves a peak power of +29 dBm. It is internally matched to 50Ω over the entire operating frequency band of 3.3 to 4.2 GHz and incorporates a fast enable/disable function through the VEN pin.

The product also offers external bias control capability for linearity optimisation, supporting up to 530 MHz of instantaneous bandwidth. Housed in a compact 16-pin, 3 x 3 mm SMT package, the device is footprint and pin-compatible with the QPA9122M high-gain and high-linearity driver amplifier, allowing for easy integration into existing and new designs, and easy deployment in popular bands in all geographies for 5G mMIMO systems.

Mouser Electronics
au.mouser.com

MissionX: built for Australia's harshest missions

Frequentis' MissionX is the solution for mission critical communication services. From the outback to coastal cities, Australian responders need communication tools that work anywhere, anytime. Frequentis MissionX delivers mission-critical voice, video, and data over 4G/5G and satellite networks – ensuring secure, high-performance connectivity for public safety, utilities, rail and mining operations.

Designed for extreme conditions and peak load, MissionX supports encrypted communications, multimedia services, high-volume data flow, and defence grade cyber security. Field users stay connected with intuitive mobile apps, while command centres gain real-time situational awareness through fully integrated multimedia. With a focus on interoperability and resilience. MissionX enables seamless coordination across agencies, borders, and technologies – supporting critical missions not only in Australia, but around the world.

Read more

www.frequentis.com

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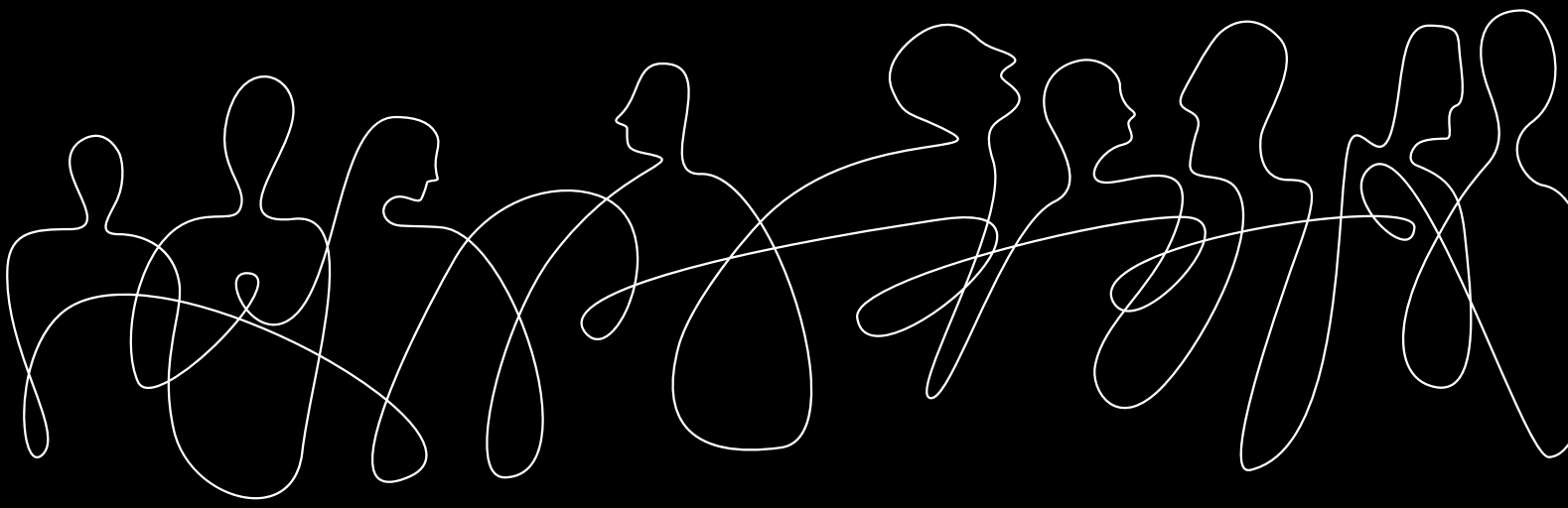

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SMART MAPS ARE CHANGING SCHOOL EMERGENCY RESPONSE

Emergent 3

When emergencies happen at school, every second matters. But let's be honest: many of the systems we still use to respond to crises are outdated.

iStock.com/Nataliia Nesterenko

Whether it's a medical issue, a security threat or a natural disaster, we're often relying on tools that just weren't built for the fast, unpredictable situations we face today. And when lives could be on the line, we need something better.

Why traditional emergency alerts often miss the mark

Old-school campus alerts usually give vague updates like "incident in Building A". That's not nearly enough detail when we're trying to act fast and coordinate with others. These older systems typically:

- point to general areas instead of exact rooms or spots;
- only send out one-way messages with no way to get updates from the scene;
- leave first responders guessing about what the inside of the building looks like; and
- force emergency teams to work separately instead of as one unit.

This kind of approach wastes time — and in an emergency, time is everything.

Smart maps

That's where smart maps come in. These new tools go way beyond the basic GPS dot on a screen. We're talking about live, interactive maps that show the exact location of the incident, down to the room number and floor. With smart maps, responders can instantly see:

- the exact room where help is needed (like Room 203, second floor, east wing);
- which doors are locked or open, and where the nearest exits are;
- where important safety gear is, like defibrillators or fire extinguishers; and
- where staff and emergency teams are in real time.

That kind of detail isn't just nice to have; it's been shown to cut emergency response times by as much as 70%. That could mean the difference between a close call and a tragedy.

Two-way communication

Smart maps are just the beginning. Today's best emergency systems also let everyone stay in the loop through live, two-way communication. Teachers, responders and admin staff can all stay connected and share updates as things unfold.

In a recent safety drill at a secondary school in NSW, first responders were able to locate the (simulated) emergency 3.5 times faster using smart mapping than with old-fashioned verbal directions. What used to take four minutes was done in just over one.

Considerations for implementation in Australian schools

If you're part of a school's leadership or safety team and thinking about bringing in this kind of technology, here are a few things to keep in mind:

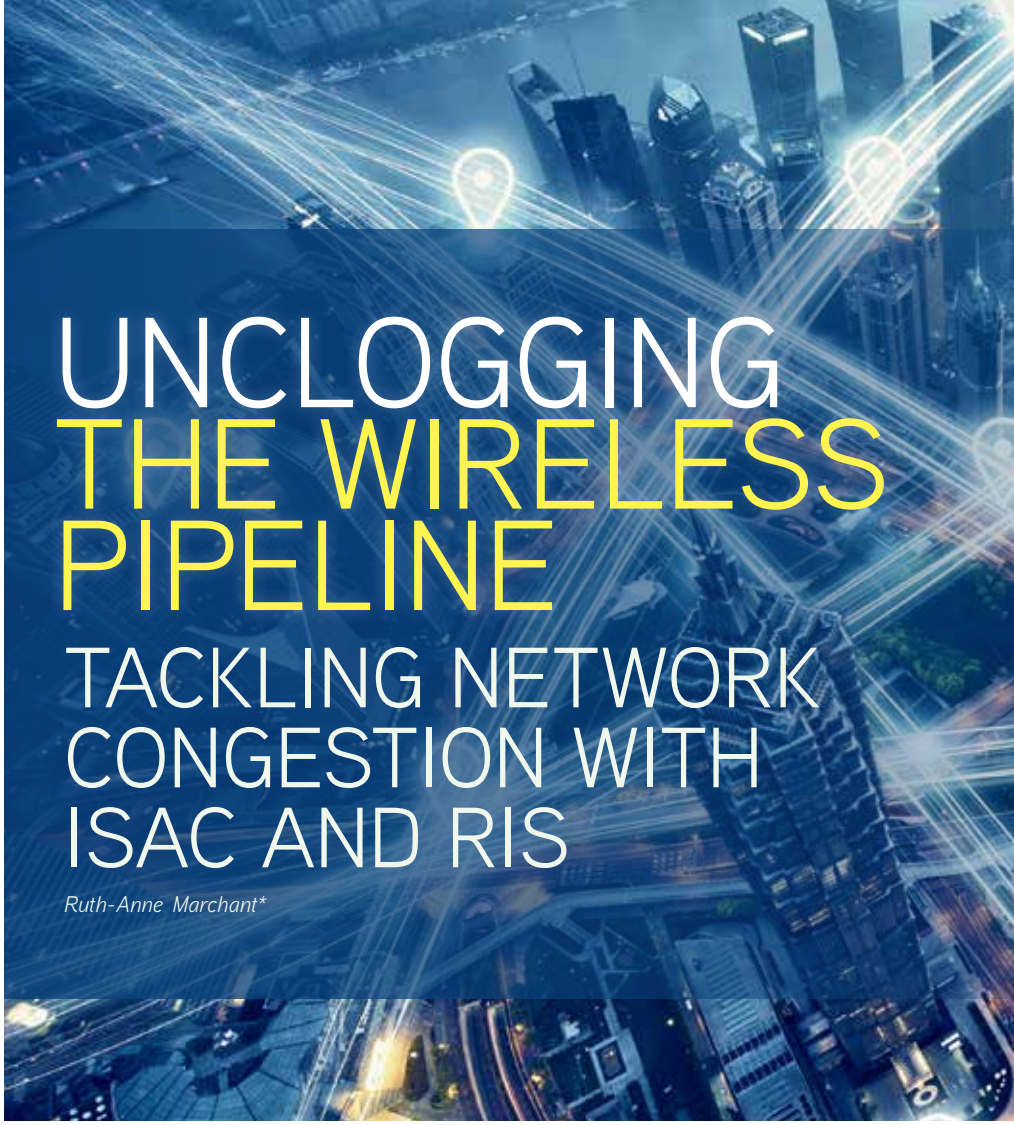
- **Working with what you've got:** The system should plug into your current security and communication tools without a hassle.
- **Ease of use:** During an emergency, nobody has time to fumble around with a complicated app.
- **Being backup ready:** Alerts should go out through several channels (text, app and email) so nothing gets missed.
- **Privacy first:** Any system you choose needs to follow Australian privacy laws, especially around location and personal data.
- **Scalability:** Whether it's a single campus or an entire district, the tech should grow with your needs.

Some companies, like Emergent 3, are already showing how powerful this can be. Emergent 3's Smart Mapping platform is helping over 1700 schools in the US respond more quickly and efficiently to emergencies, without overwhelming staff.

Moving from alerts to action

This isn't just about upgrading tech; it's about changing how we respond to emergencies in schools. By giving teachers, staff and first responders the tools they need to see exactly what's happening and stay in sync, we can drastically improve how we handle high-pressure situations.

School communities all want the same thing: to keep students and staff safe. And when the unexpected happens, having clear, real-time info and the ability to act together can make all the difference.



UNCLOGGING THE WIRELESS PIPELINE

TACKLING NETWORK CONGESTION WITH ISAC AND RIS

*Ruth-Anne Marchant**

Network congestion is a constant challenge in wireless communications from 1G to the forthcoming 6G. As the number of connected devices skyrockets, the limited available bandwidth must be allocated judiciously to allow for higher network capacity and speed.

Recently, two advancements have emerged with the most promising ways to address this challenge: Integrated Sensing and Communication (ISAC) and Reconfigurable Intelligent Surfaces (RIS). Individually or combined, ISAC and RIS can enhance capacity, reduce congestion, and provide improved user experiences.

Understanding ISAC and RIS

ISAC provides the network operator with more intelligence about users. ISAC enables the efficient reuse of resources, including hardware and waveforms, to combine the sensing and communication functions. The same equipment that offers communication services can also sense the environment, providing valuable data about user locations and movements. Access to this data enhances the user experience by allowing the network to communicate optimally with users.

RIS, on the other hand, addresses the problem of signal blockage and low signal power, especially in high-density urban settings. RIS allows RF signals' reflections to be reconfigured based on the location of the user. Once the user's location is determined, RIS manipulates signals' phase, amplitude and polarisation to direct them toward specific users. This capability ensures signals reach their intended audience, even in environments with obstacles, such as dense foliage, tall buildings in urban areas, or indoor settings with multiple walls and partitions.

The synergy of ISAC and RIS

The real power of ISAC and RIS lies in their synergy. ISAC's sensing capabilities can inform RIS on how to best direct signals. RIS uses the data ISAC provides to minimise interference and ensure each user receives the strongest possible connection. Adjusting signal paths in real time helps alleviate network congestion and optimise available bandwidth by steering signals around obstacles and directing them toward users.

One key advantage of coupling ISAC and RIS is their economic viability. These technologies do not require new base stations and minimal new hardware and investment. Instead, engineers can integrate them into existing network set-ups and avoid major infrastructure changes. ISAC uses existing base station set-ups, simply enhancing their operation with sensing capabilities. While RIS requires some investment in metasurfaces, the overall hardware investment is significantly lower than deploying new base stations or overhauling existing network infrastructure.

Potential use cases for ISAC and RIS

The combination of ISAC and RIS is promising for addressing network congestion and enhancing connectivity in a variety of applications, including broadband wireless communications, autonomous vehicles and smart manufacturing.

Broadband wireless communications

In urban environments where obstacles cause signal deterioration, ISAC and RIS overcome these challenges to enable robust, high-speed internet access. ISAC gathers intelligence about user locations and movements to optimise signal delivery. RIS uses building surfaces with reconfigurable elements that alter signals to overcome blockages and enhance connectivity based on the user locations ISAC provides.

Autonomous vehicles

In autonomous vehicle operation, ISAC offers customised communication services that enable precise and reliable communication for real-time decision-making. RIS allows engineers to manipulate the environment, ensuring the signal is focused only where needed. Using ISAC and RIS in autonomous vehicle communication supports safe and efficient operations by reducing accidents and improving traffic flow.

Smart manufacturing

Smart manufacturing relies on efficient communication and sensing to optimise production processes and improve operational efficiency. ISAC and RIS technologies facilitate these goals by enabling real-time data exchange and environmental monitoring within manufacturing facilities. ISAC's sensing capabilities provide detailed insights into machine operations and environmental conditions, while RIS ensures reliable connectivity by dynamically adjusting signal paths to avoid interference. This combination enhances the flexibility and responsiveness of manufacturing systems,

allowing for more efficient resource utilisation and reduced downtime, even in highly congested industrial environments.

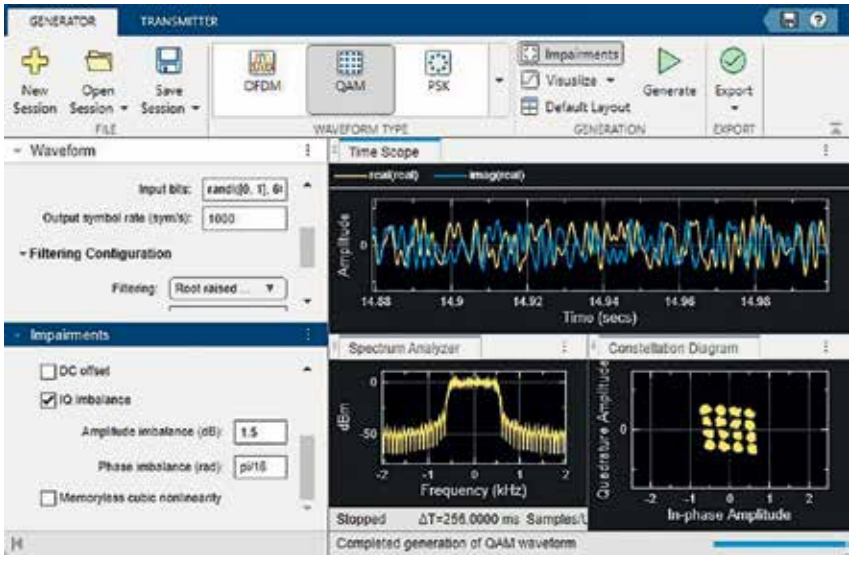
Best practices in ISAC and RIS deployment

Engineers should employ various best practices, including environmental modelling, custom waveform development, and advanced algorithm and hardware implementation, to effectively deploy ISAC and RIS into modern communication systems.

Precise modelling and simulation of the propagation environment are crucial for successful ISAC deployment. Any errors during modelling propagate and affect the final design. Path loss, multipath and signal reflection must all be accurately modelled to optimise performance and system efficiency. Additionally, it's essential to use ray tracing to model the wireless channel by simulating the reflection, refraction and diffraction of electromagnetic waves in the environment. Ray tracing requires extreme precision as it is susceptible to atmospheric effects. Modelling and simulation are vital because the accuracy of the propagation environment directly affects waveform effectiveness.

Wireless communication waveforms based on industry standards cannot be used in ISAC and RIS design. Instead, engineers must design custom waveforms to enable sensing and communication to work together seamlessly. Engineers can use the Wireless Waveform Generator app in MATLAB to generate standards-based waveforms. Carefully designed waveforms enable ISAC and RIS to achieve high-resolution sensing and maintain robust communication links. When it comes time to deploy ISAC and RIS systems, their success hinges on both the waveform design and the sophisticated algorithms and hardware solutions that manage the complex computations needed for accurate sensing and communication.

Deploying ISAC and RIS technologies requires developing efficient algorithms and advanced hardware solutions to ensure reliable real-time performance. Engineers must implement the algorithms primarily on field-programmable gate arrays (FPGAs) because of their high-speed processing capabilities, but this puts a burden on the real-time performance of the FPGAs. Therefore, the algorithms implementing ISAC and RIS must be optimised using FPGA-ready IP blocks.



Generating custom waveforms using the Waveform Generator app in MATLAB.

ISAC and RIS in 6G and beyond

As the era of 6G wireless communications draws closer, the challenge that network congestion presents grows with every passing day. The integration of ISAC and RIS has the potential to transform many industries by enabling simultaneous sensing and communication and optimising signal propagation and coverage. Their economic viability makes them even more attractive as they offer cost-effective solutions that take advantage of existing infrastructure without extensive overhauls. As engineers push the boundaries of 6G wireless communications and beyond, the synergy of ISAC and RIS will play a central role in shaping tomorrow's wireless networks.

**Ruth-Anne Marchant is Manager – Application Engineering and Training Services at MathWorks.*

Leveraging AI for increased public safety at the Brisbane Olympics

In 2032, Brisbane will be the first Australian city to host the Olympics since the turn of the century. As the city prepares, the number one priority for an event of this scale will be to ensure public safety.

With millions of visitors expected, heightened security risks and a recent rise in the national crime rate, we should embrace cutting-edge technology to create a safe and seamless experience for both visitors and residents of Brisbane alike.

Smart technology presents an unparalleled opportunity to revolutionise public safety, and the use of artificial intelligence-supported security cameras should be at the heart of our strategy.

This technology has advanced significantly in recent years. Unlike traditional security cameras that passively record footage, AI-enhanced systems can actively analyse real-time data to identify potential threats and automatically alert security personnel, allowing for quicker responses.

For Brisbane 2032, an integrated network of these security cameras could provide real-time monitoring across key locations: from stadiums, to transport hubs like the new Roma Street Station, and public gathering spaces.

There is a clear need for a technologically advanced public safety system, with expectations that the new Roma Street Station will service up to 46,000 people every weekday.

Furthermore, AI's ability to process vast amounts of data quickly is paramount in keeping people safe and helping authorities respond to threats more efficiently.

For example, AI systems can detect unattended bags, flag unusual crowd movements and recognise people exhibiting erratic behaviour, allowing security teams to act proactively rather than reactively. Integrating this with existing public safety infrastructure, such as emergency response systems and law enforcement databases, can create a unified security network.

Beyond immediate threat detection, AI can enhance crowd management by analysing pedestrian flow patterns to optimise crowd movement, thus preventing bottlenecks and ensuring easy access for emergency services. This capability is crucial for an event as dynamic as the Olympics, where thousands of spectators move on foot between venues, public transport and entertainment districts.

AI-assisted analytics can also predict high-traffic areas and suggest alternative routes in real time, improving both safety and efficiency. An example of this is facial recognition technology, which, when used responsibly and with proper privacy safeguards like at the 2025 Australian Open, can assist authorities.

Of course, with great technological advancement comes great responsibility. As Australia embraces AI-powered security, we must address privacy concerns and ethical considerations. Ensuring compliance with Australia's privacy laws and engaging the public in discussions around AI ethics will be essential in fostering public trust and acceptance of this technology.

The 2032 Brisbane Olympics is a unique opportunity for Australia to showcase its leadership in AI-driven public safety and enhance security to lay the groundwork for safer cities in the future. The time to act is now. Let's harness AI to make Brisbane 2032 the safest Olympic Games yet.

Joe De Martino is a security specialist at Dahua Technology — one of the world's largest security providers, specialising in cutting-edge AIoT video monitoring — with over a decade of experience within the artificial intelligence of things industry. He now focuses on leading specialist training programs for home security experts, as community safety becomes increasingly important.

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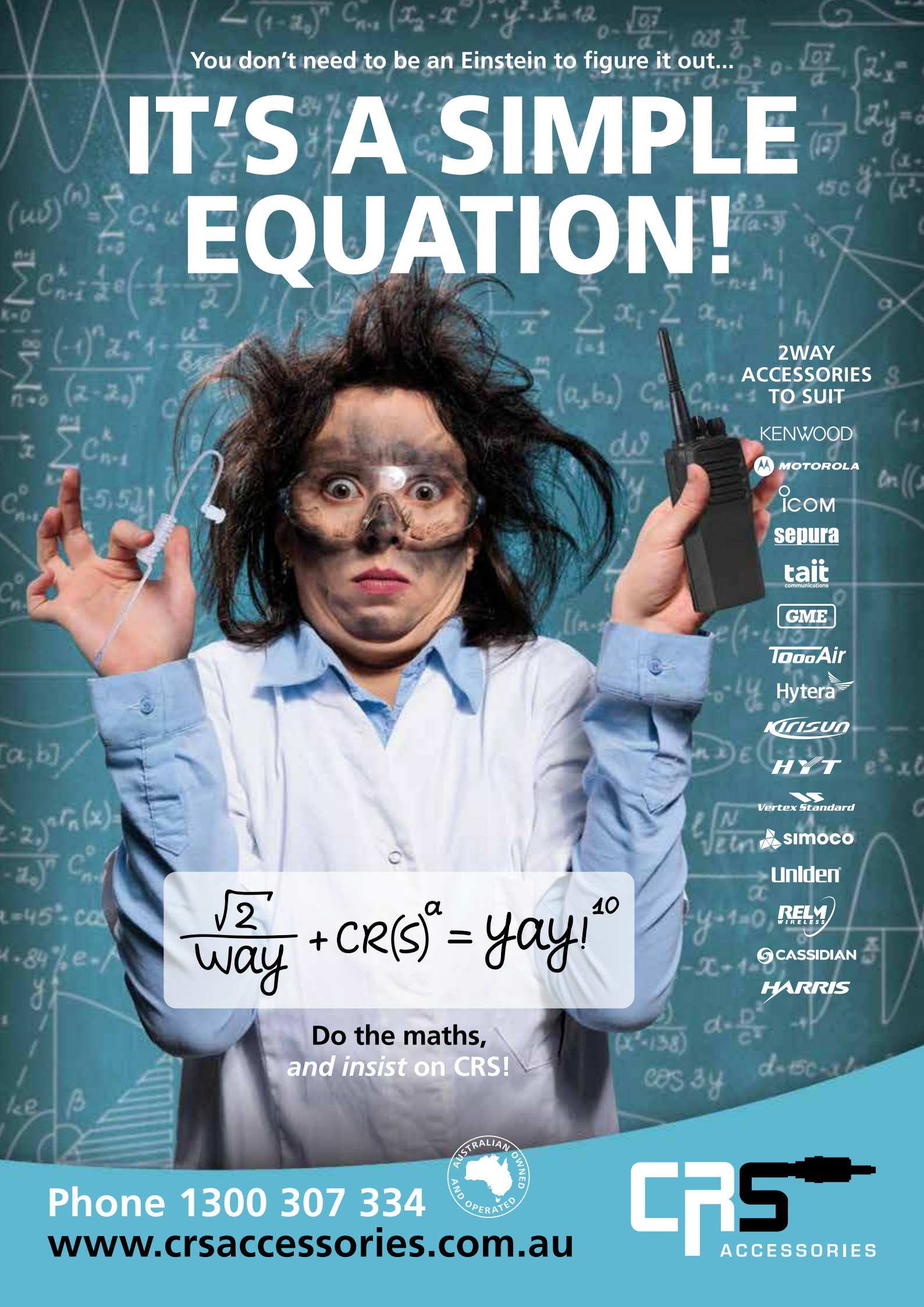

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