critical comms

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KENWOOD Viking P25
Powered By Armada

Making Safe Simple

communicate. better

MISSION-CRITICAL MEETS PUSH-TO-TALK.

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RELIABILITY

DMR provides off-network simplex/direct mode operation when LTE is unavailable. Devices will create a self-organising network to transfer voice and data amongst themselves, and back to the LTE network where possible via an MCP5 automatically acting as an LMR-LTE gateway.

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critical comms

Inside

September/October 2021

READ ONLINE!

This issue is available to read and download at

www.criticalcomms.com.au/magazine

ON THE COVER

KENWOOD Viking P25
Powered By Armada
Making Safe Simple

Armada is an intuitive, easy-to-use trunked radio fleet management tool which has been specifically designed to program and maintain the radio code plugs in a safe, efficient manner.

Armada is template-based: the fleet manager creates a master template for a fleet of radios and then links the template to multiple radios in the fleet. Once linked, Armada will update the radio profile as indicated by the fleet manager. Templates can be edited and the corresponding radio profiles are updated simultaneously, providing consistency and error-free programming across the radio fleet.

Over-the-air-programming (OTAP) enables a technician to program a fielded radio over a P25 radio system. Any KENWOOD Viking radio optioned and configured for OTAP will work with Armada OTAP. An OTAP-enabled Viking radio can be programmed automatically with a scheduled write update or manually written to by the fleet manager.

Over-the-intranet programming (OTIP) enables remote Viking mobile radio programming using IP-based network services. OTIP works with both wired (Ethernet) and wireless (Wi-Fi) networks. OTIP enables fleet managers to securely program mobiles from a Wi-Fi access point via their intranet, anywhere, at any time.

Armada also allows administrators to track KENWOOD Viking portable battery health. This allows customers to identify batteries nearing the end of their service life, so they can proactively budget for battery replacement. Battery health information can be provided to the end user through the Viking portable radio display. This includes: current capacity, health, full charge capacity and cycle count.

Armada is more than a programming application, it is an essential P25 fleet management tool.

JVCKENWOOD Australia Pty Ltd

www.kenwood.com.au

Transmit

As this magazine is being put together, there are all manner of media postings regarding the twentieth anniversary of the attack on America's World Trade Centre, known in US parlance as 9/11, which serendipitously, unfortunately, is the same numbering as their emergency phone number.

That singular day of terrorist attack changed America and, to a large extent, the world: from declared "wars on terror" affecting whole countries, right down to the personal, adding an hour extra for people to board an airplane.

One of the biggest spotlights from that day was the failure of critical communications between all the first responders and associated personnel. How could it be that New Yorkers could call loved ones around the world on their mobile phones and tell them they are OK, but emergency crews could not contact each other and warn of the impending dangers?

Once again, it takes a tragedy to learn the lessons. There have been a lot of those lessons learned just recently in Australia with the Black Summer bushfires and even during this current pandemic as medical services such as hospitals and ambulances coordinate to ensure any patient can be taken to the correct facility and administered in the fastest possible time.

I wanted to recognise this moment in history and give it due justice, so I hope you will find the article on page 18 of interest. It is an insight into the lengthy and detailed process following 9/11 that the US Government and its legislators went through to fix the errors highlighted on that day regarding critical communications.

As to our own situation, we have already reported on the increase in radio towers in remote bush areas that will provide the all-important link between firefighters. The lessons get learnt but then new lessons always arise.

Phillip Ross, Editor
cc@wfmedia.com.au

Reliable backup power
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POLARIUM SMART LITHIUM-ION BATTERIES

Key Features

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- Each battery has a battery manager which can interface with remote site management system or rectifier platforms (Enatel, Eltek, CET, etc.)

- Polarium Charge Control makes batteries independent of current control from power system

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Safe
All our products are designed with your safety in mind - throughly verified and certified for safe operation

Simple
Advanced technology made super easy to use, easy to install, maintenance free, charge control

Secure
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Smart
Automatic balancing, automatic reconnect, remote monitoring options and much more

Strong
Works in all conditions and environments with extra protection against dust and moisture for prolonged life

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COMMS AT
50 KNOTS

When flying on top of the water at over 50 knots in speed, communications on a boat like the America's Cup AC75 are not that simple.

The feeling is comparable to that of a motorcycle travelling at 100 kilometres per hour. Wind, noises and vibrations from the hull and rig are all elements that disturb the communication flow. The position of the crew members in the boat also makes hands-free communication challenging.

At the recent America's Cup in Auckland, New Zealand, onboard the Italian challenger Luna Rossa, the only sailor who moved from one side of the boat to the other during manoeuvres, passing around the stern, was mainsail trimmer and strategist Pietro Sibello. Both skippers, Australian-born Jimmy Spithill and Italian Checco Bruni in their alternating roles of helmsmen and flight controllers, did not move from their positions; nor did any of the other eight sailors.

The crew is positioned in two 'corridors', separated by the soft wing that creates a longitudinal barrier between the two sides of the hull and prevents the crew on one side from seeing what happens during the manoeuvres on the opposite side. The distance between the first man at the bow and the last one at the stern is about 15 metres, a condition that makes it virtually impossible to communicate without specific aids.

All manoeuvres are called and must be executed in a matter of seconds; two yachts approaching each other at 50 knots, for example, will close at approximately 100 metres every two seconds. It was essential, therefore, that each crew member received clear and precise information simultaneously.

For this reason it was necessary to develop an advanced intercom system for onboard communication on the AC75 that was also linked with the support boats. The system is housed within the helmets of each sailor, fitted with sophisticated microphones and earphones.

The crew interacts within the boat and with the support fleet on a single radio channel. Everyone onboard can listen, but only a select few can use the microphone. Operations Manager Gilberto Nobili was also enabled for this function, as he provided the afterguard with the information displayed on the racing software, such as the approach times to the starting line and to the laylines.

During training and sea trials, the team members on the support boats communicated with the sailing team — in particular, the coach, technicians and engineers monitoring the data from the bank of sensors mounted on the AC75, plus listening to the comments from the sailors through their headphones and interacting with them.

During the racing regattas, the rule prohibited any kind of external assistance, so intercoms of the support boats were disabled a few minutes before the start until the end of the race. Team support assumed a listen-only mode.

All boats competing could only communicate with the race director for information related to the race and with the umpires, the judges who supervise the regatta, to acknowledge any protests and penalties assigned. On Luna Rossa, Checco Bruni and Jimmy Spithill were the crew tagged with that responsibility.

As for all elements of the AC75, the communications system also required a lengthy and complex process of analysis, design, development and implementation. Delicate components needed to function properly in an environment subject to rapid deterioration as it was in contact with the corrosive saline properties of sea water.

Features such as lightness and wearability, combined with the need for an efficient instrument even in extreme conditions, made the design of these instruments even more challenging. The development of the hardware took over three years of work and numerous devices were tested: microphones, cables, connectors, earphones, speakers.

The goal was to capture and distribute a clear sound, free of any external interference tied to the screaming wind, turning winches, movement of foils and all the sounds that are heard when flying at maximum speed on a carbon-fibre foiling yacht.

The final product was a hardware device with performance that excelled, where several elements were assembled and integrated into the helmet. The comms system was designed to be encased in a custom-built ergonomic slot, with specific comfort and aerodynamic characteristics, to be an integral part of the helmet used by the sailors.

Both the design and the production of the custom-made cases were conducted in-house at the marina base with the aid of the team's 3D printer. Like all the components that make up an AC75, meticulous research had also been carried out on the communication system to reach quality standards of the highest level. The ability to communicate on board in a clear and clean way is essential to achieve racing results.

The sailing team used the Vokkero Guardian Staff product range, a hands-free communication system, light, easy to use and requiring no installation. The system could be adapted to the technical constraints of the official competitions. Secure and clear communications, even in the noisiest environment, were enabled due to a patented noise filter. All the staff were in permanent contact through the 'group' function allowing the coaching team and the medical team to communicate together or separately.

The Guardian Staff radiocommunication kits were released in 2019 for sports teams and are already used by 10 national teams and more than 50 professional football and rugby clubs worldwide. Since 2016, the Vokkero teams have also developed a specific range of product to meet the constraints for industrial markets: ATEX zones, civil and military security, nuclear, railways, construction and public works, noisy industries and more.

L&W Sports Communications Pty Ltd
www.lwsc.com.au

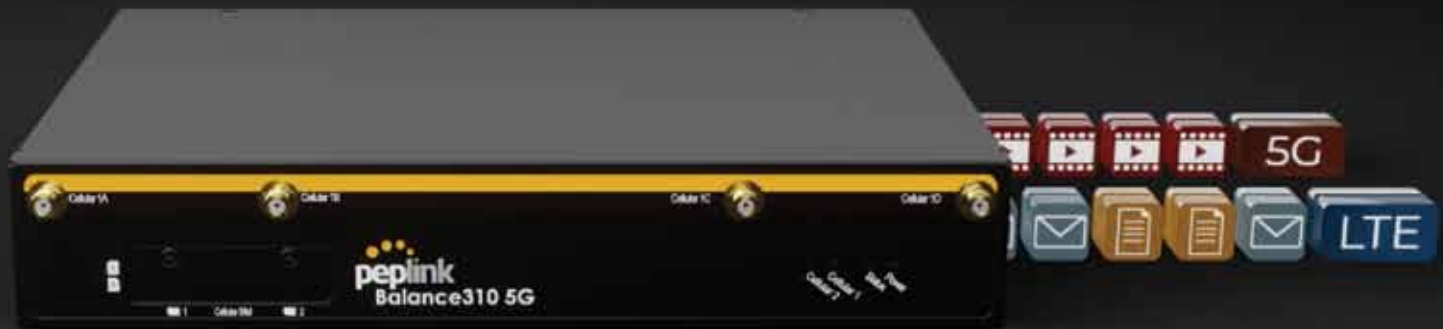Images courtesy Giulia Caponnetto/Luna Rossa Prada Pirelli

B310 5G

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News

BUILDING RESILIENT TELECOMMUNICATIONS

Australia's national science agency, CSIRO, and Optus have released findings of a joint nationwide project to improve bushfire resilience of critical telecommunications. The research analysed where there is risk of damage to the network and where upgrades could reduce vulnerability to future bushfire events.

Since mid-2020, CSIRO and Optus have collaborated on a study of the potential impacts of embers, radiation and flame on and around Optus's sites with telecommunications equipment. Information on topography, fuel load, vegetation type and local bushfire weather severity was used to develop maps which then inform resiliency decisions for this critical infrastructure.
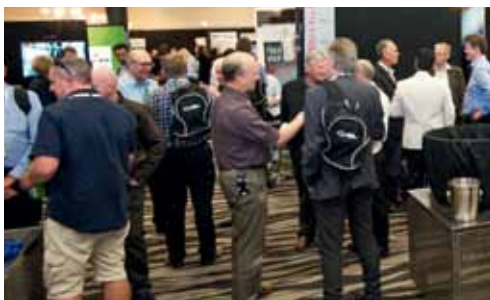
COMMS CONNECT NEW ZEALAND SET FOR MAY NEXT YEAR

After successful events in Wellington and Auckland in recent years and with the support of RFUANZ, Comms Connect New Zealand will head to the South Island next year.

On 11-12 May 2022, Comms Connect will be held at Te Pae Convention Centre in Christchurch. Te Pae is a new conference and exhibition centre, which offers the opportunity to hold both the conference and exhibition as well as the RFUANZ gala dinner all in the one location, right in the heart of Christchurch.

Head to the website for more information about an exhibition stand, submitting a presentation and/or sponsorship opportunities, and how to meet with hundreds of industry personnel from all over NZ and Australia.

COMMS CONNECT
www.Comms-Connect.com.au

2021 New PRODUCT SHOWCASE

◯ Signal splitter

The SP233 signal splitter from Acromag converts 1 mV or thermocouple sensor input into two proportional isolated 4–20 mA control signals. Power is received from one or both output loop currents.

Set-up is via either a USB connection to a PC with Acromag Windows software or the Agility mobile app, which enables configuration on an Android smart phone or tablet. Software simplifies I/O range scaling, calibration and advanced signal processing capabilities.

High-voltage isolation separates the input and between the output circuits. The isolation protects from surges, reduces noise and eliminates ground loop errors.

The units are current, voltage and temperature splitters, with ability to scale inputs differently for each output.

The instruments withstand harsh industrial environments to operate across a wide temperature range with low drift. They feature high immunity to RFI, EMI, ESD and EFT, plus low radiated emissions.

Metromatics Pty Ltd
www.metromatics.com.au

◯ Coaxial connectors

The WR-UMRF ultra-miniature RF coaxial connector is Würth Elektronik's compact high-frequency coaxial antenna connector.

The plug snaps into the jack to form a stable right-angled cable-to-board connection with a height of just 2.5 millimetres; this connection technology is of particular interest for connecting antennas to radio modules. The frequency range extends up to 6 GHz at 50Ω.

With a low height of 2.5 mm, the WR-UMRF is a slim connection solution, requiring a footprint of only 3.1 x 3.0 mm for PCB mounting. In terms of technical specifications, WR-UMRF remains compatible with many similar products on the market.

Würth Elektronik also offers pre-assembled cables with various combinations of UMRF, SMA or RP-SMA — optionally with protection class IP67. The available cable diameters are 1.13, 1.32 and 1.37 mm.

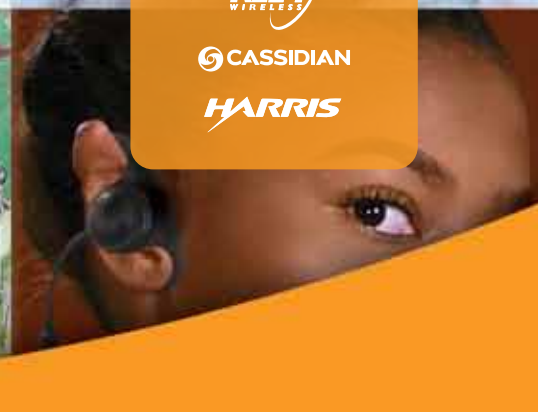*Wurth Electronics Australia Pty*
www.we-online.com

News

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DRONES PROVIDE EMERGENCY COMMS DURING CHINA'S RECENT FLOODS

The *South China Morning Post* has reported the first disaster relief deployment for China's Wing Loong 2H emergency relief unmanned aerial vehicle (UAV), was deployed during recent floods in regional areas. The drone had been tested in an exercise last October for tasks such as restoring communications and sending real-time images in areas without base station coverage.

Following a four-hour flight, the drone reached the flood-ravaged city of Gongyi, west of Henan's capital Zhengzhou. Among the worst-hit areas, Gongyi was hit by power outages and loss of communications because of the heavy rain. The drone hovered for five hours during heavy rainfall, serving as an airborne base station that provided communication services for people in the area.

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COMMS CONNECT ONLINE WORKSHOPS ANNOUNCED

The Comms Connect team have launched new dates between August and October for their popular online technical workshops.

Spaces are limited for each and there are already forward bookings in place for each of the following courses: Radio Comms 101 — a comprehensive introduction to all things radio communications, which will run for two hours each Tuesday morning in August; plus Digital LMR Standards and Techniques will take place in Sep/Oct. Then the deep-dive Microwave Radio Masterclass will be held from Oct 4–8, for two hours each morning.

For full details on each course, presenter bios and testimonials from past attendees, go to www.comms-connect.com.au. Spaces for each course are strictly limited, so secure a spot for you and/or your team now.

COMMS CONNECT
www.Comms-Connect.com.au

2021 *New* PRODUCT SHOWCASE

⬡ Auto-tunable combiner

The Sinclair auto-tunable combiner IntelliTUNE is designed with a high unloaded quality factor, wide tuning range, high linearity, high power handling, low weight and compact dimensions. The remote control is supported via Ethernet/IP connection for easy configuration and monitoring.

Key features include: channel tuning at 10 s for each; tuning range of 20 MHz; tuning accuracy at ±15 kHz; remote alarm monitoring including frequency, power, return loss, as well as antenna Tx power and VSWR of each carrier; power handling range from 10 to 100 W; Tx-Tx spacing down to 150 kHz with 700/800 MHz spacing down to 250 kHz.

The combiner is easy to use with a web-based graphic interface. Administration secure with RBAC feature to manage users and access rights.

Maser Technology Group
www.maser.com.au

⬡ Soldering irons

Weller has introduced a consumer range of soldering irons to the Australian market that, while designed to target home DIYers, crafters and hobbyists, is suitable also for engineers, electronic enthusiasts and more.

The Weller Red range, available at leading providers across Australia, utilises the professional heritage established by the Weller Blue range for almost 100 years.

The range is available in a selection of wattages including 25, 40 and 80. It includes precision handles that allow for longer use and a deft touch during intricate projects. An in-built lighting feature and improved stand also make the soldering iron easy to use. It is robust and achieves heat generation and transferability.

The Weller Red range is available at Bunnings Warehouse, Mitre 10, Home Timber & Hardware, Sydney Tools and Total Tools.

Weller
www.weller-tools.com.au

5 Watt Commercial Analogue Portable Radio

The CP50 is an Australian designed and manufactured 5 watt commercial analogue portable 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 & Busy Voting, Man Down, and Lone Worker to meet the needs of any work site.

Encased in a compact and rugged design that meets both IP67 and MIL-STD810 ratings, the CP50 provides exceptional durability. Featuring loud and clear 1.5w audio output, the CP50 ensures reliable communication, even under the harshest operating conditions.

COMMS CONNECT MELBOURNE MOVING TO MARCH 2022

Due to the ongoing uncertainty around COVID-19 outbreaks, lockdowns and travel restrictions, the WF Events team made the difficult decision this week to move Australia's premier critical communications and public safety exhibition and conference, Comms Connect Melbourne, to 8–10 March 2022. The event was originally scheduled for 19–21 October.

Comms Connect Melbourne is in its 14th year and is the annual meeting place for the sector's key vendors, suppliers, public sector leaders and end users. The updated conference program will be released late next month and the current list of sponsors, exhibitors and supporting industry bodies can be found here. The Australian Radio Communications Industry Association holds its annual ARCIA Awards gala dinner as part of the event, and this will now take place on 9 March.

TCCA WHITE PAPER: MOVING ON FROM NARROWBAND?

As next generation networks (such as 4G, 5G, LoRa and Sigfox) become more widespread in Europe, there is increasing interest from its utilities sector in the features in the standards that are targeted at IoT telemetry-type applications.

New bearers can open up exciting new applications that cannot be served by today's narrowband bearers. For 5G, ultra-reliable and low latency communications (URLLC), network slicing and support for large densities of connected devices are some of the attractions. A new white paper from The Critical Communications Association's (TCCA) and its SCADA, Smartgrid and IoT Working Group looks at the considerations for utilities looking to transition from narrowband to next-generation bearers.

COMMS CONNECT | 2021 *New* PRODUCT SHOWCASE
www.Comms-Connect.com.au

Long range Wi-Fi wireless bridge

D-Link Australia and New Zealand has launched the DAP-3712, a long-range Wi-Fi 5 wireless bridge capable of enabling point-to-point or point-to-multipoint connections up to 20 km apart.

The DAP-3712 provides a long-distance connectivity between multiple sites, such as office branches, construction sites or transportation hubs, in both rural and busy city areas. Using Wi-Fi 5 technology with speeds of up to 867 MBps, it is designed to be easy to install and offer a connectivity solution competitive with other fibre-based systems.

The wireless bridge includes a high-gain 23 db directional antenna for stable wireless connectivity. It also employs Power over Ethernet (PoE) technology, meaning the unit can be powered via an ethernet cable up to 100 m away from a PoE-enabled switch or power injector, which is useful when power sockets can be difficult to come by in outdoor deployment scenarios.

The wireless bridge is designed to perform long term, with an IP66-rated housing, providing both water and dust resistance along with 8 kV surge protection to protect the unit itself from lightning strikes and power surges.

When installing, the unit has built-in signal strength and alignment LEDs that allow easy alignment over long distances.

D-Link Australia Pty Ltd
www.dlink.com.au

Edge router

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

The R1900 supports nationwide coverage (low-band) and capacity (mid-band) networks at speeds up to 1 GBps as well as gigabit LTE. Powered by the Cradlepoint NetCloud Service, the R1900 delivers full 5G performance, enterprise-class security and SASE support, IoT connectivity with Bluetooth and edge computing for Microsoft Azure IoT Central or AWS Greengrass environments.

Vehicles such as police patrol cars or ambulances drive in and out of LTE and 5G cellular coverage and Wi-Fi zones, affecting available WAN bandwidth. Cradlepoint NetCloud for Mobile provides non-stop availability and control of application performance, whether uploading video via Wi-Fi or transitioning between LTE and 5G coverage on the road. Features like mobile SD-WAN and intelligent connection manager policies allow precise control of applications over the multiple wireless and wired WAN links.

Cradlepoint Australia Pty Ltd
www.cradlepoint.com

Industry Talking

I sincerely hope that all members of our industry around Australia are coping with the COVID situation. While we remain the lucky country the Delta strain has really hit NSW hard and the effects are now ricocheting around the rest of the country. We know that the extended lockdown periods will influence the many businesses around Australia, but please also take a little time to look after your own wellbeing, both physically as well as mentally. If you feel sad or down, please talk to someone — it is nothing to be ashamed of to reach out for a little support.

The impact on all the planned events for 2021 has naturally been huge with only limited possibilities available. The major annual event Comms Connect and ARCIA gala dinner has been postponed to March 2022 and, regrettably, ARCIA have deferred all our planned events for 2021 to a later date and that will almost certainly mean 2022; or we sincerely hope we will be able to then. As a result we are conscious that we really do need to bring training and networking to our members and partners as soon as we can.

Recently we did a quick survey on what our members and partners thought we might be able to do to help out, and one of the excellent suggestions was for ARCIA to bring general information on a range of topics to our members. We have therefore decided to run a regular 'Lunchtime Learning' program for our members. The plans are that these sessions will be at around lunchtime (or morning tea break in Western Australia) and will run for around 30 minutes with an occasional longer session and will run every fortnight.

The sessions will cover a wide range of topics and are now being developed by our executive team. Some of the early sessions will cover the following topics:

- The state of our industry — where are we at and what does the future hold?
- UHF CB: the do's and don'ts of CB frequencies in commercial radios.
- An introduction to two-way radio for industry newcomers.
- An overview of the different digital radio technologies.

Keep an eye on our newsletters for the dates and program.

Plus, we are also developing plans for our professional development training program to go online. This will take a little longer as we will have to develop an e-learning package, but the plans are already underway and we do plan to be presenting within the next couple of months. As part of the Lunchtime Learning program we will also have outlines of the professional development modules for those who have an interest but are not sure whether they want to commit to a full training session.

With the present pandemic restrictions looking to continue for some time, our plan is to have our annual awards presentation in a similar format to 2021 with a Zoom meeting to celebrate our industry and recognise members for the work they continue to do. We understand that it is far from ideal; however, we also know that the annual ARCIA awards are welcomed by the industry and give an opportunity for recognition by your peers, plus we do have a bit of fun on the day, so watch out for details of the event coming soon.

ARCIA would like to thank all our members and partners for their continued support over the last 24 months — it has been a trying time but we appreciate your support, and we always welcome your suggestions on how we might be able to continue to serve the members of our industry.

Hamish Duff, President
Australian Radio Communications
Industry Association

5G mobile networks

©stock.adobe.com/au/tanaonte

The Private LTE/5G Mobile networks are designed to help small and medium-sized businesses by providing them with their own mobile network in their smartphone.

The cellular network is all around us so there is no need to build infrastructure. It is enough to connect the mobile base station to the internet or your local intranet onsite, CCTV (including video analytics), or multiple IoT (Internet of Things) sensors and M2M (machine to machine) devices for a company's infrastructure. This network will never be congested with subscribers coming from another city, because only the user can use it.

There are key differentiators for this own network including: unique coverage (users can make own mobile coverage exactly where needed), security (unlike Wi-Fi, private LTE/5G networks are protected as carrier-level networks), scalability, services integration (including voice and push to talk), quality of service priorities ('mission-critical' data will be prioritised over another background applications).

Deployment for LTE networks is available on LTE-U solution (unlicensed spectrum), or with 5G scientific/apparatus licences depending on the location. Radio Access Network may be connected to LTE Networks Cloud Based 4G/5G Core network to minimise CAPEX, or the local mini-core for the isolated areas.

Private LTE Networks of Australia
www.PrivateLTE.com

HOW SEPTEMBER 11 CHANGED ME

*Dereck Orr**

Unfortunately, it takes a crisis to find where problems lie and the path to repair.

If you remember September 11, 2001, that day is most likely imprinted on your mind like no other day.

You remember what you were doing and who you were with. You may remember feeling confused and a sense of utter disbelief as you watched the results of the first plane's impact on 1 World Trade Center. You may have even thought — if only for a moment — "wow, what a tragic accident".

But then, you recall how that disbelief turned into horror and anger when the second plane seemed to deliberately crash into 2 World Trade Center. In an instant, it was obvious that this was not an accident — but an attack on the United States.

In 2001, I was serving as a professional staff member for the Senate Committee on Appropriations under Senator Fritz Hollings of South Carolina on the Subcommittee for Commerce, Justice, State, and Related Agencies. The morning of 9/11 was particularly frenetic because we were scheduled to introduce our FY2002 Appropriations Bill for Senate debate and vote that morning. My colleagues, Luke, Jill and I were in our office — located in the U.S. Capitol — scrambling to get everything together to support the Senator for the day's activities.

Being a Senate Office, there was always a TV on and I vividly remember the news breaking as we gathered papers. We were dumbfounded and stunned but continued our preparations until the second plane hit a few minutes later. We, along with the rest of the world, were in shock and, to an extent, paralysed.

A half hour later, we looked out our window to see smoke coming from the Pentagon; that evening we would find out that a plane, most likely headed for the Capitol, had crashed in Pennsylvania. But for the heroism and selflessness of the passengers on Flight 93 that day could have ended very differently for me and others in the Capitol Building.

After our evacuation we all tried to call our families; however, the cell networks were flooded with calls and would not be available for the rest of the day. Together we began a day-long trek through D.C. trying to figure out how to get home, with roads and trains either shut down or congested.

In the days that followed, Congress and the White House attempted to understand what happened — including issues that may have hampered emergency response to the crash sites.

> ONE ISSUE THAT WAS IMMEDIATELY APPARENT WAS THE FAILURE OF FIRST RESPONDER COMMUNICATIONS SYSTEMS

One issue that was immediately apparent was the failure of first responder communications systems during the response. Specifically, the inability of responders from different departments and jurisdictions to communicate over their various radio systems during the event, which was determined to have been a factor in the inability to evacuate 343 firefighters from the World Trade Center buildings, who all perished as a result.

As the Senate Appropriations staff member responsible for accounts related to state and local public safety, I began meeting with experts and public safety leaders to understand what went wrong. What I learned was extremely complex, but, put simply, there were no robust standards in place to allow for communications between radios made by different manufacturers and operating across different frequencies.

This was a tough problem for people to accept, including myself. Our first responders could not talk to each other across radio systems, while we as cellular customers called whoever we wanted to without worrying if they were operating on another carrier's network or if their phone was a different brand than our own.

The near-term legislative solutions were to develop grant programs that would make millions of dollars available for new interoperable radio systems at the state and local level and provide funds to ensure standards existed to support interoperability (my good friend Kevin Kimball's idea). I had no idea at the time that this would become the issue that would shape and frame the next 20 years of my career, which is how I found myself at the National Institute of Standards and Technology (NIST) beginning in 2002.

With the federal government's rapid focus on improving first responder communications, it became obvious that NIST, with its long and distinguished history in advancing standards and technology, would be a critical player in addressing this important challenge. While NIST had a small program in public safety communications in 2002, leadership recognised that an expansion was both needed and inevitable. So, when NIST posted a program manager position to shepherd the growth of public safety communications research, I saw an opportunity to transition my career to a path that I had, unexpectedly, been part of creating.

Over the next 10 years, I worked with an incredible group of scientists and engineers from NIST and the National Telecommunications and Information Administration's (NTIA) Institute for Telecommunication Science (ITS). We helped advance the state of

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standards for public safety radios, develop the first compliance program for those radios, improve their radio audio quality, and assisted public safety in charting the course to the next leap in communications — broadband technologies.

See, back then and still to this day, it is common for public safety departments across the United States to own and operate their own radio systems — either at the state or local level (and sometimes both). These can be systems made by different manufacturers and operating on different parts of the radio spectrum. So, it is not difficult to understand how communications problems could creep up when large-scale emergencies require multiple agencies to come together and communicate in order to respond.

With the promise of 4G broadband technology on the horizon, my team and I saw an opportunity to help shape the future of public safety communications by addressing interoperability issues. Plus, there was a chance to give public safety practitioners access to applications and features that they did not have with their existing systems. Working with national leaders from public safety and government, we lent our technical expertise to the endeavour of arguing for a single nationwide public safety broadband network (NPSBN) that would allow a first responder to go anywhere and talk and share data with anyone across the nation.

After years of research and discussion, the efforts culminated in the passage of the landmark Middle Class Tax Relief and Job Creation Act of 2012. This legislation funded and dedicated spectrum for the creation of an NPSBN, named FirstNet, that fundamentally changed public safety communications capa-

bilities. Additionally, the legislation recognised NIST's importance in this effort — providing a one-time $300 million for NIST to perform research and development so that responders could take full advantage of emerging broadband technologies.

With the passion and dedication of an incredible team of people from across NIST and our wonderful stakeholders, we find ourselves today having developed critical measurement tools for new public safety features. We have also funded more than 179 entities worldwide to engage their expertise in this cause, plus awarded prizes to 176 teams that stepped up to create solutions to public safety's challenges.

New companies have been formed, new academic focus areas have been launched and products are finding their way to market. We have even shaped conversations around future first responder communications involving virtual and augmented reality in heads-up displays. So, I can confidently say that this program is changing the future of public safety communications. For me, it all started on September 11, 2001.

Jill, my Senate colleague, and I still talk every September 11. We do it to remember that day. We do it to remember the lives that were taken and to remember the lives that were given so that others would live. We do it in honour of our friend Luke who died far too young due to cancer. And, we do it because we refuse to forget the impact 9/11 had on us and the world. It changed the trajectory of my life entirely, and I am proud to have spent the last 20 years in service of the cause.

Dereck Orr is Chief of the Public Safety Communications Research Division of the NIST in the United States, which serves as an objective technical advisor and laboratory to FirstNet and the Department of Homeland Security. He has led the program in its mission to accelerate the adoption and implementation of the most critical public safety communications standards and technologies since 2002. Dereck holds a Master of Public Policy from the College of William and Mary.

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National Institute of Standards and Technology www.nist.gov

German Navy invests in TETRA from Motorola

Motorola Solutions has been selected by Germany's Federal Office of Bundeswehr Equipment, Information Technology and In-Service Support to provide secure digital radio communications for 16 naval vessels and training platforms of the German Navy. The contract, valued at €69.9 million, will deliver mission-critical communications to support onboard security teams who are responsible for the safety of crews at sea and the operational readiness of naval vessels.

Motorola Solutions will roll out digital terrestrial trunked radio (TETRA) networks on each of the 16 vessels and integrate the systems into the navy's existing IT infrastructure. The solution will provide onboard security personnel with visibility of the real-time operational status of each of the naval platforms, with portable TETRA radios enabling instant workgroup communications between teams.

"Successful naval operations depend on planning, precision and trusted communications that are purposefully designed and proven to perform in these kinds of mission-critical operations", said Mark Schmidl, senior vice president international sales and services at Motorola Solutions. "We're proud to extend our ongoing partnership with the German Armed Forces and we look forward to supporting the security, safety and success of the German Navy's missions."

The navy's TETRA digital radio system will be interoperable with the communications networks of the German Armed Forces and all other German public safety organisations. This enables successful collaboration during crisis situations where interagency communication is essential.

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

COMMS CONNECT
www.Comms-Connect.com.au

2021 *New* PRODUCT SHOWCASE

⭕ Wall-mount power system

Eaton's wall mount power system (WMPS) allows users in the industrial control, electrical switching and telecommunications industries to access and monitor highly reliable battery-backed DC power.

Developed in Australia, the system requires minimal space and has a form factor that better suits industrial control and electrical switching boards, and small service closets. It also has sophisticated monitoring and control capabilities.

The system can be configured for either AC mains or solar PV power providing the convenience of a single power system type. This makes it a suitable solution for process control systems in remote locations with limited access to convenient mains AC power, and where PV solar power may be the only cost-effective power source.

The system's battery backup (lead acid/lithium) and redundancy can support most process controls systems which use PLCs, valves, solenoids, switches and sensors that are powered from 24 or 48 VDC.

The in-built SC200/SC300 advanced system controller delivers full remote monitoring and control, including ethernet, RS232 (TCP/IP or Modbus) and voltage-free relay contacts. It is an N+1 redundant design, supporting up to 1.4 kW (24 VDC) or 2.0 kW (48 VDC) secure power, making it suitable for the oil and gas, mining and industrial power industries.

Eaton Electrical (Australia) Pty Ltd

www.dcpower.eaton.com/Australia

Press-to-talk-over-cellular device

The Talkpod Smart Series N59 Press-To-Talk-over-Cellular device allows users in the field to take advantage of PoC technology without relying on glass devices.

The device allows key functions normally associated with glass devices and dispatchers, while maintaining a traditional two-way radio look and feel with booming audio and positive PTT functionality. Users can initiate private calls when required, capture and relay media back to dispatchers, send and receive messages, acquire GPS location of other users and much more.

The mid-tier PoC device provides durability and security, and is designed to increase user functionality and interaction. Features include front- and rear-facing cameras, a 2.4″ full-colour touch screen display and dedicated SOS button. The device is said to define a new era of communications with an open-source Android 9.0 operating system supporting a wide range of push-to-talk platforms.

Other features include good design, high-speed operation, clear audio, dual SIM, 2.4″ touch screen, front and rear cameras. Its IP66 rating and design make the device suitable for any organisation requiring licence-free, unrestricted Australia-wide communication.

Talkpod Australia
www.talkpodaustralia.com.au

Geo-fenced site radios

Sepura has extended its applications portfolio with the launch of AutoMate, which works by enabling TETRA radio automation through geo-fencing and situational triggers.

The application has been designed with users in mind across public safety and commercial sites. AutoMate supports control room staff via data sharing, plus field officers, who are freed to focus on mission-critical tasks.

The flexible set-up means it can be built around users' operational workflows. A variety of triggers can be utilised and these can be preset to automate radio actions. Automations can be linked and combined according to logic or priority and can be amended instantly if circumstances require.

For example, a mining organisation can ensure that radio users moving across sites can be on the right talk group based on their location, and can allow remote gates to be opened based on pre-approved devices. If they found themselves in a dangerous situation, perhaps mistakenly entering a blast zone, then both the user and the wider teams can be instantly notified, improving the safety onsite. Similarly, a utilities organisation might use Bluetooth beacons to trigger warnings to staff when they enter restricted areas, while an ambulance organisation might have their radios set up to automatically change to direct mode when in underground or remote locations, ensuring communications are constantly maintained.

Using the TETRA network, any alerts or warnings can be shared with key personnel to improve situational awareness, while on-screen reminders or notifications and audible alerts ensure users themselves are aware of any danger.

AutoMate is available to current users on Sepura SC Series handheld and mobile radios, with no upgrade required to existing devices or network infrastructure.

Sepura
www.sepura.com

Bi-directional converter

The Sierra 10 by CE+T Power is a fully bi-directional 3-port design converter, offering compactness and a range of user applications across the telecommunications and ICT sphere. It is a small-form factor, modular alternative to a traditional AC UPS.

The Sierra 10 can be used as a high-reliability small form factor UPS to secure both AC and DC loads while simultaneously providing charge to the systems batteries (lead acid or lithium-Ion).

This power-dense, highly modular and hot-swappable system is expandable in increments of 1.2 kW allowing for a system of up to 6 kW in 1 RU or 4.8 kW with integrated smart monitor. A 3-phase system can also be configured in as little as 3RU space. Options for AC output distribution include bulk feed for external distribution board or IEC sockets for direct load connection.

Powerbox Australia Pty Ltd
www.powerbox.com.au

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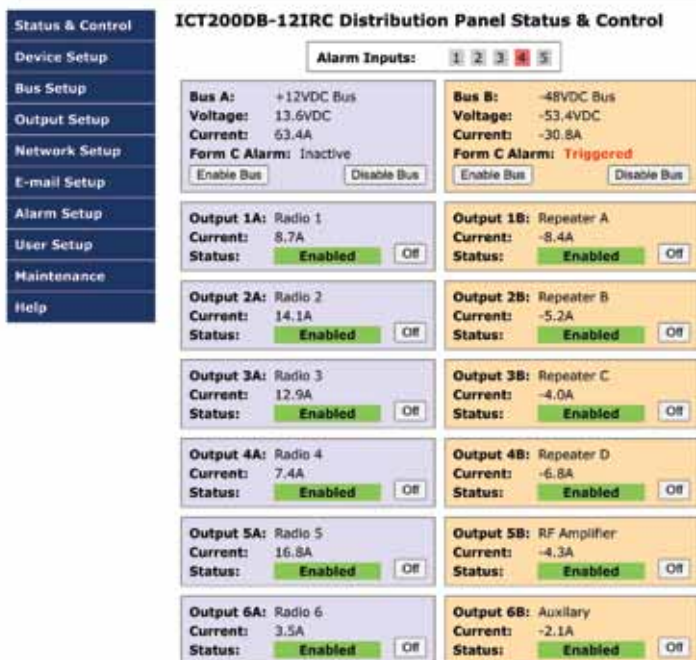
The optional Intelligent Controllers on Modular Power, Platinum Series and Distribution Series 3 include a secure, easy to use web browser interface which provides remote monitoring, alarm reporting, and control of the system over an Ethernet link. SNMP support allows integration of the power systems into your wireless network management infrastructure.

MODULAR POWER SERIES / MPS ULTRA

▶ 12, 24 and 48VDC systems
▶ Up to 8 x 700W hot swap power modules for 5.6 kW of power
▶ TCP/IP based remote monitoring and control
▶ Remote E-mail alarms and module control over Ethernet
▶ Optional single or dual 100A battery breakers with LVD
▶ Battery management features include state of charge, runtime remaining, equalization charging and battery discharge testing
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PLATINUM SERIES

▶ 800 or 1600 watts of output power
▶ 12, 24 or +/- 48-volt DC output
▶ Standard TCP/IP Ethernet communications provides full monitoring and control capabilities
▶ Network security protocols include HTTPS, TLS 1.2, and SNMPv1/2/3
▶ Optional battery backup with adjustable low voltage disconnect
▶ Battery management features include state of charge, runtime remaining, equalization charging and battery discharge testing

DISTRIBUTION SERIES 3

▶ Supports 12, 24 and 48 volts DC applications
▶ Remote monitoring and power cycling of connected load devices
▶ Automatic load shedding of non-critical loads (user defined)
▶ E-mail alarm notifications
▶ Network security protocols include HTTPS, TLS 1.2 and SNMP v1/2/3

Powering Communications For
Emergency Services
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Government
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Utilities

Radio Matters

I have now had my two vaccinations for COVID-19; this has not changed my routine as a lot believe it will. It is not a silver bullet, more a strainer post in the fence line.

This is a trying time for all. New Zealand being the figurative and literal embodiment of an island, we have dealt with COVID-19 in the best way we can. As a community we realise it is always going to affect everyone in the negative, whether it is economic or social, but the most disappointing thing for me is constantly being reminded about how short people's memories are.

I am very sorry to hear that due to the ongoing COVID-19 outbreaks in Australia that the larger conventions have been cancelled or postponed. That being said, I thank the efforts of the organisers of Comms Connect New Zealand 2021 for a successful conference and exhibition and look forward to Comms Connect New Zealand, May 2022 in Christchurch.

Welcoming back all of the Committee from the AGM in May and with a change of chairmanship handed over to yours truly, it has been a fast couple of months for RFUANZ Committee. We had a very successful face-to-face meeting in Christchurch. This meeting was hosted at Tait headquarters by committee member Mike Head, who did a fantastic job as host.

I would also like to take this opportunity of thanking Corey Weir for expertly steering the RFUANZ ship for the past five years as chairman.

As a direct result of the meeting the MOU with ARCIA has now been finalised and accepted by both organisations. In a nutshell, this opens lines of communication for sharing information on common grounds. At this meeting we discussed the continuing development of the Level 4 Radio Tech course which is well underway, plus the uptake of the Level 3 Radio Tech Course has achieved some success.

Redevelopment of the RFUANZ website and is now well underway with some new initiatives. A hot topic was planning for the 2022 AGM and Awards Dinner in Christchurch.

Representatives from Radio Spectrum Management were invited to the meeting mostly via Zoom, with one being able to attend in person, largely due to the location of our meeting and timing for these busy RSM workers. Suffice to say we had a great turnout with a lot of productive back and forth on a large range of topics.

Included were discussions on:
- future security C & D band – UHF/450 – 470 MHz
- air band cross band interconnectivity
- RSM views/thoughts on Wi-Fi 6e (6 GHz)
- update on 60 GHz
- training + ARE/ARC training uptake
- update on status of the memorandum account
- update on the new Smart Register and implementation date
- single frequency repeaters
- TVWS rules for licensing – 600 m from any TV aerial
- RSM position on national environmental standard for telecommunications facilities.

John Laughton, Chairman,
Radio Frequency Users Association of New Zealand

Vector network analyser

User-friendly and easy to configure, the handheld Rohde and Schwarz (R&S) ZNH vector network analyser helps detect and remedy defective RF cables and communications system components; suitable for R&D labs, production lines and universities, where space and budgets are limited.

The R&S ZNH comes standard with essential functions such as cable and antenna measurements and full 2-port S-parameter measurements. The touch-based interface makes the analyser easy to operate, even by a novice with no previous training.

Weighing just 3 kg, the R&S ZNH has a small form factor, fanless design, long battery life and widely spaced large keys for comfortable operation with gloves making it suitable for field applications.

RF performance features make the R&S ZNH a suitable choice for installing and maintaining RF communications systems and characterising basic RF components.

Additional options such as a power meter, pulse measurement, wave ratio and wave quantities enable field engineers to maintain and restore radar and satellite systems.

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

5G AND ADVANCED TECHNOLOGY
SOW THE SEEDS FOR FLOURISHING SMART CITIES

*Joao Pinto**

How does 5G and the advanced technology it enables contribute to smart city evolution, making cities more livable and driving enterprise?

Being connected has become one of our greatest dependencies over the past year as we anticipate and start to rebuild our lives in a post-COVID world. As a result, 5G has come to be viewed by more and more private and public enterprises as the key enabler for recovery and growth across all industries, as well as a catalyst for innovation.

The technology platforms behind the major advances in innovation — augmented and virtual reality, data and analytics, and private networks — all heavily rely on 5G for maximum effectiveness. It is therefore the power of 5G that will be the game changer in contributing to the long-term aspects of our economic recovery from the global pandemic.

5G technology drives enterprise

5G connectivity layered with advanced technologies such as IoT, data analytics and AI is going to be one of the greatest enablers for public and private enterprise we have seen in decades, possibly ever; it will also contribute significantly to smart city evolution. It presents an unmissable opportunity for organisations to gain efficiencies, improve security, provide better safeguards for health and safety, and deliver a much better customer experience.

Additionally, this associated innovation will enable significant development in our cities of the future that will, in turn, allow us to drive a green agenda, safer society and education for all. The ability to serve more connected devices in highly dense urban environments is one of the greatest benefits of shared 5G infrastructure and technology.

With 5G running at its best on superior infrastructure and powering these technology platforms at scale, the possibilities for accelerated economic development could very well be infinite. This is because 5G's revolutionary capability ultimately lies in its ability to make systems operate more effectively, allocate resources more efficiently and minimise waste more than any other technology. Overall, cities are gradually generating more collective intelligence as different systems are implemented and start 'talking' to each other. These systems implemented at a community level are the building blocks towards an urban environment reaching 'smart city status'.

Growing smart communities fast tracks smart city development

Ultimately, city planners and the private sector participants want to deliver a better and more human-friendly city for residents and visitors. If you think about 5G in conjunction with connected transit and a 'station of the future' context, together with a small cell offering above ground, you start to see that it is bringing together a number of different technology and service strands that allow us to deliver a great experience and improved safety not just for our customers, but for their customers.

An example of this in the transit industry is a crowd management application in the subway that can help operators adjust carriage supply in real time in response to a change in passenger demand. It can also send alerts to taxis and ridesharing apps above ground signalling spikes in demand for these services before they occur in specific parts of the city, which uses — and connects — all these technologies.

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Maximising the value of 5G means engaging a neutral host

To maximise the opportunities, minimising the required investment and resourcing, of shifting to 5G, we are seeing an important trend, which is the move towards neutral host infrastructure. MNOs are moving towards outsourcing infrastructure operations to neutral host service providers because this presents a key benefit in enabling MNOs to increase focus on delivering a superior connectivity experience for their customers with the advent of 5G.

At the same time, MNOs reduce operational and financial pressure by partnering with companies that specialise in designing, installing, operating and maintaining infrastructure to enable 5G on their behalf. These companies are therefore the best allies for MNOs to deliver the latest cellular technology to their customers.

Overall, this makes it significantly more efficient and cost-effective to scale a 5G offering while also ensuring the infrastructure is future-ready for when the next-generation technology is developed. Furthermore, to

deploy 5G at scale takes specific engineering expertise and skill to design, install, operate and maintain the infrastructure.

From an operational perspective, the neutral host solution saves MNOs being responsible for securing access to real estate needed for small cell devices, antennas and fibre; dealing with local authorities and applying for permits and approvals, in addition to not worrying about implementing, operating and maintaining the network itself.

For venues where security and understanding how data is coming in and out is extremely important, 5G-enabled private networks are a great fit. Private networks are ideal for operators of venues, campuses and critical infrastructure that need to regulate all aspects of their wireless network, such as data flow and security. Many of these operators are attaching a data analytics function capable of leveraging 5G infrastructure to provide them with the ability to identify valuable customer and operational insights.

Ubiquitous coverage across a campus becomes more important for remote enterprises or institutions out of reach of a mobile network. This is true for several verticals,

such as transit authorities, where coverage is important for rolling stock on a train line or a bus service. Then, if you think about factories and large utilities, or ports, ubiquitous secure coverage across the campus is very important. For example, airports and seaports certainly benefit from the connectivity advantages of private networks, such as tracking movement of people, luggage and goods; as well as the added benefit of being able to provide coverage for citizens as they move about the airport, especially when facing travel delays and the various aspects of citizen and enterprise security.

The backbone of flourishing smart cities

From these examples alone, it is abundantly clear that neutral host infrastructure providers, especially those partnering with MNOs, have a big role to play in supporting the public and private enterprises establishing smart communities, thus contributing to smart city development in a meaningful and achievable way.

The capability of the advanced technology and innovation powered by 5G is indeed sowing the seeds for flourishing smart cities. 5G is a success lever for MNOs and infrastructure companies, as well as government and smaller enterprises to be able to build the organisation of the future. In helping organisations with their communications infrastructure, networks, automation and analytics BAI must provide the necessary ubiquitous coverage on which these services depend.

This is the path to smart city evolution.

Joao Pinto is Head of Strategy at BAI Communications. He focuses on key strategic projects and exploring growth opportunities in areas such has small cells, smart cities and transit. Before joining BAI, Joao was at McKinsey & Company supporting strategy development for global media and telecommunications companies and running large-scale transformations. Joao holds a master's degree in electric and computer engineering from Lisbon's Instituto Superior Tecnico and an MBA from London Business School.

BAI Communications
www.baicommunications.com

UHF radio

The CP50 is a fully featured, 5 W, commercial analog portable radio that supports up to 2047 channels across 127 zones.

Designed, engineered and manufactured in Australia, the CP50 is suitable for a wide range of commercial applications with practical features such as channel announcement, 45 channels/s scanning, 19 h standard talk time as well as loud and clear 1.5 W external audio output.

The radio is built to military-grade standards and boasts an IP67 rating. Including a suite of important safety features such as a dedicated emergency button, man-down and lone worker, the CP50 is an important piece of communication equipment for any job site.

The radio is also backed by GME Commercial's standard 5-year warranty.

GME Pty Ltd
www.gme.net.au

Remote web interface AM/FM broadcasting

Inovonics' range of remote equipment allows users to tap into broadcasts through an easy-to-use remote web interface AM | FM | HD | DAB | DAB+, allowing users' staff to social distance from any location. Remote troubleshooting is also made easy with an automatic alert sent to radio engineers via email or SMS text message, whereby they can connect directly with Inovonics gear over a dynamic web interface.

The SOFIA 565 FM SiteStreamer+ includes many additional features to the INOmini SiteStreamers, which are web-enabled receivers for remote signal monitoring. They are installed at a broadcast transmitter site, or any remote location with an internet connection.

The SOFIA 565 provides analog, AES3-digital and DANTE AoIP-audio outputs. It can provide signal metrics in real time and a history of the entire broadcast day, as well as validating and displaying RDS/RBDS program-related metadata. Internet listening is streamed for up to 10 listeners at once. Multiple stations can be sequentially monitored using the programmable station rotation feature.

AVW Broadcast Pty Ltd
www.avwbroadcast.com.au

Parabolic antenna

Using PCB manufacturing techniques, RFI's engineering team has developed a parabolic antenna that delivers full band LTE/5G cellular coverage, where no tuning or optimisation is required.

Suitable for cellular/carrier networks, public safety and DAS applications, the design characteristics of the GM06 Mesh Parabolic Antenna include high F/B, low sidelobes with a narrow bean, which ultimately improve the line of site to the selected donor site, thus mitigating noise and interference from adjacent sites.

Lightweight and durable, the GM06 is manufactured using tubular aluminium with a lightweight, UV stabilised ABS radome designed to ensure speed of installation as well as good performance.

A GA clamp is also available, allowing for full articulation and polarisation adjustment, offering more assistance and reduction in time during installation.

RFI Technology Solutions
www.rfi.com.au

Land mobile radio analyser

The Anritsu LMR Master S412E is Anritsu's second-generation solution for installing and maintaining public safety systems. The solution combines a high-performance spectrum analyser with a vector network analyser (VNA) and signal generator with internally adjustable power. The instrument supports analysis and coverage mapping for P25, P25 Phase 2, DMR (MotoTRBO), TETRA, NXDN, NBFM, FDD and TDD LTE.

The instrument is suitable for land mobile radio (LMR) and professional mobile radio (PMR) technicians and engineers engaged in field testing the RF performance of commercial, public safety, maritime and critical infrastructure radio systems. For railway operators that use GSM-R systems, the LMR Master can be configured with GSM/GPRS/EDGE measurements.

The built-in high-performance VNA can be used to sweep cables and antenna systems. To power tower-mounted amplifiers, an internal bias tee is optionally available. Distance-to-fault measurements are used to characterise antenna systems and can easily spot poor connections, contamination, damaged cables and water penetration. The built-in receiver combined with the signal generator can be used to conduct receiver sensitivity tests.

The LMR Master S412E's VNA offers good transmission dynamic range performance (>100 dB) that can be used to view and adjust the RF performance of critical RF devices including filters, duplexers, transmitter combiners, receiver multicouplers and tower-mounted amplifiers. The DANL of -152 dBm combined with a third-order intercept of over +16 dBm makes the instrument suitable for identification and location of low-level signals that can interfere with land mobile radio systems, even in the presence of strong nearby transmitters.

Anritsu Pty Ltd
www.anritsu.com

Two-way radios

The ruggedly built Entel DTEx delivers loud audio coupled with good audio clarity, plus the ergonomic controls are specifically designed for gloved hand use.

The DTEx series combines the latest DMR digital technology with high ATEX gas group ratings and is designed to deliver high range, safety and reliability. With an IP68 rating the fully submersible DTEx is built to withstand extreme and hostile environments.

The UHF2 is exclusively available from Ace Communication Distributors.

Ace Communication Distributors Pty Ltd
www.acecomms.com.au

5G vehicle antenna solutions

The Mako 5G Dome range has been designed to provide 4x4 4G/5G MiMo performance from 617–960/1710–6000 MHz in a robust, low-profile package.

The flexible platform allows the main elements to be combined with a number of other functions including GPS/GNSS and 4x4 MiMo +1 or 6x6 MiMo/Diversity at 2.4/5.0/7.2 GHz.

Features include: low-profile antenna with 10 functions in one; 4x4 MiMo 4G/5G LTE cellular; 4x4 MiMo +1 dual band WiFi 6 and/or GPS/GNSS in one housing; antenna solution with full FAKRA cable assembly kit — various lengths available.

When choosing a 5G mobile gateway solution, Tekdis can provide a complete package to suit.

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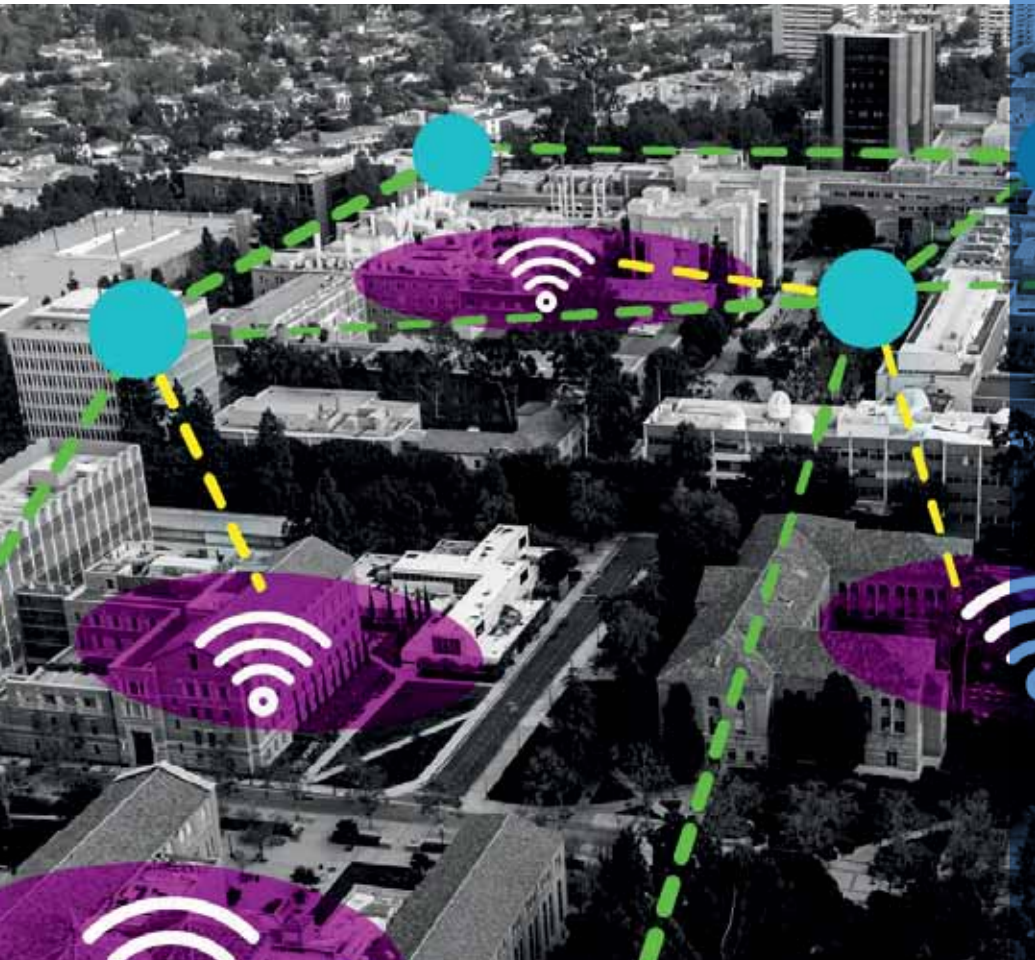
> " We are beyond pleased with the performance and more importantly the coverage of the XV2-2T. For an 'outdoor' AP, it should be called a 'go through anything AP' as it is breaking down barriers in tough to reach locations to solve tough installation challenges. "
>
> *Chaz Hager, President, North River IT*

For more info, visit:
cambiumnetworks.com/xv2-2t

Deliver Outstanding Coverage and Performance

Five reasons why you need the ET80/ET85 (ET8X) Rugged Tablet

First responders deal with extreme situations, and they do it while racing against the clock. The unpredictability of the job means they have no margin for error. For them, more than anyone else, every second counts. So why give them a second-rate device?

The value of rugged tablets vs consumer devices

Although the needs of every worker out in the field will be different, there are undeniable factors that make purpose-built rugged tablets the superior choice over their consumer counterparts. These include rugged reliability, unparalleled customisation and management control, ability to maintain peak performance levels all day long and longer lifecycles for a better return on investment.

With most public safety professionals racing against time, it is key for organisations to understand the obstacles first responders face, in order to select superior tools that keep them safe, help them work faster and perform their critical roles effectively.

Zebra's range of ruggedised tablets bring together the mobility of a smartphone with the larger screen and the advanced processing power of a desktop or laptop computer, enabling highly mobile workers to access the data, native apps and other enterprise systems they need just as easily as if they were sitting at a desk. They can also connect with their colleagues to collaborate in real time securely via push-to-talk voice apps and augmented reality tools that allow for remote assistance by specialists.

Find out why forward-thinking companies are increasingly opting to equip field-based workers with Zebra's enterprise-grade tablets.

1. Ruggedness and reliability in the most unforgiving environments

Busy public safety professionals are often on the go, working in remote, rural, or otherwise unpredictable environments. As a result, they need a device which is capable of delivering reliable performance even in the harshest conditions. Consumer tablets frequently shut down when confronted with extreme temperatures. Whereas Zebra's ruggedised enterprise devices are inherently built from the inside out to withstand challenging environments, including extreme heat and frigid cold (in the range of -20°C to 60°C). The Zebra advantage lies in being able to keep workers efficient no matter the climate or task at hand. Zebra's specially built ET8X range of rugged tablets can also withstand the heavy use and potential damage that comes with using devices while in extremely dirty, wet, or other outdoor conditions, such as during a rescue, or whilst inspecting broken powerlines. This includes accidental drops tested to military standard (MIL-STD-810H) and repeated exposure to dust, dirt, vibration, and liquids. They are completely rugged, yet just as easy to use as a consumer device.

Unlike consumer tablets, Zebra's ET8X ruggedised tablets also feature outdoor viewable, dimmable displays, which are optimised for use with gloves, making them easy to use day or night, even when it's raining, snowing, cloudy or sunny. And should they get dusty, dirty, or otherwise contaminated throughout the day, they can easily be wiped down or even rinsed under running water without the screen getting ruined or interior components getting wet. The device is rated IP65 even when the ports are opened.

In a nutshell, their durable and thoughtful ergonomic design provides unmatched reliability compared to the fragile components of the average consumer tablet.

2. Unmatched customisation and versatility

Most consumer-grade and even rugged tablets lack all the features that businesses require to get the job done properly. But Zebra's ET8X range has it all — optional built-in barcode scanner, two high-quality cameras, friction-hinged with color backlight keyboard, universal docking solution and a host of powerful workforce management software including push-to-talk and enhanced security capabilities. However, finding the right device extends well beyond the form factor alone. Zebra's ET8X tablets also feature an extensive number of accessories that are rarely offered with consumer devices, such as optional barcode scanners, specialised mounting and docking systems, and different carrying options.

> " Although the needs of every worker out in the field will be different, there are undeniable factors that make purpose-built rugged tablets the superior choice over their consumer counterparts.

In addition to control over configuration, Zebra's ET8X enterprise devices are built with business operations in mind: software upgrades and other updates can be done when it is most convenient to the business, so they do not interfere with other applications or ongoing workflows. In addition, enhanced security and IT management tools such as multi-factor authentication, SmartCard/Common Access Card readers, application whitelisting, multi-user login, lock, wipe, and device monitoring help protect valuable and sensitive data and ensure fast and reliable connectivity.

3. Peak performance and connectivity that lasts an entire shift

Tools for portability, including optional hot swappable batteries, allow Zebra's ET8X tablets to last an entire shift (Standard: Up to 11 hours; Optional Hot Swap: Up to 17 hours) without stopping or switching devices. At the same time, the memory, storage, and desktop-comparable processing power of these rugged tablets make it easy to run high-performance, workflow-specific applications that introduce greater efficiency into workers' days.

Wireless connectivity isn't a problem with the ET8X either, which ensures a constant signal is maintained so your workers can perform at the highest levels wherever that may be. The ET8X supports 5G, 4G and Wi-Fi 6E networks for the fastest WLAN access, as well as other public safety networks. It also contains Intel's 11th generation CPU for fast processing and three antenna passthroughs for

strong GPS and wireless signals, enabling consistent signals in areas that other devices fail.

4. Extremely long lifecycles

When it comes to consumer-grade tablets, the inefficiencies really add up and start to impact productivity. In fact, consumer mobile devices cost up to 50% more than rugged devices over five years. Zebra's ET8X range features long-lasting and easily replaceable components which extend the life cycle of enterprise tablets compared to consumer-grade devices. For example, the ET8X battery is easily replaceable, whereas consumer devices must be sent to service centres for battery replacement. In addition, other components like chargers and adapters are upgraded only when needed, rather than with every new device iteration.

With a more reliable fleet of devices, public safety organisations don't need to keep a large population of spares on hand or waste the effort and time required to send damaged devices to and from a service centre.

5. Better Return on Investment (ROI)

Many companies are giving more weight to rugged enterprise tablets, which can easily last up to 10 years with the right maintenance. The extended lifespan reduces the overall carbon footprint of organisations, especially when compared to consumer devices that may reach end of life in one or two years — or sooner with heavy use. By opting for rugged devices such as Zebra's ET8X that boast lower churn rates, organisations eliminate

unexpected disruptions, unbudgeted repair expenses and much more.

Give your workers a trusted lifeline, so they can perform their best, anywhere

Organisations need to invest in mobile devices that support the unique needs of their front-line and field-based workers. Zebra's ET8X range run on the same professional grade Windows 10 OS used on desktops and laptops, offering a similar user experience that can be just as simple — and compatible with most systems that organisations are currently running. The tablets enable a superior user experience; workers gain the added benefit of customised feature sets, enterprise-grade security and communication tools, extreme versatility, and proven device reliability.

Zebra's ET8X rugged tablets are the thinnest, lightest, and most rugged laptops on the market. They are the only type of tablet appropriate for nearly every work environment, from the indoor to the outdoor, and everything in between.

For more information on Zebra Technologies ET8X tablets, please visit www.zebra.com/ap/en/products/tablets/et8x-series.html

If you would like to receive more information, please email zebramarketing@primary-pr.com

Zebra Technologies
www.zebra.com

Load distribution panels

The DISICT200DB DC load distribution panel provides independent dual bus capability for 12, 24 or 48 VDC systems. Each bus is rated at 100 A and provides six (selectable) breaker protected outputs. Onboard TCP/IP capability provides customisable remote monitoring as well as remote shutdown and power cycling of individual outputs. Five digital input contacts are provided for site monitoring sensors such as door, smoke and water detection. Each input can be custom labelled in the web interface to provide descriptive email alerts. The onboard, easy-to-use embedded graphical user interface requires no software to maintain, and remote updates can be made over Ethernet. Each output has adjustable load-shed settings allowing non-critical loads to be taken offline, during extended power outages.

Suited for land mobile radio and wireless broadband communications professionals who require cost-effective dual bus power distribution either for redundancy or to support mixed voltages at their sites and to remotely power-cycle their outputs to reboot connected loads without having to travel to the site.

Features include: 200 A peak system current rating (100 A per bus); six load outputs per bus; TCP/IP remote management and power control of system and individual outputs; each output has adjustable load-shed settings; Network Watchdog feature will ping a pre-determined I.P. address and power-cycle connected device if not answered; high-quality, reliable hydraulic/magnetic breakers support 12, 24 and 48 VDC systems (breakers sold separately); mixed voltages and polarities can be supported in a single panel -30 to +60°C operating temperature range; and HTTPS, SMTP, SNMPv1/2c/3 protocols supported.

Helios Power Solutions

www.heliosps.com.au

Outdoor Wi-Fi 6 access point

The XV2-2T0 outdoor Wi-Fi 6 access point brings flexibility and performance for outdoor Wi-Fi networks. Network architects will appreciate the high-efficiency and high-gain antenna OMNI (360°) optimised for both 2.4 and 5 GHz bands. The high average gain delivers higher upstream RF link budget for better client connections at greater distances than previous generation 802.11ac outdoor Wi-Fi access points.

Everything the user needs is included in the shipping box. Users can easily mount the XV2-2T0 to a pole or directly to the side of a building. Additionally, the XV2-2T0 GE2 port provides up to 30 W of PoE power for an external Ethernet device. Users can connect a Cambium Networks PMP subscriber module, a 60 GHz v1000 CN, an IP security camera or even another access point.

Users can adopt and manage the access point from cnMaestro cloud, cnMaestro on-premises, cnMaestro X or XMS-Cloud management. The XV2-2T0 is not locked into one management option; users can easily move the access point from one management to the other. When paired with a cnMatrix Ethernet switch, the XV2-2T0 is claimed to benefit from policy-based automation that simplifies and secures device configuration.

The key value of 802.11ax is efficient use of RF spectrum. It does this by bringing MU-OFDMA from the cellular world into Wi-Fi. 802.11ax deterministic network where the access point is now in charge of assigning transmit resource units, time to transmit and when to sleep to all the clients in the network. Spatial reuse is another efficiency protocol designed to increase capacity even for low-powered mobile handset devices.
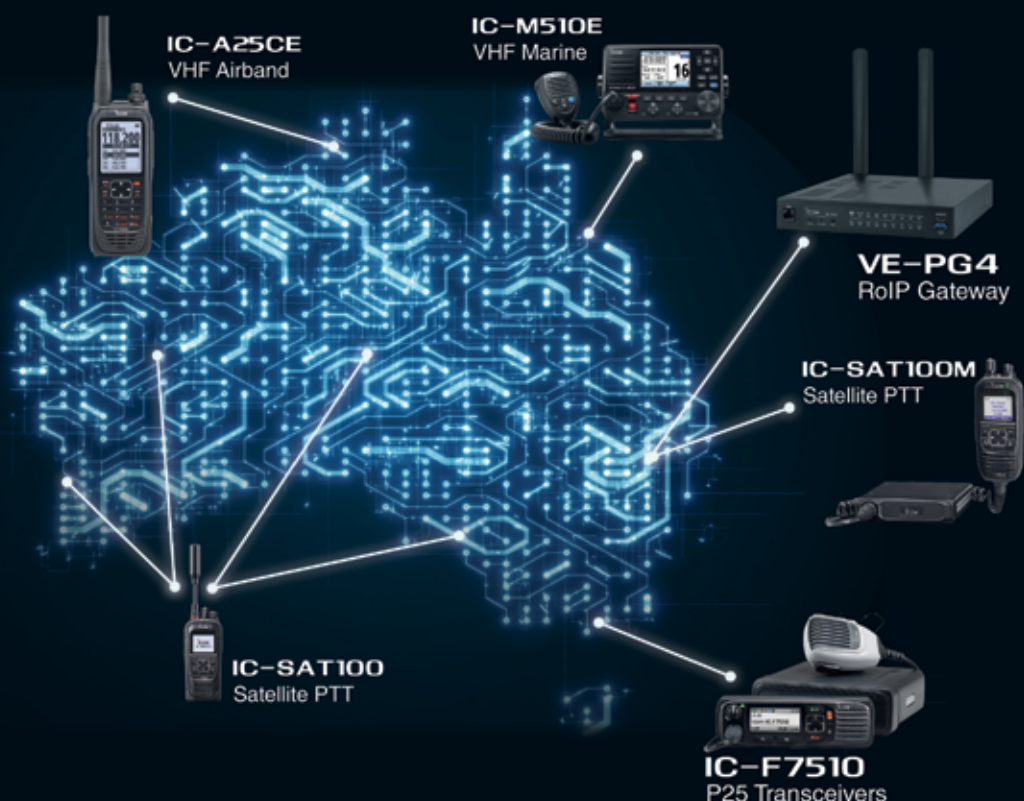
Cambium Networks Ltd

www.cambiumnetworks.com

5G radio communication tester

Users of Bluetest reverberation test systems (RTS) can now use the Rohde and Schwarz CMX500 5G NR radio communication tester for 5G FR1 MIMO over-the-air (OTA) measurements.

With the CMX500 integrated in the Bluetest Flow control software, users can measure throughput as well as receiver sensitivity and output power on multicarrier devices with up to 4x4 MIMO. The reverberation chambers from Bluetest in combination with the CMX500 now enable developers and manufacturers of 5G components and devices to perform MIMO stress testing under realistic conditions with high data rates.

Bluetest, based in Gothenburg, Sweden, specialises in reverberation chambers such as the RTS65 for efficient OTA performance evaluation of the device under test (DUT). Unlike anechoic test chambers, reverberation chambers reflect an RF signal inside the chamber to the greatest possible extent to create a Rayleigh faded multipath RF environment similar to real-world indoor and city conditions. The set-up is run by the Bluetest Flow software, an integrated test environment for complex wireless solutions. It features characteristics such as an integrated result database, comprehensive customisation options and a full-fledged scientific computing environment. It supports legacy systems as well as the latest wireless standards such as 5G NR.

It emulates the network in the test set-up, allowing both non-standalone and standalone testing in FR1 and FR2. The modular design adds 5G capabilities to LTE-based legacy solutions such as the CMW500 wideband radio communication tester or the CMWflexx platform.

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

Fixed-mount mobile radio

The ToooAir ANDROID powered TA-1500 is a fixed-mount mobile radio enabling Australia-wide, business-critical communications via PTToC on the massive 3G/4G/4GX networks.

It is designed to answer the communication needs of both private industry and the government sectors and operates on a pan-communications solution, which eliminates the need for a privately owned network infrastructure.

The communications device is suitable for any business. Using dual nano SIM cards, it provides multi-network redundancy and provides communications in underground carparks, tunnels and shadow areas.

Multiple applications provide phone, navigation, vehicle tracking, work applications and voice in one compact unit. Operational features like Wi-Fi and Bluetooth make the unit versatile with any new configurations and updates pushed over air.

The simple human interface belies the sophisticated onboard technology and produces a mobile radio that is easy to use and well adapted to the harsh Australian working environment.

A large 4″ touch screen makes selecting menu options easy, and a powerful 5 W speaker produces loud clear sound for both voice and signalling transmissions. An optional rear external speaker connection is designed to help eliminate misunderstood calls in very noisy environments.

In keeping with the broader suite of ToooAir mobile and portable radio products, the TA-1500 also highlights user safety as a priority. The SOS alarm, SMS messaging, hot microphone under duress, group transitioning, GPS fencing and map tracking on the ToooAir Despatcher software panel make the device suitable for any radiocommunications fleet.

Tooo Air Pty Ltd
www.toooair.com.au

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Integrated communications solution for copper mine in Myanmar

Hytera implemented an integrated DMR and LTE solution at the Letpadaung Copper Mine in Myanmar to provide improved wide-area voice communications and support for broadband video, environmental monitoring solutions and remote data transmission.

Background

The Letpadaung Copper Mine is located near Salingyi township in the Sagaing region in northwestern Myanmar. The large surface mine is operated by Wanbao Mining Copper Ltd, a subsidiary of China North Industries Group Corporation (part of Norinco) and Myanmar's Union of Myanmar Economic Holdings Ltd (UMEHL).

The companies have invested $1.1 billion in the mine, which is believed to be the largest hydrometallurgical copper smelting project in Asia. In 2018, the mine's output of cathode copper exceeded 100,000 tones for the first time, while in 2019 the cathode copper yield increased even further to 120,000 tonnes. The mine covers approximately 40,000 hectares.

The challenge

The original communications network struggled to keep up with the mine's operational requirements as it expanded in size and the copper yield increased. The network also needed to handle the much larger volumes of data generated by applications such as video monitoring, environmental monitoring (including rainwater) and truck scheduling.

The requirements for the upgraded communications network were that it had to provide wide area coverage across the whole mine footprint to ensure reliable voice communications between the operations centre, vehicles and workers. It also had to be able to support the transmission of large data volumes, ensure remote data transfer from radio devices and Internet of Things (IoT) sensors, and meet high levels of system reliability and availability to enable 24/7 monitoring 365 days a year.

The solution

In 2019, Hytera provided two Digital Mobile Radio (DMR) base stations along with MD785 mobile radios, PD705 hand portable radio terminals and PD795EX 'intrinsically safe' terminals for use in areas of the mine with a potentially explosive environment.

This fulfilled the customer's requirements for reliable wide-area coverage and clear voice connectivity. Good voice communications are essential in the noisy working environment of a mine, where operational efficiency and safety of personnel are of paramount importance.

In 2020, the mine operator approached Hytera to see if it could find a way to meet its growing demand for transmitting large volumes of data. The company also wanted to implement reliable and robust outdoor coverage and a remote data transfer solution for IoT monitoring sensors and applications.

Hytera was able to fulfil this requirement by deploying its iBS 3800 integrated 4G LTE broadband base station, which is capable of transmitting all the mine's video and data traffic. The iBS 3800 not only supports multi-site interconnections for wider network coverage and capacity, but it also enables interconnection between narrowband DMR systems and broadband LTE systems.

The iBS 3800 integrates the baseband unit (BBU), remote radio unit (RRU) and the 4G LTE evolved trunking core (eTC) into one compact unit. Its small size makes it highly flexible and easy to install on a wall, pole or tower. It is IP65 certified, so it can cope with the harsh outdoor environment of a mine, where terminals must continue to operate despite dust, dirt, mud and heavy rain.

It is vitally important that operators of excavator machines and drivers of haulage vehicles can communicate at all times and can continue to send sensor data. To meet this demand, Hytera developed a new vehicle CPE (customer premise equipment) able to meet the requirements of IoT data transmission, remote data access and long-term monitoring in an outdoor environment. The vehicle CPE is light, safe and easy to install.

The results

Hytera was able to combine different radio standards into one integrated network capable of fulfilling multiple purposes including: clear, robust and reliable voice communications; broadband data applications such as video; and IoT remote data transmissions and workflow management systems.

The professional outdoor deployment solution provided simple installation and flexible deployment, which can be altered to meet the changing topography of the open cast mine. The integrated voice and data communication system helped the customer increase efficiency, boost safety and save costs.

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

It's beautiful when families connect.

The new Aprisa LTE router for mission-critical field area networks joins the well-established Aprisa range of secure and hardened field area network devices from 4RF.

Innovative features include optical fiber options, dual SIM, wide range of LTE bands, enterprise-ready routing, tough security, and heavy-duty transient protection for electric grid applications. With built in Wi-Fi operation, the Aprisa LTE is also at home in mobile applications and meets tough vehicle electrical and vibration standards.

YOUR APPLICATION. OUR DATA FAMILY.

Aprisa SRi   Aprisa SR+   Aprisa LTE   Aprisa XE

4RF

PoE solution with network synchronisation

Matrix Switch TX2012R-PcnMatrix TX provides Wireless ISP operators with a non-blocking, fully managed, enterprise-grade L2/L3 switch portfolio, flexible and intelligent PoE and Cambium synchronisation in a single box solution that is easy to install and manage while improving network performance.

The fully integrated switching solution purpose-built for WISPs is designed to simplify deployment operations while improving network performance.

The solution is integrated with the complete Cambium portfolio of connectivity solutions, and managed via the cnMaestro cloud-based management system. It is designed based on the specific needs of Wireless ISPs.

Features include: full line rate, non-blocking architecture; easy and simple, free cloud (or on premise) management with cnMaestro or XMS*; zero-touch deployment of switches makes installation easy; policy-based automation eliminates manual and time-consuming configuration; enhanced security with automated device profiling and segmentation; policy-based automation eliminates manual configuration during adds, moves and changes of network devices; unified wired-wireless access solution; and non-blocking, fully managed, enterprise-grade L2/L3 switch.

The comprehensive/intelligent PoE solution includes: 802.3af/at/bt — up to 90 W; 24 V Passive PoE — up to 15 W; and 54 V Passive PoE — up to 90 W.

*Feature to be included in a future release.

Streakwave Pty Ltd
www.streakwave.com.au

Handheld communications device

Providing Australia-wide coverage on the 3G/4G/4GX networks, the TA-430 communications device is slim with a light form factor, IP protected, has a large, coloured display and is powered by an optimised ANDROID 8.1 platform.

Add to this its compatibility with Wi-Fi 2.4 / 5.0 and Bluetooth 4.0, the TA-430 is a suitable communications tool for every business and industry where secure communications over wide areas is a must. Although the TA-430 is truly a one-size-fit-all communications device, it is a good companion for the security and cleaning industries.

A powerful 4000 mAh battery ensures a long duty cycle of up to 17 h.

The large, coloured display and clean keypad make the device easy to use on the run or using the many functional features like quick group change, private call and fast recognition of notifications and alarms.

The slim design fits neatly into any work shirt or jacket affording portability and fast response to calls. With an IP54 ingress rating, the device is also suited to industries where weather and dust is a consideration.
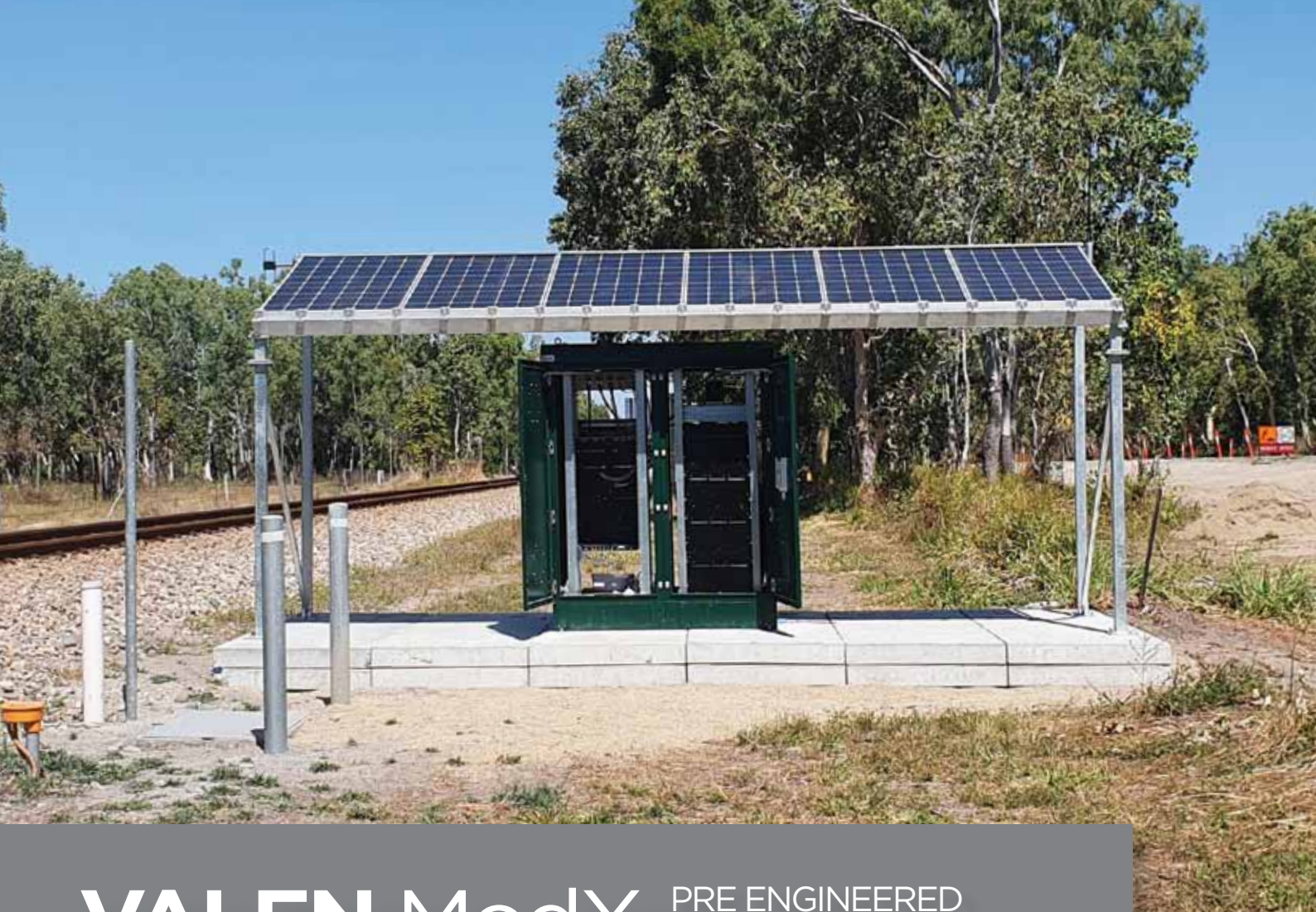
As a point of difference, the TA-430 has an internal aerial making it suitable for the courier, towing and building industries where the user needs a body worn two-way device without the inconvenience of an antenna.

Tooo Air Pty Ltd
www.toooair.com.au

○ Portable handheld radio

New to the ToooAir suite, the TA-450 is an intelligent and durable working-class handheld radio, with 2 W of loud and clear audio from its large front-facing speaker. It includes new technologies and features while retaining all the safety features known to the brand.

Foremost, the radio is small with an ergonomic design and offers multiple connectivity options including Wi-Fi 2.4/5.0 and Bluetooth 4.0. Couple this to its PTToC capability on the 3G/4G/4GX networks, and the communications device can provide seamless communications across Australia.

The radio is suitable in all market spaces but especially in large fleet operations like the courier industry, security and transport, search and rescue, shopping centres and Local Government fleets. It can quickly change working groups via the group selector knob and easily manage high-level hierarchy requirements allowing one-to-many, one-to-group and private one-to-one calls. Group selection via the selector announces the selected group to the user.

In keeping with the ToooAir product suite, the TA-450 includes an SOS alarm, missed call feature, group change and versatile lone worker feature, all fitted as standard.

When used with the ToooAir Despatcher software panel, TA-450 allows GPS fencing and national map-tracking. The radio is suitable for any business that relies on instant communications to maintain effective operations.
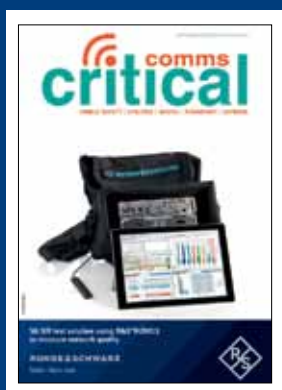
Tooo Air Pty Ltd
www.toooair.com.au

Protecting outdoor edge computing equipment

Chris Barson, Eaton Product Manager — PQ/Telecom DC

From cellular networks to mine sites, from transport infrastructure to oil and gas processing and distribution, increasing digitalisation is leading to an increasing need for computing capabilities in remote and outdoor locations. Referred to as 'edge computing', the processing of data from Internet of Things (IoT) devices tends to be performed closer to where those end devices access the network, pre-processing the data to reduce the latency in moving large amounts of data from the outdoor or remote location to a distant data centre, private network or the cloud. Since so many of these technologies are deployed outdoors or in otherwise hostile environments, the requirement for quality, secure, sealed and rugged outdoor enclosures, with a reliable and secure power supply, becomes obvious.

A quality outdoor marine-grade aluminium cabinet or enclosure will fully seal the critical equipment and backup power system against ingress of weather, dust and insects, and also secure the internal equipment from access by non-authorised personnel.

Providing a good strong box is not enough

Maintaining the sealed environment of the enclosure, to ensure the critical equipment can be protected in any and all conditions over a long period of time, is not always as simple as putting the equipment into a sealed box. For example, a regular enclosure when placed into direct sun, will have a very significant heat rise even before the equipment is powered on, which can quickly lead to the equipment shutting down or even failing entirely.

Properly engineered outdoor enclosures for edge computing and similar applications will take into consideration the material of the enclosure for a long life, with shielding to mitigate radiant heat from the harsh summer sun. It may also include built-in self-cooling systems such as air-conditioning or high efficiency heat exchangers, and even the type and colour of external paint to be used can be important.

Eaton's solution

To meet the protection needs of edge computing technology deployed outdoors, Eaton has developed the ExoCab Outdoor Enclosure range of IP rated cabinets that can be used to protect vital computing, telecommunication and DC power or UPS equipment in challenging outdoor environments. Easily adapted to specific needs, these are cases that help protect remote networks and related equipment with minimal external support to ensure that they're up and running around the clock.

Constructed from marine-grade aluminium and stainless steel for long life in harsh environments, they come in a range of sizes supporting 18U – 42U of space. They typically come provided with an anti-graffiti paint finish as standard.

Cooling options

The basic **Standard** option provides a fully sealed cabinet in which Internal air is circulated by fans, and heat is dissipated through the walls. These cabinets are maintenance-free and are recommended for low power equipment (typically 200W heat load). In these cases, the internal temperature will be equal to or higher than ambient.

The **Vented** option allows for higher heat dissipation. They are also low cost and air filters offer some protection from contaminants, though the filters will need periodic cleaning and replacement. They are recommended for cleaner environments, and where the cabinet's internal temperature will be close to ambient.

For increased power needs (200–2500W heat load), the **Heat Exchanger** option provides full environmental protection. This option has a very low energy cost and near zero maintenance; however the internal temperature will be equal to or higher than ambient.

The **Air Conditioner** option provides a fully sealed cabinet with a stable internal temperature and high power dissipation rating. It can work in a wide range of ambient temperatures and offers a high degree of protection from environmental contaminants. Air-conditioned cabinets are typically utilised with highly sensitive customer equipment.

Made to order

Eaton ExoCab systems are engineered or configured to order based on specification. The selected solution will be based on environmental conditions at the site (temperature, dust, water, noise), internal equipment specifications (temperature range, lifetime, heat losses), mechanical restrictions (dimensions, rack space), and the electrical requirements (AC, DC, run time and power consumption).

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HOW TO SELECT THE BEST MANAGED DC LOAD DISTRIBUTION PANEL

Safe tower sites are vital for both the system, the techs who visit and the public. Proper selection is critical.

DC load distribution panels are an integral part of safe, efficient communications site designs. Multiple loads can be connected to allow a DC power supply to distribute power to up to 12 devices such as radios, repeaters, switches and links. When ICT pioneered the use of TCP/IP ethernet to add remote monitoring of each connected load, as well as the ability to power cycle each output remotely, it opened up a new range of benefits to tower site designers and managers by reducing the need to visit the site to troubleshoot, or power cycle a locked up device.

How to choose the right panel

There are a number of considerations before choosing the right load panel for any application. Total system current and individual load current needs; single- or dual-bus design; positive or negative ground (or both); and what type of overcurrent protection is required to protect not only the site, but worker safety as well.

Polarity

Most 12 and 24 VDC systems operate with a negative ground. If the entire system is the same polarity, then a single bus load panel may be the best choice. Some sites, however, will operate with only a positive ground; therefore, it is important to check to see if the load panel being considered supports the type of ground you need.

More frequently, sites are starting to mix DC voltages and polarities, such as when negative ground 12 VDC repeaters are used along with positive ground (-48 VDC) backhaul radios at the same site. In this case it is not only essential, but far more cost-effective, to utilise a dual bus load panel that can support two different voltages and polarities simultaneously.

Sizing

When designing a system, careful consideration must be given to not only the total system current the load panel is required to handle, but also the individual output load requirements.

Some panels may offer relatively high individual output load ratings, say 25 amps, but if the total system current rating is only 100 amps then only four outputs would be usable. Check to see if higher rated outputs can be provided. A 40-amp output is useful for higher loads, such as RF amplifiers; higher power requirements can be sourced suited to applications like LTE radios.

Safety

The main function of a fuse or circuit breaker is to protect conductors and equipment from damaging overcurrents and quickly de-energise faulted circuits minimising hazards to personnel. The absence of such a device could result in dangerous conditions, either as a result of heat build-up during an overload condition or to employees who are not able to visually confirm a circuit has been de-energised before working on it.

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Standard Electrical Safety guidelines from organisations like NFPA, IEEE, ANSI, NEMA and many building codes provide clear direction regarding safety of electrical device installation and maintenance, including:

- utilise fuses (or breakers) with blown fuse (or breaker) indication to minimise exposure to energised components while troubleshooting the circuit
- provide selective coordination (only the area where the fault occurs is shut off)
- provide a system that is safe to service and maintain.

OSHA 29 CFR 1910.334(b)(2) states: "Reclosing circuits after protective device operation — after a circuit is de-energised by a circuit protective device, the circuit may not be manually re-energised until it has been determined that the equipment and circuit can be safely re-energised."

Almost all DC load distribution panels in the market, including ICT's distribution series product line, utilise fuses or breakers in accordance with safety guidelines issued by these organisations.

When a fuse or circuit breaker trips, it is highly advisable to visit the site to determine what the source of the overcurrent event was, which is something that is not possible to do remotely.

Helios Power Solutions
www.heliosps.com.au

Selection considerations

FACTOR	IMPORTANCE	TYPES AVAILABLE	CHECK
Bus design	Single bus is ideal for applications that require all the devices use the same voltage and polarity. Dual bus allows for different voltages and polarities on the same panel.	single and dual	May offer only one model of single- or dual-bus design, with limitations on which polarity can be used.
Polarity	Sites can be designed to operate with a negative or positive ground, or sometimes both, depending on the type of equipment being installed.	single-bus models for + or - grounds dual-bus models for + or - polarities on same panel	May offer negative ground only, not suitable for 48 VDC systems.
Current rating	Both the individual output rating and total system rating must be considered when selecting a load distribution panel.	dual-bus models with individual output ratings up to 25 A	Peak output rating compared to system requirements.
Safety	Power systems design conventions include the use of mechanical safety devices such as fuses or circuit breakers to prevent a device failure from turning into a more serious problem such as overheating or burning of wire insulation. They also provide a level of safety for employees by ensuring circuits are de-energised before conducting any work on the circuits.	fuses or circuit breakers	Any incorporated mechanical failsafe device.
Added functionality	When considering choice of panel, determine what additional features and benefits are provided.	digital inputs to connect site monitoring sensors	

Server-grade PXIe controller

Adlink Technology has released its first server-grade PXIe controller, the PXIe-3988. Combining Intel Core processors and up to 64 GB of DDR4 2400 MHz memory, the PXIe-3988 employs multiple computing engines on a single processor and can run four independent tasks simultaneously.

Specifically designed for PXI Express-based testing systems, the PXIe-3988 provides a platform for a variety of testing and measurement applications for compute-intensive workloads. Distributing processing loads across six Xeon cores reduces processing times for intensive signal and data applications such as radiofrequency tests and hardware-in-the-loop simulations.

With an auto-configured PCIe switch, the PXIe-3988 can support four links x4 or two links x8 PXI Express link capability, with maximum system throughput up to 16 GBps by PCI Express 3.0 bus. Features include: interface flexibility for hybrid PXI-based testing systems provided by two connectors, dual USB 3.0 connections for high-speed peripheral devices, dual gigabit ethernet ports, four USB 2.0 ports for peripheral devices and USB instrument control, and a micro-D GPIB connector for GPIB instrument connection.

The PXIe-3988 Express embedded controller delivers multiple benefits for test and measurement applications in a standard PXI chassis.

ADLINK Technology Inc
www.adlinktech.com

Rack enclosures

METCASE is now able to make a 28″ deep custom version of its Combimet 19″ rack enclosures for Rolec OKW. This is in addition to its 24″ versions as well. Applications include networking and communications, industrial computers, sound and studio electronics, laboratory instruments and control systems.

The 28″ (711.2 mm) deep custom Combimet case is designed to fit 1000 mm deep racks. Standard enclosures have removable top, base and rear panels, offering access to the PCBs. The top and base can be specified as either vented or unvented.

Other features include ergonomic front panel handles and mounting holes for PCBs and chassis. M4 earth studs on all components provide electrical continuity.

The 28″ cases are available in all heights from 1U to 6U and in any colour. Cases are supplied fully assembled.

All rack cases can be supplied fully customised. Services include CNC punching, folding, milling, drilling and tapping; fixings and inserts; painting and finishing, digital printing of legends and logos.

ROLEC OKW Australia New Zealand P/L
www.metcase.com.au

O-RAN testing

Viavi is collaborating with technology supplier Picocom to provide a complete test solution for validation of Open RAN base station components, including: chips, physical layers and protocol stack software for small cell 5G networks compliant with O-RAN standards.

As an Open RAN baseband semiconductor and software specialist, Picocom is actively involved with the O-RAN Alliance and the Small Cell Forum (SCF) to advance Open RAN standards for intelligent, manageable and controllable small cell base stations, meeting the differentiated needs of various markets. The Viavi TM500 network tester is capable of measuring the complete performance of the 5G network over multiple interfaces, including open fronthaul and RF through to the packet core.

Picocom selected the TM500 for use in the lab to create a precise test environment, including comprehensive feature interactions, simulated RF and accurate replications of real-world user behaviour profiles, to ensure performance of small cell base stations in O-RAN networks.

VIAVI Solutions Inc
www.viavisolutions.com.au

Talkpod
N5 SMART SERIES

Talkpod

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

The Talkpod N5 Smart Series include Android 9.0, Open API, Google Play, Dual SIM, Man Down/Gyro, Vibration Feedback, Bluetooth 4.0/BLE, Wi-Fi 802.11 B/G/N, GPS, front & rear camera (N59 only), crystal clear audio, all Australian 3G/4G bands including Band 28, and an IP66/67 waterproof rating.

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

Ultraportable spectrum analysers up to 170 GHz

Anritsu's Spectrum Master MS276xA family of ultraportable spectrum analysers provide continuous coverage to 170 GHz. The spectrum analysers are pocket-sized yet big on performance, with good dynamic range, sweep speed and amplitude accuracy, the company claims. The ultraportable size of the instruments enables a direct connection to almost any DUT, eliminating the need for lossy, expensive cables. This should enable the user to more efficiently advance their technology development and reduce time to market.

Utilising Anritsu's patented nonlinear transmission line (NLTL) technology provides >100 dB dynamic range. Measurements include channel power, adjacent channel power and occupied bandwidth with support for up to six traces, three trace detectors and 12 markers. The 145 and 170 GHz models are said to be the world's first handheld, millimetre-wave spectrum analysers to provide broadband, continuous coverage from 9 kHz to 170 GHz and break through the 110 GHz barrier. Having frequency coverage in to the higher bands enables research and development in the entire D band spectrum as well as advanced millimetre-wave applications like radio astronomy, automotive radar, antenna beam pattern testing and more.

The Spectrum Master MS276xA family are all USB-powered and controlled from a Windows-based PC, laptop or tablet, making them flexible for use in the lab, on the manufacturing floor or even in the field.

Anritsu Pty Ltd
www.anritsu.com

2-in-1 tablet

Zebra's ET80/ET85 rugged 2-in-1 tablets are designed for use in public safety, utilities, critical field service and manufacturing. They feature a thin, flexible design with a friction-hinged keyboard, optional built-in barcode scanner for data capture and a touch screen useable with gloves and when wet.

The tablets are tested to US military standard and are drop, dust and waterproof. They also have IP65 certification with ports open and feature a fan-less design to avoid spreading contaminants.

They support 5G, 4G networks and Wi-Fi 6E for fast WLAN access. The chip is an Intel 11th generation CPU, with three USB ports and an expansion connector and three antenna passthroughs for GPS and wireless.

The tablets come with a range of software, including push-to-talk and battery management applications to improve productivity, plus accessories including shoulder and hand straps, extendable hard handle and auxiliary batteries with hot-swap capabilities.

They also offer a universal docking solution that has nine additional ports and customisable security features including facial recognition, fingerprint reading and insertable CAC readers.

Zebra Technologies
www.zebra.com

Command centre software

Motorola Solutions has launched its CommandCentral suite. A cloud-native, end-to-end command centre software suite that unifies the flow of data as an incident unfolds to provide clarity for mission-critical response and decision making.

Developed from customer-based research, the suite is built on a unified data platform that collects all agency data across emergency call handling, dispatch, video analytics, field reports, records, evidence and community engagement; then makes the data instantly actionable through assisted intelligence and a 360-degree view of the incident.

There are a series of necessary steps within the public safety workflow — these include routing calls, dispatching police, fire or emergency medical services, intaking data and managing post-incident documentation, investigations, analysis and prosecution. Traditionally, each part of this workflow operated within its own application, resulting in information silos that created barriers to information sharing and delayed case closure. CommandCentral eliminates these silos by integrating applications through a unified data platform so that as information is collected, it is immediately available across all applications, saving time and eliminating the risk of human error.

Users across the workflow can securely view and add relevant information to the virtual, centralised incident from any location and with any form of data. Information is accessible and shared up- and down-stream in real time.

Motorola Solutions Australia Pty Ltd
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DIGITALISATION COVERS THE CHALLENGES FACED BY
MINING COMMUNICATIONS

The mining and metals industry faces a number of challenges including fluctuating demand for ores and metals, excess capacity and increased competition from competing materials — leading to weaker prices. The most accessible, high-quality deposits are already being exploited, forcing the industry to develop lower-quality ores in more remote regions.

Mining faces more stringent environmental and safety regulations and the requirement to engage more with local communities. The industry also suffers from an ageing workforce, but is finding it hard to recruit younger people with modern technological skills. All of these factors are driving up costs.

Development and value trends

To meet these challenges, mining companies must reduce operating costs and boost efficiency, productivity and safety if they are to achieve profitability. Increased digitalisation of the industry is one way to do this.

Greater investment in automation, robotics, in-pit mobility solutions, data-centric analytics and the creation of a digitally enabled workforce is key. Digitally enabled hardware tools are being deployed to perform or improve activities that have traditionally been carried out manually or with human-controlled machinery.

But too often, automated processes, IT layers, communication systems and monitoring regimes operate in silos. To achieve the real benefits of digitalisation, the industry needs to become an integrated enterprise using connected platforms supported by next-generation analytics.

Field teams can be empowered by using connected audio, video and data mobility solutions, along with virtual and augmented reality applications. By leveraging algorithms and artificial intelligence to process data from telemetry and SCADA systems, mining companies can exploit big data analytics. This information will improve real-time situational awareness and decision-making, as well as providing valuable data to shape future projections and strategies.

How digital communication solutions benefit the mining industry

The Hytera Intelligent Communications Solution for Mining can help the industry realise the benefits of digitisation. It provides a transportable, end-to-end broadband solution, including terminals, network, data centre and command and dispatch centre. It is capable of supporting automation, data analytics and voice, video, data and M2M/IoT applications used in the mining industry.

The 3GPP-compliant 4G/5G solution provides a wireless broadband network, including radio access network (RAN), backhaul, LTE core, device and network management. Multiple services can be run simultaneously over the high throughput and resilient 4/5G network, including: mission-critical push-to-X (voice/data/video); real-time video streaming; telemetry/SCADA, plus M2M/IoT sensor monitoring. Low latency transmission rates (<100 ms) enable precise control of remote automated operations.

The various technologies can all be managed using one unified command and visualised dispatch centre and a remote control centre, which receive and distribute real-time information from and to, the field operations. The network infrastructure also supports intelligent data analytics and artificial intelligence applications.

Hytera's communications solutions support the mining industry

Hytera's solutions have been applied in the mining industry where they have helped customers solve communication problems. For example, JSC AK Altynalmas has deployed a Hytera Hytalk (PoC) LTE platform and terminals in Kazakhstan, while the Letpadaung Copper Mine in Myanmar is using an integrated Hytera DMR and LTE solution.

Hytera's Intelligent Communications Solution for Mining provides instant voice, video and data communications to deliver team members the information needed to carry out their work. Hytera's communications solution supports an ecosystem of real-time intelligence, which enables teams to work more efficiently, productively and safely.

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

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PUTTING EMERGENCY COMMS UP IN THE AIR

TRIALLING USE OF DRONES TO EXPAND CRITICAL COMMS IN EMERGENCY AREAS

Maxwell Maurice, physicist and electronics engineer at the US National Institute of Standards and Technology.

The US is testing to see if drones can be quickly deployed to expand critical comms when emergency situations arise.

Working outside is always a highlight for me at the National Institute of Standards and Technology (NIST). Last month I drove out to Fort Collins, Colorado, at 5 in the morning to conduct some measurements for my research on broadband for public safety communications and applications.

My colleague, Roger Blalock, and I set up several tripods with smartphones that morning around Christman Airfield, a test airport owned by Colorado State University.

It was cold and tedious, but at the same time we were both more than happy to be there. The smartphones measured connectivity data from an LTE cellular transmitter attached to a drone flying overhead. It is a really cool idea for bringing broadband service to first responders in the field, and I hope the concept takes off (no pun intended).

The premise of my research is that because the public safety community has started to adopt new broadband-reliant technologies such as smartphone applications, there is now a need to make sure these

> ## "
> IT'S A REALLY COOL IDEA FOR BRINGING BROADBAND SERVICE TO FIRST RESPONDERS IN THE FIELD, AND I HOPE THE CONCEPT TAKES OFF (NO PUN INTENDED).

technologies work outside of conventional coverage areas. Whether they are in a remote mountain valley fighting a wildfire or doing search and rescue just after a hurricane, first responders need to be able to use their new smartphone-based tools.

These mobile LTE networks are basically small boxes with a couple of antennas sticking out that, once turned on, put four bars on your smartphone, giving you the ability to communicate with anyone else who is connected. The goal is not to reach back to the internet, but to get local communications going. This includes communications with application services such as mapping tools or video streaming that help first responders carry out their mission.

Our research directly aims at making this concept more viable and understood so that public safety agencies could start their own aerial communications programs. We can describe best practices and expecta-tions so that the public safety community does not have to start from scratch. At the same time, we can provide industry and academic groups with the requirements of, and feedback from, the public safety community so they can make better and better products for first responders to use.

The picture included shows one of these mobile LTE systems mounted to the under-side of a multirotor drone. It is hard to see, but the antennas are fixed to the landing gear of the drone so that once the landing gear is retracted, they point directly towards the ground. This photo was from my second trip to Christman Airfield, which makes this about the sixth time I have measured this system outside.

Prior to this experiment, I had to drive four hours each way to Gypsum, Colorado, to take measurements. Our group had authorisation to broadcast in Gypsum not too long ago, because commercial network coverage is sparse, so there would be a low amount of interference.

Thankfully, we reached an agreement with (the US) FirstNet and AT&T to do a couple one-off experiments closer to our lab in Fort Collins, though I do miss the fun of long drives on I-70 in the morn-ing. I remember on one occasion I went down to Gypsum for some flight testing at a private airfield next to town. The plan was to fly a fixed-wing drone there to observe connectivity from an orbiting LTE base station. Unfortunately, the drone never took off, as the gravel runway broke the propellers. Although the flight was a bust, we were still able to collect some good ground measurements that weekend.

Prior to the disastrous flight day, I had obtained permission from the landowners to set up a tent next to the airfield so that I could camp out the night before and wake up bright and early for testing. I never would have thought that studying electrical engineering would give me the chance to camp in the mountains for my research.

I have been with NIST for over four years now, working on the Highly Mobile Deployed Networks project, a project sponsored by the Department of Homeland

Fixed-wing drone with mobile LTE network.
Credit: M Maurice/NIST.

Security (DHS) Science and Technology Directorate. I started out at NIST as an undergraduate intern from the University of Colorado Boulder before becoming a full-time employee. I am currently studying electrical engineering as a master's student at CU with a focus in radio frequency propagation and communication systems. My time here at NIST has been spent investigating this same topic, mobile broadband for public safety, and I am still very happy to continue with it.

Our group at NIST has always been focused on helping the public safety community and this research area is very pertinent to today's public safety needs. I have talked at length with people in public safety about how, at the end of the day, they just want something that works; connected smartphones are always on the top of the list.

How do we get them wireless coverage? That is our goal and that is why we are taking these measurements. We want to answer that question and provide as much technical advice as we can.

The project has not been without some setbacks, from drones crashing, to equipment overheating, to dead phones. Lots of trial and error has been put into this work, along with lots of time spent coming up with the best way to carry out our research. I remember a dark day in Gypsum when the drone crashed right at takeoff after a connector on one of the spectrum analysers snapped off. On top of that, the other spectrum analyser started to malfunction, leaving us with no other option but to pack up and go home with nothing.

I do not look forward to more days like that, but sometimes we need them to help inform and improve our processes.

Phone tripod measurement setup.
Credit: M. Maurice/NIST

Every setback led to an improvement or a new idea—a new solution that made the following experiment better. For example, we started using smartphones scattered throughout the area to measure the systems coverage area instead of spectrum analysers, which are difficult to use in the field (we learned that the hard way lugging these systems around in the heat). It turned out that we also get better, more direct data on what the system can provide in terms of coverage to a smartphone by using smartphones to do the measurements.

Although it has not always been easy to collect the data we needed for this work, we have made really good progress. Most of our work is delivered to DHS internally, but we have shared our work every year during the NIST Public Safety Communications Research Division's (PSCR) annual stakeholder meeting. We have talked with several public safety, industry and academic groups about our work, helping them guide their goals. Today, I am still parsing through some of our aerial measurement data to get it ready for a NIST publication that I hope to release soon. I am reminded after writing this article it's hardly ever easy to accomplish something worthwhile, but that it's always worth it.

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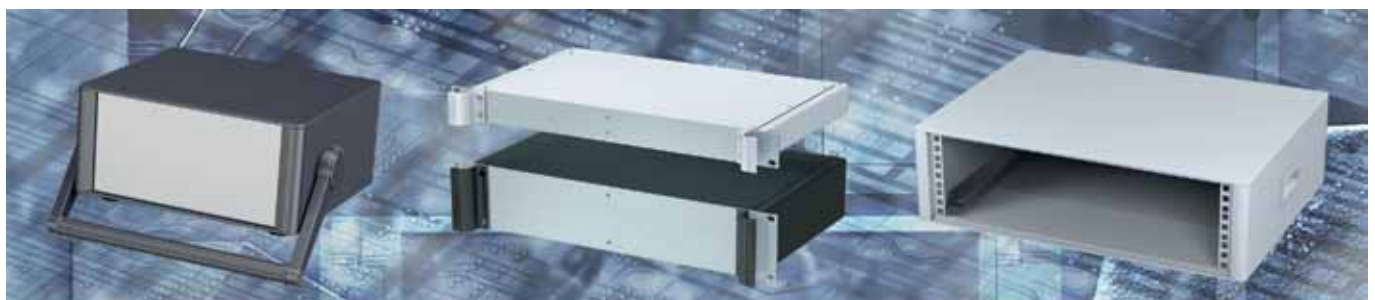
Aussie Broadband customers hit $200,000 milestone for charity

Customers of telecoms supplier Aussie Broadband have raised $200,000 through the Telco Together Foundation's Small Change Big Change program, helping more than 19,000 young Australians. Customers are given the option to add a $1 donation to their monthly bill to help young Australians in need.

The telco joined the Small Change Big Change program in July 2019. All raised donations go towards assisting in building resilient young Australians through the work of small, innovative charities ReachOut, Red Dust and Beacon Foundation. Approximately 19,149 young Australians have been given access to a range of education and engagement programs that promote good mental health.

Approximately 555 young Australians who are living in low socio-economic status (SES) areas have been given the opportunity to connect, ask questions and gain insights from industry mentors via an online career awareness program. Approximately

890 young Australians who are living in remote Indigenous communities have been given access to positive role models who deliver an engaging school-based health and wellbeing program that focuses on nutrition, physical activity, aspiration, resilience, identity and cultural strength. Approximately 17,704 young Australians who are living with a mental health challenge have been given access to a wide range of responsive and effective online mental health resources.

Aussie Broadband Managing Director Phillip Britt noted: "Even more important to us is the impact that Small Change Big Change is having on the lives of young people across Australia. Building resilience for young Australians through mental health support, Indigenous support and career mentoring is — let's be frank — the bit that floats our boat.

"We're really looking forward to seeing what Small Change Big Change can achieve for young Australians next."

Telco Together Executive Director Renee Bowker added that the program also benefits the broader community. "The organisations we support are charities but they're Australian businesses too, and these contributions have helped support over 60 staff who can continue to provide for their families and do the incredible work they do," Renee said.

Telco Together General Manager Warren Sainsbury said the program is making a difference in the lives of young Australians. "We can only do this through the generosity of partners like Aussie Broadband and their amazing customers. "Small Change Big Change is growing, thanks to their support. This growth means that we can reach more young people and look at future opportunities to make an even greater impact," he said.

"Aussie Broadband along with some other amazing telco companies are really getting behind this program and I can't wait to provide more support for the future of our country — young Australians."

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