MARCH/APRIL 2021 Vol.8 No.3

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

ON THE COVER

The IMPULSE Wireless mission-critical portable (MCP5) operates on DMR two-way radio and 4G/LTE networks or Wi-Fi.

The MCP5 has simple and straightforward operation like a normal two-way radio. It communicates using PTT over cellular, or DMR two-way radio, and autonomously uses the best of both worlds.

Users can take advantage of the MCP5 as a radio with smartphone features and applications, so they don't need to carry multiple devices.

They may also use it for PTT communications, with the DMR radio providing mission-critical backup.

When out of 4G coverage, MCP5s will use DMR to transfer voice, GPS and SOS data between each other, and back into the LTE/4G PTT network where possible via another MCP5 automatically operating as a gateway.

In this way the MCP5 provides extended coverage and reliability. DMR operation may also include simplex and repeater channels.

The MCP5 runs Android 9 and operates on the Australian 4G and 3G bands. It supports a variety of applications, including most leading push-to-talk applications, with its large PTT and SOS buttons, loud 1 watt audio output, and optional wired remote speaker microphone.

The MCP5 supports dual SIM. It is lightweight, has a 4-inch Gorilla Glass III colour touchscreen, and an accelerometer supporting man-down, lone worker, and duress safety systems.

A 4500 mAh battery is included as standard; along with a drop-in desktop charger which can charge a radio and a spare battery simultaneously.

IMPULSE Wireless
www.impulsewireless.com.au

Transmit

Great news! With the improved COVID-19 situation in Australia and New Zealand, it's now full steam ahead for Comms Connect New Zealand. A packed program of local and international speakers and case studies has been put together, and it should be a great event… especially as it will be teamed, once again, with the Radio Frequency Users Association of New Zealand's annual Gala Dinner and Awards Night. It also signals, of course, a return to some sort of normal — including face-to-face industry events — and that is something that I know we will all welcome. Make sure you check out the Comms Connect New Zealand website, www.comms-connect.co.nz, for full details, and keep an eye out for extra speaker announcements over the next couple of months.

The last 12 months have been very traumatic for many people, and disruptive for all, so it is to be hoped that our lives and businesses can make a full recovery in 2021. Regardless, though, of what has happened and what is still to come, the past year has shown us how vital communications are for all of us. I shudder to think what would have happened to Australia, the world and each of us individually, if we hadn't had the assistance of modern communications technologies to get us through this awful episode. ARCIA has a slogan — no train leaves the station, no ship leaves port, no aircraft leaves the ground without communications. I think we can add to that — no pandemic is tamed without communications.

Jonathan Nally, Editor
jnally@wfmedia.com.au

Calendar

April

Digital Mines 2021
20–22 April 2021
Online
claridenglobal.com/conference/digitalmines/

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

November

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

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

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VE-PG4

SENDING LTE TO THE MOON

NASA is going back to the Moon this decade, and it will be taking a Nokia LTE communications network along for the ride.

Image courtesy NASA

Humanity's relentless endeavour to push the boundaries of space exploration is well documented. From crewed missions to probes speeding their way to the farthest corners of the Solar System and beyond, the thirst to discover the secrets of the Universe have never been as resolutely demonstrated as they are now.

To that end, the need for advanced and resilient space communications equipment cannot be understated as space agencies around the world race to reach for the stars. Nokia, a pioneer of wireless and networking technologies, will be celebrating the new decade with an ambitious project after it was selected by NASA to build the first-ever cellular network on the Moon.

Nokia will be developing groundbreaking technologies by deploying an LTE/4G communications system on the lunar surface, helping to pave the way for a sustainable human presence on the Moon. The contract awarded to Nokia is part of NASA's Tipping Point program, which fosters the development of commercial space capabilities and will benefit future missions. NASA plans to leverage these innovations for its Artemis program, which will establish sustainable operations on the Moon by the end of the decade in preparation for an expedition to Mars.

Thierry E Klein, Head of the Enterprise and Industrial Automation Research Lab at Nokia Bell Labs, in the following interview, provided a deeper insight into the ambitious initiative that will witness Nokia's LTE/4G network provide critical communication capabilities for a range of future data transmission applications.

Nokia and NASA on the Moon

Nokia's lunar network consists of an LTE base station with integrated Evolved Packet Core (EPC) functionalities, LTE user equipment, RF antennas and high-reliability operations and maintenance (O&M) control software. The LTE base station with integrated EPC functionalities will be mounted on the landing module, while the LTE user equipment will be mounted on a rover or other payloads being deployed outside of the lander. The fully integrated cellular network meets very stringent size, weight and power constraints of space payloads in an extremely compact form factor.

We are delivering a complete end-to-end LTE network that has multiple parts to it. The first part is an LTE base station with integrated Evolved Packet Core network functionality. It's integrated into a very small, ultra-compact form factor that will go on the lunar lander from our mission partner, Intuitive Machines, along with a passive antenna system.

The second part is the user equipment and an omnidirectional antenna that will be integrated in a rover. The rovers will be transported to the lunar surface and autonomously deployed by the lunar lander. An LTE link will be established between the lander and the rover to provide lunar surface connectivity.

The rover will have two objectives: first to test very close proximity communication up to a couple of hundred metres and second to test longer-range communication with a range of two to three kilometres away from the lander. The final part of the system is a custom-built operations and maintenance software so that the whole system can be monitored and configured from mission control on Earth.

It became evident to us that, for any sustained human presence on the Moon and Mars in the future, connectivity and communications are critical. Astronauts will need the same advanced capabilities that we have on Earth in space to support their activities and run their applications, whether that is enabling voice and video communications capabilities, telemetry and biometric data exchange, sensing applications or controlling robotics.

LTE/4G is well established in terrestrial networks, provides excellent performance and economies of scale, and meets the initial mission requirements. Also, LTE/4G has a well-defined path to 5G.

The Nokia LTE/4G network funded by the NASA Tipping Point program will be

> THE LTE BASE STATION WITH INTEGRATED EPC FUNCTIONALITIES WILL BE MOUNTED ON THE LANDING MODULE, WHILE THE LTE USER EQUIPMENT WILL BE MOUNTED ON A ROVER.

deployed on the Moon sometime in late 2022. The mission objective is to deploy the first LTE/4G network on the lunar surface, and the mission duration will last several weeks to prove the network and verify its performance.

The equipment needs to be hardened for environmental stresses such as vibration, shock and acceleration, especially during launch and landing procedures, and the harsh conditions experienced in space and on the lunar surface, including temperature, vacuum and radiation. The equipment also needs to be extremely reliable and the LTE/4G network includes hardware redundancy and sophisticated O&M software that allows us to operate it remotely. Size, weight and power consumption are important considerations for any lunar mission and the system has been specifically designed to meet stringent requirements for this mission.

One of the purposes of the mission is to test and learn about radio propagation on the Moon. The lunar surface has less clutter than Earth since there are no trees, buildings and structures. But at the same time, it has its own characteristics in terms of rock boulders, mountains and craters. Our system has already undergone a series of rigorous environmental and operational tests to verify its performance and reliability, and we look forward to validating these during the mission to advance the technology readiness level of the system.

Nokia has built products to operate in harsh conditions, such as mining installations or industrial environments, that are different from conventional cellular networks. However, the challenges of operating complex electronics and software in space are breaking new barriers, which is part of the spirit of exploration at Nokia Bell Labs. This project combines many different areas of technology that we work on. We continue to learn and optimise our solution at each step along the way.

We've always had an intense scientific curiosity that has led to some of the greatest innovations and discoveries known to humankind. The teams at Nokia Bell Labs have always found inspiration in the amazing lunar research conducted by the scientific community, and we are very excited to work with NASA and be part of such an important mission.

Nokia Solutions and Networks Singapore Pte Ltd
www.nokia.com

Image courtesy NASA

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COMMS CONNECT NZ RETURNS IN MAY

A welcome return of face-to-face conferencing will see the industry come together in Wellington.

The Comms Connect conference will return with its first live event in more than a year at the Lower Hutt Events Centre in Wellington, New Zealand, on 12–13 May, and once again it will incorporate the RFUANZ Gala Dinner and Awards night (on 12 May at Te Papa Museum).

The conference program is almost complete, and will this year primarily feature local leaders from the critical communications and public safety sectors across New Zealand. Two international keynotes will also feature, via video link from the USA. The final program will be released at the end of February.

Presentation topics confirmed so far include: 5G testing; IoT asset tracking in the beer industry: Securing NZ industrial environments; Spectrum management update; Mobile-first impact on first responders; The future of connectivity; Cybersecurity and the comms industry; Edge computing and narrowband for remote sensing; Utility network migration to IP/MPLS; Microwave and mmWave wireless backhaul.

The program will also feature two ARE/ARC Workshops presented by the Radio Spectrum Management team of Len Starling and Fadia Mudafar.

If you are interested in presenting a paper at the conference please contact Geoff Hird (ghird@wfmedia.com.au) and include the proposed topic, a brief summary and your contact details.

Twenty-five companies are already confirmed for the accompanying exhibition. If you are interested in sponsoring or exhibiting please contact Narelle Granger (ngranger@wfmedia.com.au).

Early bird conference packages are now available for the event at www.comms-connect.co.nz.

Online events

Comms Connect's online training courses and masterclasses return in 2021, with three due to run in the coming months.

First up, in April, will be the popular Radio Communications 101 Workshop, with five, 2.5-hour sessions held from 14 to 26 April. This course introduces the student to radio communications and associated technologies. Modules include an overview of radio service as a transmission media, how transmitters and receivers work, an overview of wave propagation and radio antenna systems. The information is introductory in nature and designed for all audiences. Students will acquire a basic understanding of radio communications theory.

Next is the extremely popular Microwave Radio Masterclass, which has now been run several times due to demand. It will run across five, 2-hour sessions from 17 to 21 May. Presented by industry expert Trevor Manning, this course will provide an up-to-date, authoritative overview of microwave radio that dispels the myths that have become mainstream in the industry. In particular, participants will learn to apply the many new and exciting concepts introduced in modern microwave equipment.

And lastly, for those who can't make the April Radio Communications 101 Workshop, it will be run again in July. So there's really no excuse for missing out!

Full details of these courses are available on the Comms Connect website at https://www.comms-connect.com.au/online-events/.

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www.comms-connect.com.au

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News

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CODAN TO ACQUIRE DOMO TACTICAL

Codan Limited has entered into an agreement to acquire 100% of the shares in US-based company Domo Tactical Communications (DTC), from a private equity company. DTC is an established technology provider for high-bandwidth wireless communications with specialist capabilities in MIMO self-forming and self-healing mesh networks. It is a long-term supplier into more than 20 key United States government agencies as well as the 'Five Eyes' intelligence communities. "The acquisition of DTC is consistent with Codan's well-publicised strategic growth plan for our Tactical Communications business," said Codan Chief Executive Donald McGurk.

More info: bit.ly/2P0eAL9

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SAFE WORK AUSTRALIA ISSUES EWP REMINDER

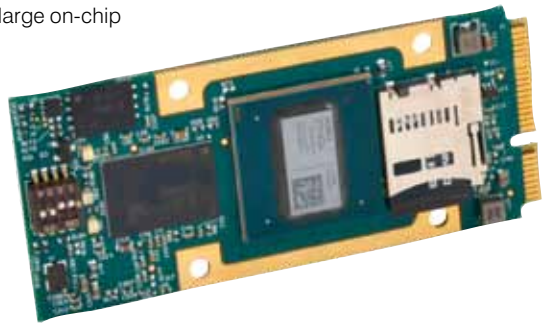
Safe Work Australia has published new guidance for inspecting and maintaining elevating work platforms (EWPs), which are considered to be in the high-risk equipment class. EWPs were involved in nine worker fatalities in the years 2015 to 2019. According to Safe Work Australia, an inspection, maintenance and testing program is crucial to assess the platforms' safe operation, and this includes annual inspections and operator training. EWPs come in many forms, including scissor lifts, self-propelled boom lifts, trailer- or vehicle-mounted lifts, and telehandlers with elevating work platform attachments. Safe Work Australia is reminding employers that they are responsible for ensuring that plant equipment is inspected and maintained.

More info: bit.ly/2NgZctr

Mini PCIe-based modules

The Acromag APZU series, available from Metromatics, expands Acromag's offering of mini PCIe-based AcroPack modules with a programmable I/O solution featuring the Xilinx Zynq UltraScale+ multiprocessor system-on-a-chip (MPSoC). Three models are available offering a choice of digital I/O interfaces with 28 TTL, 20 TTL and 3 RS422/485, or 14 LVDS signals. These mezzanine modules mount on a variety of AcroPack carrier cards for PCIe, VPX and other platforms enabling developers to mix and match I/O combinations on a single board for embedded applications running on Linux, Windows or VxWorks operating systems. They are suitable for adaptive filtering, protocol conversion, simulation, image processing and sensor fusion applications.

Two dual-core ARM Cortex CPUs (A53 application processor and R5 real-time processor) deliver high-performance computation capability, while 154k logic cells provide plenty of FPGA processing blocks for hardware acceleration and compute-intensive tasks. Additional resources include large on-chip memory, external memory interfaces, and a rich set of peripheral connectivity interfaces. Gigabit Ethernet, USB 2.0 and USB-UART interfaces are supported.



Metromatics Pty Ltd

www.metromatics.com.au

Router

The Cradlepoint IBR900 Series router is a ruggedised Gigabit-Class LTE networking platform designed for persistent connectivity across a wide range of in-vehicle and mobile applications as well as portable or fixed IoT installations. Suitable for harsh environments, it delivers enterprise-class standards of reliability, scalability, comprehensive management and security.

For organisations that depend on field forces and mobile networks, the Cradlepoint IBR900 Series mobile router with the NetCloud Mobile solution package provides ruggedised and GPS-enabled in-vehicle network solutions that are SD-WAN- and SD-Perimeter-capable. With an available Gigabit-Class LTE modem, Gigabit Wi-Fi and advanced security features, the Cradlepoint IBR1900 Series router offers secure, always-on connectivity.

With an extensive list of safety and hardening certifications, it can be deployed in the field, in buildings or in embedded systems to deliver visibility, security and control of connected devices anywhere.

Cradlepoint Australia Pty Ltd

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News

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LTE AND 5G DEVELOPMENTS

A detailed overview of developments in 3GPP Releases 16 and 17, as well as 5G standardisation, features in a white paper newly released by 5G Americas. "Despite all the global challenges during this historic year dealing with COVID-19, 3GPP finalised Release 16 and initiated the work on Release 17," said Chris Pearson, President of 5G Americas. In Release 16, 3GPP has continued enriching the 5G system with new features such as ultra-reliable low latency architecture support, 5G LAN services, Time Sensitive Networking for Industrial IoT, Non-Public Networks and much more.

More info: bit.ly/3bsksUW

PANORAMA ANTENNAS RELOCATES TO PERTH

Panorama Antennas has announced that its Australian subsidiary has now made Western Australia its home, having shifted its operations to Kardinya in Perth late last year. "This is a new and exciting chapter for our Australian business," said Robert Jesman, Sales Director of Panorama Antennas. "The new office space better accommodates our growing team and enables us to hire additional talent to continue to provide industry-leading antennas to our global clients. With local business operations now overseen by our resident director, Robert Seweryn, we have a local team dedicated to ensuring that our customer base in Australia continues to receive first-class service, support and antenna products stocked locally."

More info: bit.ly/3seFCN0

Portable radio

The IMPULSE Wireless mission-critical portable (MCP5) operates on LMR and LTE and provides autonomous and seamless operation, automatic bridging and intelligent switching between PTT over LTE and DMR Tier II.

Running Android 9 and with a 4″ Gorilla Glass touchscreen, the MCP5 supports a variety of applications, including many leading push-to-talk applications, and has large PTT and SOS buttons, loud audio and optional audio accessories including a wired remote speaker microphone or earpieces.

When out of cellular coverage, MCP5s will create a self-organising DMR network to efficiently manage the transfer of voice, GPS and SOS data between each other, and back into the LTE/4G PTT network where possible. In this scenario, devices out of 4G coverage will make use of an MCP5 with LTE/4G coverage to automatically bridge voice and data between DMR and LTE. Autonomous failover/mission-critical operation can include direct mode (simplex), DMR repeater operation, automatic voice bridging between DMR and the LTE/4G network, and automatic data bridging for sending GPS and SOS information over DMR back to the GPS tracking system via LTE/4G.

IMPULSE Wireless

www.impulsewireless.com.au

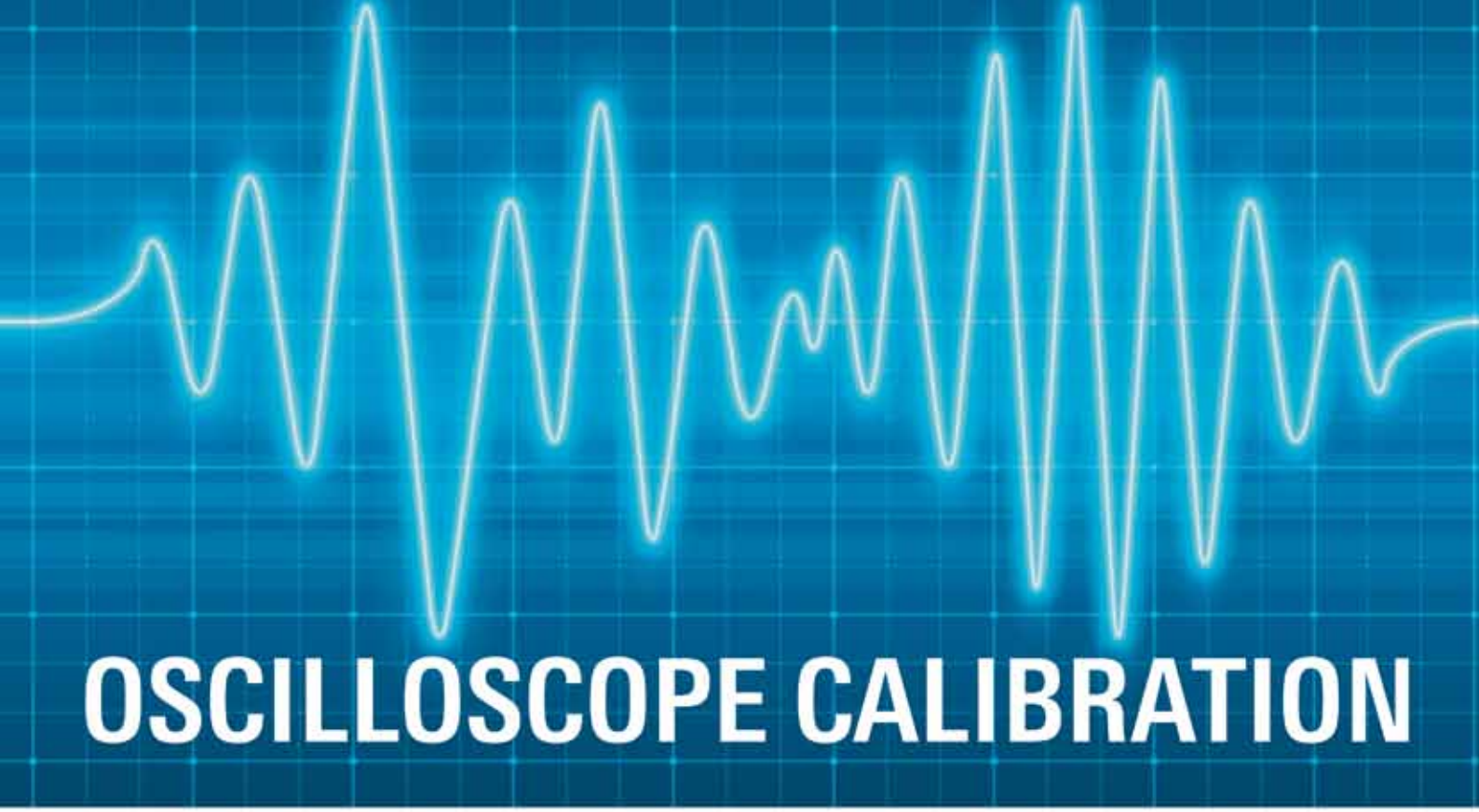
Mission-critical communications

Hypha, a range of solutions offered by Brisbane-based Wireless Innovation, combines multiple bearers with deep integration and smart devices for the public safety and enterprise sectors. HyphaFUSION turns a vehicle into a communications hub by providing connection over satellite, LMR and LTE while projecting a Wi-Fi bubble for multiple devices in the area. HyphaCONNECT provides integration back to an LMR core that allows network users to be visible to dispatch — and use their regular talk groups — while outside of LMR and LTE coverage. HyphaMESH is a group of products that use smart waveforms to interconnect devices to create a self-forming, self-healing ad hoc network.

The HyphaCAP is the flagship device. It is a lightweight, portable device that connects as a mesh network while projecting its own Wi-Fi bubble, allowing smart devices to function beyond the range of cellular networks. Operating in the 4.9 GHz band, it forms an IP transparent bridge for use inside buildings, underground or in rugged country.

Wireless Innovation

www.hypha.world



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Industry Talking

ARCIA kicked off 2021 with our planning days. Of course, with COVID-19 still affecting interstate travel, we chose online meetings over four days in February. It is much better for everyone to gather in one place, turn off the phones and focus for two days, but at least with the aid of modern conference calls the team was able to get through its usual program.

On the agenda for 2021 were events, training, our response to the bushfire royal commission, public safety mobile broadband, membership and many other topics. The online format meant that Ian Miller had to spend a huge amount of time preparing for the meetings and the effort was appreciated by all that attended the virtual planning sessions.

ARCIA, in conjunction with the University of Melbourne's Centre for Disaster Management & Public Safety and other industry bodies, made detailed submissions to the bushfire royal commission, the central theme being that communications networks should be treated as part of critical systems infrastructure. Having read the recommendations of the royal commission, ARCIA spent the first planning session in a general discussion about how some of identified issues reported to the royal commission could be solved. The committee agreed to propose there should be a national allocation of VHF High Band channels for fire ground communications; full details of ARCIA's response will be published separately.

The ARCIA committee also spent a session further refining the proposed Professional Development plan and how to deliver it. Considering the success of previous short courses and with the encouragement of the committee, ARCIA will add new content to be ready mid-2021. We believe that the content will be valuable to a wide industry audience and that the Association can run training days in a financially sustainable fashion. If you have suggestions for training content please let us know; we do want training to be relevant to the needs of industry. In line with that we are now working on a curriculum for a radio trades qualification which will be managed and presented in conjunction with ARCIA.

To coincide with training, events are now being planned for Sydney, Brisbane, Adelaide and Perth, commencing in June. Keep an eye on the events calendar on the ARCIA website for details. The major event for 2021 will be the annual Gala Dinner, which is now set down for 20 October in conjunction with Comms Connect. Given it will be nearly two years since the last major event for our industry we are expecting that lots of people will want to gather to celebrate what we hope will be the revitalisation.

During the latter part of 2020, the DITRDC conducted an enquiry on the potential for the federal government to provide grants as part of the 5G Innovation Initiative. On behalf of our industry, ARCIA responded and pointed out that it is our members who will be supporting the private 5G/LTE systems. We can now report that the grant process will be proceeding. If you or your clients have opportunities for 5G systems then this could be the opportunity to lodge a grant application and maybe get the system recognised as a trial network. If you need help, contact ARCIA. Grant details are available at https://www.business.gov.au/A5GII.

At the end of 2020 the committee decided to recommence the annual fees after a 6-month COVID holiday. I would like to thank all the ARCIA members and corporate partners for your support, the vast majority of whom paid the required fees.

Please keep an eye on the ARCIA calendar for the events we have planned for 2021; we hope the worst of the pandemic is behind us and we can return to normal.

Hamish Duff, President
Australian Radio Communications Industry Association

Smartphone application with DGNA

DAMM has announced the addition of Dynamic Group Number Assignment (DGNA) functionality to its TetraFlex PTT smartphone application, making it possible to instantly assign groups to both TETRA radio and DAMM PTT users and providing enhanced collaboration opportunities by including workers in remote areas without narrowband coverage and workers who are not equipped with a TETRA radio. DGNA is a well-known method of quickly establishing secure group communication between relevant TETRA radio subscribers on a designated group.

Using the teams feature in the dispatcher, situations can be prepared for in advance. When needed, a team can be quickly created and attached to a specific group, enabling fast set-up of an emergency group communication and extending TETRA capabilities to broadband applications.

Damm Australia
www.damm-aus.com.au/

Electrical tester

The Fluke T6-1000 PRO electrical tester measures voltage up to 1000 V AC and current up to 200 A AC, all through the open fork and without test lead contact to live voltage. It saves time by displaying voltage and current measurements concurrently and utilises Visual Continuity technology, automatically turning the screen green for continuity — a useful feature in noisy environments where it's too loud to hear the beeper.

The T6-1000 PRO features true-RMS, helping to provide accurate voltage and current measurements, even when measuring complex signals.

Fluke Australia Pty Ltd
www.fluke.com.au

5 Watt Portable UHF Radio

The CP50 is an Australian designed and manufactured Professional 5 watt UHF radio. Encompassing cutting-edge Digital Signal Processing circuitry, the CP50 delivers a future-proof platform for advanced features and value-added software functionality.

The CP50's unique selectable 5W, 1W and 100mW low power transmit mode coupled with the 2600mAh Lithium-ion battery pack offers extended operational hours.

The CP50 provides a range of features including MDC1200 Compatibility, RSSI and Busy Voting and Man Down and Lone Worker alerts to meet the needs of any work site.

Encased in a compact and rugged design which meets both IP67 and MIL-STD-810G ratings the CP50 provides exceptional durability and coupled with loud and clear 1500mW of Audio Output it ensures reliable communication, even under the harshest conditions.

GME

gmeprofessional.com

AUSTRALIAN MADE

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TELSTRA AWARDED $567M TASGRN CONTRACT

Jonathan Nally

Tasmanian mission- and business-critical organisations will soon have a new multiagency emergency radiocommunications network.

Telstra has been awarded a $567 million contract to roll out a new Tasmanian Government Radio Network (TasGRN), which will provide multiagency emergency radiocommunications.

TasGRN will replace five separate narrowband legacy radio networks with a single digital network. Prime contractor Telstra will be supported by Motorola Solutions.

Construction is due to begin in 2021, with user organisations expected to start migrating to the new network in the 2022–23 financial year with associated services spanning 12 years.

"Once complete the project will provide secure and mission-critical voice and data communications as part of the Tasmanian Government's plan to keep Tasmanians safe," said Acting Premier Jeremy Rockliff.

The initial user organisations will be Tasmania Police, the Tasmania Fire Service, Ambulance Tasmania, the State Emergency Service, Sustainable Timber Tasmania, Department of Primary Industries, Parks, Water and Environment, TasNetworks and Hydro Tasmania.

"The project is expected to create around 50 jobs during the three-year construction phase, with more than 30 additional positions created to help run, maintain and oversee the network once it is up and running," Acting Premier Rockliff added.

Minister for Police, Fire and Emergency Management Mark Shelton said the TasGRN will improve public safety outcomes for all Tasmanians and emergency responders.

"Radiocommunication is a critical technology for organisations across the state, and during emergencies, the radio network must be reliable and continuous," Minister Shelton said.

"When the state is in need, immediate interoperability will be available for interstate emergency service personnel deployed to Tasmania. Similarly, any of the 10,000 TasGRN radio users will be able to provide swift support to an interstate jurisdiction in a time of emergency."

Telstra Enterprise Executive Gretchen Cooke said TasGRN will be the largest single project Telstra has undertaken in Tasmania.

"This new radio network will be more reliable, more resilient, more secure and will replace five separate systems so Tasmania's emergency services can communicate with confidence to help keep Tasmanians safe," Cooke said.

The network will be based on Motorola Solutions' technology platform and will include mission-critical ASTRO P25 technology and broadband push-to-talk services, enabling communication between radios, smartphones and other devices, as well as enhanced integration with existing communication centres via consoles.

Motorola Solutions will also provide a solution to extend the reach of mission-critical communications into rural, remote and underground areas, and supply managed services such as technology management and network operations support.

"Our involvement in this significant project for Tasmania demonstrates our commitment to ensuring the highest levels of safety for communities as well as the emergency responders that put their lives on the line every day to protect them," said Con Balaskas, Vice President of Motorola Solutions Australia and New Zealand.

Ambulance contract extended

Ambulance Victoria's managed service agreement with Motorola Solutions for the provision and management of the Mobile Data Network (MDN) has been extended until 2025 (with a further two-year option) under a $100 million contract announced in December.

Since 2005 the MDN has provided secure, mission-critical data communications for Ambulance Victoria, mostly across the Melbourne metropolitan region, in support of the service's dispatch capabilities.

The new agreement will see Motorola Solutions "maintain the service to its current mission-critical standards whilst introducing new and emerging technologies", according to the company.

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CODAN BOOSTS R&D AND OFFERS SCHOLARSHIPS

Jonathan Nally

The company is boosting its investment in core and emerging technologies through partnerships and scholarships.

Codan has announced that it has formed a new Innovation Hub and CoLab in partnership with entrepreneurial innovation firm 11point2. The CoLab will be located at Adelaide's advanced innovation precinct, Lot Fourteen.

In a statement, the company said that the development forms part of its "strategy to invest in core and emerging technologies to future-proof the business with a pipeline of differentiated intellectual property".

The CoLab will focus on technology for situational awareness, especially non-GPS-based tracking and location. Key areas of research will include computer vision, RF location techniques, machine learning and data fusion algorithms.

"Codan is well known for a track record of innovation and product development: the CoLab with 11point2 will accelerate that process and ensure we are working on relevant industry problems," said Codan's Chief Technology Officer, Rory Linehan.

"The Innovation Hub will de-risk advanced technologies through research and proof-of-concept designs, with the CoLab driving market validation of key applications."

Linehan said the move represents a significant investment in STEM and offers Codan an opportunity to recruit new research teams, further develop in-house talent and provide a platform for PhD research.

Being located at Lot Fourteen will provide CoLab with access to a global network of entrepreneurs, tech start-ups and world-class research centres, he added.

In related news, Codan has partnered with The Playford Trust to offer PhD scholarships to South Australian students.

Codan's recently formed Research & Technology group is focusing on core and emerging technologies related to the field of situational awareness, with an initial aim being the development of dissimilar technologies to support GPS-denied ranging, location, tracking and navigation.

The scholarships will contribute to the Research & Technology group in the following technologies:

- Application of machine learning to inertial navigation.
- RF digital signal processing for wireless ranging and localisation.
- Application of computer vision technologies for simultaneous location and tracking.

They are valued at $35,000 each, with the research to be conducted at Codan's facility at Mawson Lakes.

The selection criteria and application platforms can be found at https://playfordtrust.com.au/project/codan-playford-trust-phd-scholarships/. Applications closed on 22 January 2021.

Information about the research can be obtained from the relevant faculty/college at each of the three South Australian universities: The University of Adelaide, Flinders University and the University of South Australia.

Codan Radio Communications
www.codanradio.com

Pictured: Steven Marshall, Premier of South Australia; Rory Linehan, Chief Technology Officer, Codan; Mark Ogden, Managing Partner, 11point2; Diane Dixon, State Project Lead, Lot Fourteen; and Chris Kirk, General Manager, Stone & Chalk.

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PROJECT TO CREATE NEXT-GEN WIRELESS DEVICES

Researchers are experimenting with adaptive, tunable filtering to reject interference in spectrum-sharing systems.

Eric Laine

Two Cornell University researchers are looking into a new way to meet the growing demand for wireless services in the US.

Amal El-Ghazaly and Alyosha Molnar, from the School of Electrical and Computer Engineering (ECE) at Cornell, have received a US$880,000 grant from the National Science Foundation (NSF) to design a new class of radio devices capable of operating across a large portion of the growing wireless spectrum, while adaptively suppressing interferences.

"The electromagnetic spectrum has a lot of different frequencies that are accessible for communication," said El-Ghazaly, an assistant professor of ECE. "But there are so many more users than there are frequencies."

To meet growing demand for wireless services in the US, the Federal Communications Commission has periodically made an ever-widening range of frequencies in the electromagnetic spectrum available for unlicensed usage. This creates opportunities for innovation in the way devices like mobile

Credit: Jason Koski/Cornell

A mobile phone chip developed by Al Molnar, associate professor of electrical and computer engineering.

phones and computers use the spectrum for various types of communications.

As the usable spectrum becomes more congested, wireless devices may be forced to share frequency bands or use frequencies tightly packed together, leading to interference. New wireless systems must become more robust against interference to take advantage of the increased bandwidth.

To spur innovation among researchers, the NSF created the Spectrum and Wireless Innovation enabled by Future Technologies (SWIFT) program. SWIFT is looking for innovations in transmitters, receivers and spectrum coexistence, which refers to two or more applications using the same frequency band at the same time without adversely affecting one another. Spectrum coexistence has received less attention from researchers.

El-Ghazaly and Molnar, along with Bernd-Peter Paris, associate professor of electrical and computer engineering at George Mason University, have a unique approach to coexistence in their SWIFT-funded project: use the entire range of frequencies and apply adaptive, tunable filtering to reject any interference. Their project is titled "Adaptive Interference Rejection with Synthetic Channel Diversity".

The team will develop a radio receiver architecture capable of operating across a large portion of the wireless spectrum while suppressing interferences as they arise. A new algorithm will allow the receiver to adaptively adjust its interference response as needed using digital signal processing.

"Your cell phone has certain bands it can use and some it can't," said Molnar, an associate professor of ECE. "For any given band you want to use, you need a filter that's engineered to just let that band through and block everything else."

But those filters are fixed, or only very weakly changeable, he said, when you build the device.

"You can't really use the spectrum efficiently because you have to commit in advance [to] which bands you want to use," said Molnar. "The approach we're taking is, rather than building these very narrow filters that only pass certain things, we're going to pass everything through."

But when a device receives all the frequencies, it's also taking in a lot of interference, overwhelming the receiver. The key: designing a device to enhance the signal in the frequency you want to receive and suppress interference at others. Such a device could take in a much wider band but also be able to filter out interference to focus on the desired signal.

"Any sort of band-limiting filter needs to have at least a couple of different components," El-Ghazaly said. "When the components are tunable, we're able to slightly change the values of the inductor and the capacitor so that we can adjust the network as needed to be optimal for each new set of signals and interferences coming in."

The algorithm analyses the signals and calculates how to tune each of the values in real time, to get the best possible signal.

This type of device would remain usable even as the spectral environment changes. As regulators make additional bands available, such devices would already be capable of utilising them. Likewise, bands that are in use only in certain locations, or at certain times of day, would become available.

"If you are near a satellite station during certain times of day when the satellite is overhead, you can't use that band," Molnar said. "That only happens a few times a day in certain locations, but the rest of the country is blocked from that band."

With his team's new adaptive architecture, those frequencies could become usable. The new receiver will be dynamic and tunable, the researchers said, responding in real time to whatever bandwidth is available and unconstrained by its own hardware.

The project includes plans to educate and train rising engineers, at both the graduate and undergraduate levels, to think holistically about the components and operation of wireless systems and design robust receivers for the future.

Some of the initial concepts foundational to this project were funded by the Semiconductor Research Corporation, through the Joint University Microelectronics Program.

Eric Laine is a communications specialist in the Cornell University College of Engineering.

Images courtesy Optus

OPTUS STADIUM GOES 5G

Perth's Optus Stadium has become the first sporting venue in Western Australia to be 5G enabled.

VenuesWest, on behalf of the Western Australia State Government, together with Optus and VenuesLive, has announced that ultra-fast 5G connectivity had been switched on throughout key areas of Optus Stadium, including the pitch, corporate suites and seating areas.

According to Optus, the stadium is the first commercial building in Australia (excluding Optus retail stores) and the first sporting venue in Western Australia to be 5G enabled.

Fans who have a 5G handset will benefit from the newly switched on 5G technology with a more reliable video and app streaming experience, even when 60,000 people are uploading images and streaming video of an event to social media channels.

Optus says 5G is an ideal network solution for stadiums, enabling large numbers of users in a crowd to connect simultaneously, and it is part of the company's network rollout strategy to enable new experiences across multiple industries such as sports and entertainment.

"5G will be transformative in the home, at work and when we are at play, like cheering on your team or singing along to your favourite artist," said Optus CEO Kelly Bayer Rosmarin. "This next-generation technology has the potential to revolutionise the way sport and live entertainment is enjoyed."

President of Nokia Mobile Networks Tommi Uitto said that while "access to public events has been impacted in the current environment, Optus' 5G network will ensure extraordinary 5G experiences for all in readiness for spectators filling stadiums to capacity again".

"5G is set to transform the way we now watch sport and live performances as well as how we connect with everyone, while also significantly enhancing the fan's first experience," added Sport & Recreation Minister Mick Murray.

"It has been an exciting partnership with Optus as our naming rights partner, with many additional benefits such as added technology support and funding," the Minister said.

"I would like to thank the team at VenuesWest and VenuesLive for coordinating the rollout of this exciting new technology together with Optus, and providing an incredible fan's first experience."

Optus has also integrated 5G into the popular Optus Stadium Tour package, offering an immersive and interactive experience for tour patrons that will enhance the stadium experience.

Using a Samsung Galaxy S20 Ultra, the tour will initially include a day-to-night view of the stadium, including its light show, using augmented reality run over 5G... with plans to launch additional content over the coming months.

Optus says it has more than 1000 5G sites switched on nationwide, with more than 100 of these in Western Australia.

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Radio Matters

It's great to be able to report that the 2021 annual Comms Connect New Zealand conference and exhibition will be going ahead at the Lower Hutt Events Centre on 12–13 May, with the annual Gala Dinner and Awards Night to be held at Te Papa on the 12th.

Training continues to remain in the forefront of the RFUANZ list of priorities, with considerable progress being made with Etec and Radio Spectrum Management for the introduction of a Level 4 program being made available before the end of the year.

Updates will be available through the RFUANZ bi-monthly newsletter.

FirstNet is a public safety mission-critical broadband network in America that is similar to the Next Generation Critical Communications (NGCC) project for which the NZ Government has just released a tender. One of the members of the NGCC board is TJ Kennedy, ex-president of FirstNet.

The following excerpt from Andy Seybold's Public Safety Advocate newsletter gives an update on one aspect of spectrum issues in the US, specifically the repeal of the T-Band 'giveback':

"As part of the 2012 Bill that included formation of FirstNet a condition was included that, in ten years, eleven major metropolitan areas and their surrounding suburbs were to lose public-safety spectrum along with some businesses also using the spectrum previously allocated to TV stations. Some of this 470–512-MHz spectrum was assigned to public-safety agencies in major metro areas and some to business users.

"A sale of the recovered spectrum was expected to provide billions of dollars in income to the Government. Lawmakers anticipated that FirstNet would be able to accommodate voice radio traffic from the T-Band systems. Many in the public-safety community recognized the risk of this spectrum sale and have been lobbying for the bill to be repealed. The National Public Safety Telecommunications Council (NPSTC) have been instrumental in providing evidence supporting these efforts.

"In December 2020, a funding bill was signed repealing the spectrum reclamation and ensuring that the T-Band will remain in the hands of public-safety and business radio users for ongoing voice communications."

We don't expect a similar change to radio spectrum here but there is an expectation that mission-critical voice services will gradually migrate to cellular (and away from radio). Andy Seybold's update demonstrates that this migration hasn't occurred to the extent anticipated in the US.

Corey Weir
Chairman, Radio Frequency Users Association of New Zealand

RFUANZ
Radio Frequency Users Association of New Zealand

Body worn camera with PTT radio

The TroooAir TA-500 is a light body worn camera (BWC) that can not only stream and record video back to a dispatcher but doubles as a PTT communication radio. The BWC connects via 3G/4G/4GX LTE, Wi-Fi and has integrated GPS + NFC. Included with the platform is video, voice, GPS tracking, lone worker and SOS duress functions. Archiving of video, voice and tracklog on a PC or the cloud is also included.

The BWC can record 64 hours of video onto its internal storage. Live streaming of video can be invoked by the dispatcher as a simple video monitor or two-way live video chat with full duplex hands-free audio. The device has separate buttons for video record, voice PTT, SOS (with hot mic) and camera infrared.

The TA-500 comes with a belt clip, pocket clip and drop-in cradle with connection for direct charging and data transfer. Options available are a magnetic mount, 8-way dock and earpiece.

Tooo Air Pty Ltd
www.toooair.com.au

Smart radio

The MOTOTRBO Ion smart radio combines voice, broadband data and multimedia capabilities via the DMR standard, Wi-Fi, public LTE and private broadband networks. Its fully open Android application ecosystem enables integration of mobile data applications, such as those used for enterprise-grade barcode scanning, as well as team communication platforms used for messaging, meetings and shared content.

A 13 MP camera and 4″, high-resolution touchscreen enables workers to attach photos to work tickets, use video chat for remote diagnostics and view detailed images, schematics, diagrams, photos and videos. And it has dual microphones, noise suppression and features cloud-based programming and provisioning, remote updating and real-time device monitoring.

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UWA'S $1M CONTRACT TO MINIATURISE COMMS COMPONENTS

A critical piece of comms equipment will be reduced to chip size using a combination of micro-electro-mechanical systems and photonics.

The University of Western Australia (UWA) will take a leading role in strengthening Australia's defence capability after it was announced as the host of one of 10 new Defence Innovation Hubs.

According to a UWA spokesperson, the researchers will be working to significantly reduce the size, weight and power of an undisclosed piece of Defence equipment used for radio and wireless communication, to make it easier to use and transport.

They will reduce it to chip size by using a combination of micro-electro-mechanical systems (MEMS) and photonics, to create a band-agnostic communications technology component.

The project will be led by a team of experienced electrical engineers. This includes Associate Professor Dr Gino Putrino from the UWA School of Engineering, who will lead the project within UWA's Microelectronics Research Group, a research group led by Professor Lorenzo Faraone.

An additional six researchers will contribute to the project, as well as industry partner the Australian subsidiary of L3Harris, based in Queensland.

The multidisciplinary team will also use research infrastructure at the Western Australian Node of the Australian National Fabrication Facility (ANFF-WA), which is supported through the Commonwealth's National Collaborative Research Infrastructure Strategy (NCRIS), the Western Australian Government's Department of Jobs, Tourism, Science and Innovation, and UWA.

It is estimated the program will be carried out over a two-year period. If successful, the technology will be integrated into defence equipment.

Federal Member for Curtin Celia Hammond congratulated researchers from The University of Western Australia on receiving the $1 million contract.

"I am pleased to see West Australian researchers showing strong potential to provide Defence with game-changing capabilities," Hammond said.

"By investing in the ideas of our defence experts, the Morrison government is helping to grow our industry."

Minister for Defence Industry Melissa Price said the program was helping small businesses develop ideas that could give the men and women of the Australian Defence Force the edge they need.

"These investments demonstrate the importance of Defence's partnership with the Australian defence industry and innovation sector, and how we can work together to improve capabilities and support available to our ADF personnel," Minister Price said.

Hybrid wireless

The Hitachi ABB Power Grids Tropos TRO600 portfolio is a hybrid wireless architecture that integrates 2G, 3G and 4G LTE communication technologies, self-healing broadband mesh and select sub-GHz technologies from its eco-system partners into a single device.

The TRO600 comes with dual-SIM configuration for an always-on connection, enabling customers to reduce expenses by switching network traffic between 3GPP options and mesh for the lowest operating cost. Features include secure storage of keys and credentials, device certificates and comprehensive options for encryption and authentication.

Hitachi ABB Power Grids

www.hitachiabb-powergrids.com/

Satellite PTT radios

Icom's IC-SAT100 handheld and IC-Sat100M mobile satellite transceivers offer one-to-many communication capabilities with a push of the transmit button, with no need to dial a number or wait for a response. The disaster-resistant and real-time communication system uses 66 non-geostationary, low-Earth-orbit Iridium satellites, so users do not need to be concerned with the satellites' locations. In addition, the radios do not require licences or qualifications.

The products have IP67 waterproofing and dust-tight protection, built-in Bluetooth capability, AES 256-bit encryption and 1500 mW audio output.

Icom Australia Pty Ltd

www.icom.net.au

Modular DC power systems for mission-critical networks

Darren Salter, Eaton Product Line Manager – PQ/Telecom DC

Reliable, efficient and flexible modular DC power systems must be at the heart of all mission-critical infrastructure.

In the modern era, society expects and relies on highly reliable systems to support our quality of life. Standard utility power just does not have the levels of reliability needed by mission-critical applications. During times of natural disaster, utility power is usually one of the first services lost. Only properly engineered and designed backup power systems can provide the levels of security and reliability needed by modern society. Eaton Modular DC Power Systems are engineered to provide uninterrupted DC Power to mission critical equipment such as telecommunications, public safety radio networks, fibre optic cables and any other application that needs essential power.

Eaton Modular DC Power Systems are designed for 24Vdc and 48Vdc, which are the most common voltages used globally for critical equipment and vary in size from 1 kilowatt all the way up to hundreds of kilowatts. Together with lead acid or lithium batteries, such systems can provide backup power from tens of minutes to several days.

The building block of modular DC Power Systems is the rectifier module, which converts AC utility or AC generator power into clean and noise-free DC power at a voltage suitable for the critical load and for recharging batteries. Eaton rectifier modules range from 900W rating to 5,800W rating, with the most popular and common being the 2,000W module. Modules can be paralleled together to provide scalability to build systems from the smallest to the largest. Eaton modular rectifiers are based on leading-edge switch mode technology using highly efficient resonant mode topology and active power factor correction. They also use digital signal processing and embedded control to automatically and efficiently control the power electronics resulting in 96+% conversion efficiency and extremely low electrical output noise and input THD.

Reliability is achieved by redundancy of the rectifier modules. Commonly, systems are designed with N+1 redundancy meaning one more rectifier module is provided above and beyond that needed to support the critical load. Modular systems also allow for even greater redundancy such as N+2 or N+N simply by adding more rectifiers. This level of design flexibility is something not easily achieved in monolithic power systems. Diversity is also possible in Eaton's modular systems, for example by having multiple AC utility power sources feeding each half the rectifier modules.

Because the core power rectifier modules used in Eaton DC systems are microprocessor controlled, they automatically configure themselves to the power system requirements upon insertion. This means that the modules are hot swappable and can be removed and replaced easily by general technical staff without specialist power training. Mean time to repair becomes only a matter of minutes and can be done on site by keeping a strategic set of modules as spares.

Often DC Power Systems need to cater for growth as the load changes over time. Financial controllers are looking for ways to defer capital expenditure; Eaton modular DC systems accommodate this requirement. At Day 1 the DC system can be designed for the future load requirements but only initially deployed with the minimum number of rectifiers. More can then be added if and when the load grows.

All of this design flexibility and reliability would not be possible unless the system had a sophisticated controller. Eaton DC systems include a system level controller that manages all the rectifier modules, ensuring good state of health, and equitable load sharing, and perfectly managing power to the batteries. The system controller can communicate using TCP/IP or RS232 and with popular protocols such as Modbus, SNMP, HTTP/HTTPS.

Eaton has also built in resilience, such that even the controller can be removed and replaced (if failed) without stopping the DC power system from continuing operate. The rectifiers just keep doing what they were last told to do if they no longer have the central controller available.

Eaton APS and DV2 range of DC power system are available as stock items or as engineer-to-order solutions.

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For more information, visit www.dcpower.eaton.com/australia

Cooling

STULZ has introduced its CabinetAir PRT solution, part of its Shelter Cooling portfolio and designed to control the temperature in outdoor multifunction telecommunications cabinets by combining the benefits of mechanical cooling with energy saving direct free cooling technology.

CabinetAir PRT operates at a temperature range of –20 to 60°C and provides service even during extreme temperature fluctuations. As well as lowering the noise level of active system equipment, its direct free cooling technology helps to significantly reduce energy consumption by using the outside temperature to cool the telecommunications cabinet. This is particularly effective in locations where the ambient air temperature is colder than that required inside a cabinet. For locations with higher outside temperatures, CabinetAir PRT combines direct free cooling with mechanical cooling. Both modes are controlled by an integrated STULZ C100 microprocessor, which also enables optional connection to a central building management system via Modbus RTU, as well as alarm management and a multi-level configuration menu with password protection.

The CabinetAir PRT range is available in three versions — fully integrated, semi-integrated and side mounted. The fully integrated option offers protection against vandalism, while the semi-integrated and side mounted variants allow more space for IT and network equipment.

STULZ Australia Pty Ltd
www.stulz.com.au

UHF CB radio

GME has released the TX6600S — an Australian-made, 5 W, handheld UHF CB radio. The product has a rugged build and an IP67 ingress protection rating, making it suitable for a wide range of demanding applications from agriculture to construction, mining, local councils and so on.

It comes with a range of features such as 5/1/0.1 W switchable transmission power, Scansuite digital scanning technology for fast channel scanning and multiple power saving modes. It also has rotary channel selection with voice announcement, two priority channels, triple watch and programmable receive-only channels (403–520 MHz).

Standard Communications Pty Ltd
www.gme.net.au

Point-to-point solutions

The Cambium Networks ePMP Force 425 and Force 400C point-to-point solutions deliver up to 1 Gbps throughput based on 802.11ax standards and Cambium's proprietary ePTP protocol. The Force 400 Series is a suitable solution for service providers looking to deliver high-capacity access services to enterprise and residential customers. The series can also serve as a low-cost backhaul for MicroPOPs and outdoor Wi-Fi access points that require a lot of capacity at moderate range without the overhead of licensed microwave.

With an integrated SFP port and optional GPON ONU module, the Force 425 acts as a fibre extension to reach places where fibre cannot with an integrated 25 dBi dish (and even further with the optional 28 dBi range extender). The optional range extender is ordered separately and can be assembled and attached in the field to add additional link budget and fade margin for challenging links or to move to higher capacity, where needed, and higher modulations, where achievable. For even longer-range applications, the Force 400C is a connectorised option with two RP-SMA RF interfaces for use with larger parabolic dishes or horn antennas.

Cambium Networks Ltd
www.cambiumnetworks.com

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$10M UP FOR GRABS IN 5G TRIAL GRANTS

The federal government is calling on businesses to demonstrate innovative industrial solutions using the powerful capabilities of 5G.

A total of $10 million in grants is being made available under the Australian 5G Innovation Initiative, which aims to trial commercial uses of 5G technology and, by extension, support investment in telecommunications infrastructure and create jobs.

The Initiative, which will run over three years, is part of the federal government's JobMaker Digital Business Plan.

"I encourage Australian businesses across all sectors to consider how 5G can benefit them and apply for funding through this Initiative," said the Minister for Communications, Urban Infrastructure, Cities and the Arts Paul Fletcher.

"Whether it is the use of sophisticated sensors on farm animals to provide information about their welfare in real time or using 5G in factories to monitor machinery to detect faults and do maintenance, reducing breakdowns and increasing efficiency: the opportunities are endless and I encourage all sectors to tell us how 5G can make a difference to their business."

To be eligible, projects must conduct trials that "undertake rigorous, commercial, and replicable testing of technologies that make use of 5G, as well as identify solutions that demonstrate 5G's capabilities".

Those eligible activities must make use of at least one of three core 5G capabilities:

- Enhanced mobile broadband.
- Ultra-reliable, low-latency communications.
- Massive machine-to-machine communications.

The Department of Infrastructure, Transport, Regional Development and Communications has suggested the following areas as examples for which 5G's capabilities could be applied:

Agriculture: 5G sensor nets deployed for on-farm monitoring, providing real-time information about soil moisture or water levels. This data can support farmers make data-driven decisions in farm management.

Manufacturing: Live device monitoring over 5G to predict equipment wear and schedule predictive maintenance in manufacturing and industrial locations and provide real-time feedback on the performance and operation of machinery.

Healthcare: 5G networks could connect diagnostic imagery to specialists in real-time. Through wearables, doctors could have real-time information about patients' conditions.

Transport and logistics: 5G connected smart tags can provide real-time tracking for goods as well as providing insights on food freshness. Enhanced digital labelling could improve place of origin information.

Construction: 5G could provide workers with building visualisation onsite through augmented reality glasses. Sensors can be placed in building components to provide real-time data on construction as well as the ongoing performance of buildings.

An online noticeboard has been set up to enable businesses to connect with potential partners with whom to deliver projects, propose ideas or find potential projects.

Businesses can apply for between $100,000 and $2 million in grant funding. Applications open on 19 February 2021 and close at 5:00 pm AEDT on 31 March 2021.

SYDNEY GPS TUNNEL TRIAL TO GO AHEAD

GPS repeaters to be trialled in both new and old Sydney road tunnels.

A trial to assess the boosting of GPS signals in Sydney's road tunnels has been given the go-ahead, with funding approved and federal laws amended to accommodate the project.

The trial, which aims to improve safety within the tunnels by providing more reliable GPS signals via provision of repeaters, will be conducted by Transport for NSW.

The Acting Deputy Secretary for Transport for NSW, Howard Collins, said, "We know how frustrating it can be for motorists when your GPS signal drops out mid-journey. This is even more of a problem for emergency services and freight operators that depend on GPS to quickly find and communicate within their teams.

"We have been working with tunnel experts to develop solutions that will assist drivers to navigate the existing and future road tunnel network faster and more accurately."

According to Collins, the stumbling block had been a federal law that banned GPS repeaters due to concerns they could interfere with external GPS signals if not operated correctly.

"Transport for NSW joined with other key agencies to make a submission to get the law changed. The Australian Communications and Media Authority (ACMA) has agreed to amend the law, and we've now confirmed funding to start rolling out trials in coming months," Collins said.

Transport for NSW has worked on the initiative with the NSW Telco Authority, Fire and Rescue NSW, NSW Ambulance and NSW Police. Funding is to come from the Transport for NSW Asset Technology Program, with the amount to be finalised once a procurement process has been completed.

Fire and Rescue NSW Deputy Commissioner Jeremy Fewtrell said that "Fire and Rescue NSW crews will be at the forefront of testing this new technology, undertaking various scenarios to ensure our specialist communications team can pinpoint the exact location of a Triple Zero (000) caller if they are in a tunnel and increase our visibility of our trucks and crews to ensure the correct resourcing is assigned to an emergency incident.

"The increased response capability will help us better protect the NSW community."

Hamish Duff, General Manager of The Orion Network, said that the trial is a "very good idea".

"Firstly there is a public safety need, but also GPS has become a community expectation. GPS is now an essential service that many users rely on without even realising it. The general community may expect GPS to work in modern tunnels just as broadcasting and cellular does," he said.

"We see this as a natural extension" to all the other services into which resources are being invested, he added.

Ben Cosier, Operations Manager at IMPULSE Wireless, said that "GPS repeaters are a great initiative to improve not only motorists' safety, but also the safety of tunnel staff including incident response, maintenance and emergency services."

Cosier points out that while a number of road tunnel operations track their staff underground using Bluetooth beacons, this, however, "requires users to have an authorised application for detecting and locating the beacons".

"Where provisioned, GPS repeaters could open up underground tracking to all users of smart devices," he said.

If the trial is successful, it could lead to a licensing arrangement for devices that can be used across projects such as the forthcoming Western Harbour Tunnel, Beaches Link, M6 Stage 1, as well as existing road tunnels.

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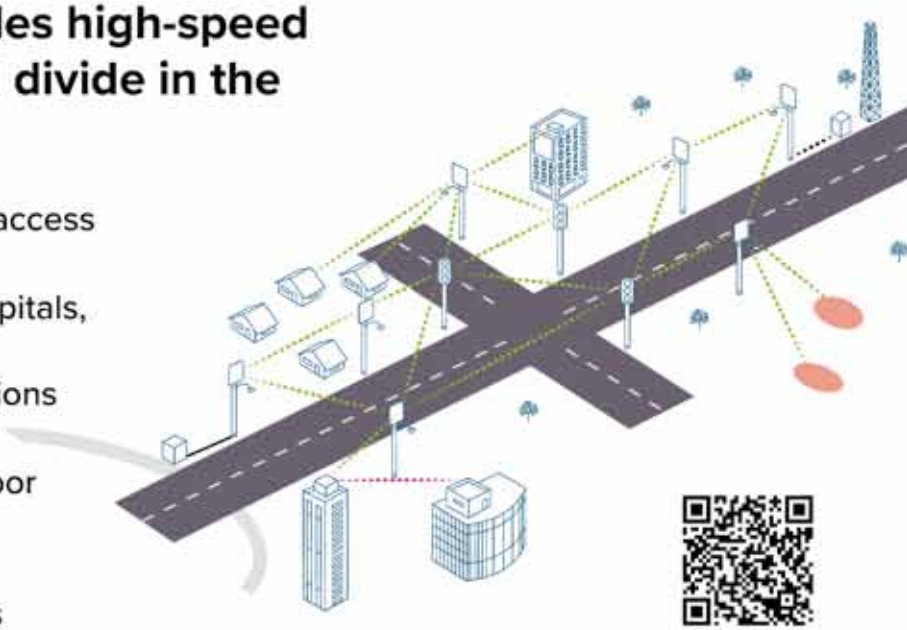

www.cambiumnetworks.com/cnwave/

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Monitoring software

Fusion Enterprise is a software platform that monitors onsite systems and distributes alerts automatically to the appropriate personnel as critical events occur. It can be used to monitor fire and security alarms, PLC and SCADA, air conditioning and cooling systems, building management, access control, CCTV, IT network devices and servers or any other onsite device. Staff can also send messages manually via the secure web interface and real-time, two-way messaging to almost any wired or wireless device including a smartphone/smart watch, 4G text messaging, email, Wi-Fi/DECT/TETRA handsets, low-cost pagers, LED signs and more.

Fusion Enterprise runs on 64-bit Windows servers or virtual machines, allowing it to handle the demanding workload of hospitals, airports, factories, power stations, mine sites or IT data centres.

Fusion Series

www.fusionseries.com

Combination antenna

The Taoglas MA9917.A GuardianX is a 17-in-1 combination antenna that combines all 17 antenna elements into one low-profile, heavy-duty, IP67 rated, waterproof, wall mount external enclosure. The product comes with 1x Active GPS/GLONASS/Galileo, 8x 5G/4G cellular MIMO (600–6000 MHz) and 8x Wi-Fi 6 MIMO (2.4/5.1–7.125 GHz) as standard.

The unit has a low profile for IoT and automotive applications where space is at a premium, and is suitable for applications where drilling a hole through the roof of a vehicle or a metal panel for an external antenna is not feasible. Typical applications include passenger bus, rail and air; automotive and heavy equipment vehicle tracking and telematics; HD video over 5G/4G; first responder and emergency services; and M2M/IoT.

Cable type and length, as well as connector types, are fully customisable. The product can also be customised for any variation of antennas below 17 in 1.

Glyn Ltd

www.glyn.com.au

PIM analyser

Anritsu introduces the PIM Master MW82119B-0703 2-port 700 MHz PIM analyser, a dual-function solution that can conduct two-port RF PIM measurements where the two CW tones are transmitted separately from two different Tx ports, as well as traditional one-port RF PIM measurements. With the MW82119B-0703, RF field engineers and technicians, and third-party contractors can conduct highly accurate PIM measurements and conduct troubleshooting for co-located sites.

By offering separate RF outputs for each of the two CW tones, the two-port PIM Master simulates real-world conditions and makes troubleshooting PIM more accurate.

The PIM Master MW82119-0703 can also function as a traditional one-port PIM test set for verifying PIM in cable and antenna systems. To convert between a two-port and a single-port PIM measurement solution, the user simply connects or removes the supplied jumper cable between the two ports.

Cost-of-test in the field is lowered because the PIM Master MW82119-0703 can more efficiently troubleshoot Rx noise floor creating PIM issues that affect KPIs. Test time is reduced because multiple antennas can be compared on a single display, which subsequently shortens time spent on rooftops finding customer-impacting PIM issues.

The PIM Master MW82119-0703 has the same compact, lightweight, portable field-proven form factor with the same battery life and easy-to-use GUI as existing PIM Master instruments. It is a 40 W, battery-operated PIM analyser featuring Site Master line sweep capability. With the Site Master option included, the PIM Master is able to fully certify cable and antenna system performance, measuring PIM, Distance-to-PIM, Return Loss, VSWR, Cable Loss and Distance-to-Fault with a single test instrument. PIM Master includes a large, outdoor viewable display and intuitive user interface that is optimised for field conditions.

Anritsu Pty Ltd

www.anritsu.com

Image courtesy FirstNet Authority

FIRSTNET USERS OFFERED ACCESS TO NEW CAPABILITIES

Four new options are available to FirstNet subscribers, including a Z-axis spatial awareness solution.

FirstNet users in the US have had access to a national public safety mobile broadband network for quite some time now — something Australian first responders can still presently only dream of, despite assurances in recent years that Australia has essentially 'caught up' with global developments. And now, FirstNet users have even more communications options up their sleeve.

AT&T has begun offering FirstNet user agencies and subscribers four new public safety solutions, being an extended range capability, Z-axis location capability, the option to purchase cells-on-wheels and an LMR-to-LTE interoperability PTT option.

The first solution is called MegaRange, which AT&T says enables subscribers to use the highest power class signalling available on Band 14 in the US.

According to the company, MegaRange will be useful for rural, remote and maritime first responders, as the solution can substantially improve connectivity, particularly at the edges of the network.

It will also be useful for urban and suburban responders, with the stronger signal more likely to reach into difficult places such as building shadows, car parks, garages, basements, elevators and stairwells.

The new location capability is called Z-Axis for FirstNet. It will enable emergency services organisations to locate their first responders in the vertical plane (inside tall buildings) as well as the horizontal plane.

This kind of spatial awareness capability has not previously been available using traditional GPS-based location methods, according to AT&T. Intrepid Networks is the first provider to bring the Z-axis capability to market, via its Response situational awareness platform.

US public safety agencies can now purchase their own compact, rapidly deployable (CRDs) network assets in the form of cells on wheels, which can be deployed by a single person within a matter of minutes.

These CRDs link to FirstNet via satellite and have their own power supply, making them suitable for use during emergencies in areas where communications are temporarily unavailable.

Finally, AT&T says FirstNet now supports LMR-to-LTE interoperability, enabling first responders using LMR to virtually seamlessly communicate with users on FirstNet PTT and vice versa.

With LMR interoperability, FirstNet PTT gives staff who do not need LMR (such as those who use smartphones) and others who travel outside LMR coverage, to remain connected to the wider FirstNet system. Eleven FirstNet Ready devices are already approved for FirstNet PTT.

"First responders are the heart of FirstNet, and it is their input that is shaping the new tools and technologies on their network, today and for decades to come," said Jason Porter, Senior Vice President, FirstNet Program at AT&T.

"It is exciting to see the FirstNet marketplace continue to flourish and meet the unique needs of public safety," added Ed Parkinson, CEO of the FirstNet Authority.

"These new mission-ready features are delivering lifesaving capabilities into the hands of first responders.

"The FirstNet Authority will continue to work with our public safety community to innovate and advance their network."

Tracking platform

Alert. Locate. Protect. Manage. Logic Connect is a web-based indoor/outdoor tracking platform plus emergency event management service. Logic Connect allows users to be located by roaming from indoor (BLE) to outdoor (GPS) seamlessly, with a high level of confidence that during an emergency event, they are supported.

Emergency alerts can be managed from the web-based user interface, or sent externally via SMS or email, ensuring someone has been notified and is always there to help. With added benefits of voice recording, geofencing and reporting, Logic Connect can assist users with their health and safety requirements.

Logic Wireless Pty Ltd

www.logicwireless.com.au

Electrician's case trolley

The Wiha Electrician's Competence XXL case trolley contains 115 pieces of content. The case has been tailored to meet the needs of the electrical trade. It contains plier products such as the all-round, 3-in-1 TriCut installation pliers, and the VDE screwdriver and torque solutions from the Wiha slim family, which offer easy, protected access to low-lying screws. It contains a specific selection of six VDE slim bits for electrician applications, which are ready for withdrawal at the press of a button.

At just over 10 cm, the short Stubby VDE screwdriver bit holder with slim bits guarantees greater safety in confined spaces. The automatic stripping pliers can be used for a wide range of cables between 0.03 and 16 mm2. Plier cutters can be quickly exchanged thanks to replacement blades, instantly provided in the handle when needed. The supplied damper reduces recoil when skinning large cable gauges.

The automatic crimping pliers make crimping wire-end sleeves easy as they combine two crimping pliers in one to handle cable gauges between 0.08 and 16 mm2. A feed mechanism for wire-end sleeves prevents the plastic cover from being crimped along with the wires. Especially small wire-end sleeves no longer get caught or twisted thanks to the hexagonal crimping.

A dowel racket is offered as an alternative to conventional power drills for inserting dowels into soft construction materials. A simple strike of a hammer replaces the use of much heavier power tools, which generally produce much more noise and dust. The dowel racket protects users from sparkovers thanks to galvanic isolation in the solid steel cap.

Due to the ample space in the tool inserts, the individual tools can be quickly and conveniently taken from the robust case. The possibility to transport this 'mobile workshop' on wheels makes it a convenient day-to-day companion. Gas-filled shock absorbers hold the lid in the open position, thus preventing work accidents such as fingers getting caught.

Premium Tools

www.wiha.com

5G antennas

Designed for stationary installations to work with CEL-FI GO/ GO+ stationary units, the SG3500 comes standard terminated with 500 mm RU240-UF low loss ultra-flexible coaxial cable (longer lengths can be specified) and an SMA male connector — suitable for direct connection onto a CEL-FI GO/ GO+ stationary unit. The SG3500 significantly improves 5G signal strength in comparison to the in-the-box supplied stubby whip.

Working in conjunction with a mobile signal booster such as a CEL-FI GO/ GO+ mobile, the SGL3500 is a parallel spring vehicle mount solution for all available Australian carriers' 5G networks. The parallel spring base will ensure the antenna maintains the optimum vertical polarisation while remaining flexible in case of contact. It is terminated with 8 m of RU240-UF low loss, ultra-flexible coaxial cable and an SMA male termination, suitable for direct connection onto a CEL-FI GO/ GO+ mobile unit. An SMA-F to FME-F adaptor is supplied for connection into a mobile phone cradle or FME-terminated device.

ZCG Scalar

www.zcg.com.au

Server

ADLINK's MECS-7210 is an NGC-Ready validated and OTII-compliant edge server, providing a flexible platform for 5G network solutions with hardware acceleration.

The MECS-7210 enables telecom users to bring AI to advance an array of applications — from 5G open RAN to edge data centres, private networks and MEC — benefiting from continuously refined AI frameworks from NVIDIA. Users can migrate workflow compute environments including both hybrid and multi-cloud implementations, run software on bare metal servers or on virtualised environments, and maximise utilisation of GPUs and portability.

ADLINK Technology Inc

www.adlinktech.com

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SOUTH AUSTRALIAN AVL TRIALS OFF TO A GOOD START

Automatic vehicle location trials have set the stage for a rollout to more than 1400 fire and emergency vehicles.

Automatic vehicle location (AVL) technology has been successfully trialled across South Australia as that state's government moves closer to implementing recommendations from the Keelty Review.

Country Fire Service (CFS), State Emergency Services (SES) and Department for Environment and Water (DEW) vehicles were recently fitted with AVL, which provides real-time truck and vehicle tracking to improve fireground intelligence during bushfire emergencies.

The technology forms part of the government's $97.5 million plan to create a more bushfire-resilient South Australia. AVL implementation into the emergency services sector has been recommended since 2012.

Minister for Emergency Services Vincent Tarzia said $5 million was committed to trial AVL technology and develop a business case for the full rollout ahead of the 2021–22 bushfire season.

"Field trials put different technologies to the test and the Marshall government is excited to see AVL rolled out, boosting response capability during bushfires," Minister Tarzia said.

"The trials started last month and took place in the Mount Lofty Ranges, on Kangaroo Island, West Coast, Yorke Peninsula, Far North and South East.

"Recent bushfire-hit locations at Lucindale and Cherry Gardens also featured in the field trials to gather data from partially active firegrounds.

"AVL is the future of fighting bushfires in South Australia and will allow us to pinpoint the location of any asset, anytime and anywhere to the second. AVL boosts safety by allowing us to keep a watchful eye over our hardworking CFS and SES volunteers and staff during bushfires."

AVL will be installed in more than 1400 vehicles following completion of a tender process. It will be used in CFS, SES and DEW fire management assets during bushfires and other emergency incidents that occur in metropolitan Adelaide and regional South Australia.

SAFECOM Chief Executive Dom Lane said the AVL project team travelled to Kangaroo Island and covered numerous satellite-only areas in remote parts to test connectivity.

"Key outcomes of the trials were to test the solutions and validate their ability to failover from cellular to satellite in difficult coverage locations," Lane said.

The Upper Sturt CFS Brigade, which responded to the Cherry Gardens fire, was the first group to test AVL on 28 January.

CFS Deputy Chief Officer Andrew Stark said: "The past weeks of trials have provided us with great opportunities to test the ruggedness of the AVL units in various, challenging conditions to ensure we get the best fit for our brigades across the state."

AVL was fitted to a 24P (2000-litre 4WD pumper) and vehicles belonging to the CFS, SES and DEW.

The project team also travelled to Wottons Scrub and ran through various testing scenarios while the software was viewed and analysed from the SES Netley base.

"SES volunteers and staff have actively participated in these trials and are looking forward to the enhanced situational awareness and safety that AVL will bring," SES Deputy Chief Officer Dermot Barry said.

The first CFS vehicle travelled to the South East, Berri, Naracoorte, Mt Gambier and Ngarkat National Park. The vehicle then moved to Kangaroo Island, while the SES vehicle travelled to Maitland and Coober Pedy.

The second CFS vehicle travelled to Port Augusta, Port Lincoln, Streaky Bay, Port Augusta and then to Adelaide via Willington.

Paul Fletcher, Deputy Chief Officer of MFS, noted the AVL project as having the potential to expand the MFS's existing AVL capability.

"Through this solution, we hope to improve the MFS's connectivity in non-satellite areas across the state," Fletcher said.

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AML LEADS TO SWIFT RECOVERY OF STRANDED KAYAKERS

Advanced Mobile Location pinpoints stranded kayakers' location after a Triple Zero call.

Advanced Mobile Location (AML) technology has been used to save stranded kayakers from rough waters at Seacliff in South Australia, pinpointing the pair's location after a Triple Zero call on New Year's Eve.

AML speeds up emergency response times for people in need of urgent help, and it proved crucial when two people became caught in strong winds on the kayak approximately 3.2 kilometres offshore and unable to paddle back to safety.

A man on the kayak called Triple Zero, automatically activating AML, which honed in on the remote location with lifesaving accuracy.

"Saving lives is the number one priority for our police and emergency services. This technology further enhances the capability of SAPOL to respond to emergency situations quickly and precisely," said Police Minister Vincent Tarzia.

"SAPOL Water Operations officers had clear-cut information to work from, allowing them to locate the kayakers quickly and return them home without injury."

SAPOL is one of the first 13 agencies in Australia to adopt automated AML.

With AML, smartphones use GPS, Wi-Fi and mobile network information to automatically send an SMS text message to Triple Zero with the phone's estimated location. This SMS is sent in the background; the caller is not required to perform an action.

AML-enabled smartphones recognise when an emergency call is made to Triple Zero. If the smartphone's location services are switched off at the time the call was initiated, AML will temporarily activate the location service for the duration of the emergency call. When the emergency call has finished, AML will be deactivated.

Across Australia each day, an average of 27,000 emergency calls are made to Triple Zero for police, fire and ambulance assistance. More than 75% of calls come from mobile phones.

"AML is capable of providing a caller's location within a 5-metre radius outdoors and a 25-metre radius indoors," Minister Tarzia said.

"If callers have been in a serious crash, or are in shock after an incident, sometimes they cannot identify their surroundings. AML is a game changer that ensures help will be on the way as fast as possible."

AML capability has been automatically activated on Android mobile devices running Android operating system 4.1 and higher with Google Play Services installed.

Apple iPhone users will need to update their operating system to use iOS 14.3 to enable the AML capability within their device. iOS 14.3 is available on the iPhone 6s and above.

Telstra is responsible for the operation of Triple Zero and has been working with Apple and Google to test the technology for iPhone and Android devices, as well as mobile carriers and emergency service organisations across the country.

SAPOL Assistant Commissioner Ian Parrott said AML is incorporated into the South Australia Computer Aided Despatch (SACAD) system and will provide accurate mobile phone location data.

"In other countries across Europe and also the United Kingdom, and New Zealand, we've seen a number of lives saved and positive operational outcomes as a result of AML," Assistant Commissioner Parrott said.

"About 78% of Triple Zero calls come from mobile phones so AML has the potential to save lives by enabling police and other emergency services to respond more efficiently."

Triple Zero callers are still required to supply their address or location to the emergency operators as a first priority. AML does not replace this need.

Other South Australian emergency services are expected to adopt AML at the end of fire danger season.

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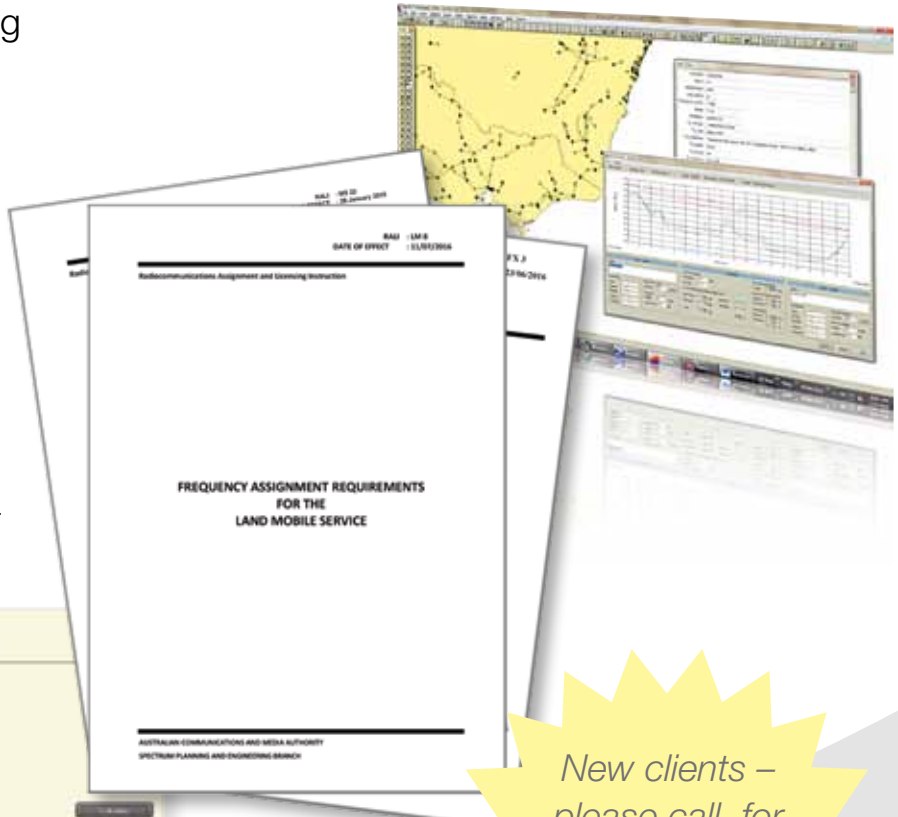

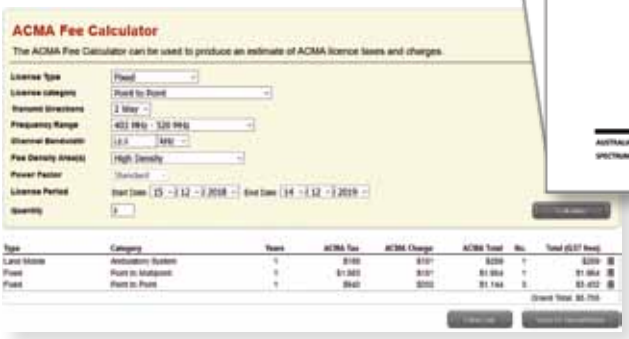

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Mobile dispatch solution

Zetron's Acom Mobility Solutions provides the flexibility to enable core functions to be completed remotely, without costly technology overhauls or retraining or cornering the user in a 'one size fits all' remote working scenario. It enables the capabilities of Zetron dispatch systems to be taken on the go, where and when needed, to ensure service continuity at all times.

Mobility Solutions enables operators to accommodate considerations such as geo-diversity to easily mobilise dispatch positions to other rooms, facilities or even the private residences of team members on a temporary, permanent or 'wait and see' basis.

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The Vertiv Edge is a line-interactive UPS, designed for small spaces commonly found at the edge. Available in mini-tower, rack/tower and rack-mount design configurations, it ranges from 500 to 3000 VA.

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Post-COVID mission-critical comms — a European perspective

Having started our engagement with 3GPP back in 2012 — during Release 12 — with the creation of TCCA's Broadband Group, it would be fair to say that the progress made by the European public safety communications community towards fully functional and deployable next-generation solutions has not been as rapid or as smooth as we would have liked.

Although significant progress has been made in the UK with the ESN, Finland with VIRVE 2.0 and France with RRF, only a few countries had even reached the pilot phase by the end of 2020 and there are still no fully operational networks on a significant scale.

As the wider world begins its move to 5G technology, the European public safety community is still depending on those narrowband stalwarts, TETRA and TETRAPOL, for its mission-critical communications needs.

2020 will forever be remembered as the year when our increasingly interconnected and interdependent modern world was struck a devastating blow by a truly global pandemic. Europe has been particularly badly hit over the past 12 months and there is still some way to go before we will get the all clear and be able to focus on rebuilding fractured societies and economies.

For major recovery programs to be truly successful, care and attention — and a considerable number of euros — will need to be dedicated by governments and public safety agencies in order to complete the full 3GPP-based digital transformation journey that we began almost a decade ago.

The travel and social distancing restrictions put in place across Europe and around the world during 2020 (and continuing into 2021) have slowed down progress within 3GPP on the latest Release 17 — although fortunately Release 16 was concluded during 2020, including important LTE-P25/TETRA interworking procedures. During 2020, Finland's Erillisverkot also chose its suppliers for VIRVE 2.0 and the French Ministry of Interior launched the tender process for its ambitious RRF program.

There is still not enough prime spectrum for mission-critical services, forcing public safety agencies to partner with mobile operators to deliver more advanced services. But this is perhaps not such a negative development, as it means that both public and private players need to work closely together to make sure shared RAN networks are robust enough to deal with emergency situations. There is also a strong trend towards separate, dedicated, public safety core networks.

As numerous nationwide initiatives move forward, the European Commission and PSC Europe continue working with public safety agencies from 11 nations and three multidisciplinary consortia led by Airbus, Leonardo and Frequentis to deliver the BroadWay program, promising cross-border operable mobility based on 3GPP communications standards. PSC Europe has also just started a closely related BroadGNSS program, looking at incorporating Galileo-based satellite services into the public safety communications mix.

LTE/5G technology also continues to evolve further as more vertical industries — Industry 4.0, automotive, railways, utilities, etc — bring their requirements to 3GPP through a growing number of partner associations (such as 5G-ACIA, 5GAA, UIC/ERA, EUTC), building on the initial mission-critical work carried out by the public safety community within 3GPP SA6.

Work on non-public networks, satellite, common API frameworks, sidelink/D2D, multicast, time-sensitive networking, and the full range of mMTC and URLLC capabilities of full 5G systems will undoubtedly bring major future benefits to the public safety community over the next 5–10 years.

We are right in the middle of a major, global paradigm shift moving us away from the wasteful, destructive, resource-intensive economies of the recent past towards more service-based, human-centric, climate-friendly ones. 5G era technologies — including AI/ML; SDN/virtualisation/cloud-native architectures; multi-access edge computing; open RAN, transport and core; end-to-end network slicing; multi-domain orchestration and closed-loop automation — will transform the telecommunications sector, providing powerful new tools for first responders, who must no longer be forced to play catch-up with the commercial sector regarding advanced technology.

Just as Europe's exit from COVID can only be secured by guaranteeing vaccines for the whole world, so European public safety agencies must work closely with their global counterparts to make sure there is one common global standard for next-generation critical communications. Such collaborative attitudes will provide the basic framework and underlying conditions for societies to build back better, smarter and safer in line with United Nations Sustainable Development Goals for 2030.

Peter Clemons is Director of communications sector advisory firm Quixoticity, and a highly regarded industry veteran who has presented many times at Comms Connect in Australia.

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