MAY/JUNE 2021 Vol.8 No.4

critical comms

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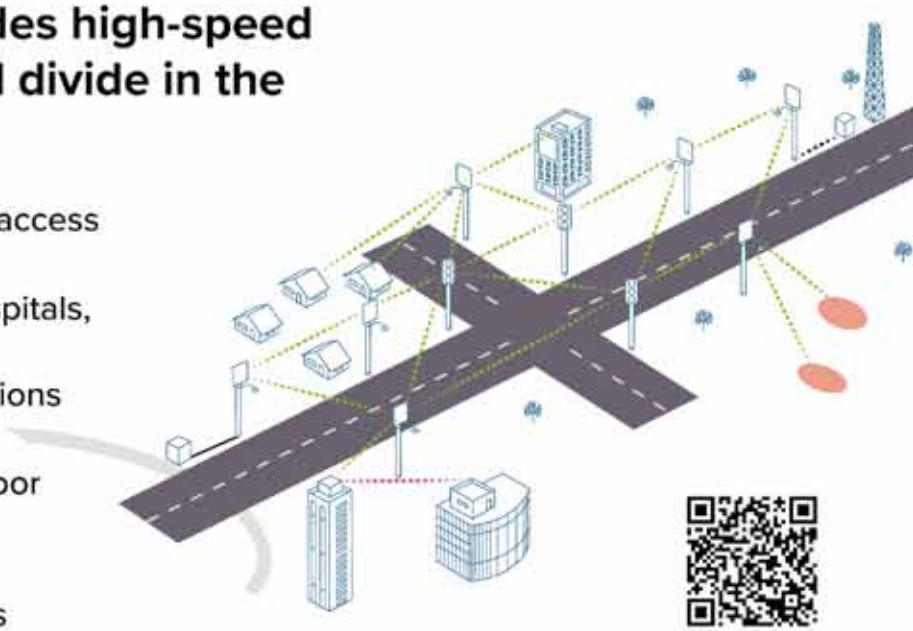

www.cambiumnetworks.com/cnwave/

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comms critical

Inside

May/June 2021

Cover image: © Stock.Adobe.com/au/Tomasz Zajda

READ ONLINE! *This issue is available to read and download at*
www.criticalcomms.com.au/magazine

ON THE COVER

Built tough, users can depend on the all-weather performance from the KENWOOD TK-3710X CB.

The TK-3710X meets international ingress protection standards for IP67 and can be immersed in water for 30 minutes at a depth of 1 metre. The radio also meets or exceeds eleven MIL-STD 810 C/D/E/F/G environmental standards.

The TK-3710X packs 1 W of audio power from its internal speaker and offers superb clarity. From component selection and construction to optimisation, evaluation and analysis, the KENWOOD difference is loud and clear as an audio expert.

KENWOOD's TK-3710X is more than just a CB radio: enterprises can make use of 128 private channels 128 zones/128 channels per zone (Frequency range: 450–520 MHz TX/RX).

Bundled with all of the accessories needed to start using the radio today. It comes with a high-capacity IP67-capable Li-ion battery to deliver long hours of operation; the bundle also includes belt clip, charger and antenna.

The TK-3710X uses standard KENWOOD two-pin accessory connector and is compatible with all accessories of this type, making it a great radio to replace older legacy models.

JVCKENWOOD Australia Pty Ltd
www.kenwood.com.au

Transmit

Other than growing up in the 70s hating the song 'Convoy' by CW McCall, I did not take much notice of two-way radios. Until I was invited to join the crew of a yacht racing on Port Phillip, Victoria, gearing up to do the Melbourne to Hobart yacht race.

Having previously only sailed on dinghies, this was a big step up. Although honoured, I was only too aware of my lack of experience, I figured I needed to do all I could to make myself irreplaceable; so I signed up for a radio operator's licence course.

Over my ensuing decades of ocean sailing, it is still one of the handiest things I did; eclipsed only by a first aid course.

As you can gather, I have taken over as editor for *Critical Comms* media from Johnathan Nally. He has moved on to other ventures and WF Media and I wish him well. He has left a fantastic legacy that I hope to continue.

While, once again, my knowledge base may be lacking, my keenness to get cracking is not. I intend, once more, to make myself just as irreplaceable to industry. So here is my first issue of *Critical Comms*, with residual assistance from Mr Nally.

I already see issues ahead and I am ready to talk with you all to bring these issues, plus answers, to the fore.

If you have company news of your products and services to promote then please send them to: cc@wfmedia.com.au.

If you wish to have a chat and talk shop, sorry I do not have a two-way, but please feel free to contact me directly and let's get ourselves a convoy (I promise I will never make that joke again).

Phillip Ross, Editor
cc@wfmedia.com.au

Calendar

May

Comms Connect New Zealand 2021
12–13 May 2021
LHEC, Wellington
comms-connect.com.au

June

Critical Communications World 2021
8–10 June 2021
IFEMA, Spain
critical-communications-world.com

August

AFAC21
17–20 August 2021
Sydney
afacconference.com.au

September

IWCE 2021
27–30 September 2021
Las Vegas
iwceexpo.com

October

EENA Conference & Exhibition 2021
6–8 October 2021
Riga, Latvia
eenaconference.org

Comms Connect Melbourne 2021
19–21 October 2021
Melbourne Convention & Exhibition Centre
comms-connect.com.au

November

Critical Communications World 2021
3–5 November 2021
IFEMA, Spain
critical-communications-world.com
Read more: https://www.criticalcomms.com.au/events#ixzz6siqprzor

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

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connecting industry

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- Directional Antennas
- RF Accessories

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STEPGLOBAL

5G AND CYBERCRIME:
WHY 5G IS MORE COMPLEX TO SECURE THAN OTHER NETWORKS

Brian Grant, ANZ Director, Thales

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The 5G conundrum leaves embedded security as the key to Australia's critical infrastructure safety.

Cloud, the Internet of Things (IoT) and telco networks are all at the forefront of data privacy and cybersecurity conversations in Australia. This is not new — everyone agrees higher levels of security are needed to face the challenges arising from today's accelerated digital growth rate.

What is new, however, is that over the next three to five years most of the technologies aforementioned and organisations' digital platforms, which are already facing increased cyber threats, will rely directly or indirectly on 5G networks. This includes our national infrastructure as well as organisations from critical infrastructure sectors including banking and finance, government, communications, energy, food and grocery, health, transport and water.

This reliance on 5G, while providing fantastic opportunities, will also greatly increase the cybersecurity risk for our economy and for Australia as a nation.

Before 5G becomes a keystone to our economy, it is important we understand how to better secure it for a safer connected future.

5G's balancing act: a world of opportunities in a heightened cyberthreat universe

5G will offer organisations unprecedented opportunity, radically enhancing the way enterprises and government capture, store and use data.

This will have particular benefits when looking at the growing number of IoT devices used by those critical infrastructure sectors. With 5G, connected devices will be able to generate and exchange a wide variety of high- and low-value data at much greater scale, leading to a lower price point.

It will increase the extent and speed at which data and insights can be analysed –— thanks to greater machine learning capabilities — to help drive new digital services, faster and cheaper.

5G will also offer latency of a few milliseconds, enabling organisations and service providers to operate highly autonomous systems that are geared towards specific requirements.

Critical and vital industries such as health care, financial services, energy and more are already heavily investing in or exploring the potential of 5G.

However, 5G poses unique threats that need specific considerations and approaches. In particular, concerns are rising around data confidentiality, integrity and availability: these are intrinsic to safe and reliable operations, yet most organisations in critical industries are not fully prepared to guarantee its safeguard.

Addressing the unique intricacies and challenges of securing the 5G network

First of all, the architecture behind 5G itself poses new risks to the security of data.

Historically, network functions resided on their own propriety hardware platforms, the physical isolation of which provided a particularly strong level of protection. However, network function virtualisation (NFV) –— whereby network functions rely on software and run on virtual machines (VMs) –— means that, going forward, network elements will be distributed as and reside in software.

This poses a risk of contamination from malware to the networks themselves or the infrastructure that is connected to the network.

Secondly, to deliver ultra-low-latency requirements, many of the new 5G applications are hosted in data centres at the

edge of the network (mobile edge computing, ie, MEC). Edge locations typically have fewer physical protections or computing security controls and new use cases that employ edge computing subsequently increase the attack surface, exposing organisations to greater risks.

There is also a risk that 5G could actually be too fast, chiefly when we look to automate actions based on data, known as zero-touch automation (ZTA).

In practice, this could mean that corrupted data from hacked or compromised devices automate the wrong or even harmful outcomes. The high level of automation could also unwittingly help malware spread throughout a system or to third-party and downstream systems that would otherwise be secure.

Finally, we have seen the software and technologies that have driven the digital economy over the last decade being weaponised to steal, expose, compromise or block access to data.

With 5G being the first ever cellular generation to launch in the era of global organised cybercrime, nation states are implementing aggressive cyber programs — this raises many concerns in terms of the scale, depth and impact of a successful cyber attack. This is particularly worrying considering the increased attack surface brought by the billions of devices expected to be connected to the internet in the next couple of years –– massive denial-of-service attacks could be performed by coordinating thousands or even millions of devices.

We absolutely need to prioritise the protection of the network and the data at the source, before looking at other, more superficial, security layers.

Promising regulatory conversations and initiatives: a first step

For the past year, we have seen positive conversations and initiatives happening at a national and state level, some of which rightly call for embedding security at the core of the technologies and networks themselves.

The Australian Strategic Policy Institute has, for example, called for the Australian Government to implement 'Clean Pipes', a default level of security delivered to customers that prevents cyberthreats at the source of the network provided to them.

The Department of Home Affairs is currently progressing the Protecting Critical Infrastructure and Systems of National Significance reforms, a key initiative of Australia's Cyber Security Strategy 2020 and part of the Security Legislation Amendment (Critical Infrastructure) Bill 2020.

The NSW Government-sponsored taskforce of industry leaders has recently called on federal, state and local governments across Australia to adopt internationally recognised cybersecurity standards for cloud services. It has also urged governments to evaluate proposals or tender bids more favourably from companies that adopt cybersecurity and other risk standards for telecommunications and IoT.

It is important we move those conversations further, to start actively protecting infrastructure, systems and technologies so they can be highly secure when 5G peaks.

Embedded security the only way: a change of mindset needed, today

5G will expand the attack surface, with data and digital systems being located anywhere from a few metres from its origin to miles away in the cloud with billions of devices as potential attack vectors.

Unfortunately, we cannot rely on users to provide the extra level of security needed in such a highly connected world. Each new data breach report we see points to users –– humans –– being one of the biggest risk factors in cyber incidents and data breaches.

We need to move away from user- and computer-centric approaches and instead focus on the systems, data and network. Security needs to be embedded, woven into digital systems as well as into organisations' operations and processes.

Codifying security

It is vital that any edge computing and its locally stored data is physically and logically secured, typically using public key infrastructure (PKI) and encryption. With any solution supporting low processing latency, wide geographical diversity, centralised management and integrated threat alerting are a must.

Luckily, much of the automation required for codifying PKI, encryption and granular access control is already available and has been deployed successfully. We just need to go further.

Cohesive security from the edge to the core

Traditional security, such as encryption of data in transit, should be augmented with the securing or anonymising of the data as it is collected at the edge.

Edge data security should be able to be systematically integrated with downstream processing, such as in cloud applications. This will require organisations to embrace holistic security platforms and move away from point security solutions — often favoured by application providers or developers.

Keys as the root of all trust (even in the zero-trust era)

The keys needed to secure networks, machines, devices, users and data must be protected and managed in a highly secure manner to ensure integrity of the digital systems and its operations.

Legacy approaches of storing security keys in software or applications, or of storing keys and the data it is protecting together, are untenable and too easily exploited in the current cyberthreat landscape.

To ensure integrity of critical infrastructure, security needs to be implemented end to end from the device to the corresponding application in the cloud, ensuring systems and data can be trusted and only authorised access is allowed at either the application or user level.

Trust in the digital ecosystems that we build is what will allow organisations –– and Australia as a nation –– to reap the benefits of 5G. As such, it is critical that industry and government work together to re-think, re-frame and re-strategise our overall cybersecurity posture to focus on embedded security first.

Thales Australia
www.thalesgroup.com

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Tropos outdoor mesh routers deliver high reliability and performance in extreme application environments.

Mobile capability is immediately available on the full Tropos portfolio. Mobile use cases supported include fleet management, telematics, autonomous vehicle control and Wi-Fi hot spots for mobile workers. The routers can be mounted on service vehicles, drilling rigs, mining equipment, and cranes, providing mobile communications within the Tropos broadband mesh cluster. Mobile capability or fast roaming will be made available through the latest firmware release, 8.9.3. Customers with an existing software maintenance plan can download the update free of charge and install it remotely via the Hitachi ABB Power Grids' Supros network management system.

The industrial-grade Tropos portfolio is specifically designed for mission-critical applications in harsh environments such as mining, oil & gas, utilities and smart cities. Products supported include Tropos 6420-XA for extreme outdoor environments including salt fog resistance and ATEX Zone 2 for explosive atmospheres, Tropos 6420 and 1420 for external mounting, and Tropos 2420 for mounting inside a vehicle. All are dualband routers operating at 2.4 and 5GHz, providing an extremely reliable and secure self-healing broadband mesh network.

Wireless Tech Australia Pty Ltd
Unit 1/63-79 Parramatta Road
Silverwater NSW 2128,
Australia

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WirelessTech

COMMS CONNECT NZ

The bubble opening allowed a top line of presenters to appear at the conference.

The opening of the Trans-Tasman travel bubble permitted another regional industry leader to be added to the Comms Connect New Zealand conference program, held in May.

ARCIA President Hamish Duff presented a paper on how hybrid LMR/LTE devices are breathing new life into the LMR sector. The final slot in the program was filled with Intelsat's Robert Suber, who presented a paper on delivering high-throughput satellite connectivity for critical communications.

Hundreds of critical comms and public safety professionals gathered in Wellington for Comms Connect New Zealand on 12 to 13 May, with a program full of quality technical and technology-focused presentations. The highlight of day two was the expert panel session, chaired by CartGIS MD Chris Stevens, to discuss where the future of the industry lies and how best to optimise the available resources and funding.

The conference featured three international industry leaders presenting by video, including the CTO of the First Responder Network Authority in the USA, Jeff Bratcher, who delivered an update on their mission-critical push-to-talk deployment. The Public Safety Network's Drew Delaney, also appearing by video, presented a US perspective on smart EMS solutions.

Co-moderator Chris Stevens delivered his well-received presentation from Comms Connect Virtual last year: 'Big data integration — using the power of GIS as an integration tool for spatial and non-spatial data'.

Other additions to the program included: Mike Smith, Chairman of the Wireless Internet Service Providers Association of NZ, delivering a paper titled 'Internet of Things — a role for wireless ISPs in rural IoT'; plus ARE Chairman Don Robertson, with a session titled 'Supporting New Zealand's SAR, Civil Defence and other emergency services through expert volunteers'.

With the travel bubble opened up, the event registered a number of critical communication and public safety professionals coming from Australia to add to the already strong registration numbers from New Zealand.

Comms Connect Melbourne is next in line this October and is looking for presenters and exhibitors. Visit: https://melbourne.comms-connect.com.au

Comms Connect (WFevents)
www.comms-connect.com.au

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Forget building out or maintaining a costly radio infrastructure. Get your team up and running quickly by deploying nationwide* push-to-talk without the need for costly or time-consuming connectivity infrastructure licensing, or manual programming. You can even use the TLK Series radios with your current compatible LMR radio systems and smartphones.

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News

Image courtesy NBN Co.

100 SATCOM DISHES INSTALLED ON RURAL FIRE SERVICE BUILDINGS

Satellite dishes to provide NBN connectivity have now been installed on 100 Rural Fire Service building and evacuation centres across Australia under the $37.1 million Strengthening Telecommunications Against Natural Disasters (STAND) package.

The dishes are connected to the NBN's Sky Muster satellites, which cover all 7.7 million square kilometres of Australia.

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ARCIA PROFESSIONAL DEVELOPMENT TRAINING PROGRAM FOR 2021

The Australian Radio Communications Industry Association is working to resume its professional development training program for the year. In addition to increasing the number of training options over the coming 12 months, it is also adding new training topics to the program.

Half-day training topics are intended to include:

- multi-coupling and filtering fundamentals
- tower earthing and lightning protection fundamentals
- mapping and GIS fundamentals
- communications antenna fundamentals
- DC power fundamentals
- basic private LTE/5G system design fundamentals.

Full-day training topics include:

- radio communications antenna and transmission line testing
- advanced DC power systems and design.

Discounts for early bird training bookings and ARCIA members will be available. Check the website.

1RU power supplies/chargers

The Pro Series line of DC power supplies is a high-performance, high-efficiency 1RU DC power supply. The core of the series is derived from the ICT Digital Series power supply design that delivers high efficiency, power factor corrected AC input, space-saving 1RU chassis and an optional battery backup terminal with integrated low voltage disconnect.

ICT Pro Series DC power supplies provide 690 W of power with 12, 24 or 48 VDC output. They provide a suitable low-cost, entry-level DC power solution for wireless communications professionals who require cost-effective, high-efficiency space-saving DC power systems for LMR, broadband and network communications equipment including radios, repeaters, trunking systems, paging systems, RF amplifiers, microwave, WiMax, routers, bridges, multiplexers and VoIP.

The Pro Series is also suitable for industrial power applications such as security systems, transportation, process control and DC in-building power systems.

Pro Series models all provide the following key features: 690 W of output power in a 1RU rack mount chassis with 90 to 93% efficiency; 12, 24 and 48 VDC output voltage models; wide-ranging power factor corrected AC input helps reduce energy costs; optional factory-installed battery backup with low voltage disconnect; Form C alarm and remote shutdown contacts standard.

The ICT Pro Series is designed and manufactured in North America to provide the flexible DC power solution available today for wireless communications, broadband and other demanding DC power applications.

Helios Power Solutions

www.heliosps.com.au

Router for vehicles

Cradlepoint has launched its R1900 ruggedised 5G edge router, powered by a Cradlepoint NetCloud subscription service that includes cloud-delivered software, endpoints, training and support. It is optimised for in-vehicle networks and offers ruggedness, performance, security, connectivity and utility in a compact design.

The R1900 supports nationwide coverage low-band and capacity mid-band networks at speeds up to 1 MP/s as well as gigabit LTE. As 5G proliferates, enterprise and public sector organisations will take advantage of secure and fibre-fast 5G mobile networks to enable immersive applications for field force productivity and enhanced user experiences.

The IP64-rated R1900 provides wireless and wired connections in a rugged, compact design with optimal port placement to ease installation.

Cradlepoint Australia Pty Ltd

www.cradlepoint.com

5 WATT IP67 UHF CB HANDHELD RADIO

Introducing the all-new Australian Made 5 Watt UHF Pro CB Handheld Radio from GME, the TX6600PRO. With a rugged IP67 ingress-protection rating ensuring exceptional performance and years of reliable use in the harshest working environments the TX6600PRO is built tough, setting a new benchmark for professional-grade UHF CB Handheld Radios.

We have designed the TX6600PRO to suit a wide range of demanding commercial applications from construction to mining, civil projects, councils and utilities, and countless other industries that require private, dependable communication to get the job done safely and efficiently.

Key features of the TX6600PRO include 5/ 1/ 0.1 Watt switchable transmission power, 119 dealer-programmable private channels, IP67 Ingress Protection, alpha-numeric display, rotary channel selection with voice announcement, multiple power saving modes, two priority channels, and triple watch.

Designed, engineered and manufactured in Australia, the class-leading TX6600PRO is backed with a 5-year warranty.

GME

gmeprofessional.com

AUSTRALIAN MADE

News

FEASIBILITY TRIAL CONTRACT FOR PUBLIC SAFETY MOBILE BROADBAND PROGRAM

A contract to develop a feasibility trial for the Australian Public Safety Mobile Broadband program has been signed.

As a result of the Royal Commission into National Natural Disaster Arrangements and its implementation of recommendations for Australian, state and territory government implementation, recommendation 6.4 sought the delivery of a public safety, mobile broadband capability.

The NSW Government, on behalf of all state and territory governments, and the Australian Government have committed to work with Nokia, TPG Telecom and Optus to develop and test technology in a trial that will help shape the design of the national platform for emergency service communications.

The Commonwealth is also exploring additional opportunities and technologies, such as satellite communications, that might augment a PSMB capability into the future.

GLOBAL TWO-WAY MARKET REPORT RELEASED

The global push-to-talk (PTT) market size is projected to expand steadily at over 8% through to 2031, according to a report available from Fact.MR.

Preference for land mobile radio (LMR) systems and the proliferation of rugged mobiles have propelled industry growth during the previous five years from 2016 to 2020.

The LMR segment is leading the market in terms of network type.

As a result, this network type is expected to dominate further. Another key segment in terms of network type is cellular.

Measurement tool for signal strength and quality

The ETM Pacific 770 is a user-friendly handheld tool for measuring, logging and displaying all key 4G LTE, 3G and 2G cellular signal strength and signal quality parameters. Functionality and useability have been enhanced with support for the latest LPWAN (Low Power WAN) IoT services available on 4G/LTE networks; LTE-M/CATM1 and NB-IoT/NB1 & NB2 with support over 20 frequency bands ensuring device will work on any private or public network in ANZ with any APN.

The ETM770-x is used widely by installation professionals deploying cellular enabled IoT devices such as smart meters, routers, modems and can also be used to rapidly determine optimal antenna type, size or location.

Technicians can see accurate and instant display of key signal quality parameters; RSRP, RSRQ, RSSI, SINR in addition to GPS location data. Displayed data is stored locally and can be simultaneously uploaded in near real-time to ETM hosted cloud dashboard for later retrieval and archiving.

A SIM from the desired cellular network operator is inserted providing actual end to end connectivity information including Ping Test data. The unit is recharged from standard USB chargers supplied in the kit which includes a wide range of accessories and optional rugged silicon protective cover.

ETM Pacific Pty Ltd
www.etmiot.com.au

Radio-activated body cameras

Motorola Solutions has announced an integration between its V300 body-worn cameras and mission-critical APX Project 25 (P25) two-way radios.

Video, nowadays, serves as a crucial piece of evidence for law enforcement while also serving as an essential ingredient for building trust and transparency with the communities they protect. The integration is designed to automate officer tasks and capture evidence in the most critical moments by activating a body-worn camera recording when an officer triggers the emergency mode on their radio.

For example, an officer who may come under attack will need to call for backup, but will also need to keep full focus on the assailant. By pressing the emergency button on their radio, the officer is able to alert the dispatcher of their situation and, simultaneously, begin recording on the body-worn camera. A real-time, unbiased perspective of the evolving situation is captured.

If the body-worn camera is connected to the officer's 4RE in-car video camera system, or their partners' body-worn cameras, these will also start recording.

Other automated tasks can be included: automatically activating the body-worn camera and the in-car video when an officer steps out of the vehicle, when the vehicle exceeds a certain speed or when the lights and sirens on a vehicle are turned on.

Motorola Solutions Australia Pty Ltd
www.motorolasolutions.com.au

The Power of Reliability

SIMPLIFY YOUR LIFE

DC Power Supplies with Built-in Battery Charging and Low Voltage Disconnect Save Time and Money

When designing wireless communications sites utilizing small indoor or outdoor DC power systems, it can be challenging to select which components to use. Panel mount or DIN rail? Integrated battery charging or extra module? Low voltage disconnect? Remote alarm capability?

The ICT IntelliCharge Series helps solve this dilemma by providing a 360 watt DC power supply that runs your loads, charges your battery with temperature compensated charging, and incorporates a low voltage disconnect so you don't need to add separate modules or devices, saving space, cost, and installation time.

The IntelliCharge Series can be panel, DIN rail, shelf or rack mounted, and is available with 48, 24 or 12 volt DC output. The battery charge current is adjustable, and form C contacts provide a remote alarm signal to help you manage the site.

If you are looking for an easier, fully integrated DC power solution for your cabinets or enclosures, consider the ICT IntelliCharge Series of DC power supplies.

DIN rail mounting accessory available

Available with or without OLED high resolution display

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Industry Talking

ARCIA is looking forward to many face-to-face events this year as we begin to ramp up our program out of COVID lockdowns. We have made the decision to commit to industry training, and events are starting to be organised. ARCIA would like to thank all the people who are contributing to the effort to get this all happening.

The plan is to offer industry-based training aimed at basic concepts to begin with and as we build up content and interest move to more complex industry topics.

ARCIA has also started a separate training fund to assist paying for content creation and other costs associated with training. This is only possible because of the kind donations by life members of the association starting with Stan Goodwin. Stan really wanted to find a way of giving back to the industry; helping to train people in all things LMR is the perfect way.

For all ARCIA members and industry professionals, please engage with the team and training events. We need your people to be trained and feedback is essential to improve the program over time. We have also had some interest from groups wishing to have the training done in situ and that may be possible in some circumstances.

ARCIA has had informal discussions with the ACMA earlier in the year on a number of topics. A date has been set for the introduction of the new Radio Communications Act, which we believe will come into force from 17 June 2021. The new Act is described as evolutionary rather than revolutionary and we expect that any short-term impacts to industry will be minimal. There will also be a move away from industry standards to 'equipment rules', which will be simpler and reflect international standards.

There was also discussion about having better access to specific information on the ACMA website that is sometimes difficult to find. ARCIA will look for ways to share what we think are relevant links on the ARCIA website.

Good to see some action on the Public Safety Mobile Broadband plan. The industry supports all action to improve public safety communications. The press release contained the sentence "to replace UHF LMR communications"; however, that seems to go against current trends. With recent public comments about support for PROSE and LTE direct mode it seems like LMR will be around for some time to come.

Simply providing network coverage for all the bushfire prone areas is a daunting prospect for any technology. ARCIA believes that a range of technologies will be required to meet the needs of public safety for the foreseeable future.

While the economy is rebuilding it seems that most industry providers are busy and that projects are moving ahead. The resilience of the communications industry highlights the importance of communications to all the things that keep the lights on.

Planning is underway for the ARCIA annual gala dinner in Melbourne in October. We think the theme for 2021 should be a welcome back party after the last 18 months of lockdowns. So mark your calendars and plan your trip to Melbourne for Comms Connect and the largest industry event of the year.

Hamish Duff, President
Australian Radio Communications Industry Association

PTX service and TLK devices

The Wave PTX service and TLK devices can keep employees connected and accountable with crisp, clear audio, location tracking and Wi-Fi. With a long battery life, the series can maximise efficiency with single-button operations and improve focus without a large distracting screen to get in the way.

Forget building out or maintaining a costly radio infrastructure, Wave PTX can be set up quickly by deploying nationwide* push-to-talk without the need for costly or time-consuming connectivity infrastructure licensing, or manual programming.

The TLK series radios can also be used with current compatible LMR radio systems and smartphones.

The Wave PTX is available as a monthly investment and users can scale their service to match their business needs.

Users can reduce or stop their service easily, at any time.

**Coverage will vary.*

Ace Communication Distributors Pty Ltd
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5G microwave transport portfolio

Nokia has expanded its Wavence portfolio to provide indoor and outdoor solutions with a microwave solution for all uses covering short-haul, long-haul, E-Band and SDN to support operators with 5G networks.

Two compact split-mount solutions for 5G backhauling are enabled by the MSS-E and MSS-HE indoor units. These compact units can handle a temperature range spanning -40 to 65°C. This is achieved without fans, reducing periodic maintenance.

A full outdoor nodal configuration, which includes a compact networking interface module (NIM), can be used for new deployments or upgrades to an installed UBT base. This flexible, zero-footprint solution can be plugged onto a standard ultra-broadband transceiver (UBT) offering multiple directions, multiple interfaces and carrier aggregation. One NIM attaches to all UBT types, specifically UBT-m (80 GHz), UBT-T (Twin), UBT-S (Single).

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INTERVIEW WITH BAI COMMUNICATIONS' BRENDAN O'REILLY

Q&A with the recently appointed group chief technology officer.

Based in London, Brendan O'Reilly joined BAI communications (BAI) in March this year with the focus on accelerating the expansion of BAI's neutral host solutions and magnifying its strengths as a telecommunications infrastructure service provider.

"First and foremost, however, I want to make a significant contribution to enabling the business to deliver for its customers in their new, as well as existing, pursuits," O'Reilly said. "Our customers are in a fast-changing market and need to adapt and provide great service quickly and we can help them achieve this. Through this work, I want to place BAI at the head of thought leadership in the 5G space."

Critical Comms sent Brendan some questions on his past, present and future.

Firstly, please tell us about yourself and your background.

I joined BAI from Telefónica where I worked for 17 years, most recently as the chief technology officer for O2's UK operation for six years where I was responsible for O2's strategy, design, planning, test, delivery and operation of the entire mobile and fixed network, messaging and Wi-Fi. I was supported by a team of more than 700 professional engineers who helped me lead the development of O2's network share partnership with Vodafone, O2's fastest 4G deployment in the UK and the recent launch of its 5G network.

What I do professionally is very much a part of delivering the best customer experience, which is at the heart of how I work, knowing that the people in my team and the other teams I'm part of are key to achieving this. I'm a strong advocate for the people with whom I work, and I actively support their development and self-learning.

BAI is an Australian company but with interests around the world, is that the best way of describing it? In which countries do you operate?

I would describe BAI Communications as a global team of telecommunications engineering experts and technology innovators that partners with public and private enterprise to design, build and operate highly customised and future-ready, cellular, Wi-Fi, broadcast, radio and IP networks.

Our global operation spans North America, United Kingdom and Hong Kong as well as Australia and specialises in delivering complex transit and telecommunications solutions — putting cellular, wireless and Wi-Fi networks in challenging and confined environments. In fact, we're an industry leader in providing 5G ready, futureproofed, neutral host wireless and fibre-optic services tailored to suit the local environment.

This capability sees us responsible for significant infrastructure projects that deliver cellular and Wi-Fi coverage in the major cities of New York, Toronto and Hong Kong. Our connectivity solutions are also relied on by emergency services teams across New South Wales and public transit emergency services in New York and Toronto.

Can you give us a brief history of the company — where/how it started and its evolution into the present company?

Over the past two decades, since privatisation in 1999 and sale to Macquarie Bank in 2002, acquisitions and organic growth have led to BAI's business expansion around the world, leveraging our expertise and capability to design, build and operate communications infrastructure in complex environments. Since 2009 Canada Pension Plan Investment Board (CPP Investments) has been BAI's majority shareholder and a trusted long-term investor that actively invests in infrastructure assets around the world; plus a strong supporter of BAI's evolution.

A large part of our growth and acquisition to date has been focused on North America. In 2010, BAI acquired a majority stake in

Transit Wireless to design, build and operate communications infrastructure in the New York subway in a public-private partnership with the Metropolitan Transportation Authority (MTA). In 2012 a contract to build two ground-stations to provide wideband satellite services for the Department of Defence and an exclusive long-term contract with the Toronto Transit Commission (TTC) cemented our presence in Canada.

We have also grown in the Asian market through acquisition of Hong Kong-based Radio Frequency Engineering (RFE) in 2007, which has seen our strong relationship with the MTR Corporation flourish since. Our newest office in London, which we opened in 2016, underlines BAI's long-term commitment to the UK and desire to expand its European presence in coming years.

However, BAI's heritage lies in Australia with decades of expertise in building, operating and maintaining towers for broadcasting operations, even though today the company is very much a global one. BAI began operating a century ago by transmitting ABC radio programs and now provides television and radio broadcasting services to most Australians. Having evolved from a local broadcaster to a global communications infrastructure provider, BAI Communications is well placed to deliver on the goals and growth trajectory set out in the global strategy by Group CEO Igor Leprince last year.

What are your main operations (and clients, if you can mention them) in Australia?

We provide services to all major TV and radio broadcasters in the country. In fact, BAI operates one of the most extensive broadcast networks in the world across more than 700 sites in Australia and is the largest and only truly national broadcast network in the country. We provide over 2000 fully managed television and radio broadcast services, delivering about 130 million broadcasting hours to 99% of the population as well as providing tower and fibre co-location services for mobile network operators (MNOs) and other service providers, enterprise and public sector customers. In times of crisis, such as natural disasters, national broadcasters rely on BAI to maintain their connection with Australians and emergency services rely on us to help keep them informed. Additionally, in NSW, we also operate and maintain the New South Wales Government's Public Safety Network for the NSW Telco Authority (NSWTA).

Decades-long contracts with national public broadcasters ABC and SBS have seen BAI manage the Australian transition from analog to digital television, among other broadcast milestones. Throughout that transition, we worked together with the broadcast industry to provide spectrum-planning advice to the Australian Communications and Media Authority. Today, we are applying our expertise to develop the broadcast and telecommunications networks of the future; for example, bringing the first 4K television broadcasting trials to Australia.

> BAI BEGAN OPERATING A CENTURY AGO BY TRANSMITTING ABC RADIO PROGRAMS AND NOW PROVIDES TELEVISION AND RADIO BROADCASTING SERVICES TO MOST AUSTRALIANS.

During 2019, we were delighted to forge long-term agreements with Australian commercial broadcasters Network 10 and Southern Cross Austereo (SCA). Additionally, we acquired SCA's broadcast transmission network as part of our long-term managed services agreement to broadcast free-to-air-television and radio services across Australia.

Most recently, in November last year, the Australian Communications and Media Authority granted BAI a carrier licence, laying the groundwork for expanding our outdoor neutral host solutions and bolstering our strength in broadcasting. As the holder of a carrier licence in Australia, BAI Communications can host and carry services on behalf of the MNOs from our infrastructure that is proactively maintained and upgraded when necessary.

Can you describe some stand-out projects BAI has been involved in in recent years?

BAI's impressive track record for completing projects on time and under budget, from large-scale infrastructure to supporting applications, is a stand-out in and of itself. However, its skill and experience in delivering the next wave of connectivity solutions for MNOs, broadcasters, transit operators and governments — that is our differentiator.

In the US, Transit Wireless has designed, built, owns and operates one of the largest neutral-host wireless networks in the world within the New York City subway system. Our infrastructure supports secure private networks, public safety and transit communications, as well as public Wi-Fi, cellular and broadband wireless. Transit Wireless also provides MNOs with cellular and Wi-Fi connectivity for their customers across large infrastructure projects, including the New York City subway system. Numerically speaking, it provides 160 miles of fibre to service 283 underground stations on 22 subway lines, serving about 5.3 million riders on any given weekday.

Transit Wireless is the exclusive long-term provider contracted to finance, design, build and maintain the public Wi-Fi in all New York City underground stations. This state-of-the-art network covers 243 square miles with a 160-mile fibre-optic backbone, 5000 Wi-Fi access points and a distributed antenna system (DAS) with over 7000 antennas, making it one of the world's largest DAS and Wi-Fi systems. Across New York, Transit Wireless has five data centres built to run the cellular and Wi-Fi network, optimised for edge computing and ready to take on future 5G developments. Thus, with our 27-year contract, we are in a unique position to help usher in smart city technology as 5G evolves.

In Hong Kong, BAI digitally enables 2 billion underground passenger rides every year across the 218-kilometre metropolitan network, which is one of the world's busiest rapid transit railway systems. The driverless train applications that we support have the capability and connectivity to transmit real-time video surveillance of carriages to a remote-control centre and real-time data and alarms are carried by the MNO 4G network as well as the private track-to-train wireless network we built.

In Toronto, one of our more recent projects has seen BAI develop and implement a data analytics solution that provides insights into foot traffic and crowding conditions throughout the subway system. These insights help the TTC identify and manage overcrowding more effectively, which enables better resource allocation and improves incident response times — proactively resolving issues before conditions become hazardous. Obtaining a complete view of the subway's day-to-day usage helps the TTC make better informed transit planning decisions. Our communications infrastructure network includes Wi-Fi, cellular and IP connectivity that covers all 75 subway stations, backed by 75 km of fibre optics deployed throughout the TTC subway system. This network also provides connectivity for various applications including connectivity services for 1600 PRESTO fare payment devices.

Back in Australia, our work for the Public Safety Network (PSN) sees us managing more than 200 sites nationally to facilitate communication among emergency services as well as transport, energy and environment services providers. The PSN is one

of the world's largest government radio networks. It already covers approximately 325,000 square kilometres and is further expanding its footprint to increase the shared coverage for government agencies and essential services to cover 85% of the state and 98% of the population.

Through these and other projects we're working on around the world, we're proud to be helping our customers uncover connectivity solutions that create new opportunities and improve operational efficiency, thereby enabling them to direct more focus and resources towards business imperatives.

Which current or future technologies is BAI focused on capitalising upon? Eg, 5G, Wi-Fi 6?

5G will be the key driver of development for industry 4.0, significantly increasing uptake in many applications that will see businesses and government enterprises worldwide make significant progress in their digital transformation. Emerging technology such as artificial intelligence, the Internet of Things, machine learning and data analytics is maturing, and we can now achieve even more with this computing power using 5G's speed, latency and capacity. 5G is expanding opportunities for enterprise and industry all over the world and we expect to see technology increasingly scaled by organisations to improve their operations and customer experience.

As this happens, enterprises will increasingly, and more swiftly, need the infrastructure capable of supporting the connectivity requirements and as a communications infrastructure provider it's exciting to be at the forefront of delivering the next generation of connectivity solutions that can help realise those opportunities. However, this comes with considerable direct and opportunity cost across a variety of resources.

At the start of this value chain, MNOs are expanding their 5G capability and services to capitalise on increasing demand from industry and governments to help drive transformation within their own markets and organisations, including smart cities. However, the investment to roll out 5G networks is significant, especially when you account for the highly specialised skills and experience necessary to ensure success. Furthermore, the return on investment depends on managing capital and scarce resources at both an operational and investment level. This is extremely complicated and therefore very difficult to make it a viable and workable prospect — unless it's your speciality.

This where the neutral host model presents significant advantage. At the end of the day, it is similar to various network sharing initiatives that exist in several forms in most of the world and an area in which BAI specialises. With end-to-end responsibility for shared networks as our strength, we have a suite of 5G neutral host connectivity offerings to help customers manage 5G deployment effectively. So, we've found that MNOs are responding very positively to the possibility of working with neutral hosts like ourselves. They understand the value we bring and expect us to play a bigger role in rolling out mobile infrastructure in the next few years.

There has been a flurry of announcements of executive appointments recently. Does this signify that BAI is expanding?

As we continue to win new projects and technology continues to evolve rapidly, we are seeing increasing demand for our services around the world and have forecast a growth trajectory for BAI that is built into our 2025 global strategy. To meet current demand and the anticipated future need for our solutions in coming years, we have been assembling industry leaders to bring their knowledge and expertise to the company's operations and innovation.

A recent press release remarked upon "BAI's ambitious growth strategy as the business looks to aggressively scale its solutions and operations over the next four years, particularly across its existing geographies: Europe, North America, and Australia." Are you able to give any information about the growth plans?

BAI's Group CEO, Igor Leprince, who joined the company last year, has some very ambitious plans to grow the wireless infrastructure business of the company across the broader public transport sector from a vertical market perspective as well as private networks horizontally. Igor's plans are to grow by increasing BAI's core infrastructure footprint, but also by adding applications for enterprise customers to that core infrastructure. To achieve this, the business is pursuing organic opportunities, but Igor's team is also considering strategic acquisitions over the next few years.

Finally, what haven't we asked? What other points would you like to make?

Over the last 12 months the COVID-19 pandemic has demonstrated just how quickly we can adapt to new technologies and has also heightened how much we rely on technology and communication systems to live and work. BAI is in a unique position to provide the infrastructure solutions many government and private authorities and operators are increasingly needing to be able to continue operating effectively and efficiently. It's an exciting period of innovation for telecommunications and many other industries, and it's great to see companies like BAI leading the charge to effect the change and improvement that comes with it.

BAI Communications
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US RESEARCH PROTOTYPE

BRINGING LMR TO LTE IN A SIMPLE SYSTEM

The goal is to allow handheld radios to utilise the LTE networks.

Engineers at the US National Institute of Standards and Technology (NIST) have built a low-cost computer system they claim connects older public safety radios with the latest wireless communications networks, showing how first responders might easily take advantage of broadband technology offering voice, text, instant messages, video and data capabilities.

NIST's prototype system could help overcome a major barrier to upgrading public safety communications. Many of the 4.6 million US public safety personnel still use traditional analog radios, due to the high cost of switching to digital mobile phones and these systems' slow incorporation of older 'push to talk' features that are both familiar and critical to first responders.

The prototype connects analog land mobile radio (LMR) handsets and towers with a long-term evolution (LTE), the most widespread wireless standard, server that handles operations inside a broadband network. The LTE system is known as mission-critical push-to-talk, which refers to essential aspects of public safety radios such as high availability and reliability, speaker identification, emergency calling and clear audio quality.

It uses software instead of hardware to enable flexible frequency selection and interface designs, which interact with the LMR signal interfaces and feeds that data into the next unit. An open-source software environment for managing software radio handles digital signal processing. A user interface for LTE handsets allows LMR radio users to talk to LTE network users like they are both on the same push-to-talk network, with calls initiated from either side.

Goals include robustness, low cost and close conformance to existing and future standards. The physical equipment includes computer hardware that runs all three components, suitable software and an antenna. The computer must have an internet connection to the LTE system. The entire set-up is about the size of a video game console plus a laptop or desktop computer.

The NIST system costs less than existing US industry and government efforts to bridge radio and mobile phone networks. To promote technology transfer, they intend to publicly release all capabilities on an open source basis for use by anyone.

National Institute of Standards and Technology
www.nist.gov

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CASE STUDY

DAMM systems set to monitor India's Pune Metro rail network

Equipment from DAMM Cellular Systems, and partner Consort Digital, has been selected for an Indian metro rail project in Pune.

Once operational at the end of 2021, Pune Metro will have a capacity of 1000+ riders per train, which will run along a combination of underground and elevated tracks. The service will run 19 hours a day and is expected to serve more than 600,000 passengers a day. The solution consists of a combination of DAMM indoor systems, Consort Digital train radio systems and Sepura TETRA handheld and mobile radios. It will be used to provide radio communication for two lines covering nearly 33 km of tracks, 34 cabs, 29 stations and two depots.


Pune Metro

The DAMM Indoor System is designed to ensure sufficient coverage for the entire railway, above and below ground, while the distributed architecture, open API and modular configuration provide a customised solution to meet customer's needs.

Due to an insufficient infrastructure, resulting in average commute times above 100 minutes a day using public transport, the city saw a significant rise in the number of people driving into the city instead. To address this issue, it was decided to strengthen the city's infrastructure with a new reliable metro rail line. Apart from an estimated 75% reduction in travel time, Pune Metro will lead to improved air quality, less consumption of fossil fuels and fewer road accidents.

Antenna

Panorama Antennas has expanded its Sharkee antenna range with a 5G, LTE-ready, combination antenna solution.

The 5G MiMo Sharkee antenna offers 2x2 ultra-wideband 617–960/1710–6000 MHz cellular antenna elements, covering all 5G LTE spectrum frequencies worldwide; including LTE Band 71 (617-698 MHz), which is now used in the US as a frequency band for 5G LTE communications.

The MiMo Sharkee 5G also adopts up to 4x4 MiMo dual-band Wi-Fi, covering 2.4 GHz and 5.0–7.1 GHz bands using GPS/GNSS technology with band noise filtering. A version is available which allows for an external whip; therefore allowing for VHF or UHF voice radio communication to be used through the single antenna or AM/FM radio function.

The 5G MiMo Sharkee enables all communication functions to be performed by a single antenna with a single hole-mount installation on the vehicle roof. It is designed to fit within the roof rib lines on all major vehicle manufacturers or can be installed in place of the existing roof antenna on most vehicles. The MiMo Sharkee has also been developed with advanced 5G LTE vehicle router technology in mind. It allows for a single antenna solution to align to a single vehicle cellular router for easier procurement and installation process.

The antenna is suitable for harsh conditions and offers an IP66 rating, making the antenna weatherproof and waterproof. The wideband cellular antenna elements offer >12 dB isolation between 5 and 9 dBi peak gain. The Wi-Fi elements are also WiFi 6 ready for the latest technology. The antenna also features UN118 compliant cable assemblies, requested by the automotive vehicle sector.

The Sharkfin antenna is designed for regular police fleet vehicle or covert operations. Other emergency service and frontline vehicle fleets would also benefit. It is suitable for mass transit buses and coaches as well as any utility fleet where connectivity is important.

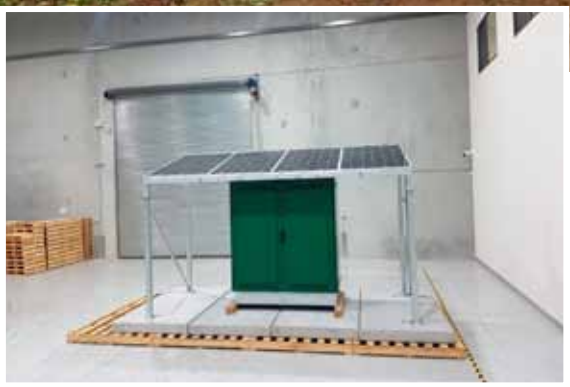
Panorama Antennas Ltd

www.panorama-antennas.com

CASE STUDY

Valen Power provides energy storage for remote sites

Final installation.



Valen Power was engaged in 2020 by a state rail provider to support them in an energy storage solution for remote radio sites.

Scope and challenges

The client wanted to expand its existing radio network; however, there was no access to mains power at several of the proposed radio network sites. This meant the client needed to look for a reliable off-grid energy solution.

The preference was a system without ground penetration to minimise the installation time required onsite. Additional space also needed to be factored in to give Valen Power's client the ability to add to the system as the need expanded. The client had a number of these sites, all with slightly different load profiles, so each site needed individual consideration to get the best outcome.

Solution

Valen went to the drawing board bearing in mind the client's expectations and designed three different modular systems to cover the requirements of the various site load profiles.

As the client required site installation time to be minimised, the Valen Design Team came up with a complete package including all components, from pre-cast footings, solar frame, panels that could be installed by one person safely, lithium batteries, solar regulator, DC distribution panel and enclosure.

Components were all pre-assembled where feasible, again to minimise time spent onsite. Valen organised all project components to be supplied directly to the client's sites.

Outcome

Valen designed and engineered a customised solution to fit the client's communication project scope covering all important aspects. These systems were then delivered directly to the individual sites on time.

The client was able to install these complete packaged solar off-grid systems within a reduced time frame onsite. Valen engaged and supported the client through the installation and maintenance phase of these off-grid energy systems.

Valen Power Pty Ltd
www.valen.com.au

REDEFINING COMMUNICATIONS FOR MOBILE WORKFORCES

Dave George

Communications needs to be backed by strong support to ensure operations run smoothly and teamwork is optimised.

Communicating with personnel was already a challenge for companies with workers in the field, widespread workforces in siloed divisions and office locations, or desk-less staff who travel. Now that COVID-19 has all but eradicated traditional in-person relationships and many in-office team members are now working remotely, keeping everyone synced is an even more daunting task.

The entire face of team communications has changed, escalating the need for alternative ways to communicate with the growing mobile workforce. Internal and external communications are merging as businesses strive to reconnect with disconnected teams offsite and in virtual environments.

Digital engagement

Managing the employee journey has become as important as managing customer experience. Businesses are struggling to keep distributed employees engaged, maintain corporate culture and re-establish a sense of community. In addition to connecting with remote workers and keeping employees up to date, team communications solutions must also facilitate onboarding, training and career growth, and be able to segment messaging for distinct employee groups of different geographies, cultures, ages and job functions, while also maintaining personal interactions and peer collaboration.

Email doesn't cut it and excessive reliance on videoconferencing has already created 'Zoom fatigue'. Remote work now requires mobile communication delivery at an unprecedented level. Companies are discovering faster, more effective ways to communicate meaningfully with simple, plug-and-play digital solutions.

App-powered workforces

Mobile team communications apps are fast becoming the go-to solution across the spectrum, from small business to major enterprises, and spanning every industry, whether working in a shared workplace or remotely. App features are more comprehensive than ever with integrated augmented reality (AR), artificial intelligence (AI) and mixed reality programs, as well as text chats, audio calls, videoconferencing, file and screen sharing, discussion threads, forums and more, all combined into one communications hub on a dedicated channel. With the multitude of app options available today, the key is determining which functions will best address organisational needs.

Though team text chats and videoconferences are productive, nothing compares to live voice messaging in real time, either one-to-one with individuals or one-to-many with groups. Team apps that offer a 'walkie-talkie' feature enable push-to-talk (PTT) to transmit instant voice messages to colleagues without risk of cross-talk or eavesdropping, while also reducing the number of devices workers carry and cutting IT costs. Feature-rich apps also allow users to track locations, trigger emergency alerts in critical situations, coordinate logistics and quickly resolve issues.

However, some industries have highly specific processes and require more

customised communications interfaces, such as public safety, security, manufacturing, logistics and health care. The emergence of no-code/low-code development platforms (LCDP) has made it possible for developers and customers to accelerate delivery of custom applications. Though they can be deployed on virtually any platform, mobile accessibility is a driving factor behind the use of LCDP apps, which enable workers to tap into on-premise or cloud data from a mobile device.

Where security and compliance risks are a concern and privacy is essential to protecting sensitive information, there are communication apps that can be self-hosted on a company's own servers and integrated directly to the user interface rather than through a third-party server.

PTT networks

Traditional private radio and land mobile radio (LMR) networks often require significant upfront capital expenditure. The spike in mobile workforces is driving explosive growth in push-to-talk over cellular (PoC) for wide-area communications due to the low operational expenditure for start-up and subscription-based services.

With the press of a PTT button, PoC provides the same capabilities as traditional two-way radio systems and enables instant group calls to multiple users. Because PoC leverages existing LTE cellular and ubiquitous Wi-Fi networks, systems can be deployed more quickly with no infrastructure required. PoC network services can also be located on privately hosted servers using gateway routers to provide connectivity between the LTE network and the PoC server.

Another approach is unified communications (UC) platforms, which integrate diverse radio systems with PoC and PTT over Wi-Fi into one centralised ecosystem.

Digital devices

PoC devices such as radios, smartphones and even bodycams are purpose built for professional communications as compact, rugged, easy-to-operate handheld devices. Digital mobile radios (DMR) with advanced features can support PoC functions, including instant group calling, GPS location tracking, emergency notifications and mission-critical PTT (MCPTT).

Enterprise models of ruggedised smartphones now have programmable buttons that support PTT communication and integrate with walkie-talkie apps. For example, retailers can use programmable buttons to enable scanning capabilities or POS payments.

For harsher work environments like industrial settings, there are PoC devices with IP ratings for water and dust resistance, etc. For occupations that require gloves, such as public safety, fire and EMS, some devices offer enlarged buttons or glove mode.

Mobile workforce support

Many team communication apps are compatible with hands-free PTT accessories, including headsets and Bluetooth adaptors, which not only keep drivers from being distracted, but allow freedom of movement when operating machinery, maintaining facilities and a host of other physical tasks. A single button push connects drivers with dispatch or workers with team members, which is ideal for transportation companies and businesses with vehicle fleets, as well as for the hospitality, property management, foodservice and retail industries.

There is a vast array of accessories available that augment audio and voice quality, from waterproof headsets to discreet surveillance kits for undercover and security, or throat mics and earmuffs for high-noise environments like construction sites, manufacturing plants and entertainment venues.

However, few manufacturers specialise in making affordable professional-grade products that far surpass most low-cost alternatives, my company being one of them. Of course, these days hygiene is also a primary concern, which is why experienced makers offer swappable accessories specifically designed for individual or one-time use.

In today's COVID world, companies want to raise team communications to a higher level, while also reducing expenses. This has created demand for simpler, more cost-effective solutions that are also dependable and backed by strong support to ensure operations run smoothly and teamwork is optimised. Ultimately, it has also redefined the future of mobile workforce communications.

Dave George, Chief Technologist and President of Pryme Radio, has been an RF engineer for over 40 years. He holds 29 patents and is the inventor of multiple award-winning products.

Pryme Radio
www.pryme.com

THALES AND OPTUS ACHIEVE SBAS MILESTONE

The companies have tested technology intended for the enhanced positioning service.

In an important milestone for the delivery of an SBAS for Australia and New Zealand, Thales Australia and Optus Satellite have successfully received a new Thales SBAS signal in Western Australia.

The testing used a Next Generation Thales SBAS technology developed especially for customers close to the equator and others with difficult ionospheric conditions, like Australia and New Zealand.

SBAS and PPP (Precise Point Positioning) will deliver a greatly enhanced positioning service for Australia and New Zealand under the Southern Positioning Augmentation Network being undertaken jointly by the governments of Australia and New Zealand.

In order to test and validate key subsystems for the delivery of early services to the two countries should Thales be selected to supply the Southern Positioning Augmentation Network, the transmission received in WA was generated by Thales Alenia Space using the NIGCOMSAT-1R satellite, currently involved in testing of a Next Generation SBAS solution.

Thales Australia Director Space Matt Dawson said that the company's team and integrated industrial network extends across multiple continents and demonstrates its ability to deliver system outcomes despite the challenges of COVID-19.

"Thales has been supported in its work by specialist expertise from GPSat Systems based in Melbourne, and by Hexagon | NovAtel, a world-leading GNSS receiver manufacturer," he said.

"NovAtel engineers that have also been monitoring this new broadcast reported sufficient data to track PRN 147 signals and use them for SBAS corrections."

Thales Alenia Space VP Navigation Benoit Broudy said that Australia is integral to the global development of Thales's SBAS and PPP solutions and will benefit from major advances in the technology.

"The current broadcast comes via the NIGCOMSAT-1R satellite that is positioned to serve Africa, so Western Australia is on the very edge of its coverage area," Broudy said.

"We are offering two new satellite payloads aboard Optus satellites to provide services across Australia and New Zealand, which could be extended into the Pacific Island regions."

"Receiving this signal through Optus' Lockridge Earth Station, using Thales' SBAS technology, is a major milestone and demonstrates what is possible from a world-leading SBAS provider," added Optus Head of Satellite and Space Systems, Nick Leake.

Thales Australia
www.thalesgroup.com

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The benefits of smart battery integration

in modular power systems

Complete integration of the power system controller with the batteries' BMS secures the true benefits of lithium technology for critical power systems.

Chris Barson, Eaton Product Manager — PQ/Telecom DC

Critical power systems within the communications, utilities, and mining segments have in the past utilised valve-regulated sealed lead acid (VRLA/SLA) battery technology for power backup. VRLA batteries offer a basic design without any integrated monitoring or control, and are usually controlled by a modular DC power system. Unfortunately, such a lack of self-monitoring and self-management is out of pace with the modern shift towards digital technology.

High maintenance costs an issue

The absence of the built-in intelligence means that for VRLA batteries there is an ongoing requirement for frequent scheduled (and unscheduled) maintenance site visits by knowledgeable expert technicians during the life of the batteries. Monitoring systems are available that can provide added battery visibility compared to a standard power system, but the information gained remains basic. VRLA battery monitoring systems are also typically a separate system to the charger, resulting in a higher starting cost, which results in some users choosing to forego this added component. In any case, the battery monitoring device does not remove the requirement for field technicians to perform scheduled routine maintenance, with its associated costs.

Making battery banks smarter

Nowadays a key technology shift has been occurring with the move to smarter battery systems such as those based on lithium cells. Lithium batteries with built-in multipart battery monitoring systems (BMS) are a key digitisation advancement over VRLA technology, as they not only provide a significantly higher level of monitoring of the battery bank than that which could be achieved with dedicated VRLA monitoring systems, but can also remove the need for periodic battery maintenance entirely.
The built-in BMS fitted within most telco-grade lithium systems are highly sophisticated and can self-manage most aspects of the charging and discharging functions — down to the single cell level — providing balancing that was traditionally unavailable to VRLA batteries.

Integration is key

Many modular DC critical power systems and lithium batteries as offered as separate components of an 'intelligent' and 'integrated' solution. However, despite obtaining some benefit from such a solution with a quality lithium battery, multiple essential capabilities of the solution are simply unused and unavailable when designed in this way. To secure the true benefit of lithium technology within a critical power system, a comprehensive integration of the communication between the power system and the battery's internal BMS units must be provided. Without full integration, many requirements of a truly reliable critical power system cannot be achieved — such as accurate and functional control of system features like battery current limiting, multi-stage charging, intelligent generator start/stop control, and peak load reduction, for example.

Greater safety

As is the case for most companies today, the focus on technology is important, but providing a safe working environment for employees is also paramount. Batteries are a frequent point of concern for OHS teams, as VRLA batteries are permanently energised and present a risk to personnel and equipment during transit, installation and maintenance. Despite the likelihood of accidents being low, they remain a concern to many who are looking for ways to minimise the potential for harm.
Reputable 48 VDC long-life telco-grade lithium iron phosphate ($LiFePO_4$/LFP) batteries will typically allow for de-energisation of battery terminals either manually by the user, or automatically via the in-built BMS if a protection event occurs, such as short circuit. LFP battery technology typically also emits no gases — unlike VRLA batteries which emit hydrogen — and have an internal chemistry that includes no toxic or hazardous materials. Even in worst-case scenarios LFP batteries are virtually incombustible.

True integration lowers TCO

Properly engineered critical power systems — with true integration of components — remain at the heart of achieving the essential functional capability and the lowest total cost of ownership (TCO). Installing non-integrated smart devices together does not make a smart solution; it instead adds to TCO with unnecessary site visits, reduced functional capability and reduced remote visibility. Users should not accept anything less than a truly integrated solution.

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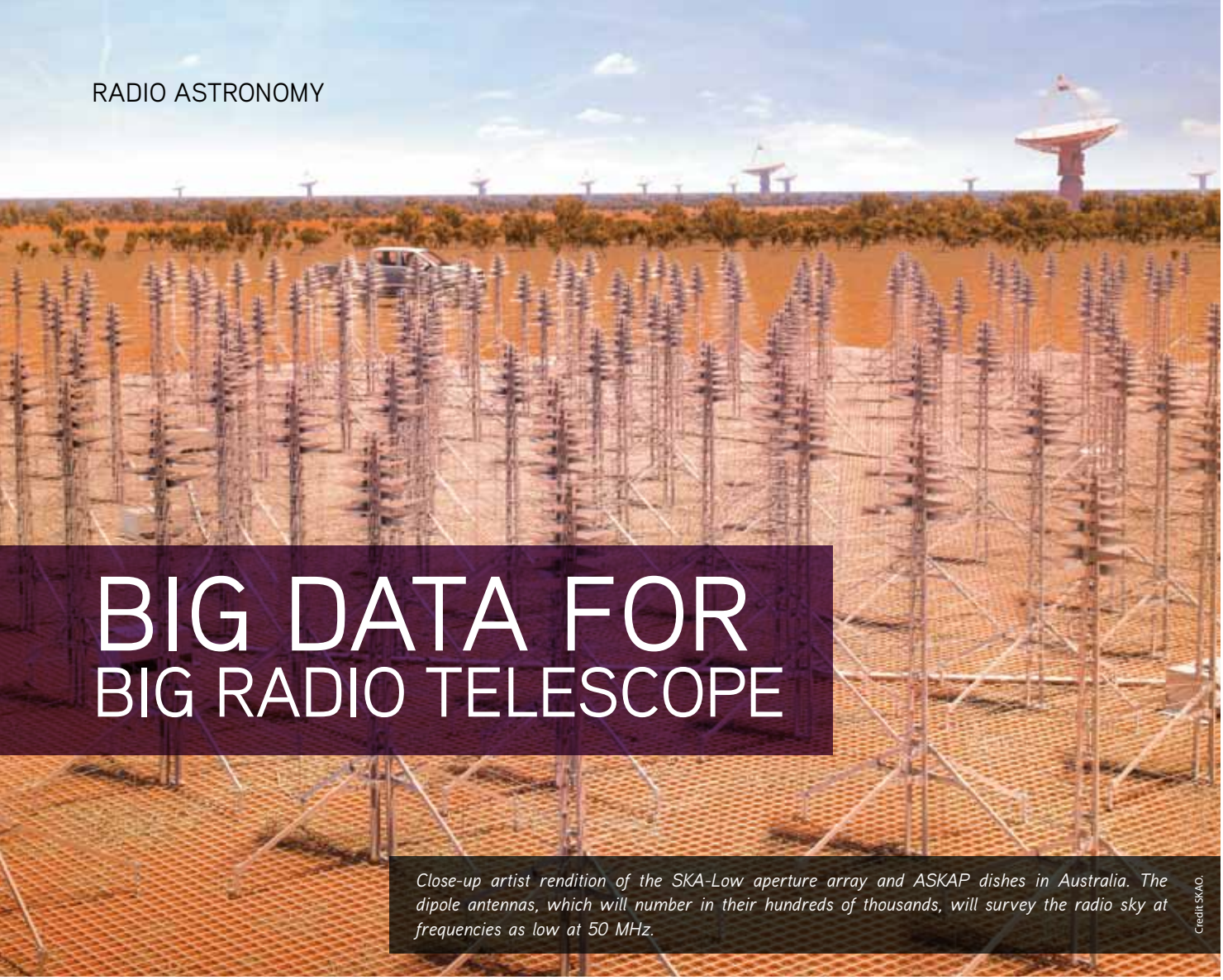


BIG DATA FOR BIG RADIO TELESCOPE

Close-up artist rendition of the SKA-Low aperture array and ASKAP dishes in Australia. The dipole antennas, which will number in their hundreds of thousands, will survey the radio sky at frequencies as low at 50 MHz.

Credit SKAO.

A team preparing for the billion-dollar SKA radio telescope reached the shortlist for 'Nobel Prize of supercomputing'.

An international team led by The University of Western Australia was one of six finalists for the prestigious Gordon Bell Prize for outstanding achievement in high-performance computing.

The group was shortlisted for the award — commonly referred to as the 'Nobel Prize of supercomputing' — for their work developing data pipelines for the future Square Kilometre Array (SKA) radio telescope and testing them on the Summit supercomputer.

The team used Summit — the world's fastest supercomputer at the time — to process simulated observations of the early Universe ahead of the radio telescope being built in Western Australia and South Africa.

International Centre for Radio Astronomy Research (ICRAR) Director of Data Intensive Astronomy Professor Andreas Wicenec, who is based at UWA, said construction of the billion-dollar SKA project was expected to begin next year.

"When complete, the SKA will be the world's largest radio telescope and one of the world's largest data generators," he said.

"The low-frequency part of the telescope alone is set to have more than 130,000 antennas in its initial phase, generating around 550 gigabytes of data every second."

To process data on this scale, Professor Wicenec said the team used a cluster of 4560 computers, featuring 27,360 high-end GPUs and 191,520 CPU cores.

"The whole simulation ran for about three hours at an average of 64.9 PFLOPs, or 64,900,000,000,000,000 mathematical operations, per second," he said.

"The highest writing data rate we achieved was 925 GB a second, and the effective throughput of the complete simulation was about a factor of two better than what is required by the SKA."

Professor Wicenec said the team was surprised but thrilled to be a finalist in the Gordon Bell Prize.

"I didn't expect it at all given the calibre of previous winners and the highly sophisticated nature of their projects," he said.

"We didn't have the Gordon Bell Prize in mind when we set out to do this work, so it's fantastic to be recognised for the remarkable performance the multinational team achieved."

The project was a collaboration between ICRAR, Oak Ridge National Laboratory (ORNL) and Shanghai Astronomical Observatory (SHAO).

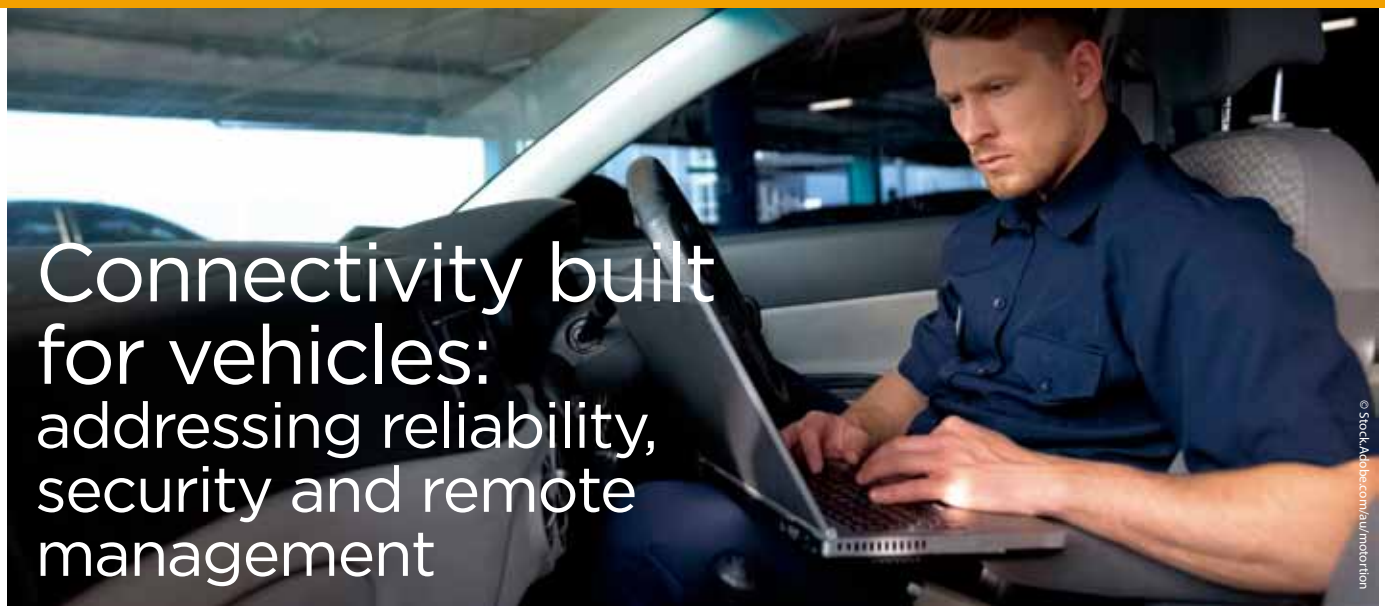
The group's nomination for the award was supported by SKA Director General Professor Philip Diamond and US National Radio Astronomy Observatory Director Dr Tony Beasley.

The ACM Gordon Bell Prize was established in the 1980s with a nominal $100 prize for anyone who could overcome Amdahl's Law and demonstrate that parallel computing made sense.

Today, the prize continues to track the progress of parallel computing, while rewarding innovation in applying high-performance computing to science, engineering and large-scale data analytics.

In previous years, finalists have presented their work in person ahead of an award ceremony at the annual SC supercomputing conference.

In 2020, the conference and award ceremony were held virtually, with the prize ultimately awarded to a nine-member team, drawn from Chinese and American institutions, for their project, 'Pushing the limit of molecular dynamics with ab initio accuracy to 100 million atoms with machine learning'.



Connectivity built for vehicles: addressing reliability, security and remote management

For fire, police and ambulance services that cannot afford downtime, LTE and 5G networking solutions are a reliable, secure and cost-effective means to ensure always-on connectivity.

A requirement that is unique to emergency services is that of uninterrupted in-vehicle connectivity, which presents challenges.

Selecting in-vehicle network and connectivity solutions requires several considerations:

Data accuracy

Intermittent connectivity can prevent emergency service vehicles from connecting to the cloud and tracking a fleet's location, meaning data is both inaccurate and unreliable. Emergency services base sites, utilising apps that track vehicle locations for example, will be incorrectly informed about where and when a vehicle will arrive at specific emergency sites.

Security

Any in-vehicle solutions must also maintain the highest levels of security, ranging from security of personal data of civilians being attended to by emergency services personnel, to security of vital information passing between vehicles and headquarter sites.

Physical conditions

From cold and wet to high heat and humidity, weather conditions will play a role in how in-vehicle networks function at any given time. Likewise, vehicles traveling on bumpy, rural roads that are not maintained as well as urban streets will require different features and adaptability from their in-vehicle networking solutions.

Ensuring that in-vehicle solutions do not compete for power with other onboard systems — or even the vehicle itself — is an important factor.

In-vehicle needs

The most suitable solution for emergency services organisations will be determined by that organisation's specific situation. Solutions can include:

- *Constant connectivity.* Constant, reliable 4G LTE or 5G connectivity is essential for everything from vehicle location tracking to remote medical records access, to criminal history data.
- *Distance tracking.* With robust telematics data gathered from connected vehicles and AVL solutions, vehicle trips and distance travelled can be tracked. This also allows emergency services organisations to continuously develop and implement more efficient routes.
- *Geofencing.* If an in-vehicle GPS system is reliably working and producing accurate data, organisations can not only track where its vehicles are at all times, but also receive alerts when the vehicles have gone beyond predetermined boundaries.
- *Cloud management.* Being able to troubleshoot connectivity problems via the cloud rather than going aboard each vehicle can significantly decrease costs, staff time and user frustration.
- *Dual-modem and multi-carrier options.* For vehicles in more remote areas, multi-SIM or even dual-modem options for wireless-to-wireless failover are more of a need than a luxury. In such regions, carrier flexibility is essential.
- *Scalability.* Dual-modem functionality and cloud management are major boons for scalability.

Cradlepoint for example offers 4G and 5G solutions for fixed locations, temporary locations, mobile vehicles, and IoT installations, making it an ideal solution for an organisation's entire edge. By having a solution that has been proven for all types of locations, including branches and other fixed sites, it allows mobile networks to take advantage of networking technologies such as SD-WAN, SASE and analytics that are more prevalent in the branch but just as important for vehicle networks.

Case study: Nevada Highway Patrol leverages cloud-managed LTE to keep tech. tools and CAD system connected

Challenge: Nevada Highway Patrol equips its vehicle fleet and highway patrol officers with a range of technologies that help them save lives. However, keeping those devices and applications connected to headquarters is no easy task, especially with hundreds of vehicles serving every inch of a rugged and sprawling state.

Solution: Since deploying Cradlepoint NetCloud Service for mobile in its vehicles, Nevada Highway Patrol's IT professionals have begun making fleetwide network adjustments with point-and-click ease — and from anywhere. NetCloud Service includes a WiFi access point, content filtering, GPS and telematics integration, WiFi-as-WAN, and cloud configuration and troubleshooting, all delivered via an in-vehicle LTE router.

Benefits: Remote management and reliable, carrier-flexible LTE connectivity for technologies such as computer-aided dispatch (CAD) allow highway patrol officers to focus on their mission: to promote safety on Nevada highways.

"Our officers have removable tablets. If they're outside the car and need network access, they use WiFi provided by Cradlepoint to issue citations, complete and send accident reports and fulfill other mission-critical tasks — which really increases efficiency." - Lt. Chris LaPrairie, Commander of NHP's Research and Planning section.

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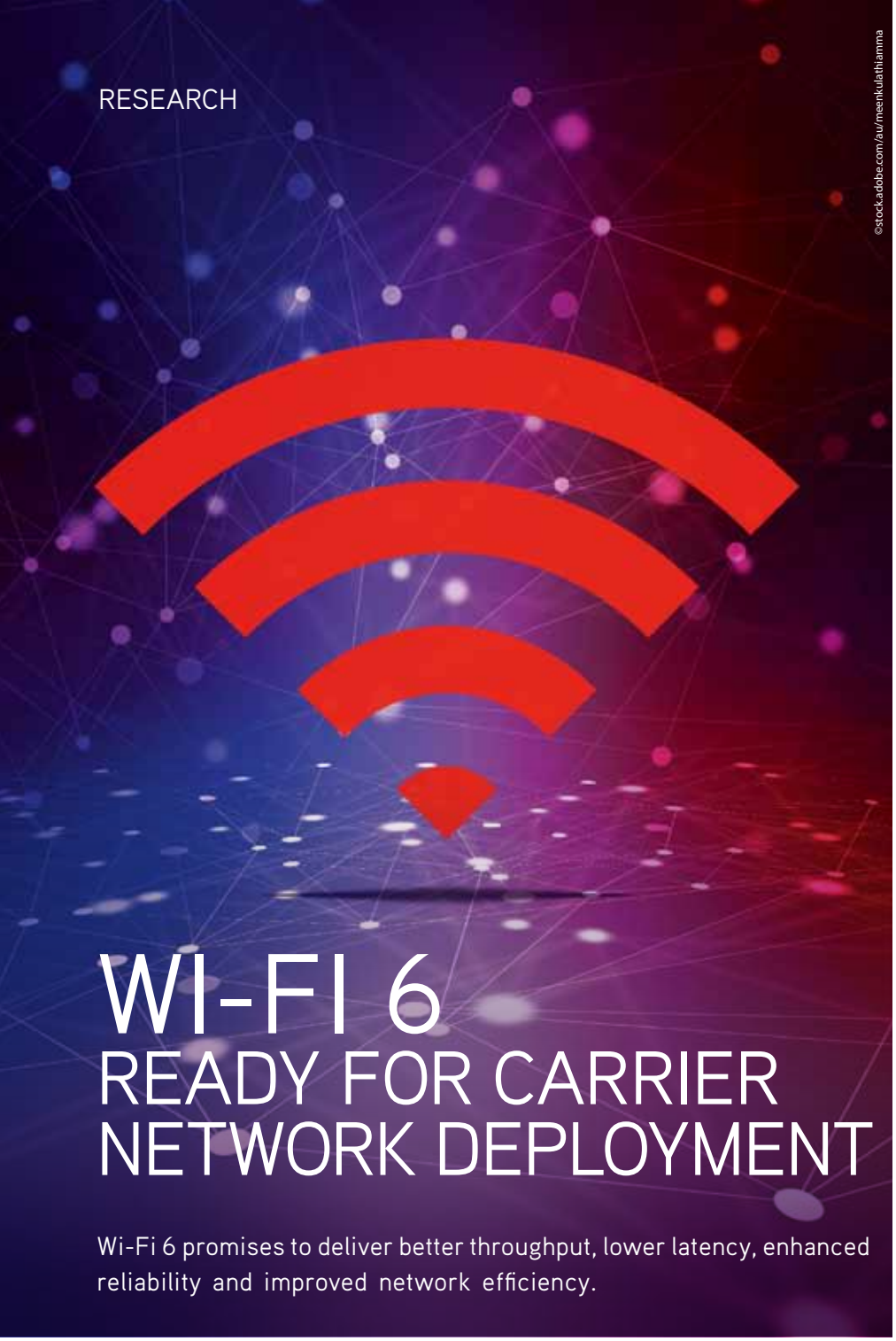
Connect Beyond

Cradlepoint Australia Pty Ltd
cradlepoint.com/au



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WI-FI 6 READY FOR CARRIER NETWORK DEPLOYMENT

Wi-Fi 6 promises to deliver better throughput, lower latency, enhanced reliability and improved network efficiency.

The Wireless Broadband Alliance (WBA) has announced the conclusion of five trial deployments of Wi-Fi 6 across diverse markets, showing that — with wider channels up to 160 MHz and capacity up to 9.6 Gbps — it can enable data rates nearly three times faster than Wi-Fi 5.

WBA says Wi-Fi 6 is now proven to deliver better reliability, lower latency, more deterministic behaviour and better network efficiency, especially in environments with many connected devices.

It will also help with congestion problems and increase densification of the network, helping to connect more devices, and enable new use cases.

The trials covering a range of different verticals and deployment scenarios to demonstrate the key capabilities of Wi-Fi 6 in live networks, establishing its readiness for carrier Wi-Fi deployments around the world... laying the foundation for deployment of Wi-Fi 6 in enterprises, homes, schools, transportation hubs and the IoT.

WBA members including network providers, infrastructure vendors and device vendors set up the trial environments and executed the test cases in end-to-end, real-life networks. The trials addressed the following deployment in key vertical markets:

Industrial manufacturing

Mettis Aerospace worked with Broadcom, Cisco, iBwave and Intel to deploy Wi-Fi 6 in a dense industrial environment with heavy metal, high temperatures and moving machinery, where previous generations of Wi-Fi did not perform well. The Wi-Fi 6 trial demonstrated much improved reliability, coverage, throughput and lower latency for supporting mission-critical applications.

High-density shopping centres

SK Telecom deployed Wi-Fi 6 to improve connectivity for consumers, increase quality of experience (QoE) for densely populated areas and provide high throughput for immersive media services. Wi-Fi 6 reduced latency by 80%, reduced throughput fluctuation and improved service reliability to customers anywhere, anytime, throughout the centre.

Single-family and multi-dwelling units

CableLabs, Intel and Kyrio deployed Wi-Fi 6 in a mixed-use residential area to increase the user experience in a Wi-Fi loaded network. In this trial, Wi-Fi 6 delivered a significant increase in throughput, enabling the delivery of multiple 4K video with higher quality.

Education in rural areas

C-DOT and Intel deployed Wi-Fi 6 in a rural school trial in India to enhance new learning technologies and improve signal coverage and streaming performance. Wi-Fi 6 improved throughput by more than 50% throughout the network.

Transportation hubs

In the US, Boingo, Cisco and Samsung worked together to launch Wi-Fi 6 at John Wayne Airport to power a next-generation connectivity experience and support airport operations. Following the SNA deployment, Boingo has moved its Wi-Fi 6 technologies from trials to commercial operations.

Most recently, Boingo announced an airport-wide commercial deployment of Wi-Fi 6 at São Paulo/Guarulhos International Airport, delivering fast speeds and low latency for passengers.

"These successful deployments prove the strength of Wi-Fi 6 technology to achieve better throughput, lower latency, enhanced reliability, improved network efficiency and better user experience," said Tiago Rodrigues, CEO, WBA.

"Ultimately, they prove the readiness of Wi-Fi 6 for carrier deployments, and the WBA continues to develop and expand new trials that support Wi-Fi 6 and 6E expansion into new areas in different geographies around the world."

In a recent WBA survey, it was found that more than 65% of members will have deployed Wi-Fi 6 by the end of 2021.

Combination antenna — cellular, WiFi, GNSS

The Coach II permanent-mount, dual-carrier antenna platform supports the high-speed requirements of complex RF communication systems used for intelligent transportation systems (ITS), Industrial IoT applications, and tracking and asset management.

Able to withstand severe environmental conditions, it has an IP67-compliant design with overmoulded gasket that protects it against water or dust ingress (when installed on sealed surface).

The low-profile, high-endurance antennas feature four 5G elements compatible with leading multi-carrier cellular routers that support 600 MHz to 6 GHz frequencies. The platform also incorporates 802.11ax WiFi MIMO connectivity, with four dual-band 2.4/5 GHz WiFi elements supporting DSRC 5.99 GHz applications. In addition, PCTEL's proprietary high-rejection multi-GNSS technology is included for high-precision tracking and asset management. It also features out-of-band rejection and is easy to install and/or replace.

Step Global Pty Ltd
www.stepglobal.com.au

Radio gateway for Damm TETRA

The Omnitronics Radio over IP (RoIP) gateway for Damm Networks increases compatibility with the latest Damm firmware while adding a number of enhancements.

The TETRA GatewayDM is a software-based IP gateway offering radio users, moving or upgrading to the latest 8.02 Damm TETRAFlex networks, a way to connect into other analog or digital systems via RoIP. Including to Omnitronics radio dispatch systems RediTALK-Flex and omnicore.

For those wanting to record talkpaths within a Damm TETRA system to Eventide recording solutions, the Omnitronics TETRA GatewayDM is a suitable standalone product, even without an Omnitronics dispatch console.

The TETRA GatewayDM is available globally.

Omnitronics Pty Ltd
www.omnitronicsworld.com

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CASE STUDY

ViaLite timing modules used to rebroadcast AM

When driving through tunnels, AM radio signals are blocked out by dense matter such as hills and buildings, resulting in drivers temporarily being unable to listen to a chosen radio station.

In Hong Kong, ViaLite Communications was approached to provide a solution, which was integrated into a BAI Communications system developed to reproduce the AM radio signals previously blocked. Its Blue OEM timing module, although typically used for GPS/GNSS timing applications, was chosen as a viable option. The module could be used for this application as it covers frequencies of up to 4.2 gigahertz.

The end result was a system that could repeat AM radio signals transmitting in a frequency range of between 550 kilohertz and 1.72 megahertz, allowing for uninterrupted coverage of AM radio signals.

CASE STUDY

Radio interoperability in outdoor conditions

The Brazilian state of Mato Grosso has deployed a multi-agency communications solution using Sepura's SC20 TETRA radios to support security operations on the border with neighbouring Bolivia. The solution enables coordination between the Border Task Force, military and civilian police forces, the military fire department, and other supporting agencies.

The solution is an extension of the TETRA network currently in operation in the Brazilian state, built on infrastructure provided by Teltronic. The SC20 radios interact with Teltronic's control centre solution, CeCoCo NG, ensuring that operations can be coordinated and information shared between the various operational teams.

The SC20 provides users with a TETRA communication device providing loud, clear audio and a robust design to withstand repeated rough treatment in outdoor environments. The SC20 also benefits from connectivity options, allowing links to data sources aiding the situational awareness of both control room staff and field officers. The radio's large screen means that images and text-based messages can be read in varying light conditions, adding another element to the team's ability to communicate.

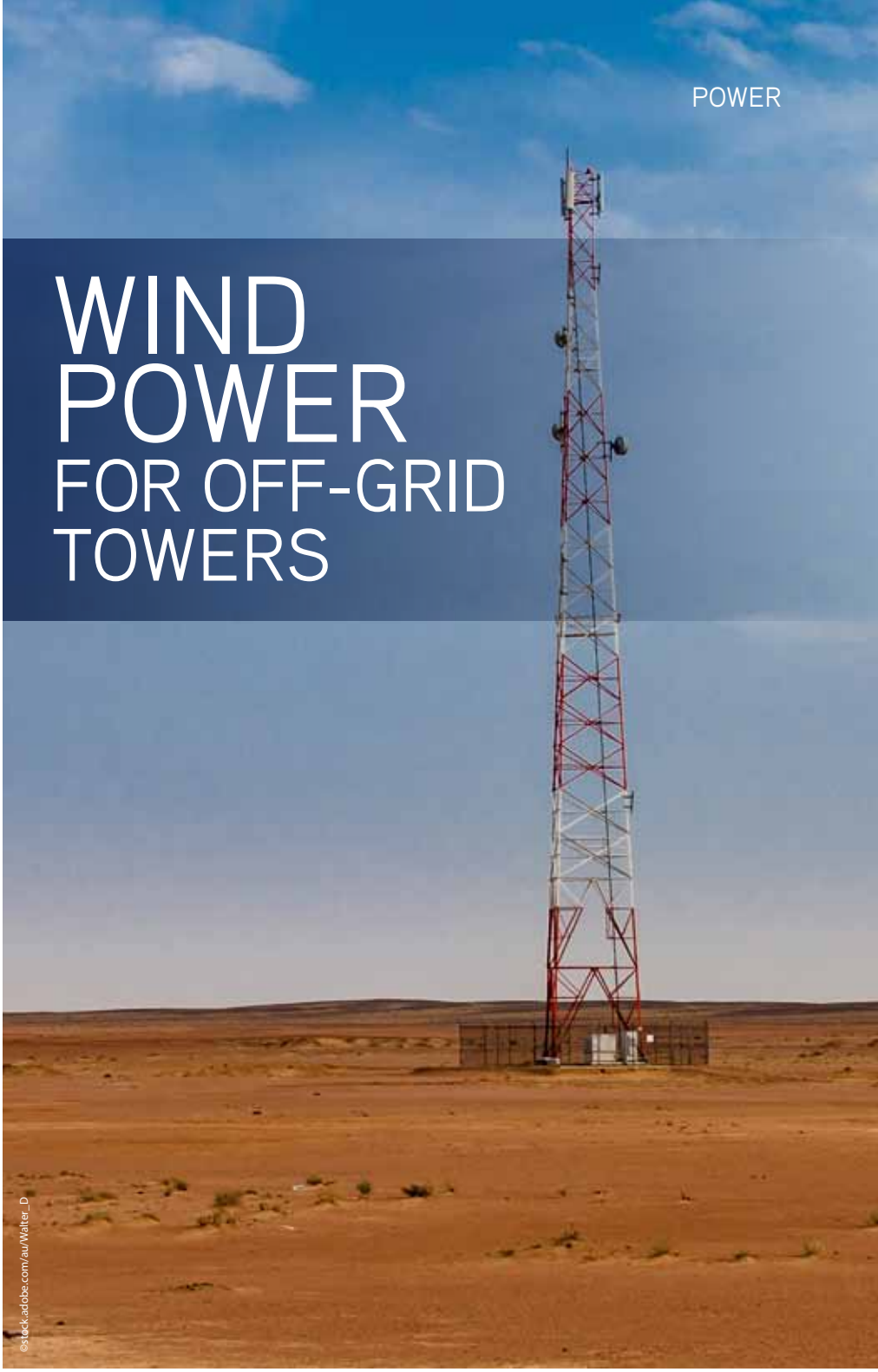
The border between Brazil and Bolivia is characterised by changing landscape, from dense rainforest to urban developments. The SC20 benefits from water-porting technology, meaning that even in rainforest downpours, or areas with significant moisture, the radio will maintain continuous service.

Loud audio and a range of audio accessories mean that voice communications will be heard even in noisy environments. An extended range should ensure that communications are maintained, whether based in remote areas with undulating terrain or in high-rise urban areas.

Terence Ledger, Sepura Worldwide Sales Director, said: "The SC20 is a trusted device for public safety officers around the world. We have seen many organisations adopt the radio to maintain the advantage of TETRA networks and benefit from a market-leading tough, powerful radio. We are delighted to support police in Mato Grosso state and throughout Brazil with their operations and look forward to working with them to extend their communication solutions in the future."

Sepura
www.sepura.com

WIND POWER FOR OFF-GRID TOWERS



Australian-developed wind turbine technology aims to reduce emissions while providing electrical power for off-grid telecommunications towers.

The Australian Renewable Energy Agency (ARENA) has announced $341,990 in funding to Diffuse Energy to demonstrate the effectiveness of its innovative micro wind turbine technology for use with off-grid telecommunications towers and broader remote applications.

As part of a $922,307 project, the Newcastle-based start-up will install its small wind turbines at 10 off-grid telecommunications towers across various locations in Australia.

Current diesel generation systems leave off-grid sites exposed during natural disasters such as bushfires and floods, cutting off vital communication when it is most required. With resilience a major issue for the telecommunications industry, wind turbine technology is seen as a solution to keep these towers operating.

Diffuse Energy developed a novel small wind turbine capable of generating 500 W that solves a number of technical issues previously associated with small wind turbines, including low energy efficiency compared to their larger counterparts, maintenance issues and poor commercial outcomes for the end user.

Small wind turbines are complementary to solar PV and batteries, particularly when solar and batteries are restricted due to space restrictions or lack of sun.

Founded in 2018 out of the University of Newcastle, Diffuse Energy will use the project to further validate its technology for the global telecommunications market, which is expected to spend more than US$3.4 billion on distributed energy solutions by 2024.

ARENA CEO Darren Miller said ARENA was pleased to support home-grown innovation in the private sector with real-world commercial applications.

"Diffuse Energy's micro wind technology offers an opportunity for a renewable energy solution to reduce emissions for off-grid telecommunications, while also ensuring the resilience of these towers in being able to operate at critical times such as during bushfires," he said.

"ARENA is excited to be assisting an Australian start-up in proving the effectiveness of their small wind turbine technology, which could have large market potential across many markets and applications.

"While this particular project is focusing on communications towers, the technology could also have other potential applications including mining, small microgrids and farming," Miller added.

Diffuse Energy Co-founder and CEO Joss Kesby welcomed the funding, saying with ARENA's support, its operation could be scaled up.

"Telecommunication providers depend on secure and resilient energy generation in order to deliver essential communication services. The industry is also rapidly moving towards net zero carbon emissions, creating a very strong demand for innovative, cost-effective renewable technologies.

"A nationwide rollout of our wind turbine technology to these sites could displace 17 GWh and 33,000 tonnes of CO_2 from fossil-fuelled generation per year. Equivalent to $43.9 million in savings of diesel fuel, transportation costs and generator maintenance."

Diffuse Energy was one of seven teams that participated in ARENA's A-Lab Incubate in late 2019, successfully using that experience to help develop its project.

Australian Renewable Energy Agency (ARENA)
www.arena.gov.au

Power meter

Schneider Electric has released a high-density power meter range, the PowerLogic HDPM6000. This meter range enables custom solutions for cost and network management in critical facilities. Leveraging the latest in IoT-enabled technology, including MODBUS, SNMP and BACnet TCP/IP, the HDPM6000 is designed to enable customers to better manage power consumption, optimise uptime and allocate energy costs.

Designed for new construction or retrofit installations, these switchboard or busway multi-circuit meters meet a wide array of customer power applications. Ideal for data centres, hospitals or industrial facilities with critical power needs, PowerLogic HDPM6000 meters are highly versatile and equipped with enhanced features that facilitate simple installation. They also provide building operators and facility managers with valuable power quality data at the branch circuit level that can be easily integrated with EcoStruxure edge control software or other third-party management systems.

With monitoring of up to 192 circuits to identify increased harmonics and help prevent potential failures, the HDPM6000 is the optimum solution for high-density metering applications. Its user-friendly web interface allows easy commissioning and configuration on branch circuits, and it easily adapts to changes in distributed architectures and scales to future requirements.

Schneider Electric

www.se.com/au

Control handset

Barrett Communications has released its 4050 control handset as an enhancement for the 4050 HF SDR transceiver.

The 4050 control handset combines smartphone-style ease of use with the touchscreen intuitiveness that users of the 4050 HF SDR transceiver are familiar with. A streamlined design, which includes a built-in microphone and loudspeaker, makes the 4050 control handset a substitution for the 4050's control head in mobile installations. An unobtrusive size mounts to a vehicle dashboard or vessel helm easily. A quick-release attachment makes removing the handset a one-hand operation.

The control handset can connect to both the front and rear of the transceiver and be used as the primary control interface, completely replacing the standard 4050 HF SDR transceiver front control panel, or as a secondary interface in conjunction with the standard control panel.

Connected to the transceiver body by a 6 m cable, incorporating an auxiliary speaker jack, the handset display incorporates a bright, high definition, 24-bit colour touchscreen, providing viewing ability in all lighting conditions.

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Is public safety being short-sheeted early in the process?

In the business press of recent weeks there have been mentions of the release of the contract for the PSMB Proof of Concept trials (see full report earlier in magazine). One of the issues that continues to be raised is the old wives tale that "The network will eventually replace current voice radio critical communications networks". This is an assumption that has been put forward many times, yet over time this has been found to not be the case.

In the United States of America there are now close to one million subscribers to the FirstNet system, with over 10,000 individual agencies on the network, it is interesting to note that with so many user-agencies there have been few reports of existing Land Mobile Radio (LMR) radio systems being decommissioned. Users have found that the LMR voice radio networks provide an immediacy of communications that is essential, and the one-to-many format of LMR provides better operational decisions to be made and delivered to all operators quickly rather than the one-to-one or one-to-several formats wireless broadband 'apps' offer. There is a viable and necessary need for the continuation of existing LMR voice radio networks that are supported by the data delivered over wireless broadband.

When we look at the progress on the PSMB system since the initial discussions in 2013, followed by the Productivity Commission report in 2016 and then the release of the Proof of Concept RFI in 2017, there are very lengthy delays. One of the changes that should now be considered is that many of the original aims of the PoC contract have now been implemented and demonstrated in overseas jurisdictions under working conditions. FirstNet in the USA, SafeNet in South Korea, Verve II in Finland and the ESN system in the UK are all utilising functions and features that the PoC contract is designed for. Why would we spend close to $10 million to 'prove' that they will work?

The considered position of the Australian Radio Communications Industry Association is that the recommendations of the Productivity Commission report should be implemented as a matter of priority, and that the Commonwealth funds be spent in part on having a proper evaluation of the overseas systems and bringing back real-world information on how they have implemented their systems. The spectrum issue is a side discussion as the PSMB network would operate on the public networks, with some pressure from the Communications department to convince the carriers to permit inter-network roaming for public safety devices.

The press release information refers to the recommendations to the Bushfires Royal Commission about providing better interoperability communications, an important recommendation. In our recent response to the recommendations regarding this issue we pointed out that in the wake of Cyclone Tracy the Commonwealth allocated some UHF spectrum nationally for the use of our various Police Forces to enable better communications in joint exercises and emergencies. If the Commonwealth were to use the Natural Disasters of 2019–20 as the catalyst, they could now allocate some VHF high band spectrum to be used by our relevant volunteer fire services and other emergency service agencies to have an interoperable communications plan. Perhaps the Commonwealth funds could give better outcomes in this area?

Ian Miller is the respected Executive Officer of the Australian Radio Communications Industry Association (ARCIA) Inc., "the voice of the Australian wireless communications industry".

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