NOV/DEC 2017 Vol.5 No.1

critical comms

PUBLIC SAFETY | UTILITIES | MINING | TRANSPORT | DEFENCE

PP100007393

The New KENWOOD NX-3000srs Multi-Protocol

Does your choice of radio test equipment hold water?

Poor specifications and inadequate performance can put holes in your coverage.

Don't Risk It!

Insist on Cobham 8800SX or 3920B for testing your network
Find out more today from Vicom

Visit Vicom at Comms Connect Stand 129

or

1300 360 251 www.vicom.com.au

Vicom

Inside

Nov/Dec 2017

ON THE COVER

The two-way radio environment in retail and industry is often a mixture of digital and analog FM, and many companies are contemplating which digital radio format to adopt in the future. The NX-3000 Series from JVCKENWOOD offers futureproof flexibility with support for both NXDN and DMR digital air interfaces, as well as FM analog, all in a single radio.

The NXDN protocol features excellent spectrum efficiency, wide coverage and high scalability, and provides expansion capabilities across a work site, across a state or even an entire country. In addition to NXDN Conventional, NXDN Type-C Trunking and Gen 2 Trunking offer enhanced features, flexibility and performance, such as the ability to link up to 1000 sites. DMR is an excellent, cost-effective solution for simple systems. The two-slot TDMA can obtain two talk paths within 12.5 kHz bandwidth, effectively doubling the capacity for a single licence and/or repeater.

The desired digital protocol can be selected at will, giving you the freedom to migrate to digital or expand your digital environment further at your own pace. The NX-3000 also offers the unique capability to add or delete functions at will, such as voice recording, encryption and OTAP. This, coupled with out-of-the-box features such as IP67, Bluetooth and GPS, make the Series one of the toughest and most flexible mid-tier radio series available on the market today.

For more information and demonstrations, visit JVCKENWOOD on stand 68 at Comms Connect Melbourne.

JVCKENWOOD Australia Pty Ltd
www.kenwood.com.au

Transmit

Interference has always been a problem for radio communications. But with the proliferation of intentional and unintentional radiators in all sorts of bands, and with new technologies such as 5G (and the thousands of picocells it will bring) just around the corner, diagnosing and identifying interferers is becoming more vital than ever. In this issue we cover both the technical side of cutting-edge interference analysis (see 'The evolution of analysis'), as well as the regulatory environment (see 'Diagnosis: Interference'). Let's hope both the technology and regulators can keep on top of this ever-growing problem.

Critical Comms would like to congratulate ARCIA on the occasion of its 10th anniversary. Every industry needs a peak group to lead discussion and debate, focus minds on the important issues and provide a united voice when dealing with governments and other bodies. ARCIA certainly accomplishes all of that and more. All of the hard-working people who have served on the committee, or helped in other ways, should be very proud of what they have achieved over the past 10 years. The anniversary will be celebrated in style at ARCIA's annual dinner and awards night in November, parallel with the Comms Connect Melbourne conference and exhibition.

Speaking of Comms Connect, it is now just days away, and this year will feature an even stronger-than-normal international component. If you want to hear firsthand about critical communications developments in various overseas jurisdictions, make sure you register today to reserve your place. And don't forget that if you can't make it to any of the speaker sessions, there are free exhibition passes available — check out the melbourne.comms-connect.com.au website for details. See you there!

Jonathan Nally, Editor
jnally@wfmedia.com.au

Calendar

November 2017

Comms Connect Melbourne
21–23 November
Melbourne Convention & Exhibition Centre
melbourne.comms-connect.com.au

PMRExpo 2017
28–30 November
Koelnmesse, Cologne, Germany
pmrexpo.de/en/pmrexpo

December 2017

Critical Control Rooms
5–6 December
Kempinski Hotel, Geneva, Switzerland
tmt.knect365.com/critical-control-rooms

February 2018

Critical Communications Europe 2018
8–9 February
Bella Center, Copenhagen, Denmark
tmt.knect365.com/critical-communications-europe

May 2018

Comms Connect Auckland
2–3 May
SKYCITY Auckland
comms-connect.co.nz

Critical Communications World 2018
15–17 May
Messe Berlin ExpoCenter City
critical-communications-world.com

June 2018

Mission Critical Technologies 2018
13–14 June
Excel, London
tmt.knect365.com/mission-critical-technologies

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

wfmedia
connecting industry

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

Head Office
Cnr. Fox Valley Road & Kiogle Street, (Locked Bag 1289), Wahroonga NSW 2076 Australia
Ph +61 2 9487 2700 Fax +61 2 9489 1265

Editor: Jonathan Nally
cc@wfmedia.com.au

Publishing Director/MD: Geoff Hird

Art Director/Production Manager:
Julie Wright

Art/Production:
Colleen Sam, Wendy Blume

Circulation: Dianna Alberry, Sue Lavery
circulation@wfmedia.com.au

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

Advertising Sales

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

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

Gemma Burr Ph 0413 220 178
gburr@wfmedia.com.au

Print Post Approved PP100007393
ISSN No. 2202-882X
Printed and bound by SOS Print + Media
+61 2 9549 2119

Subscriptions: For unregistered readers, price on application

HARRIS®

TECHNOLOGY TO CONNECT,
INFORM AND PROTECT™

THE FUTURE OF INTEGRATED COMMUNICATIONS IS CLEAR

Harris' Australian made Switch***plusIP*** system provides control room operators with streamlined access to all of their communications assets. The integrated system gives operators simultaneous lines of crystal clear audio to keep in touch with field crews and operating staff irrespective of technology or brand.

Our promise is simple: to connect, inform and protect.

harris.com | #harriscorp

DIAGNOSIS: INTERFERENCE

Chris Fosten, Manager, Communications Infrastructure, ACMA

Interference diagnosis and management is all in a day's work for the ACMA and its expert inspectors.

The ACMA plays an important role in managing Australia's radiofrequency spectrum. For the general public, this means making sure radiocommunications and broadcasting services work without being affected by interference — we all want to use our smartphones and enjoy TV and radio services uninterrupted. For industry and government, it can mean the difference between providing a reliable mission-critical communications service or one that is compromised by unauthorised and harmful transmissions or interference.

Managing interference can be done from behind a desk in some cases, but more often diagnosis and resolution takes ACMA officers into the field and to all parts of Australia — from our major cities to coastal and outback communities. ACMA field staff, who are technically qualified and appointed as inspectors, respond to complaints of interference and work hard to make sure everyone gets the most out of Australia's radiofrequency spectrum.

A typical day in the field

A mobile phone carrier reported to the ACMA that one of its base stations near Flemington, close to Melbourne's CBD, was experiencing interference. An ACMA officer travelled to the area to find the source and stop the interference.

The information pointed to a transmitter located in a housing area close to the Flemington Racecourse. The ACMA officer scoured the area using a spectrum analyser to gauge the signal strength and find the location of the transmitter. The high-density housing complicated the search because it caused high signal reflections, but the officer used his expertise to quickly narrow the search down to a couple of houses.

He then used his 800–900 MHz directional Yagi antenna to pinpoint the exact location of the device on the second floor of a townhouse, near an external wall. With the cooperation of the resident, the inspector quickly identified a malfunctioning indoor TV antenna booster as the source of the interference. This type of device should not transmit radio signals in the mobile phone band.

The inspector explained to the resident why the device couldn't be used and advised on how TV reception in the townhouse could be improved. The device was disconnected and an advice notice issued to reinforce the information he had provided.

With the booster out of action, the carrier's mobile network was restored to its normal performance.

Images courtesy ACMA.

While ACMA inspectors are travelling around, they normally have a spectrum analyser running in the vehicle. This picks up any unusual radiocommunications activity. In the Melbourne suburb of East Brunswick, the analyser identified interference in the 1920–1930 MHz frequency range — the frequency used for mobile phone services in Australia.

Stopping his vehicle, the inspector used his 1900–2100 MHz directional Yagi antenna and spectrum analyser to determine the direction of the signal. He soon narrowed it down to a nearby commercial multistorey building and tracked the signal to a first-floor business.

After introducing himself and explaining the reason for his visit, the inspector searched for the source of the interference. Again, the antenna and spectrum analyser came into play, zeroing in on the interfering signal and identifying the device as a wireless VoIP server. The server was part of the business's telecommunications set-up and, while other pieces of their phone equipment were appropriately labelled with the relevant compliance mark, this device was not.

The wireless VoIP server wasn't licensed to operate under the carrier's spectrum licence or the Cordless Communications Class License, which would generally authorise devices of this kind. In this case, this licence did not apply because it was operating on frequencies outside of the allocated band.

The device was disconnected and the inspector clearly explained why the device could not be used in Australia. He also issued a warning notice for the unlicensed operation of a radiocommunications device.

> UNDER CURRENT ARRANGEMENTS, IT IS POSSIBLE THAT DEMAND FOR INTERFERENCE DIAGNOSIS SERVICES COULD BECOME GREATER THAN THE ACMA'S ABILITY TO SUPPLY THOSE SERVICES.

The lowdown on spectrum reform

Australia's spectrum is managed using a framework that was developed in 1992. In 2014, the Department of Communications and the Arts (DoCA) instigated a Spectrum Review to look at whether changes are needed to cope with the increase in demand for spectrum and changes in technology, markets and consumer preferences. The review report was released by the Minister for Communications in May 2015.

In August 2015, the government announced that it had accepted all the recommendations of the Spectrum Review and would replace the current legislative arrangements with new legislation that removes prescriptive processes and streamlines licensing.

The exposure draft of the Radiocommunications Bill 2017 released by DoCA in May 2017 aims to simplify the legislative arrangements relating to resolving interference disputes. The Bill provides for:

- a discretionary power for the ACMA to make interference management guidelines (the guidelines) regarding procedures for resolving interference complaints;
- a discretionary power for the ACMA to investigate interference complaints and for it to inform the complainant of the results of the investigation;
- the provision by the ACMA of an alternative dispute resolution service directed towards resolving the interference complaint. The ACMA may also refer interference complainants to one or more providers of dispute resolution services.

Part 5 of the Bill also provides for a right of action available to licensees in the Federal Court.

Looking ahead

While new legislation is still being developed, the government has clearly set out its policy objectives. In other countries, some of the interference management services that the ACMA provides are supplied by the private sector — for example, a German company that operates around the world and provides 'interference hunting' services in several countries including the US. Faster response times and overall cost-effectiveness are cited as drivers for mobile carriers using its services in the US rather than seeking recourse to the regulator.

The ACMA expects that demand for interference diagnosis services is likely to continue to grow. Under current arrangements, it is possible that demand for interference diagnosis services could become greater than the ACMA's ability to supply those services to an acceptable quality or in an acceptable time frame. Demand for ACMA interference diagnosis services could be managed by further rationing services through established case prioritisation processes, charging for interference diagnosis services or a combination of the two.

Consistent with the *Radiocommunications Act 1992*, the ACMA is proposing to clarify and refine its interference diagnosis role within the interference management framework in accordance with Recommendation 1(e) of the Spectrum Review — allowing licensees to resolve interference and disputes — including:

- encouraging licensees to access alternative dispute resolution;
- requiring the ACMA to develop and publish guidelines on its dispute management processes;
- expanding rights of licensees to undertake civil proceedings.

If adopted, this type of approach would see a transition from the ACMA being the major provider of interference diagnosis services to an interference management framework that increasingly enables and facilitates the provision of interference diagnosis services by third parties. There would be additional incentives for parties to an interference event to independently resolve the issue when the level of harm and seriousness did not warrant regulatory intervention.

Getting involved

It's important that regulatory decisions are informed by evidence and take into account the views of those with an interest in the outcome — our stakeholders. For instance, this year's RadComms event included an interference management workshop, which enabled participants to be involved in the development of new arrangements. The ACMA welcomes feedback and input on radiofrequency spectrum interference and other matters via its 'Interference investigation service' web page at acma.gov.au/theACMA/ACMAi/Complaints/Interference-and-reception-complaints/interference-investigation-service-acm.

Enabling Wireless Everywhere

WirelessTech commits to provide latest and innovative wireless products, networking technologies and tailored services in pursuit of supporting Australian System Integrators.

- Licensed and Unlicensed Wireless Point-to-Point
- Licensed and Unlicensed Wireless Point-to-Multipoint
- Wireless Mesh Technology
- Wireless Hotspot and Outdoor Wi-Fi
- Multi-WAN Load Balance Routers with VPN Bandwidth Bonding
- Multi-Cellular Mobile Routers
- IP Cameras, NVR, Video Encoders & Decoders
- Enterprise Switches, IP SAN & NAS Storage
- Antennas, POEs, Lightning Surge Protectors
- Customised Network and RF Cable Assemblies
- Touch Monitors

Public Safety

Service Provider

Industrial/Mining

Transportation

WirelessTech

sales@wirelesstech.com.au
www.wirelesstech.com.au
+61 2 8741 5080

THE EVOLUTION OF ANALYSIS

Jonathan Nally

Cutting-edge, real-time spectrum analysis is leading a revolution in the ability to identify sources of interference.

It is said that necessity is the mother of invention. Nowhere is that more true than in the field of radiocommunications and, in particular, spectrum analysis for diagnosing interference problems. With intentional and unintentional radiating devices proliferating in more and higher bands, and with 5G just around the corner, the need for spectrum analysis has never been more acute (see 'Diagnosis: interference' in this issue).

Intentional radiators that have active transmitters include: broadcast radio and television, cellular, satellite, radar, mobile radio, WLAN and cordless phones. Unintentional radiators that use RF but not for radio transmission include: microwave ovens, radio receivers, industrial heaters and MRI equipment. And incidental radiators that do not use RF include: switching power supplies, clock and control signals, ignition motors and fluorescent and LED lighting.

Field spectrum analysers have been available for well over a decade now and have helped in the vast majority of situations where interference has been experienced. But initially they were large, cumbersome beasts.

"In the early 1990s when I was doing fieldwork, you took a full-sized bench instrument out into the field and you had a power inverter in the car or van," said Steve Karandais, general manager of Keysight Technologies Australia. "You had to lug it all around or you would try to do some recording techniques.

"When you're out there in the real world and they're saying, 'Look, we've got interference out here and we need to solve this problem quickly,' it was always problematic having a full-size spectrum analyser."

Portable or handheld spectrum analysers have made life much easier, and over the last five years they've become a lot more capable as a huge increase in processing power has seen the capabilities of high-end, research-grade, benchtop spectrum analysers make their way into handhelds.

A new breed

According to Karandais, standard swept-tuned and fast Fourier transform (FFT) spectrum analysers have Achilles heels that make them miss many kinds of interference.

"What's happened in more recent years is that the overcrowding of the spectrum and the proliferation of electronic transmitters that are unintentional transmitters... has made the space very, very crowded," added Karandais. "Sometimes the interference that's occurring is sitting underneath the bandwidth of the signal that would normally be there, [so] we can't detect it. Or, the signals ›

MARKET LEADERS IN 2WAY RADIO ACCESSORIES

CRS Accessories stock a comprehensive range of high quality 2way radio accessories at competitive prices.
Visit www.crsaccessories.com.au for more information.

Antennas

Converters

Vehicle Wireless PTT

Switch Mode Power Supply

Batteries

Earpieces

GPS Antenna/ Receiver

Lightweight and Heavy Duty Headsets

Bone Conduction Earpieces

Wireless PTT Surveillance

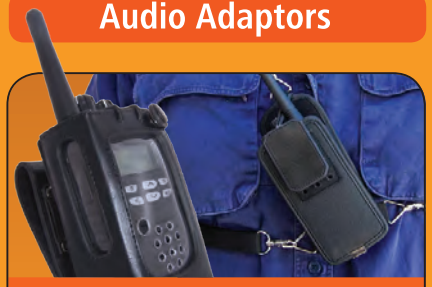
GPS Speaker Microphones

PMR & LMR Microphones

Belt Clips

Multibay Chargers

Audio Adaptors



Carry Cases & Chest Harnesses

Throat Microphone

Helmet Kits

2-WAY ACCESSORIES TO SUIT ALL BRANDS AND MODELS

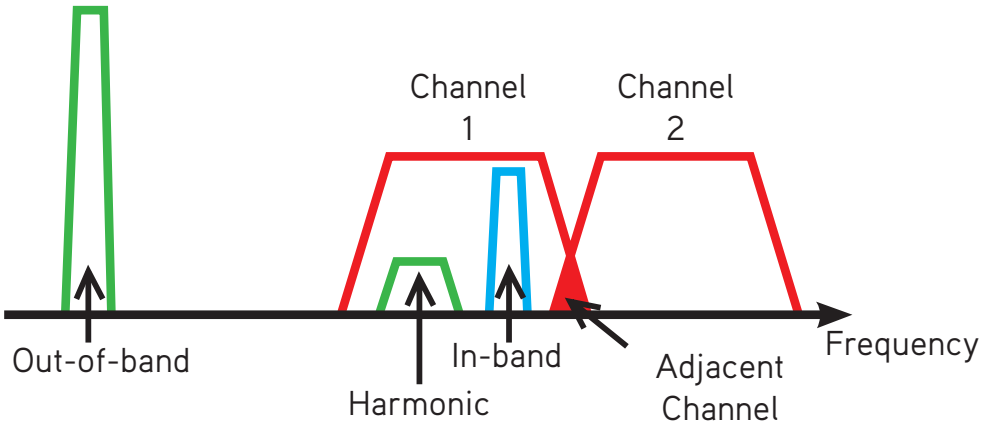
HYT sepura tait KENWOOD ICOM Hytera
Uniden Vertex Standard MOTOROLA simoco GME

AUSTRALIAN OWNED AND OPERATED

Phone 1300 307 334
www.crsaccessories.com.au

CRS ACCESSORIES

> IN THE OLD DAYS WITH A NORMAL SPECTRUM ANALYSER, PEOPLE WOULD JUST WALK AWAY AND SAY 'I CAN'T SEE ANYTHING USEFUL'. — STEVE KARANDAIS, KEYSIGHT TECHNOLOGIES AUSTRALIA



Real-time spectrum analysis can hunt down hard-to-find in-band signals.

that are there are for such short spans that as we try to use a normal spectrum analyser... we don't see the interferer because they're there for shorter periods of time than our sweep time allows us to capture.

"With a swept tuned analyser, unless you happen to coincide with your interferer being on at the time that you're sweeping, you'll lose it," added Karandais. "And with a normal FFT analyser, there's lost information while it's calculating and then displaying data, [before] it starts amassing data again."

The new breed of real-time spectrum analysers, such as Keysight's FieldFox, are still FFT based but the bandwidths are much larger — 10 MHz as opposed to the 100 KHz that was normal in the past — and they have multiple FFT engines running at the same time to provide overlapping measurements.

"What we do is we run three FFT engines built into 11 ASICs inside the FieldFox," said Karandais. "This is processing power and memory speed. We can get a [measurement] in and out of memory, process it and display it really, really fast."

Solving the unsolvable

According to Karandais, until recently many interference problems hadn't been solvable. Either the source of the interference could not be found or the interference itself could not be isolated within the bands. "All we could do was fiddle with enough things until we'd either fixed it or it became less of an issue," he said.

"Sometimes they've had to move and abandon whole bits of spectrum or they've had to increase amplitudes to levels they would prefer not to have to use because of power requirements and heat," he added. "They've had to overcome the interference in some way without actually being able to always identify what's going on."

But with real-time spectrum analysis, "you can say, 'All right, I have a signal at this frequency, at this bandwidth, and now I can look around and say, Who else is in this spectrum? Who else has licensing here? What else could this possibly be?'

"In the old days with a normal spectrum analyser, people would just walk away and say 'I can't see anything useful', whereas now, within a minute of setting up, you'll be able to say, 'this area is clear', or 'there's my problem'," he said.

A growing need

What has changed everything is the ability to put vast processing power and fast memory into smaller packages.

"With products like these, you can take the technology of a very large, really well specified major spectrum analyser, take some of those algorithms and technology and press it into an ASIC," he said. "With exactly the same methodology, the same measurement sciences behind it, but you're putting it much, much closer to the coalface. And this is what's really changing the way that we can track down these interferers.

"And we need to stay on top of this because of the level of complexity of electronics and the environment. Especially when 5G comes along, we're going to have picocells all over the place," he added. "They'll be operating at a frequency that's very, very high, which means that the attenuation will be extreme, [so] they'll have to have one every 50 to 100 metres."

When LTE and 5G sites are spread all across town and cities, plus Wi-Fi, other wireless bands, and automotive radars and electronics, "People will have a really difficult time figuring out who's interfering with whom. So we're going to need these spectrum analysis tools," he said.

GME COMMERCIAL

PORTABLE REPEATER SYSTEM

when every second counts

Emergency Response Fast Deployment Communications Network

1300 463 463 gme.net.au

CR017B

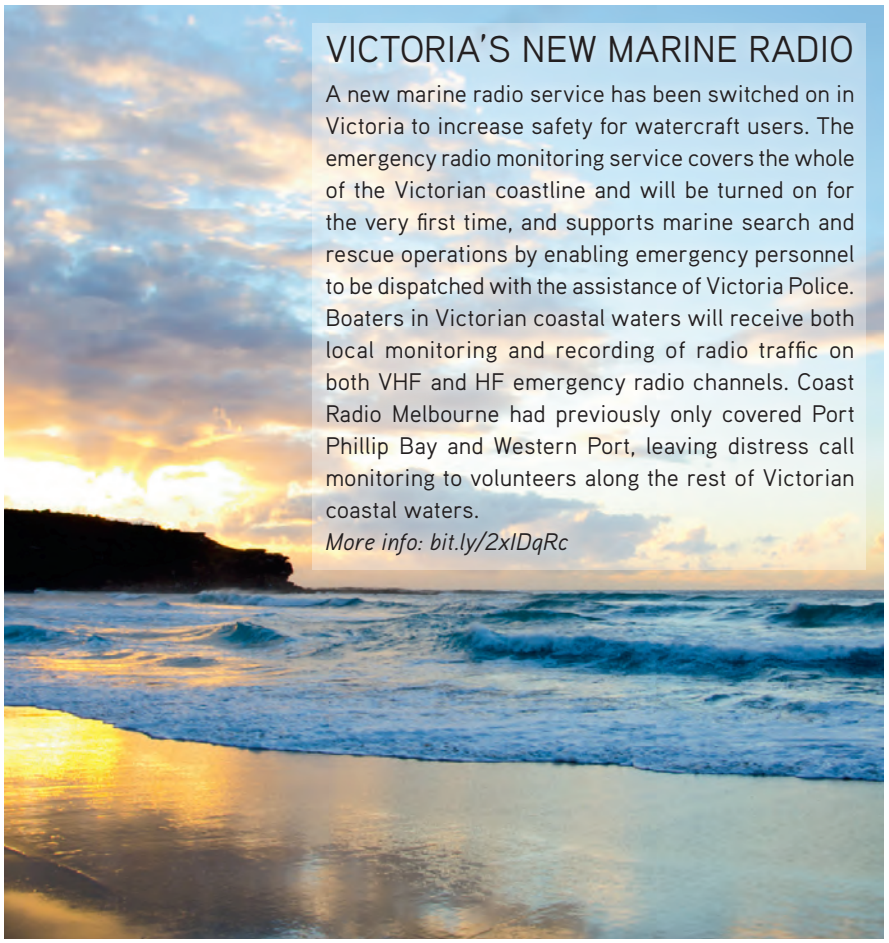
News

© iStockphoto.com/zabelin

RADAR TECH BROUGHT TO MARKET

Radar technology designed to protect soldiers and manage commercial air traffic will be exported from South Australia. Start-up Silentium Defence has developed passive radar technology, which uses a silent sensor to locate active and silent objects. The technology will be brought to market with the help of $200,000 in state government funding. "There is a significant export potential for our technology," said Silentium Defence Chief Executive Dr James Palmer. "We are aiming to have Silentium Defence products on the global market within the next two years, potentially through a global partner."

More info: bit.ly/2ylAKgU



Gavin Terpstra

VICTORIA'S NEW MARINE RADIO

A new marine radio service has been switched on in Victoria to increase safety for watercraft users. The emergency radio monitoring service covers the whole of the Victorian coastline and will be turned on for the very first time, and supports marine search and rescue operations by enabling emergency personnel to be dispatched with the assistance of Victoria Police. Boaters in Victorian coastal waters will receive both local monitoring and recording of radio traffic on both VHF and HF emergency radio channels. Coast Radio Melbourne had previously only covered Port Phillip Bay and Western Port, leaving distress call monitoring to volunteers along the rest of Victorian coastal waters.

More info: bit.ly/2xIDqRc

© Stock.Adobe.com/au/Alex

NEW TCCA BOARD MEMBERS

The TCCA has just appointed two new board members. Ari Toivonen and Philippe Agard join board chair Mladen Vratonji and existing board members Ali Helenius, Airbus Defence and Space; Dr Barbara Held, BDBOS Germany; Francesco Pasquali, Leonardo; Jeppe Jepsen, Motorola Solutions; Malcolm Quelch, Sepura; and independent consultant Tero Pesonen. Toivonen will be the board member representing the Emergency Services Mobile Communications Program. He is the current chairman of the UK's Public Safety Spectrum Policy Group, reporting to the UK Spectrum Strategy Committee. Agard will be the board member representing the TCCA Broadband Industry Group. He is Global Public Safety and Defence Segment Leader at Nokia.

More info: bit.ly/2if6rSP

TCCA BROADBAND WORKING GROUP

A new critical communications Broadband Industry Group has been formed, with representatives from Nokia and Ericsson elected to lead the organisation. The TCCA working group has been formed to encourage broadband vendor cooperation during the development of common global critical communications solutions. Philippe Agard, Nokia's global public safety and defence segment leader, will chair the group, supported by Jason Johur, Ericsson's market development director, mission-critical communications, as vice-chair. "With the formation of the BIG, TCCA has provided industry a home to advance critical service based on broadband, including migration to 3GPP LTE and 5G standard technologies," said Tony Gray, TCCA chief executive.

More info: bit.ly/2kR5uRg

© iStockphoto.com/Robert Churchill

Compact. Portable. Powerful.

Experience our new analyzers:

3-in-1 allrounder

The R&S®ZNL network analyzer is a 3-in-1 instrument: a network analyzer, a spectrum analyzer and a power meter. It offers solid RF performance and fast measurements in one compact box.

For lab and field

The R&S®FPL1000 spectrum analyzer provides good RF performance with a small footprint. Its light weight and battery make it the perfect instrument for the lab and in the field.

Convince yourself and find out more: www.rohde-schwarz.com/ad/analyzers

sales.australia@rohde-schwarz.com

Visit our stand number 126
at Comms Connect Melbourne

ROHDE&SCHWARZ

News

NOKIA MISSION-CRITICAL LTE

Advanced communications for first responders will be improved as Nokia enables faster adoption of mission-critical LTE. Nokia's ViTrust device software customisation service will be expanded to help accelerate agency adoption of Android-based devices for first responders. "The success of moving to broadband-based critical communications requires deep technological and operational expertise," said Asad Rizvi, head of Nokia's global business development in Global Services. "Leveraging our systems experience, technical expertise and in-house tools, these new services address agency-specific requirements to help public safety agencies rapidly adopt and take advantage of the possibilities of mission-critical broadband."
More info: bit.ly/2yMXpTN

PANORAMA'S 70TH YEAR

Panorama Antennas has now been in operation for 70 years. Founded in 1947 by Leon Jesman, the company is still a family business, now in its third generation. From its history pioneering the process of 'insert injection' moulding, Panorama Antennas is now a designer and manufacturer of high-quality communication technologies. Many members of the founding family, who still work at Panorama, hosted an anniversary event aboard the Elizabethan, an 1890s-style paddle steamer on the Thames. "There is a lot of activity in our industry, especially in IoT. It's endless and Panorama will continue to grow with it," said Panorama Managing Director Christopher Jesman
More info: bit.ly/2geD7qZ

MOTOROLA ACQUIRES KODIAK

Motorola Solutions has completed the acquisition of Kodiak Networks, a privately held company that partners with mobile network operators globally to offer a cloud-based PTT solution and management platform over 4G LTE, Wi-Fi and 3G networks. "Acquiring Kodiak Networks is another step in building Motorola Solutions' communications and collaboration software suite and establishing annual recurring revenue streams," said Bruce Brda, executive vice president, Products and Solutions, Motorola Solutions. "Kodiak's broadband PTT software expands our offerings for mobile network operators, especially in commercial markets, and complements our software and carrier capabilities." Kodiak adds a complementary, carrier-integrated PTT-over-cellular solution to Motorola Solutions' mission-critical WAVE PTT portfolio.
More info: bit.ly/2xHUJah

TRANSPERTH SIGNALLING UPGRADE

A new signalling system for Perth's urban rail network will be developed over the next two years. The new automatic train control (ATC) system will use state-of-the-art technology and enable more trains to travel more often on the existing network. It will also reduce the number of signals and other trackside equipment on the network, increasing system reliability, making it easier for railcar drivers to monitor signals and reducing field maintenance requirements. "As new METRONET rail projects come online, ATC will enable the network to handle the extra train movements," said Transport Minister Rita Saffioti. The WA government will spend $7.4 million over the next two years.
More info: bit.ly/2kTdvoP

Kirisun

WDS WIRELESS DATA SOLUTIONS
EXCLUSIVE AUSTRALIAN DISTRIBUTOR

CONNECT RELIABLY – CONNECT FOR LESS

Kirisun DP5 series hand held radio

DP580 DP586 DP585

- DMR Tier II IP66 rated hand held radios with GPS & Bluetooth capability
- Available now is VHF 136–174MHz, UHF1 (400–470MHz), soon to be released in (450–520MHz)
- Standard non–display and full display with limited or full keypad
- Kirisun Dispatch Application available

Kirisun Press To Talk over Cellular and Wi–Fi (PoC) is coming!

- Android & iOS Apps available from Play & App Store available now
- Data Centre hosted or on–site PoC Server available.
- Dealer PoC service billing available
- Radio to POC Gateway available
- Desktop PoC Dispatch Application available
- Body Worn Camera with live steaming and PoC facility available

Android & iOS App –Press2Talk

W65 W60

Smart BWC Model DSJ–H9

M50 In vehicle PoC terminal to be released in January 2018

Kirisun UHF CB radios are now available

- Kirisun Commercial radio released with UHF CB firmware which can be upgraded to full commercial product with software key
- The PT6500 & PT8200 are easy to use and built to provide reliable instant voice communication in the toughest Australian environments.

· PT 6500 · PT 8200

PT8100 mobile radio also available in **66–88MHz**

DEALERS WANTED ➡ CALL 1300 937 469 0409 999 917

COMMS CONNECT MELBOURNE 21–23 NOVEMBER 2017

Jonathan Nally

A strong line-up of international experts leads the program for Comms Connect's 11th year. Don't miss it!

Since 2007, Comms Connect Melbourne has been the number one meeting place for Australasian critical communications users and industry. This year, around 50 expert speakers, 70-plus exhibitors and over 1100 professional delegates — from first responders to mining professionals, from utilities providers to enterprise end users, from manufacturers to developers — will take part in the highly targeted and energised event.

A wide range of topics will be covered, from LMR to 5G, IoT to drones, public safety, LTE, smart cities, mining, research, SCADA, connected workers, spectrum management, CAD and more. There'll also be a panel session on placing critical communications requirements at the core of future converged networks.

Headline speakers

The conference organisers have put together an impressive line-up of local and international keynote and plenary speakers, including:

- Finding the balance: privacy and security — Michael Doucet, Executive Director, Security Intelligence Review Committee, Canada;
- The FirstNet wireless LTE network and the Internet of Life Saving Things (IoLST) — TJ Kennedy, President, First Responder Network Authority;
- A new kind of network to empower everyone to thrive in a connected world — Karim Nejam, Director, Global Enterprise Product Engineering, Telstra;
- Radiocommunications legislation: a platform for the future — Cathy Rainsford, Assistant Secretary, Spectrum and Security Branch, Market Reforms Division, Department of Communications and the Arts; and
- The UK Emergency Services Mobile Communications Programme: a technical insight into its delivery — Duncan Swan, Director, Mason Advisory, UK.

Speaker sessions

Comms Connect always attracts a first-class list of speakers from industry, government and academia, with experts from home and abroad coming together to share their knowledge and insights. Here are just a few of the topics that will be covered:

- Public safety mobile broadband in Australia: next steps — Luke Brown, Emergency Management Australia
- The future for critical messaging — Jim Nelson, Critical Messaging Association of America (CMAA)
- Operational communications: the next wave — Kate Foy, NSW Telco Authority
- Wireless fabric for smart cities — Roy Wittert, Cambium Networks
- Towards a broadband future: a critical broadband standards update — Tony Gray, TCCA
- Upgrading SCADA comms for a large electricity utility's network — Sarosh Dubash, Schneider Electric
- Enhancing safe work at heights near radio sites — Tony Paul, PicoNet Consulting
- The future connected worker — Damien Batey, Motorola Solutions

The full list of speakers and topics can be viewed on the Comms Connect website at melbourne.comms-connect.com.au/conference-program.

Workshops

It's important that industry members keep up to date with the latest developments, which is why ARCIA's preconference technical workshops are always very popular. This year there will be seven workshops, held on Tuesday, 21 November (the day prior to the start of the conference).

- Private LTE workshops, with a focus on mining
- Project and engineering excellence on converged network upgrades
- Global trends in public safety mobile broadband
- The impact of M2M and IoT on public safety
- How to build a network from the ground up
- Using social media to build situational awareness in emergencies
- Complementary digital LMR and LTE networks

Full workshop details are available on the Comms Connect website.

Top row, left to right: Michael Doucet, TJ Kennedy, Karim Nejam. Bottom row, left to right: Cathy Rainsford and Duncan Swan.

Exhibitors

One of the best parts of Comms Connect is the opportunity to meet and greet face to face with local and international vendors. In particular, it's a great chance to compare notes, give feedback, get up-to-date information on the latest technologies (including, often, pre-release or developmental details) and generally build connections within the industry. You can see a full of exhibitors at melbourne.comms-connect.com.au/whos-exhibiting.

Don't forget that you can get a FREE expo pass to visit the exhibition — see melbourne.comms-connect.com.au/pricing-and-registration for more details.

Panel sessions

There will be two panel sessions. The first, on the Wednesday, will discuss 'Placing critical communications requirements at the core of future converged networks'. The discussion will be led by Inspector (Ret.) Lance Valcour O.O.M, Canadian Association of Chiefs of Police, along with Hamish Duff (ARCIA), Alex Stefan (Telstra) and Mike Norfield (Simoco).

The second panel session (on the Thursday, and moderated by ARCIA's Ian Miller) will be a discussion on the topic of 'Public safety mobile broadband — the way forward for critical communications in Australia', which will bring together experts who will discuss the need for a national strategy that covers public safety mobile broadband and next-generation triple zero, and their effect on emergency services communications centres. Not to be missed.

ARCIA dinner and awards

The annual ARCIA Gala Industry Dinner will be held on the evening of Wednesday, 23 November, at the Convention Centre. This year the event will feature a very special celebration — the 10th anniversary of the founding of ARCIA.

Bringing together more than 500 industry professionals, the evening will include: networking over pre-dinner drinks and canapes; live entertainment; a three-course dining and drinks package; and, most importantly, the presentation ceremony for the Industry Excellence Awards, which celebrate and recognise the achievement of outstanding individuals in our industry.

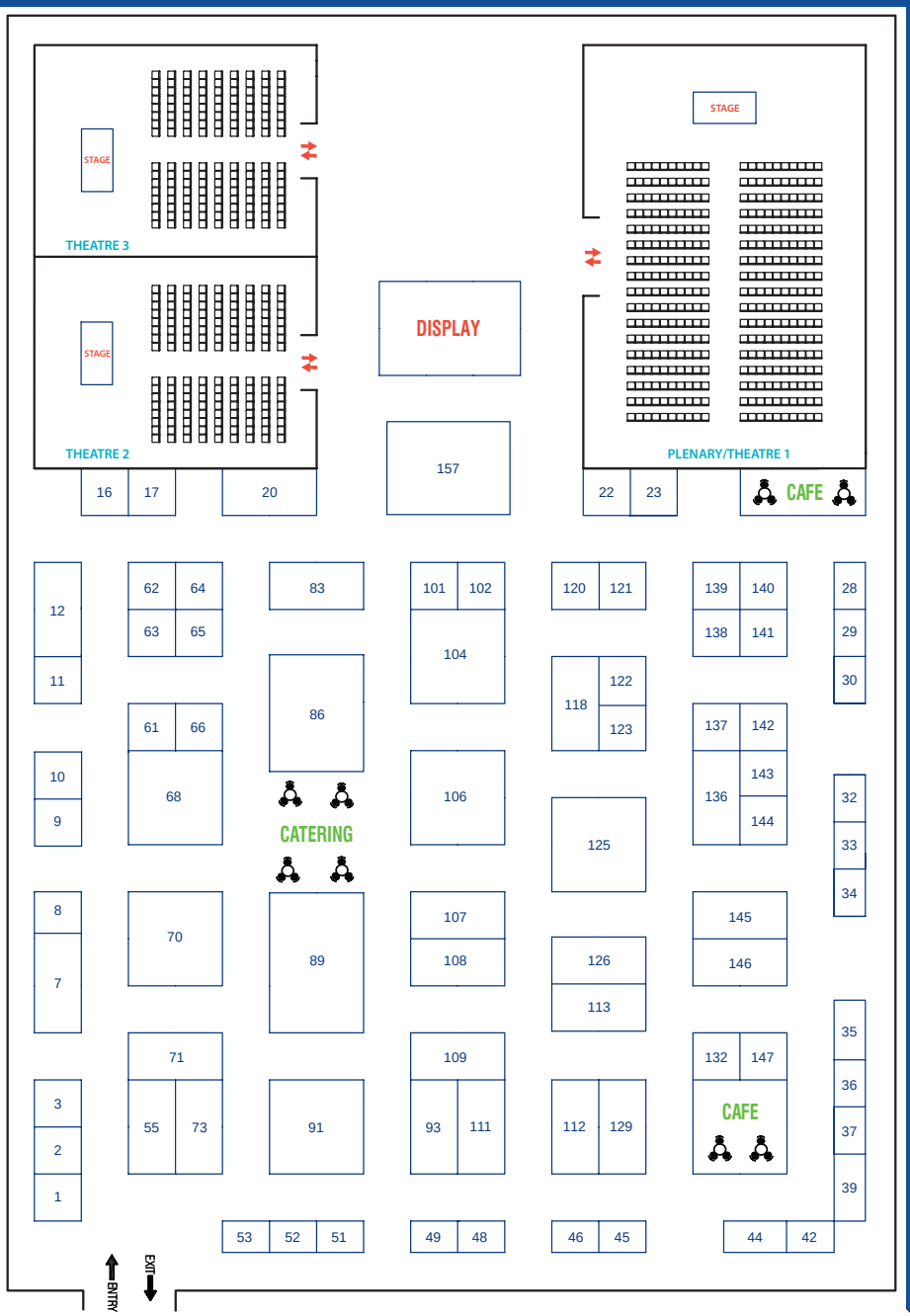
The dinner is always a fantastic opportunity to celebrate what makes the radiocommunications industry great with partners, clients, employees and colleagues. You can book your tickets through ARCIA's website, arcia.org.au.

In conclusion, Comms Connect sees hundreds of like-minded professionals — from government, the resources sector, first responders, transportation, utilities, enterprise and other sectors who use critical communications — gather to ensure that they have access to the very latest information and technology solutions. This year's event promises to be one that's not to be missed. Make sure you're there to join in!

Comms Connect Melbourne

Workshops:	Tuesday, 21 November (9.30 am–5.00 pm)
Conference:	Wednesday, 22 November (9.00 am–5.30 pm) and Thursday, 23 November (9.00 am–4.30 pm)
Exhibition:	Wednesday, 22 November (9.00 am–5.30 pm) and Thursday, 23 November (9.00 am–3.30 pm)
Where:	Melbourne Convention and Exhibition Centre
Who:	1100+ attendees, 50+ speakers and 70+ exhibitors
Web:	melbourne.comms-connect.com.au

Exhibiting Name	Stand No
4RF Australia	118
Anritsu	49
ARCIA	53
Applied Satellite Technology Australia	44
ATDI South Pacific	65
Australasian TETRA + Critical Communications Forum (ATCCF)	33
Benelec	109
Cambium Networks	62
Centre for Disaster Management + Public Safety	39
Challenge Networks	139
Chatter PTT	132
Cistech Solutions	20
Cobham	71
Codan Radio Communications	70
CommSite	101
Cradlepoint	17
Critical Comms	147
Digi	37
Emona Instruments	61
Frequency Plus	120
Fujian BelFone Communications	144
GME	136
GMG Solutions	7
Helios Power Solutions	23
Hytera	89
Icom Australia	93
Intercel	9
IPMobileNet	91
iTkey	22
Japan Radio Company	140
JVCKenwood	68
Kalibre/Genesis	2
Keysight Technologies	111
KORE Wireless	83
Logic Wireless	146
L&W Sports Communications	34
Maestro Wireless Solutions	48
Midland	64
Motorola Solutions	108
MTA Sales	102
NEC Australia	137
NICE	10
Omnitronics	112
Open Spectrum	8
Orion Network	55
Panasonic	113
Powerbox Australia	145



Regal Electro	12
RFI	104
RF Technology	91
Rohde & Schwarz	126
SAF Australia	35
Schneider Electric	16
Sensear	142
Sepura	89
Simoco Wireless Solutions	125
Spectrum Engineering Australia	46
Survey Technologies	51
Tait Communications	107
TASSTA GmbH	28
Telstra	106
Telstra Vehicle Display	86

TeleResources Engineering	138
TroooAir	36
TPL Systems Asia Pacific	52
TRBOnet	123
Trio Test & Measurement	141
Unicom	66
Vertel	11
Vicom	129
VicTrack	63
Wave1 Wireless Communications	32
Wireless Data Solutions	3
Wireless Innovation	157
Wireless Tech Australia	45
ZCG Scalar	121
Zetron	73

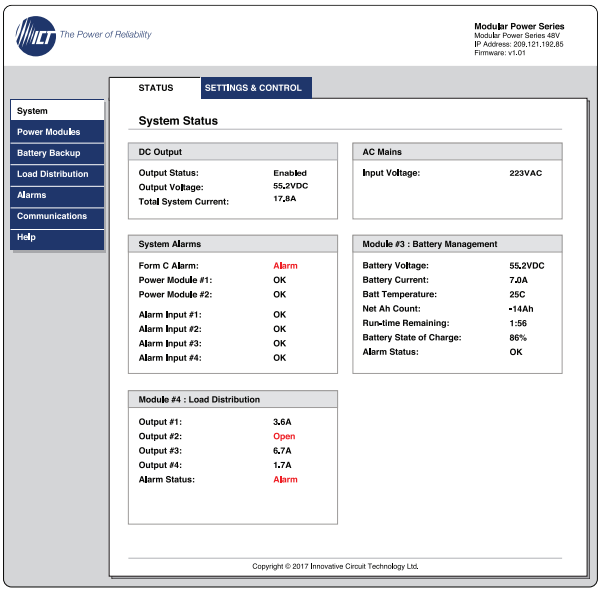
The Power of Reliability

CHOOSE THE RIGHT DC POWER SOLUTION

For Today's Demanding Wireless Communications Applications

DC power supplies from ICT provide unmatched flexibility in power, voltage, functionality and connectivity for a range of DC power infrastructure requirements for wireless communications applications. Choose the solution that's right for you.

www.ict-power.com



The optional Intelligent Controllers on Modular Power and Digital Series include a secure, easy to use web browser interface that 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

- 12, 24 and 48VDC systems
- Up to 4 x 700W hot swap power modules
- Optional 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
- Advanced battery management features
- Optional 4 output load distribution with remote power cycling

DIGITAL SERIES

- 12, 24 and 48VDC systems
- 600 or 1200 watt power output
- Optional TCP/IP based remote monitoring and control
- Remote E-mail alarms over Ethernet
- Adjustable output voltage and charge current settings
- Optional battery charging terminal with LVD

PRO SERIES

- 12, 24 and 48VDC systems
- 690 or 1200 watt power output
- Form C alarm output contacts
- Optional battery charging terminal with LVD

Powering Communications For
Emergency Services
Mining and Resources
Government
Fleet Operators
Transportation
Utilities

Available From

HELIOS POWER SOLUTIONS

www.heliosps.com.au
Email: sales@heliosps.com.au
Tel: (02) 7200 9200

THE EVOLVING CRITICAL COMMS ENVIRONMENT

Ged Griffin, Centre for Disaster Management and Public Safety, University of Melbourne

Dr Fahad Mushayt, CEO of Saudi Arabia's BRAVO, spoke on efforts to develop a nationwide critical communications service. Image courtesy Airbus Defence and Space.

Standards, spectrum, security, cloud computing, the IoT and applications were on the agenda at this year's CCMENA.

I had the good fortune to once again attend the Critical Communications Middle East and North Africa (CCMENA) conference in Dubai (25–26 September 2017), and it offered me the opportunity to reflect on how much the conversation regarding public safety mobile broadband has advanced over the last 12 months. Last year the presentations and discussions were focused on a debate regarding the choice of networks in terms of 4G or 5G, and the strategy options in terms of dedicated, commercial or hybrid networks. This year there was a greater focus on applications and system features. It appeared that delegates had accepted that their choice of network will be driven by the availability of both budget and spectrum. I think this is a positive step as it enables decision-makers, vendors, engineers and users to start envisioning the huge potential of the new mobile broadband environment.

Barbara Held from Germany's Federal Agency for Public Safety Digital Radio (BDBOS) provided a comprehensive overview of the current status and development of public safety broadband initiatives across Europe. It appears that there is either a strong focus on hybrid solutions or the various governments are still discussing a range of options, including testing some of these potential options.

Within the MENA region, authorities and decision-makers have few budgetary and spectrum restrictions and this has allowed them to be at the forefront of innovation. To this end, Dr Fahad Mushayt of BRAVO provided a detailed presentation outlining the strategic approach taken by Saudi Arabia to develop a nationwide critical communications service to meet the public safety needs of the kingdom. I am sure that the European delegates were envious of this operating environment, given their highly restrictive budgetary allocations and the limited spectrum availability in Europe. This environment is further complicated by cross-border relationships with multiple adjoining countries. As an Australian I can identify with the budgetary challenges, but I certainly appreciate the ACMA's approach towards inclusive and strategic allocation of spectrum.

The key issues at the forefront of discussions this year included standards, spectrum alignment, security, cloud computing, the Internet of Things (IoT) and applications. Standards must be a critical element of our future communication ecosystems, as they are at the heart of interoperability and cost reduction. The key challenge is that a number of these standards are still being developed. So how do you specify or design a network without the full range of standards? Unfortunately there are no easy answers to this question, but it is obviously a shared responsibility of all participants within the communications industry. It also underpins the need to be actively involved in the various communication industry associations and to attend major communications conferences such as CCMENA and Comms Connect. The TCCA has also established the Critical Communications Broadband Group (CCBG) to drive the development and adoption of common global mobile broadband standards and solutions for users who operate in a mission- or business-critical environment.

New technologies

Security within the LTE environment is a significant risk; it is an issue that has to be considered as a principle element within every aspect of the communications ecosystem. As detailed by Kiran Vaya of Motorola Solutions, the proliferation of IP-based technolo-

gies has resulted in a broadening of potential attack surfaces and this has been associated with a growing sophistication in attack methodologies. For these reasons, it is essential that public safety communications systems adopt a proactive and intelligence-led approach that provides in-depth protection for all elements of the ecosystem. Kiran outlined a five-step process that involved the stages of identify, protect, detect, respond and recover.

It appears that some developments within the artificial intelligence and network monitoring software communities may help to establish baseline activity and performance metrics which can be subsequently monitored to detect potential interference and snooping within our future systems. Delegates expressed an intention to work together to share knowledge regarding these types of security risks and recent activity. Once again, active involvement in industry associations like the TCCA and ARCIA will help communications industry stakeholders get access to some of these 'lessons learned' and insights.

The role of cloud computing within the new communications ecosystem is emerging as a core element of our future systems; however, the culture and attitudes of some stakeholders — especially within government and the public safety agencies — may

Simon Riese outlined the ongoing work of Airbus in developing network management tools. Image courtesy Airbus Defence and Space.

be a challenge. Robin Davis (chair of the TCCA Transportation Working Group) gave an excellent presentation on the basics of how the cloud can provide significant financial benefits, as well as enhancing the efficiency and resilience of our future communications ecosystem. This presentation was further enhanced by Omid Mahboubi of the MENA Cloud Alliance, who has developed a cloud computing index to evaluate the maturity of cloud computing capability within the MENA region. This type of research will help decision-makers understand the potential challenges in using cloud computing to support the digital transformation of services. A copy of this report can be found at www.menacloud.org/Doc/MENACA CCI (c).pdf.

It would be interesting to see the results of a similar evaluation of the status of cloud computing in Australia and the Oceania region. The move away from the traditional ICT approach of using propriety agency-based servers, towards a more federated data model within the cloud, is likely to be a major change management issue — some ICT departments within agencies will see this as a key threat to their power base and influence. Strong leadership will be needed if we hope to transition to the cloud and realise the significant potential that is before us.

The IoT was a key topic of discussion, with an expert panel considering the hunger for data within the consumer space and its impact on the critical communications industry. It was suggested that, thanks to mobile devices and the IoT, we have moved from big data to hyperdata. Whilst this was a passing comment, there could be significant opportunities to streamline processes within a critical control room, but it will also require deeper thought regarding the human-machine interface to ensure that we do not overwhelm personnel working in this data-intensive environment.

This type of environment will be challenging if we want to take full advantage of the potential of new and emerging technology. Antti Kauppinen, of Finland's State Security Networks Corporation, highlighted the need to carefully identify and prioritise the data needs of personnel and to adjust the presentation of any relevant data to fit the user needs or network capabilities. Nick Smye of Mason Advisory

The BRAVO stand at CCMENA.

> IT IS ESSENTIAL THAT PUBLIC SAFETY COMMUNICATIONS SYSTEMS ADOPT A PROACTIVE AND INTELLIGENCE-LED APPROACH THAT PROVIDES IN-DEPTH PROTECTION FOR ALL ELEMENTS OF THE ECOSYSTEM.

presented a detailed technical analysis and comparison of 3GPP IoT bearer standards and Low-Power Wide-Area (LPWA) approaches.

In terms of mission-critical SCADA networks, Nick suggested that IoT LPWA approaches are not yet suitable for operational use; however, they are mission-assistive. For example, the Remote Asset Inertial Monitoring and Alerting Network (RAINMAN) project in Scotland is significantly enhancing the effectiveness of monitoring wooden power poles. This approach reduces the number of catastrophic failures of the poles and the associated power outages. Nick suggested that these types of remote, low-power applications could be a 'game changer' and open up a whole new range of services.

In terms of applications, Motorola Solutions displayed its connected firefighter demonstration. This is an advanced application that shows how the IoT and mobility put advanced real-time intelligence from the fire ground or from inside a building into the hands of an incident controller and agency commander.

An international effort

Video is emerging as another key feature of our future ecosystem, although, from the presentations given, the spatial enablement and visualisation of complex datasets appear to have a greater role and more impact than actual videos. This trend would suggest a need to invest in spatial data infrastructure to support new and advanced forms of data visualisations.

Marijo Novosel of the Croatian Ministry of Interior delivered a very interesting presentation on the potential role of video and 'computing at the edge'. His outline of the potential benefits of computer vision, dynamic visual recognition and video analytics proved to be thought-provoking. For example, these tools can be used to detect abnormal behaviour of people or objects at a given location when compared to the average baseline activity. Similarly, a suspect object and potentially violent behaviour can be automatically detected and cause an alarm to be raised at a control centre.

Peter Clemons from Quixoticity outlined how technology is resulting in a more open and interconnected society where we are seeing the virtual convergence of everything. This situation has resulted in a lot of uncertainty for decision-makers. To this end, Peter is developing the Global Index for Critical Communications to assist in the decision-making process of governments, regulators, mobile operators and users. While he outlined the key criteria at CCMENA, the full index will be unveiled at Comms Connect Melbourne in November. The index examines 10 key markets, including Australia, and provides a framework for understanding the evolution of the critical communications world. I would strongly urge anyone with an interest in critical communications to attend Comms Connect Melbourne so that they can learn more about the index and get some insights into future opportunities within the industries associated with critical communications.

Simon Riese outlined the ongoing work of Airbus in developing network management tools to operate hybrid networks in a way that is invisible to end users. He also demonstrated the capabilities of Airbus's Tactilon Dabat, which is the world's first smartphone and TETRA radio combined into one device. This is a very impressive device and I think it provides some insight into the future of our mission-critical communications ecosystem. Going forward, I think the development of new mission-critical technology and devices like this device will be a key priority issue worth monitoring.

This year, my key take-home message is probably best summarised by a comment made by Barbara Held: "our networks might be national as far as coverage and user services are concerned, but standards, manufacturers and providers are international". So once again, this reinforces the need to be an active member of the radio communications industry and to support ARCIA in representing the needs of Australian stakeholders.

In conclusion, the TCCA should be congratulated on organising a fantastic conference. Jackson Szabo and his team at KNect 365 managed the conference in an excellent manner and ensured all attendees had an amazing experience. In some ways, this event marked a 'changing of the guard'. The new chief executive, Tony Gray, announced the renaming of the association from TETRA-CCA to simply TCCA to ensure that it represents all current and future standardised critical communications technologies, not just TETRA. Going forward, the TCCA is forming a new partnership with the Mark Allen Group to manage future events in Europe and the MENA region.

Ace Communication Distributors Pty Ltd

2/60 Alexandra Place, Murrarie, 4172
Tel: 07-3821-4111 Email: sales@acecomms.com.au Web: www.acecomms.com.au

Australia's Two-Way Radio Distributors, with everything you want in a Distributing Partner:

- Family owned, 100% Australian Business
- 12 years of two-way radio distributing and logistics experience in Australia
- Distribution and Wholesale of radios, accessories and radio repair parts
- Full end-to-end product support including repairs, and assistance with system design and implementation
- Motorola Solutions' only Value Added Distributor in Australia
- The only Preferred Motorola Battery Supplier in Australia
- National Vertex Standard Distributor
- Same day/next day/overnight dispatch of ex-stock items

MOTOROLA SOLUTIONS
Value Added Distributor

Vertex Standard
Authorised Distributor

ARCIA
Australian Radio Communications Industry Association
SILVER PARTNER

GET READY FOR THE NEXT GENERATION OF MOTOTRBO™

MOTOROLA

Industry Talking

This year (and indeed the decade) seem to be rolling by faster than ever, and before we know it we will see the year 2020. By that time the Swans will have won two more AFL flags, the Wallabies will hold the Bledisloe Cup, the Socceroos will have won the World Cup and all of public safety will be on LTE.

Of course, all that we know for sure is that the future is wireless.

As new technology options arise, ARCIA will continue to advocate for and educate on the benefits of wireless technologies. You will see this in action firsthand at Comms Connect in Melbourne in November. It is a fantastic achievement by ARCIA and the Comms Connect team to assemble such a world-class line-up of people to discuss the future of public safety mobile broadband. ARCIA would like to thank everyone who is giving up their valuable time and travelling from around the world to participate in the event.

Ian Miller presenting Rod Dowling with the SA Industry Professional award.

ARCIA will also be celebrating its 10th birthday during Comms Connect, and it is worth noting that the industry is indebted to all the individuals and partners that have put time and money into the association over the past 10 years. So much has happened in those years — we have a lot to be proud of, and we think we have a great future ahead.

Regardless of the technology that markets adopt, the wireless industry will still need engineers, technicians, installers and administrators. Industries cope with change over time as new markets emerge and regulation changes. ARCIA firmly believes that regardless of our wireless technology future, government and industry need to understand how to manage it. Systems are becoming more complex and more connected than ever before and, while we all enjoy the benefits that are provided, the security risks must be understood. In many critical systems, such as energy, transport and public safety, we must not put convenience or cost before security. In some cases this might mean that keeping systems separate might be a less risky and ultimately cheaper option than putting all our eggs in one basket.

ARCIA has been presenting our thoughts on the future of wireless to the ACMA and DoCA. Thinking about what ARCIA represents brings to mind the approximately 65,000 apparatus licences in our market. Each of these licences exists for some kind of private network, and the fact that they exist tells you there is a market need for private networks. It is hard to imagine a future where demand for private wireless networks ends.

Just as the railway operators, public safety agencies, energy utilities, state governments, mining companies and others have argued that access to spectrum is vital to the success of their respective businesses, ARCIA argues that access to spectrum for new technologies must be available to all markets, not just a select few. ARCIA is watching developments in new technologies closely and we, as an industry, need now more than ever to keep working together to ensure that the benefits of new technology are available.

If you think about a parallel in the IT world, we all have at home and in our businesses private IT networks. We keep them private because we know that having that network in a confined area is easy to understand and manage. For the most part, the gateway to the world protects us and we get to enjoy the benefits that these productive tools provide.

But what would happen if the government came to us and said, "IPV4 is a finite resource and we just can't make any more IP addresses. So what we have decided to do is create an auction process for IPV6 addresses and everyone will just have to use the one public network. The new owners will of course assure us that there are no issues, as the new system has so many IP addresses that there will be plenty for everyone." Would you will feel like giving up control of your private IP network? And so, ask yourself: are your wireless communications any less important?

Finally, the most recent ARCIA event was held in Adelaide, with the local industry gathering at the National Wine Centre. The event was well attended and as always Adelaide put on a great night with an engaging guest speaker. The SA Industry Professional award was presented to Rod Dowling for his long-term work and commitment to public safety communications for South Australia and indeed for his involvement on national committees.

Hamish Duff, President, Australian Radio Communications Industry Association

NATIONAL INSTRUMENTS™

SMARTER

TEST SYSTEMS LET YOUR TECHNOLOGY

TAKE FLIGHT

Delivering innovative aerospace and defense technologies ahead of the competition and within budget is your mission. And thanks to solutions that range from hardware-in-the-loop simulation to mixed-signal electronic test for everything from jet engines to climatic tunnels, NI's open, software-centric platform is ready to help you explore these new frontiers with a powerful, proven approach to smarter test.

See how at ni.com/aerospace-defense.

NI ASEAN and NI ANZ

Singapore (65) 6226 5886
Philippines (632) 659 1722
Other ASEAN Countries (65) 6226 5886
asean@ni.com

Malaysia (603) 7948 2000
Vietnam (84) 8 3911 3150
Australia 1800 300 800
info.australia@ni.com

Thailand (662) 298 4800
Indonesia (62) 21 2924 1911
New Zealand 0800 553 322
info.newzealand@ni.com

A new WAVE of communication for the mining sector

Australia's mining sector is showing continued signs of resurgence marked by increased employment and more stable commodity prices.

The more optimistic outlook for the sector must be supported by secure and effective communications, enabling mining companies to maintain efficiency and productivity while protecting the safety of workers. Through Motorola Solutions' WAVE technology, Roy Hill, an iron ore, mining, rail and port operation in West Australia's Pilbara, is extending the reach and capability of its communications — from mine sites to beyond.

Like many major industries, Australia's mining sector has benefited from exponential technology innovation in recent years.

From autonomous vehicles to advanced data analytics capabilities, to wearable devices, drones and beyond — innovation is enabling the industry to become truly digital and is paving the way for continued growth.

For consumers, smartphones and the applications that power them have become indispensable to daily life. However, for heavy industrial environments including mining, voice communication and the need to quickly connect with members of a group reinforces the continued need for secure and efficient push-to-talk (PTT) communication to get the job done.

Although the traditional means of providing these communications were once exclusively provided via radio networks, technology has evolved, reflecting the fact that not all industry workers carry a radio.

Motorola Solutions' WAVE portfolio suite of PTT applications enables users in mining and other industries to communicate between traditional radios and smartphones, tablets and other devices.

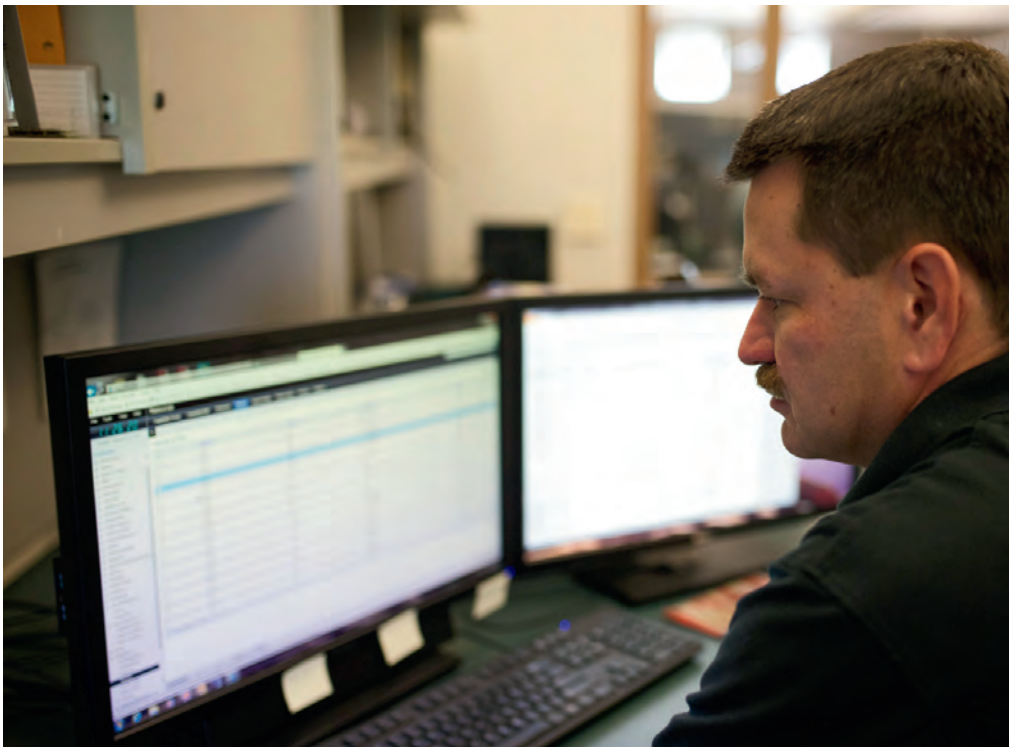
A new way to connect with WAVE on MOTOTRBO

Through a new software update, any Wifi enabled MOTOTRBO radio with a screen can be upgraded to connect back to its radio system via the WAVE server, even when operating outside of its RF coverage area.

The software update means a mine site supervisor could use a MOTOTRBO radio to access a communication group even when working at a remote location such as the corporate headquarters.

This creates a simple and easy way to stay connected to a radio network without the need to carry an additional device to talk with the communication group.

WAVE is a vital technology for large organisations with workforces that need to stay connected across multiple locations, including transportation, hospitality and healthcare companies.



How WAVE helps Roy Hill communicate better

One of the largest and most well-known integrated mining projects in Australia, Roy Hill, is located approximately 340 kilometres south-east of Port Hedland, in the Pilbara.

A key aspect to the project's operational success is the cohesive communications maintained between project sites, Roy Hill's Perth-based corporate headquarters and its remote operations centre. This provides a coordinated and integrated approach to the planning, operation and overall management of the project's operations.

Using Motorola Solutions' WAVE 5000 application, LEX L10 handheld devices and TETRA RADIO Network and handset, Roy Hill operates a highly efficient remote operations centre, where maintaining constant communication between on-site workers and controllers is critical.

The solution has enabled increased interoperability between devices including rugged devices, smartphones, tablets or desktops while maintaining security.

Control room users are now able to securely communicate with Roy Hill's radio talk groups without having to stay at their work stations.

Communication is also not restricted to voice, with built-in features that enable Roy Hill workers to communicate via text, to share presence and location information, complete logging, audits and reporting, and much more.

Securing business critical communications

In business critical communications security is paramount and security cannot be compromised by bringing a range of different devices onto the network.

WAVE's inbuilt encryption helps to maintain that security. In Roy Hill's case, the LEX L10 devices used as part of the solution also contain encryption as standard.

This level of security provides the means and comfort to have 'operational conversations' over the network. "Encrypted security ensures the commercial and operational integrity of the data. It's a competitive environment.

Operational conversations happen over the radio so we want to know that these are secure," said Kevin Atkinson, Manager of the IT Program at Roy Hill.

Increased safety

While productivity and efficiency are vital in the mining sector the safety of personnel will always be paramount. Herein lies the greatest advantages MOTOTRBO technology can bring.

Apart from being 'always-on' and contactable to alert field workers and the control room when an incident takes place, other important safety features within MOTOTRBO ensure workers are as safe as possible.

Flexible subscriptions and pricing

As WAVE is a software-as-a-service (SaaS) offering, it can be accessed via affordable and flexible subscriptions that avoid the need for large capital costs.

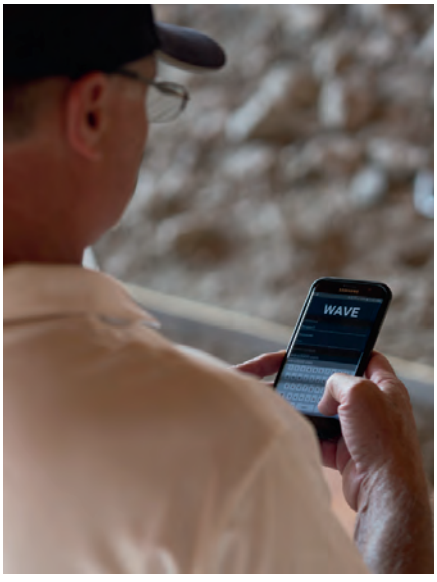
As a software-based platform, next generation upgrades can also be more easily deployed without the need to upgrade devices.

A reliable network for digital mines of the future

The mining sector will continue to be exposed to environmental pressures including fluctuations in commodity prices and other factors. However, technology innovation provides a constant to help businesses maximise their goals for efficiency and productivity, keep workers safe and stay competitive, all while providing greater protection should economic cycles change.

MOTOROLA SOLUTIONS

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



CSIRO and UK-based Surrey Satellite Technology Ltd (SSTL) have agreed to a 10% share of 'tasking and acquisition' time on the NovaSAR satellite. Developed by SSTL and with a payload supplied by Airbus UK, its S-band SAR technology is a significant advancement on current civilian satellite capability. Under the terms of the agreement, worth $10.45 million over seven years, CSIRO has the right to direct the satellite's activity over Australia, download and process data, and make these data available to the wider research community. It enables images to be taken day and night, and through cloud cover, which is especially useful in tropical zones and cloud-affected areas.

More info: bit.ly/2yNuHm0

AIRBUS TETRA IN SAUDI ARABIA

The latest Airbus TETRA technology will be installed by Bravo in Saudi Arabia. Airbus will deliver and deploy 150 TETRA base stations in the coming months. After Bravo's positive experience with Airbus's radio coverage during this year's Hajj pilgrimage in the west region, the state-owned public safety operator for secure mobile communications expanded its cooperation with Airbus via the local reseller 'House of Invention (HOI)'. "When it comes to modernising and upgrading large PMR networks, we are the key choice in the Middle East because of our experience and versatile technology," said Selim Bouri, head of Middle East and Asia-Pacific for Secure Land Communications at Airbus.

More info: bit.ly/2ysoNWc

WAN platform

The Cradlepoint NetCloud platform provides the pathway to an Elastic Edge using LTE, software-defined policy management and network orchestration to eliminate the increasing complexity of today's WAN.

Through leveraging path diversity — including LTE and broadband — organisations can realise secure 24 x 7 access for all locations and devices, regardless of location.

NetCloud consists of integrated components to enable seamless connectivity, security, management and network extensibility.

NetCloud Manager provides a platform to configure, monitor and manage network connected resources from anywhere — anytime.

NetCloud OS is the software on Cradlepoint's hardened routers, enabling primary/failover routing and WAN traffic control, as well as edge services such as firewall, IDS/IPS and security.

NetCloud Perimeter is a software-defined, identity-based security perimeter to connect M2M and IoT devices to the network.

The product has purpose-built routers for fixed site, branch, transportation, M2M/IoT and failover requirements.

Extensibility (SDK and APIs) enables the user to integrate and leverage Cradlepoint technologies for their own needs, such as in-vehicle telemetry.

Cradlepoint Australia Pty Ltd

www.cradlepoint.com

Cellular and Wi-Fi emulation system

The Keysight Technologies T5510S cellular and Wi-Fi emulation system supports simultaneous cellular and Wi-Fi testing. It is a powerful, flexible platform enabled by the combination of the company's UXM network emulator and the Ixia Solutions Group's wave test system. The result is a test platform covering a complete cellular and Wi-Fi system, from data traffic generation to physical transmission, layers 1 to 7.

The product also includes a flexible test automation platform and ready-to-use, built-in test cases. This complete system delivers capabilities for testing with the latest cellular standards (LTE/LTE-Advanced/NB-IoT/Cat-M) as well as all Wi-Fi protocols (802.11a/b/g/n/ac) under a wide range of traffic and RF emulation conditions.

The product helps users improve performance and time to market by prototyping, evaluating and diagnosing complex interoperability environments.

Keysight Technologies Australia Pty Ltd

www.keysight.com

ZCG

Supplying quality antennas for more than 40 years

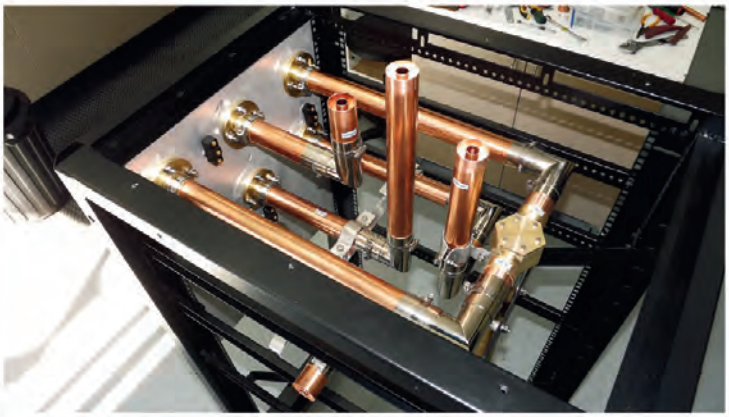
AUSTRALIAN MADE ANTENNAS FOR EXTREME CONDITIONS

ZCG Wireless Communication Solutions

- AVL Fleet management
- Emergency services
- Mining
- Defence communications
- Air traffic control
- Digital TV and radio broadcast

ZCG has a proven record of providing high quality, competitively priced antennas and RF accessories for all applications. If we can't offer an off the shelf solution we can design and custom build a product to suit.

Visit our website for more info.

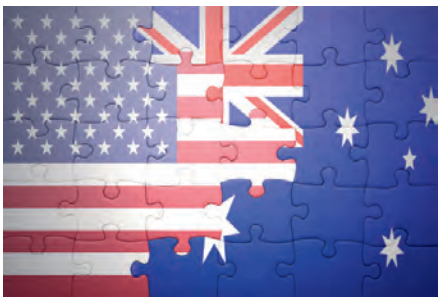


www.zcg.com.au

News

© Stock.Adobe.com/au/João Freitas

Personal locator beacons will be allowed on small craft in Queensland, such as jetskis, canoes and sailboats under six metres. "Current regulations require Queensland regulated ships to carry an emergency position indicating rescue beacon (EPIRB) when operating outside of the declared smooth or partially smooth waters or other waters more than two nautical miles from land," said acting Ports Minister Steven Miles. "We have determined it is now possible for personal watercraft (PWC) and other lightweight craft users to wear personal locator beacons." MSQ will issue an exemption allowing the wearing of a personal locator beacon by users of PWC and other lightweight craft where, up to now, the standard EPIRB was required.
More info: bit.ly/2xJ1UPk



© Stock.Adobe.com/au/luzitanija

HAROLD E HOLT STATION TURNS 50

Australia and the US have celebrated the 50-year anniversary of the official commissioning of Naval Communication Station Harold E Holt in Exmouth, Western Australia. The station was built following the 1963 signing of construction and operation agreements, and the status of forces agreement, between Australia and the US. "Since the station was commissioned on 16 September 1967, it has played a significant part in the Australia–US relationship through its strategic and operational role," said Minister for Defence Marise Payne. "The station provides very low frequency communication transmission services in support of Australian, US and allied submarines and has strengthened the relationship between Australia and the US."
More info: bit.ly/2xIjQJX

Hybrid portable radio

The Midland G18 5W UHF-CB & LMR Hybrid Portable Radio combines the latest radio technology for communication. Built into a sturdy compact diecast aluminium chassis with IP67 protection to withstand dust and immersion in water (up to 1 m deep for 30 min), the G18 is suitable for demanding uses and environments.

The product is suitable for emergency divisions such as rural fire services and ambulance services, aged-care facilities, waste and recycling plants, and traffic control organisations.

Features include output power 1/5 W switchable; channels 80 CB, 256 LMR, dealer programmable; frequency range 476.425 to 477.4125 MHz; CB 450 to 520 MHz LMR; channel width 12.5 kHz narrowband and wideband; operation mode Simplex and Duplex; antenna 50 Ω - SMA connector; waterproof; and working temperature: -20 to +55°C.

Audioxtra International Pty Ltd
www.audioxtra.com.au

Fuel cell generator

The EFOY Pro 12000 Duo fuel cell generator can provide back-up power for remote, weather-affected telecommunications sites. Suitable for New Zealand service providers in the upcoming winter months, the product can provide a reliable alternative to increased site battery capacity, larger solar arrays or diesel generators.

Designed for the telecommunications market, the 19″ rack mount EFOY Pro 12000 Duo is a 24 V/48 V DC 500 W direct methanol fuel cell (DMFC) that provides 100% reliable off-grid and backup power.

The fuel cell generator is a smart energy producer that can be used to continuously and automatically recharge a site's battery bank. To do this, the fuel cell is connected directly to the site's batteries that provide the load, while continually monitoring the batteries' state of charge. The fuel cell recharges the battery automatically and then switches to standby, without the need for maintenance or user intervention.

Very long periods of site autonomy are achievable by pairing multiple M28 (28 L) methanol fuel cartridges or the MT60 (60 L) methanol cartridge.

With an operating temperature range of -20 to +50°C, the product is able to meet the environmental challenges faced by remote telecommunications sites across New Zealand.

Powerbox Pacific Ltd
www.powerbox.co.nz

In-Vehicle Connectivity Solutions *for* Public Safety

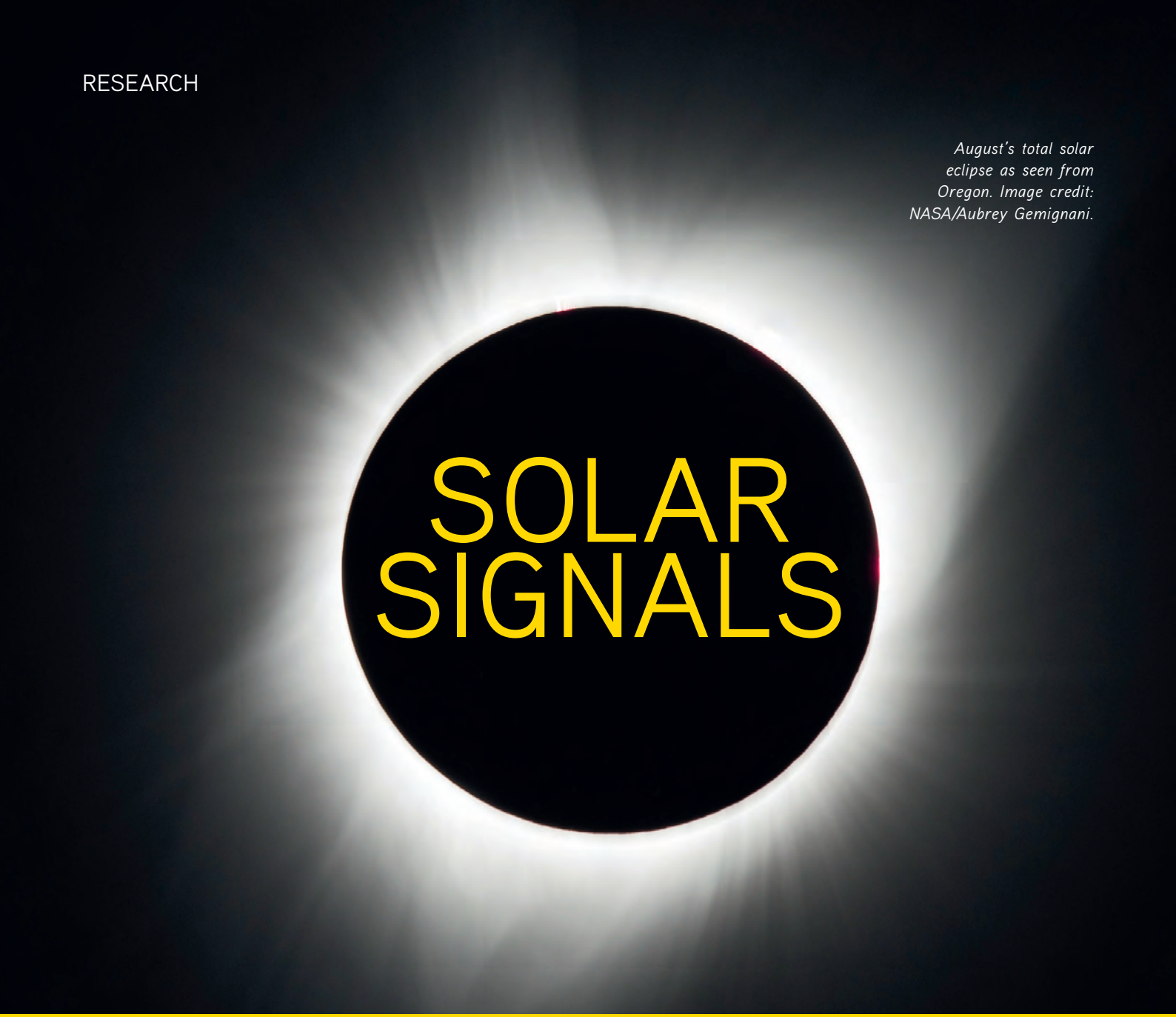
Dash Camera | Body Camera | Driver Tablet | IoT Sensors | Dash Computer

With public safety at stake, reliable network connectivity is a must. Take advantage of Cradlepoint's cutting-edge technologies, including Band 14 readiness, to create operational efficiencies and better protect and serve your communities.

With Cradlepoint solutions, your agencies will be always connected and protected.

Learn more at cradlepoint.com.

cradlepoint



August's total solar eclipse as seen from Oregon. Image credit: NASA/Aubrey Gemignani.

SOLAR SIGNALS

Earth's ionosphere was the subject of scrutiny by an army of amateur radio operators.

When a solar eclipse plunged the US into darkness on 21 August, Nathaniel Frissell was stationed directly along the shadow's path, leading one of the largest experiments in the history of space science from the back porch of a cabin in Gilbertsville, Kentucky.

With a 31 m long-wire antenna, he made contact with a network of ham radio operators he'd assembled around the world to test the strength and reach of their HF signals as one measure of the eclipse's impact on Earth's atmosphere. Around 200 operators — from New Jersey to India — had signed on to be 'citizen scientists' that day by recording their contacts with one another.

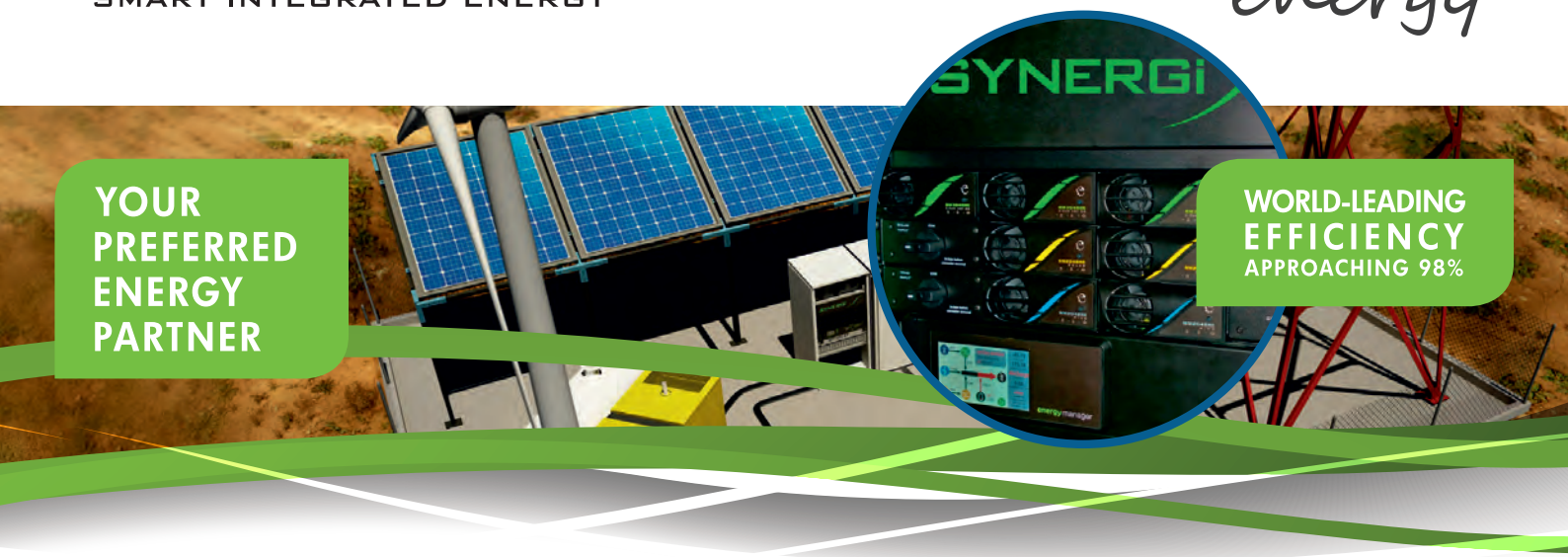
"Among other phenomena, we're hoping to use our radio transmissions to identify how much of the ionosphere is impacted by the eclipse and how long the effects last," said Frissell prior to the event. Frissell is an assistant research professor of physics at the New Jersey Institute of Technology's (NJIT) Center for Solar Terrestrial Research, and a sophisticated practitioner of ham radio who is intent on elevating the technology's role in space science research. He will share data and analysis from the day at the American Geophysical Union annual meeting in December.

Frissell had spent more than two years preparing for the event. While a PhD student at Virginia Tech, he founded the Ham Radio Science Citizen Investigation (HamSCI), an organisation that connects professional researchers such as space physicists and astronomers with the amateur radio community. By merging their data, the different groups hope to construct a comprehensive picture of atmospheric effects caused by space weather events ranging from the solar eclipse to more common phenomena, such as solar flares. In 2014, he first demonstrated the use of ham radio data by showing the effects of an X-class solar flare on HF.

According to a paper co-authored by Frissell ('HamSCI and the 2017 Total Solar Eclipse'), "The continental United States is well-instrumented to study eclipse-induced ionospheric effects, as it contains a suite of instrumentation including GPS Total Electron Content (GPSTEC) receivers, ionosondes, Super Dual Auroral Radar Network (SuperDARN) radars, and other ionospheric instruments capable of obtaining data at an unprecedented level of detail. Even so, the ionosphere is vast and remains under sampled, and therefore additional data sources are welcome complements to existing measurement systems." ›

SYNERGi
SMART INTEGRATED ENERGY

enatel energy



SYNERGi maximizes your site uptime and limits human intervention

Unique patented generator optimization and dynamic phase balancing features that automatically adapt to varying conditions.

High efficiency building blocks

Robust scalable power for flexibility and seamless integration.

Solar and Wind integrated and standalone

Predictability in maximizing harvest and protection features for safety and investment preservation.

Innovative **hybrid power solutions** that reduce OPEX and CO_2 emissions

powerbox
Powering Progress

1800 251 380

SALES@POWERBOX.COM.AU

POWERBOX.COM.AU/TELECOMMUNICATIONS

Members of NJIT's ham radio club preparing for the eclipse. Left to right: Nathaniel Frissell, Peter Teklinski (director of Core Systems and Telecommunications for NJIT and club adviser), Spencer Gunning (standing) Joshua Vega (sitting) and Joshua Katz (standing). Image credit: NJIT.

Members of Frissell's NJIT team of undergraduate ham radio operators, including Spencer Gunning, Joshua Vega and Joshua Katz, developed a website and data analysis tools that enabled them to gather and interpret the observations generated during the eclipse.

"We'll be participating in an international data-collection effort, learning more about the space weather effects of the eclipse, exposing the general public to amateur radio and watching a beautiful once-in-a-lifetime solar event all on the same day," Katz said prior to the event. "That's more excitement than programmers and data analysts like me are usually allowed to have in a single sitting!"

A major source of HamSCI data comes from the Reverse Beacon Network (RBN). The Reverse Beacon Network is an automated radio (1.8–144 MHz) receiving network created and maintained voluntarily by ham radio operators.

"What's exciting from a researcher's perspective is that people have access to tools such as digital radios and computers that are connected in ways they weren't in the past, allowing us to make observations and then collect and share them," said Frissell.

"For us, this is an unusual opportunity to learn things we don't know about the ionosphere," he added. "This is one of the very few times we're able to conduct a controlled experiment around a space weather event. Normally, we have no advanced knowledge over when, where and how they happen."

> **"WHAT'S EXCITING FROM A RESEARCHER'S PERSPECTIVE IS THAT PEOPLE HAVE ACCESS TO TOOLS SUCH AS DIGITAL RADIOS AND COMPUTERS THAT ARE CONNECTED IN WAYS THEY WEREN'T IN THE PAST.**
> **— NATHANIEL FRISSELL**

Frissell noted that the eclipse was expected to change the ionospheric state and possibly create communication paths that do not normally exist. His team was on the lookout for those and other changes.

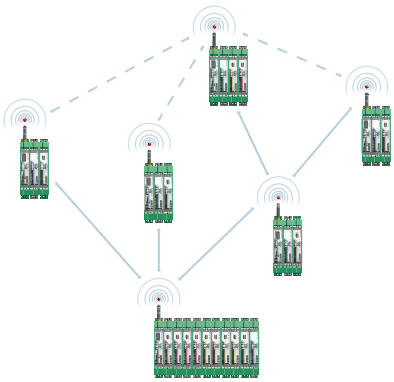
"If you suddenly alter the ionosphere as happens during an eclipse, by reducing the number of ions or changing the temperature, for example, does it create waves or instabilities?" he said. "How far can these effects be detected?"

Indeed, early results suggest the shadow of the eclipse stopped ion production in the ionosphere, as well as the suggestion of a decrease in both maximum usable frequency and D-layer absorption. Amateur operators observed Doppler shifts, phase shifts and amplitude changes in WWV, WWVB and AM radio station reception, and observations suggest a raising of the F layer and depletion of the D layer.

Also arranged for the eclipse was a 'QSO party', which was a great success, with 571 submitted logs and 28,694 QSOs from 5201 unique call signs (including 864 from outside the US).

Adapted from information issued by NJIT.

NEW
Radioline 915 MHz
Now available!



Easy signal distribution with I/O mapping

The Radioline wireless system

Radioline is the wireless system for large systems and networks.

Special features include extremely easy assignment of inputs and outputs by simply turning the thumbwheel - without any programming. Radioline transmits I/O signals as well as serial data, making it very versatile. In addition, you can implement various network structures: from a simple point-to-point connection to complex networks.

For additional information visit **phoenixcontact.com.au/radioline**

or call 1300 786 411

PHOENIX CONTACT
INSPIRING INNOVATIONS

The long-range backscatter system uses a source that emits a radio signal, low-power sensors that encode information in reflected signals and an off-the-shelf receiver.

All images courtesy Dennis Wise/University of Washington.

BACKSCATTER BREAKTHROUGH

The long-range communication barrier has been shattered for near-zero-power devices.

The UW's long-range backscatter system's sensor (shown in the foreground) was able to communicate with a receiver (held in the distant background) throughout a 0.4-hectare farm, a 450-square-metre house and an office area covering 41 rooms.

University of Washington (UW) researchers have demonstrated that devices that run on almost zero power can transmit data across distances of up to 2.8 kilometres — breaking a long-held barrier and potentially enabling a vast array of interconnected devices.

Flexible electronics hold great promise for collecting data. But today's flexible electronics and other sensors that can't employ bulky batteries and need to operate with very low power typically can't communicate with other devices more than a few feet or metres away. This limits their practical use in applications ranging from medical monitoring and home sensing to smart cities and precision agriculture.

By contrast, the UW's long-range backscatter system, which uses reflected radio signals to transmit data at extremely low power and low cost, achieved reliable coverage throughout a 450-square-metre house, an office area covering 41 rooms and a 0.4-hectare vegetable farm.

"Until now, devices that can communicate over long distances have consumed a lot of power. The trade-off in a low-power device that consumes microwatts of power is that its communication range is short," said Shyam Gollakota, lead faculty and associate professor in the Paul G. Allen School of Computer Science & Engineering. "Now we've shown that we can offer both, which will be pretty game changing for a lot of different industries and applications."

›

iTkey

Networked Media
Time & Frequency
Control Systems

Visit us at
Comms Connect Melbourne
Booth 22

MobileViewpoint

Bonded mobile video links for industrial and UAV deployment

MEINBERG

Modular time & synchronisation for control, telco & finance

FileCatalyst®
reinventing file transfer

High-speed, secure, guaranteed file delivery
for mission critical applications

Bodet

Time & Audio systems
for control rooms, education, and industry

CRESTRON

Audio Visual, Conferencing and Room Automation
from the smallest room to the biggest campus

WorldCast Systems

Multi-vendor network monitoring
for communications and IT networks

CUSTOM CABLING

Cable assemblies, harnesses, pre-wired racks
and on-site installation

onair SOLUTIONS

Video capture, encoding and streaming
for events and corporate communications

P +61 2 8882 7755 E sales@itkey.com.au W itkey.com.au

The long-range backscatter research team includes Bryce Kellogg (left), Vamsi Talla (centre) and Mehrdad Hessar (right).

> "THIS IS THE FIRST WIRELESS SYSTEM THAT CAN INJECT CONNECTIVITY INTO ANY DEVICE WITH VERY MINIMAL COST." — VAMSI TALLA

The team's latest long-range backscatter system provides reliable long-range communication with sensors that consume 1000 times less power than existing technologies capable of transmitting data over similar distances. It's an important and necessary breakthrough towards embedding connectivity into billions of everyday objects.

The long-range backscatter system will be commercialised by Jeeva Wireless, a spin-out company founded by the UW team of computer scientists and electrical engineers, which expects to begin selling it within six months.

The sensors are so cheap — with an expected bulk cost of 10 to 20 cents each — that farmers looking to measure soil temperature or moisture could affordably blanket an entire field to determine how to efficiently plant seeds or water.

Other potential applications range from sensor arrays that could monitor pollution, noise or traffic in smart cities or medical devices that could wirelessly transmit information about a heart patient's condition around the clock.

"People have been talking about embedding connectivity into everyday objects such as laundry detergent, paper towels and coffee cups for years, but the problem is the cost and power consumption to achieve this," said Vamsi Talla, CTO of Jeeva Wireless, who was an Allen School postdoctoral researcher and received a doctorate in electrical engineering from the UW.

"This is the first wireless system that can inject connectivity into any device with very minimal cost."

The research team, for instance, built a contact lens prototype and a flexible epidermal patch that attaches to human skin, which successfully used long-range backscatter to transmit information across a 300-square-metre atrium. That's orders of magnitude larger than the one-metre range achieved by prior smart contact lens designs.

The system has three components: a source that emits a radio signal, sensors that encode information in reflections of that signal and an inexpensive off-the-shelf receiver that decodes the information. When the sensor is placed between the source and receiver, the system can transmit data at distances up to 475 metres. When the sensor is placed next to the signal source, the receiver can decode information from as far as 2.8 kilometres away.

The advantage to using backscattered radio signals to convey information is a sensor can run on extremely low power that can be provided by thin cheap flexible printed batteries or can be harvested from ambient sources — eliminating the need for bulky batteries. The disadvantage is that it's difficult for a receiver to distinguish these extremely weak reflections from the original signal and other noise.

"It's like trying to listen to a conversation happening on the other side of a thick wall — you might hear some faint voices but you can't quite make out the words," said Mehrdad Hessar, an Allen School doctoral student. "With our new technology we can essentially decode those words even when the conversation itself is hard to hear."

To overcome the problem, the UW team introduced a new type of modulation — called chirp spread spectrum — into its backscatter design. Spreading the reflected signals across multiple frequencies enabled the team to achieve much greater sensitivities and decode backscattered signals across greater distances even when it's below the noise.

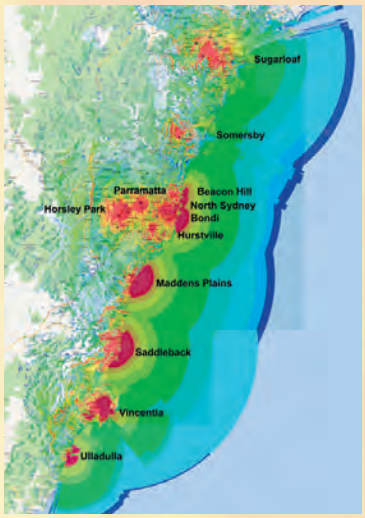
"We basically started with a clean slate and said if what we really need to enable smart applications is long-range communication, how could we design the system from the ground up to achieve that goal?" said Bryce Kellogg, a co-founder at Jeeva Wireless who was a UW electrical engineering student.

Other researchers involved in the work include Joshua Smith, professor in the Allen School and the UW Department of Electrical Engineering, and UW electrical engineering doctoral student Ali Najafi. The research was funded by the US National Science Foundation.

shift
smarter cities

WIDE AREA COVERAGE NETWORK:
DMR TIER III TECHNOLOGY

DMR TIER III:
THE FUTURE OF RADIO



DMR TIER III FUNCTIONALITY INCLUDES:

- ➤ GPS
- ➤ VOICE RECORDING
- ➤ TELEMETRY APPLICATIONS**
- ➤ ADVANCED ENCRYPTION
- ➤ REMOTE RADIO DISABLE
- ➤ PHONE INTERCONNECTIVITY
- ➤ GEO-FENCING
- ➤ EMERGENCY ALARM
- ➤ MAN DOWN ALARM
- ➤ TEXT MESSAGING AND EMAIL
- ➤ MULTIPLE TALK GROUPS AND PRIVATE CALLS
- ➤ EFFICIENT DISPATCH SYSTEMS
- ➤ IMPROVED COVERAGE
- ➤ IMPROVED VOICE CLARITY

** Future development

The SHIFT Network
Be Smarter | Be Better | Be 1st
For Smarter Cities

PHONE: (02) 8090 4701
EMAIL: SALES@SHIFTTODMR.COM.AU
WEB: WWW.SHIFTTODMR.COM.AU

Hytera

Antenna range

The Panorama Antennas LPAM-7-27-24-58 and LGAM-7-27-24-58 antenna range is suitable for a variety of uses, such as M2M and IoT applications. It offers multiband connectivity in a single unit comprising MiMo cellular LTE and MiMo dual-band Wi-Fi, with optional GPS, in a single, compact antenna.

The compact, low-profile design means the product measures only 5 cm in height, 15 cm in length and 4 cm width, making it one of the smallest multifunction antennas available.

The LPAM-7-27-24-58 antenna contains two antenna elements, with effective isolation and correlation covering all current global cellular LTE bands, including 698–960/1710–3800 MHz and dual-band Wi-Fi 2300–2500/4900–6000 MHz. The LGAM-7-27-24-58 variant also provides the optional active GPS/GNSS/Galileo/BeiDou antenna 1562–1612 MHz with 26 dB LNA gain.

The antennas offer an easy, quick, secure and weatherproof installation with the single-hole mounting bush and acrylic adhesive sealing pad. The antenna does not require a ground plane and maintains a high level of performance, even when mounted on a non-metallic surface. Supplied with integrated 3 m cables and SMA male plugs fitted, the antenna provides a MiMo multifunction connectivity solution in a single antenna.

Panorama Antennas Pty Ltd
www.panorama-antennas.com

Handheld transceiver

The ToooAir TA-308 handheld transceiver fits snugly in the hand. It has a mono display and 2800 mAh battery, drop-in charger and built-in super-sensitive GPS receiver. The product is a PTToC unit operating on the NextG 850 MHz network. It enables Australia-wide terrestrial coverage, including in-tunnel and enhanced in-building reception.

The dispatch software includes a 'lone worker' feature, designed to alarm the controller if no contact has been activated from a radio within a given time period. Other features include GPS tracking, priority call, hierarchy call handling, group call, dynamic group reprogramming, stun, geofencing and network voice record.

Tooo Air Pty Ltd
www.toooair.com.au

Trunking cube base station

The Hytera DMR Tier III trunking cube base station is designed with fast deployment and operation simplicity in mind.

It is a highly integrated system, enabling users to power on the base station to start delivering communications. Quick and flexible to deploy, the device can be mounted indoors or outdoors, ensuring swift positioning to provide business- or mission-critical communications.

With multicarrier and software-defined radio (SDR) technologies, one base station is expandable to eight carriers and all frequencies and carrier capacity can be customised. It also has an eco-friendly design with low power consumption due to advanced technology like DPD.

Hytera Communications Co. Ltd

www.hytera.com.au

Antenna range

The ZCG Scalar BLKR antenna range comes in a sleek and stylish all-black design, combining black chrome and electro-plated components.

The SG477-BLKR is an all-black ground independent UHF CB Radio antenna with 477 MHz, UHF male, 20 W, 2.1 dBi — 900 mm.

The SGL477-BLKR is an all-black ground independent lightweight UHF CB radio antenna, with 477 MHz, 5 m cable, UHF male, 30 W, 2.1 dBi — 750 mm.

The SG1100-BLKR is an all-black AM/FM radio receive antenna, solderless car radio connector, which is receive only — 900 mm.

The SGL1100-BLKR is an all-black AM/FM radio receive lightweight antenna, with 5 m cable, solderless car radio, and receive only — 750 mm.

ZCG Scalar

www.zcg.com.au

Rx-Tx case

The Survey Technologies Rx-Tx Go case provides the capability to measure downlink RSSI and BER from on a test channel transmitted from a site, as well as transmit the needed uplink signals for measurement at a site.

The product is an extension of STI Field Test 7 and when combined with the needed site side equipment, enables uplink and downlink coverage and performance testing in a single drive test. This integrated unit contains lithium-ion batteries for several hours of use if not connected to external power, battery charger, antenna switch and cooling fans to force air through the internal components.

The Tait test mobiles utilised with the product are configurable for P-25 phase 1 or P-25 phase 2 TDMA operation by the user.

Survey Technologies Incorporated
www.surveytech.com

Dispatch console application

The Omnitronics RediTALK-Flex is an advanced Windows-based dispatch console application. It is quick to install and easy to use and does not require a central server. This makes it suitable for small to medium-sized organisations.

RediTALK-Flex has been developed in collaboration with major radio manufacturers to ensure it delivers full functionality, from call management and text messaging to GPS. Because it works with both conventional and trunked systems, it can be used in a broad range of applications.

It also works with analog radio and supports traditional signalling schemes such as Selcall, MDC and 2-tone paging. RediTALK-Flex provides a user interface (UI) that is easy to use, and is consistent across different radio systems. Regardless of whether the system uses DMR, P25 or both, RediTALK-Flex strives to make the operator's job easy.

RediTALK-Flex is suitable for digital and analog networks.

Omnitronics Pty Ltd
www.omnitronics.com.au

Dual bus DC distribution panel with remote power control

The Helios Power Solutions DISICT240DB-8IRC dual bus DC distribution panel with remote power control is designed to be used in 12, 24 or 48 VDC applications. All connections and functions are located on the front of the panel for when rear access is not available.

Each bus features 4 output positions and supports hydraulic/magnetic breakers with up to 25 A continuous output each. The ability to remotely monitor and manage each output via Ethernet makes the DISICT240DB-8IRC suitable for high current loads such as LTE radios and RF amplifiers. The 1RU design saves valuable rack space and fits all standard 19″ racks.

An integrated security-protected Ethernet communications port allows the DISICT240DB-8IRC to be monitored from a remote site using an industry-standard web browser. HTTPS and SNMP V1/V2c protocols are supported. System current, system voltage, individual output currents and fuse status can be monitored, and alarms can be sent to multiple email accounts.

DC outputs can be turned on and off remotely, allowing connected loads to be power-cycled individually or together using the Ethernet connection. Automatic load-shedding can be defined to protect critical loads. A network watchdog feature will ping up to two IP addresses and power-cycle loads such as routers, which may need rebooting to restore communications with the site.

Four digital contact and one analog temperature input are provided to allow site monitoring sensors such as door, water and smoke alarms to be connected and email alerts to be sent. Each alarm can be given a unique name.

Product highlights include dual independent DC load buses; 240 A peak system current; 120 A peak bus current; 25 A continuous load per output; 12, 24, or 48 VDC supported; mixed voltages and polarities can be run simultaneously; each bus features four breaker-protected outputs; front access to all connections and functions; 1RU 19″ rackmount; independent form C alarm contacts for each bus; Ethernet-enabled, supports HTTPS and SNMP protocols; five site monitoring input contacts; remote monitoring of load currents; remote power control of individual outputs for power-cycling and rebooting loads; network watchdog (auto-ping); automatic load shedding; and up to 30 days of data-logging.

Helios Power Solutions
www.heliosps.com.au

Marine mobile phone and wireless data deck mount

The ZCG ZM18-4GX marine mobile phone and wireless data deck mount offers good reception range in a broadband Telstra 4GX network antenna.

It has an omnidirectional, marine collinear antenna; a frequency range of 700–788 MHz; a white fibreglass radome; a chrome mount ferrule and cable assembly; tri-metal plated termination; a cable tail with an FME connector; maximum power of 30 W; gain of 8.1 dBi; and a height of 1.8 m.

ZCG Scalar
www.zcg.com.au

TASMANIA'S ESCAD MILESTONE

Jonathan Nally

The southern state's emergency services now have integrated dispatch capabilities.

In the first step of its rollout, Tasmania's new Emergency Services Computer-Aided Dispatch (ESCAD) system is now being used by Tasmania Police.

The Tasmanian Government has committed more than $17 million to the ESCAD project, the contract for which was awarded to Fujitsu and local Tasmanian firm Synateq.

The system will eventually be used by all of the state's emergency services agencies, providing for greater cooperation and visibility across the island.

Rene Hidding, Tasmania Minister for Police, Fire and Emergency Management, viewing the new ESCAD system.

"This will improve the efficiency and effectiveness of our emergency response departments, resulting in both increased safety for those on the frontline and more Tasmanian lives saved in emergency situations," said Rene Hidding, Minister for Police, Fire and Emergency Management.

"An integrated communications and dispatch system was ignored by Labor during their 16 years in office despite numerous calls from stakeholders for its implementation, and it has taken a majority Liberal government to provide this important upgrade in our first term."

The next service to start using the system will be Ambulance Tasmania, with a 'go-live' date of 28 November 2017, followed by the Tasmania Fire Service and State Emergency Service in 2018.

When *Critical Comms* spoke with Tasmania's Deputy Commissioner of Police, Scott Tilyard, last year, he said that the CAD system then used by Tasmania Police was built in-house nearly 30 years ago and that it had done an "exceptionally good job".

"But it's at end of life, so that was really a catalyst for us to look at a replacement system," he said.

"And, of course, these days the question needs to be asked, what is the whole-of-government benefit we can get from this?" he added. "Rather than just replacing a system for police, we needed to look more broadly to a common system for emergency services and police.

"And certainly in some other places in the country that has already been done," he said. "So it was agreed that we would move to a common system and it would be used by all of the services and, for the first time, give SES a dedicated CAD capability as well."

Tasmania also operates an interim interoperability gateway, which enables the disparate emergencies agencies to communicate with each other.

RediTALK-Flex

Delivers what digital radio promises

Sophisticated Linking/patching

Geofencing & Location Services

SIP Telephone Connectivity

Flexible scalabilty

omnitronics

reditalkflex.com

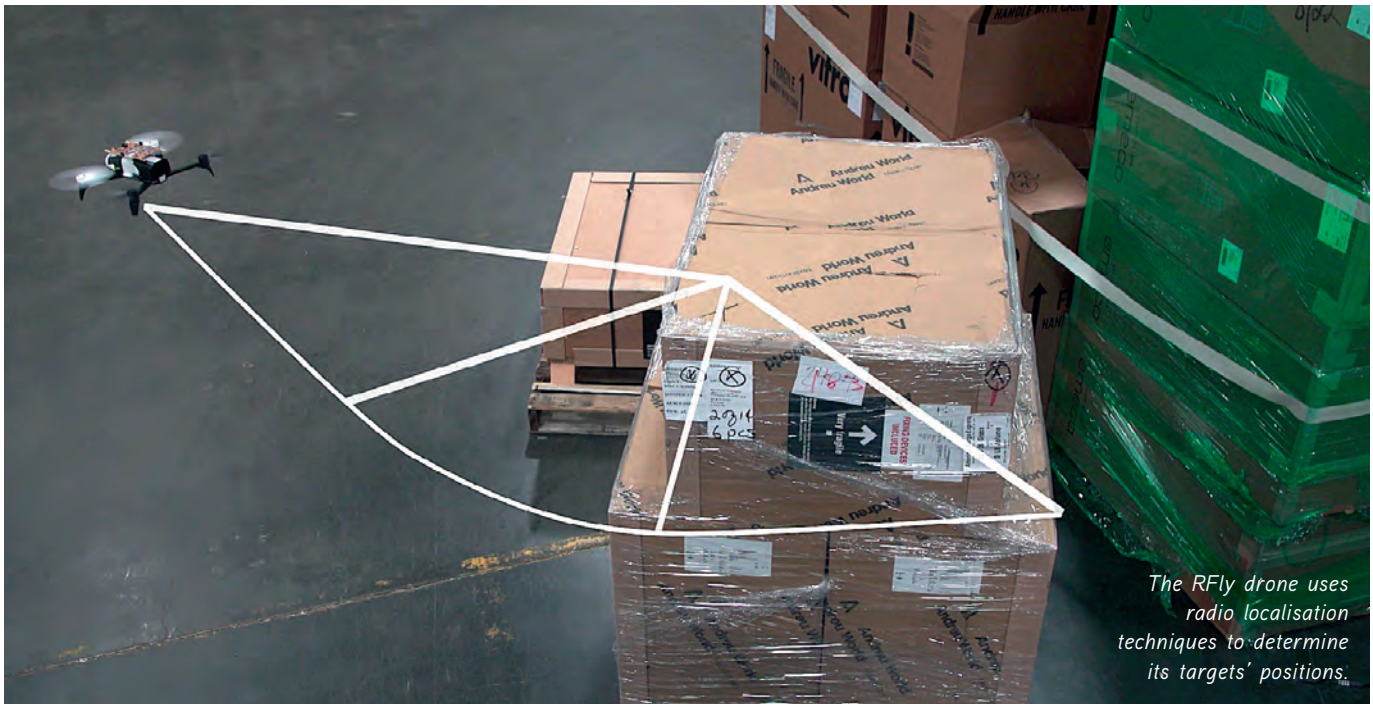
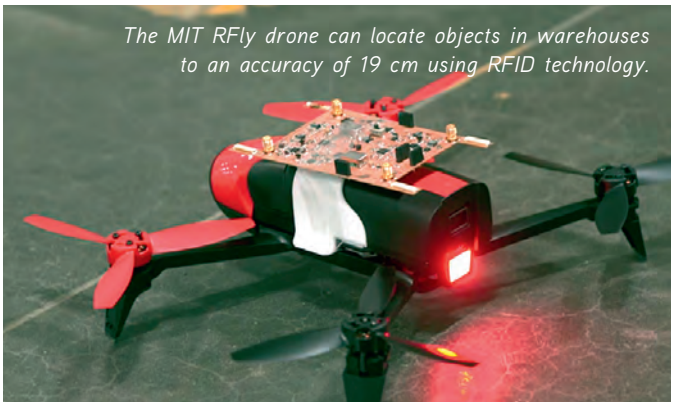


Image courtesy MIT.

The RFly drone uses radio localisation techniques to determine its targets' positions.

SKY TRACKERS

Industries could save billions of dollars by tracking items from the air using radio location technology.



The MIT RFly drone can locate objects in warehouses to an accuracy of 19 cm using RFID technology.

Radio-frequency ID tags were supposed to revolutionise supply chain management. The dirt-cheap, battery-free tags, which receive power wirelessly from scanners and then broadcast identifying numbers, enable warehouse managers to log inventory much more efficiently than they could by reading box numbers and recording them manually.

But the scale of modern retail operations makes even RFID scanning inefficient. In the US, for instance, Walmart reported that in 2013 it lost US$3 billion in revenue because of mismatches between its inventory records and its stock. Even with RFID technology, it can take a single large retail store three months to perform a complete inventory review, which means that mismatches often go undiscovered until exposed by a customer request.

Massachusetts Institute of Technology (MIT) researchers have now developed a system that enables small, safe, aerial drones to read RFID tags from tens of metres away while identifying the tags' locations with an average error of about 19 cm. The researchers envision that the system could be used in large warehouses for continuous monitoring, to prevent inventory mismatches and for the location of individual items, so that employees can rapidly and reliably meet customer requests.

The central challenge in designing the system was that, with the current state of autonomous navigation, the only drones safe enough to fly within close range of humans are small, lightweight drones with plastic rotors, which wouldn't cause injuries in the event of a collision. But those drones are too small to carry RFID readers with a range of more than a few centimetres.

The researchers met this challenge by using the drones to relay signals emitted by a standard RFID reader. This not only solves the safety problem but also means that drones could be deployed in conjunction with existing RFID inventory systems, without the need for new tags, readers or reader software.

"Between 2003 and 2011, the US Army lost track of US$5.8 billion of supplies among its warehouses," said Assistant Professor Fadel Adib, whose group at the MIT Media Lab developed the new system. "In 2016, the US National Retail Federation reported that shrinkage — loss of items in retail stores — averaged around US$45.2 billion annually. By enabling drones to find and localise items and equipment, this research will provide a fundamental technological advancement for solving these problems."

The MIT researchers describe their system, dubbed RFly, in a paper they presented at the annual conference of the Association for Computing Machinery's Special Interest Group on Data Communications. Adib is the senior author on the paper and is joined by Yunfei Ma, a postdoc in the Media Lab, and Nicholas Selby, an MIT graduate student in mechanical engineering.

Phase shift

Relaying RFID signals and using them to determine tags' locations poses some thorny signal-processing problems. One is that, because the RFID tag is powered wirelessly by the reader, the reader and the

tag transmit simultaneously at the same frequency. A relay system adds another pair of simultaneous transmissions: two between the relay and the tag and two between the relay and the reader. That's four simultaneous transmissions at the same frequency, all interfering with each other.

This problem is compounded by the requirement that the system determine the location of the RFID tag. The location detection — or localisation — system uses a variation on an antenna array, where signals detected will be slightly out of phase. From those phase differences, software can deduce the angle of transmission and thus the location of the transmitter.

The drone is too small to carry an array of antennas, but it is continuously moving, so readings it takes at different times are also taken at different locations, simulating the multiple antenna elements of an array.

Ordinarily, to combat interference, the drone would digitally decode the transmission it receives from the tag and re-encode it for transmission to the reader. But in this case, the delays imposed by the decoding-encoding process would change the signals' relative phases, making it impossible to accurately gauge location.

All radio systems encode information by modulating a base transmission frequency, usually by shifting it slightly up and down. But because an RFID tag has no independent power source, its modulations are detectably smaller than those of the reader. So the MIT researchers devised an analog filter that would subtract the base transmission frequency from the signals that reach the reader and then separate the low-frequency and high-frequency components. The low-frequency component — the signal from the tag — is then added back onto the base frequency.

> THE SYSTEM WAS ABLE TO LOCALISE THE TAGS WITH 19-CENTIMETRE ACCURACY WHILE EXTENDING THE RANGE OF THE READER TENFOLD IN ALL DIRECTIONS.

Frame of reference

At this point, however, another problem still remains. Because the drone is moving, the phase shift of the signals that reach the reader result from not only the drone's position relative to the RFID tag but also its position relative to the reader. On the basis of the received signal alone, the reader has no way to tell how much each of those two factors contributed to the total phase shift.

So the MIT researchers also equip each of their drones with its own RFID tag. A drone alternates between relaying the reader's signal to a tagged item and simply letting its own tag reflect the signal back, so that the reader can estimate the drone's contribution to the total phase shift and remove it.

In experiments in the Media Lab that involved tagged objects, many of which were intentionally hidden to approximate the condition of merchandise heaped in piles on warehouse shelves, the system was able to localise the tags with 19 cm accuracy while extending the range of the reader tenfold in all directions, or one hundredfold cumulatively. The researchers are currently conducting a second set of experiments in the warehouse of a major retailer.

AURIZON'S TETRA ROLLOUT

TETRA network linking mines and ports will be groundbreaking in its scale, functionality and capability.

Radlink Communications is set to deliver one of the largest, most technologically advanced radio networks in Australia after securing a contract with Aurizon, Australia's largest rail freight operator.

The network — due for completion early next year — will use TETRA digital radio technology, encompassing 79 sites and covering 2670 kilometres of rail network, linking 50 coalmines and four major ports throughout central Queensland.

The new system will consolidate four outdated, independent analog systems across Aurizon's train control, shunting, maintenance and wayside operations.

The new single network will provide the highest level of reliability and availability, with no single point of failure.

It will also deliver improved monitoring, remote diagnostics, overlapping radio coverage, GPS tracking and distress signal capabilities.

Created with flexibility and reliability in mind, Radlink's technical solution utilises DAMM Tetraflex radio base stations with Sepura radio terminals, while remaining fully open standard and interoperable with other approved TETRA radio terminals.

Radlink Communication Project Director Scott Manson said the system will provide Aurizon with a high-performance communications network.

"The system we are implementing for Aurizon is truly groundbreaking in terms of its sheer scale, functionality and capability," he said.

"The new TETRA network will be fully integrated to operate over the Aurizon Central Queensland MPLS network and will provide greater radio coverage, increased reliability and advanced monitoring for what will be a critical communications network."

The system will utilise Radlink's Reveloc digital radio software, a platform designed to provide advanced functionality and unlock the full potential of digital radio systems such as TETRA.

Applications available to Aurizon will include advanced facilities such as geofenced auto channel change; weather alerts directly over the radio system from the Weather Watch website; heat maps that track and show the identity and location of every radio; speed alerts and signal strength; and a mobile phone client that provides two-way radio access and functionality on iPhone and Android smartphones.

DAMM technical staff pose with some of the TETRA equipment used in the contract.

Images courtesy Aurizon, Radlink and DAMM.

Radlink Project Manager Jimmy Whelan said construction of the network is on track for the scheduled completion date.

"Installation of the project is running smoothly, with live testing producing seamless handover between neighbouring sites and measured signal strengths vastly exceeding customer expectations," he said.

"Since being awarded the contract in mid-February of this year, we have advanced to stage three of the five-stage project and are on schedule for our estimated completion in the first half of 2018.

"To ensure quality of service, we are replacing all components of the existing radio system and adding an additional 19 sites to the old Aurizon radio network," he added.

The new radio system is one of the most technically complex and strategically important projects in Aurizon's asset renewal initiative.

Aurizon last renewed its radiocommunications more than 20 years ago, so an overhaul of the old system was imperative to ensure reliable, secure communications to meet future operational requirements.

Radlink is providing a complete turnkey design-and-construct network solution, including towers, solar power installations, system interfaces and applications.

Founded in 2007 by partners Jim Reid, Scott Manson and David Moran, Radlink Communications is an Australian-owned and -operated telecommunication business with workshops and warehouse complexes in Western Australia, Queensland, South Australia and New South Wales.

FREE EXPO PASS

22-23 November 2017

Melbourne Convention and Exhibition Centre

MELBOURNE

COMMS 2017 CONNECT

Events for critical communications users and industry

1500+ users and industry experts | 80+ exhibitors | 75+ speakers
7 training workshops | 3 conference streams

LAST CHANCE TO REGISTER — DON'T MISS OUT

Industy and users are coming together to Melbourne for three days … join the conversation, connect with your peers, and discover what's developed to solve your comms issues.

EXHIBITION OPENING TIMES:
WED 22 NOV – 9.00AM-5.30PM
THURS 23 NOV – 9.00AM-3.30PM

NETWORKING DRINKS:
OPEN TO ALL
WED 22 NOV – 5.30PM-6.30PM

WHO CAN YOU SEE?

Platinum Sponsor

Hytera — Respond & Achieve

Gold Sponsors

rftechnology, ZETRON, tait communications, COBHAM, simoco wireless solutions, omnitronics, MOTOROLA SOLUTIONS

Silver Sponsors

challenge networks, CODAN RADIO COMMUNICATIONS, ICOM, Schneider Electric

Exhibitors include

4RF, Anritsu envision:ensure, ARCIA, ITkey, ATDI software solutions in radiocommunications, BelFone, COMPS, ChatterPTT smart team communications, CISTECH, CommSite integrated communication, cradlepoint, comms critical, FREQUENCY PLUS, Genesis, GME, KENWOOD Listen to the Future, GME, HELIOS POWER SOLUTIONS, intercel, KEYSIGHT TECHNOLOGIES, KORE, L&W SPORTS, logicwireless, MIDLAND, ORION always connected, Panasonic TOUGHBOOK, REGAL ELECTRO Powering Excellence, RFI TECHNOLOGY SOLUTIONS, Wave, ROHDE&SCHWARZ, SPECTRUM ENGINEERING, STI Survey Technologies, TASSTA, TCCA, TELERESOURCES, TOOOAir, UNICOM, powerbox, AST, vertel, vicom, VicTrack, WDS, maestro wireless solutions, BENELEC, Cambium Networks, David Clark Company Incorporated, DIGI Connect with Confidence, WirelessTech, IPMobileNet, JRC, Japan Radio Co., Ltd., NEC, NICE, OpenSpectrum, Sensear, sepura, SAF Australia, TPL SYSTEMS ASIA-PACIFIC, TRBOnet Digital Technologies, TRIO Test & Measurement, Wireless Innovation, EMONA, ZCG

Digital Partner

Lanyard Sponsor

ERICSSON

Networking Drinks Sponsor

Wireless Innovation

Media Partner

comms critical — www.CriticalComms.com.au

Association Partner

ARCIA

www.melbourne.comms-connect.com.au

The winning Radical Solutions team won $30,000 in prizes, including $15,000 in cash and credits with Amazon Web Services.

RADICAL SOLUTIONS FOR REAL PROBLEMS

Jonathan Nally

Radical Systems has won the 2017 Motorola Solutions New South Wales public safety hackathon.

The Darwin-based business systems developer won the fast-paced, 48-hour challenge with a solution designed to capture vital data for emergency services while maintaining the integrity of highly secure and covert communications.

The solution is designed to provide better connectivity and communications for public safety organisations, enabling improved decision-making and response to major events such as bushfires. The application would also enable system users to capture vital data on their devices when they are not connected to the network.

Radical Systems incorporated the use of Motorola Solutions' convergence suite of software in its solution design, enabling radio network access to be securely extended to users of smartphones and other devices.

The company was awarded $30,000 in prizes through the competition, including $15,000 in cash and credits with Amazon Web Services (AWS) to further develop its solution in the cloud. Second place went to a combined team from Mastercom and Battlerz, which was awarded a combined $10,000 in cash and AWS credits.

Other competing developers included DiUS, Motorola Solutions, Gridstone and a team of NSW university students studying engineering.

The hackathon was supported by public safety agencies including the NSW Telco Authority, NSW State Emergency Service and NSW Rural Fire Service. Agencies provided challenge statements based on real operational problems faced by their frontline personnel every day.

Real-world solutions

Applying the principles of agile development, application developers worked to resolve the challenge statements by developing smart applications in a pressure-cooker environment.

The event highlighted how mobile broadband innovation could be applied to improve situational awareness and collaboration for Australia's public safety organisations while opening up new possibilities for developers.

"This experience taught us a lot about what emergency services personnel face in their daily work," said Iain Buchanan, senior developer with Radical Systems.

"This really stretched our thinking in terms of solutions design and forced us to consider how technology could be applied to improve safety and productivity within their environments."

"This win will stimulate further growth for business and we plan to expand our solution — possibly by incorporating video streaming and image sharing — to create an even more valuable product for our customers," explained Adam Whitehead, Radical Systems' technology director.

Stiff competition

The team that came second comprised just two individuals who first met on the day of the hackathon. Amit Chawathe from Battlerz and Cameron Duff from Mastercom teamed up to compete against larger and more senior development teams and companies.

"The challenge we worked on was regarding the crew welfare of emergency services personnel on the ground during an incident,"

said Chawathe. "We developed a prototype for crew welfare and showed how it could be enhanced to engage the public for disasters with a personalised plan for risk reduction. The personalised data could then be leveraged during the disaster for better planning and real-time updates from the public.

"The emergency services representatives at the hackathon were especially thrilled about the latter," he added. "The solution was also shown to be useful for enabling spontaneous volunteering from members of the public during an emergency. We received great feedback and hope to realise the solution."

"We cherished the opportunity to work on real-world problems directly with the emergency services and Motorola Solutions staff, by gaining an understanding of the problems on the ground and then proposing realistic solutions," said Duff. "We were particularly grateful to the emergency services staff and volunteers who gave us their time.

"We came a close second and are proud of the effort and achievement of our tiny team against stiff competition, in a very supportive and well organised environment," he added.

"We're grateful to Motorola Solutions, AWS and the government agencies involved for giving us the opportunity to participate," said Chawathe. "We look forward to the next challenge and the chance to work together again in the future, which is the real win."

Collaboration

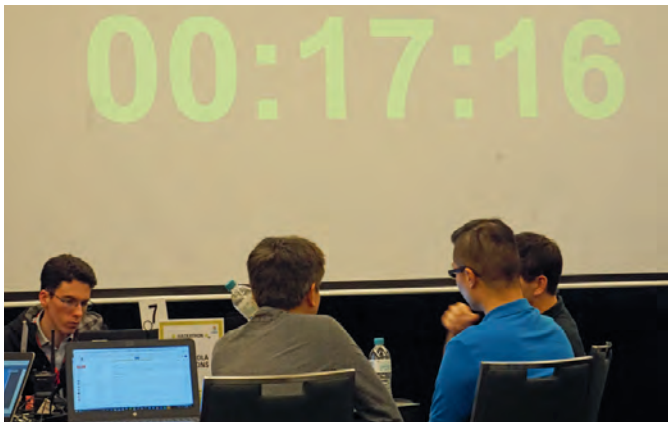
All intellectual property developed during the hackathon belongs to the competing developers, giving them the flexibility to complete their applications either on their own or with support from Motorola Solutions.

Motorola Solutions' vice president of cloud infrastructure, Tom Guthrie, said his company would continue to invest in hackathons and the growing number of services available within the cloud to deliver innovation to emergency services and enterprise organisations.

"Hackathons and the rapidly growing, common toolsets available within the cloud make a powerful combination," Guthrie said.

"Used together, they provide a new way for us to work, share our ideas, iterate and learn from each other. This kind of collaboration is essential to developing much-needed technologies to support public safety and enterprise organisations into the future."

Planning for Motorola Solutions' next hackathon, in Melbourne in mid-2018, is now underway. For more information, contact Motorola Solutions Australia and New Zealand's marketing director, Kym Little, at kym.little@motorolasolutions.com.



Fixed mount mobile radio

The ToooAir TA-300 fixed mount mobile operates on the NextG 850 MHz Telstra network and ToooAir controlling platform.

The product is a compact unit measuring 110 x 100 x 40 mm and can be mounted above or below a dash. Additionally, the LCD display can also be reversed top to bottom to facilitate above windscreen console mounting. The product is supplied with an in-vehicle GPS and GSM antenna.

The unit has group call, individual call, call hierarchy, dynamic group reprogramming and radio stun. The platform also records all voice communication and tracklogs that can be recalled months later.

With over 7000 repeater sites situated around Australia, the network offers good urban and rural coverage and improved in-building and in-tunnel reception.

Tooo Air Pty Ltd

www.toooair.com.au

Surge protective devices

Valvetrab SEC-DC type 2 surge protective devices are narrow pluggable modules with just 12 mm per channel. They are used to protect linear direct current sources. Due to safe energy control (SEC) technology, these products are both durable and powerful.

The disconnect device provides protection for all standard 120/220 VDC applications. The self-extinguishing capability of the protective device eliminates the need for a backup fuse. Sensitive downstream components are reliably protected, thanks to the low voltage protection level. The basic element and the plug can be rotated by 180° to one another. This enables a connection with shorter cable lengths with the marking remaining legible. The easy-to-read status indicator and the floating remote indication contact keep the user informed about the status of the product at all times.

Recurring inspections of the protective devices are carried out quickly and easily with the Checkmaster 2 test device.

Phoenix Contact Pty Ltd

www.phoenixcontact.com.au

Two-way POCSAG/Cellular pager

The Birdy 3G incorporates a POCSAG paging receiver with a 3G module, giving the user the ability to receive critical messages from the robust paging network as well as over 3G cellular networks. The 3G module also enables a response channel so the Birdy 3G can send an automatic acknowledgement when a message is received and a confirmation of response by the user advising if they are available to take part in a mission-critical incident.

Birdy 3G is also able to receive messages sent over a cellular network either in M2M mode or via SMS.

The Birdy 3G is designed to be used in tough conditions with an IP54 water resistance and dust rating. The rugged case also protects the device from unavoidable bumps during field operations.

The design also includes a GPS module so that response times and distances can be calculated to an event or meeting point. Geofencing can also be utilised to target the closest available responders. The Birdy 3G offers the possibility to send an SOS call by pressing the button or using the 3-axis accelerometer for man-down and dead-man applications.

The Birdy 3G also includes a module enabling workforce management from the device so volunteer responders can easily change their status of availability depending on their circumstances.

TPL Systems provides the ability to integrate the Birdy 3G into third-party CAD/ dispatch systems via the TPL Birdy Server for connection between the cellular network and the internet and passes XML files to the user's software.

TPL Systems Asia-Pacific Pty Ltd

www.tplsystems.com.au

Mobile phone collinear antenna

The ZCG SG700-4GX mobile phone collinear antenna has the ability to receive and transmit on the 820–890 MHz band.

The super gain collinear antenna has a frequency range of 718–788 MHz and 820–890 MHz at a reduced gain.

The antenna has been built with brass, Teflon and a fibreglass radome. It is 1.1 m tall and designed to operate in the Telstra 4GX frequency range. The 5.1 dBi antenna includes a 4.5 m cable and an FME female connector.

Alternative mounting options, waterproofing, adapters and other installation accessories are all available separately.

ZCG Scalar

www.zcg.com.au

GNSS simulator

The Rohde & Schwarz SMW200A GNSS simulator is a satellite navigation system simulator. It can be extended to up to four RF outputs and allows GNSS signals to be simulated simultaneously in multiple frequency bands for multiple antennas. It can internally simulate a complex interference environment in parallel with GNSS signals.

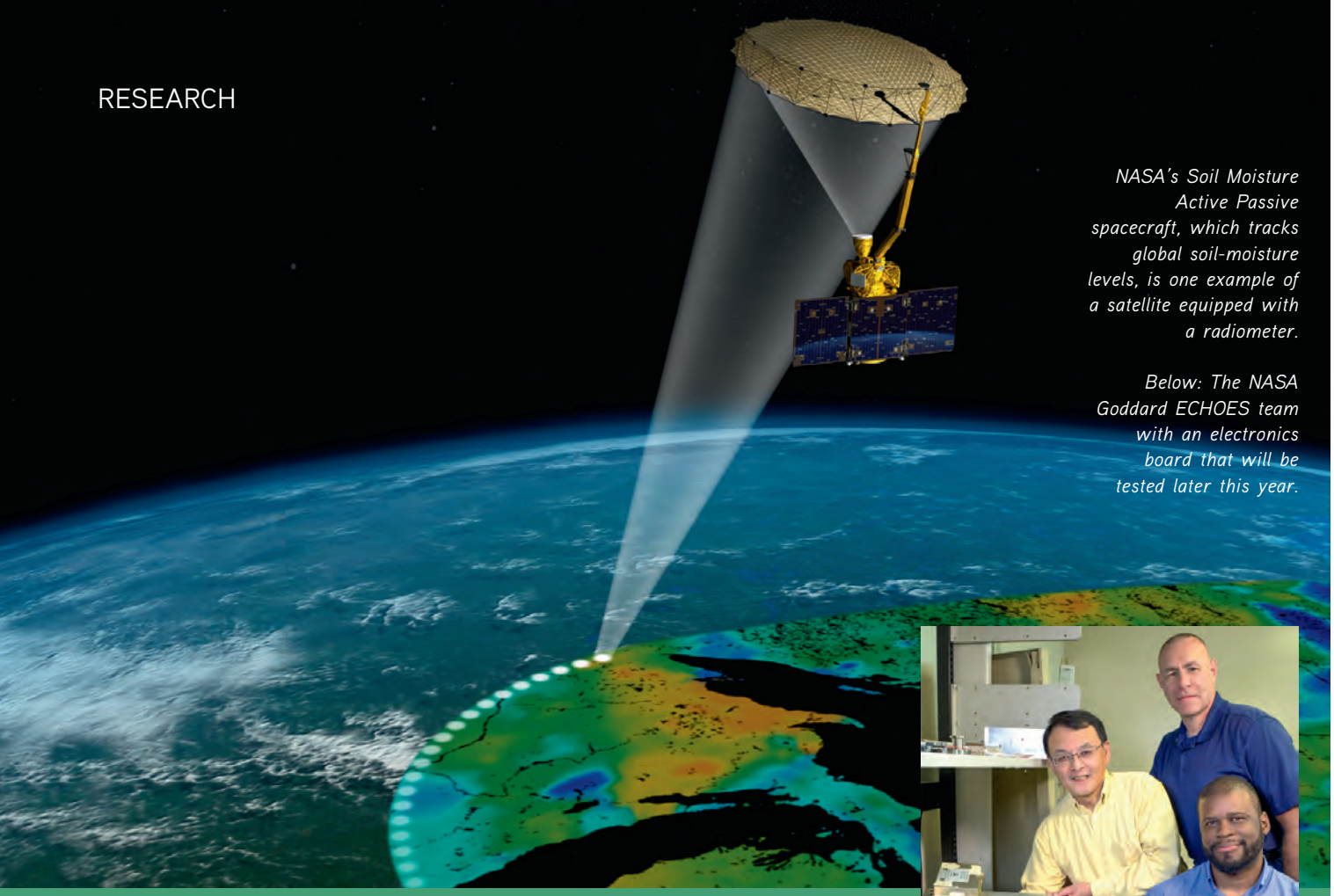
Accuracy can be further improved with differential GNSS (DGNSS) techniques. These techniques are used in applications such as autonomous driving, and they are suitable for precise positioning of aircraft during landing approaches.

The product offers an innovative test solution for easy generation of complex and realistic test scenarios for a wide variety of GNSS applications. To test multi-frequency and multi-antenna systems, users have access to 72 GNSS channels that can be assigned to up to four RF outputs. The product can generate QZSS and SBAS signals as well as GPS, GLONASS, Galileo and BeiDou signals. This enables users to quickly and easily verify the position accuracy of their receivers under realistic conditions.

The product has an internal noise generator and can generate complex interference scenarios with multiple interferers. All signals (GNSS, noise and interference) are generated directly in the instrument. Additional signal sources for external generation of interference signals are not necessary, simplifying test set-ups.

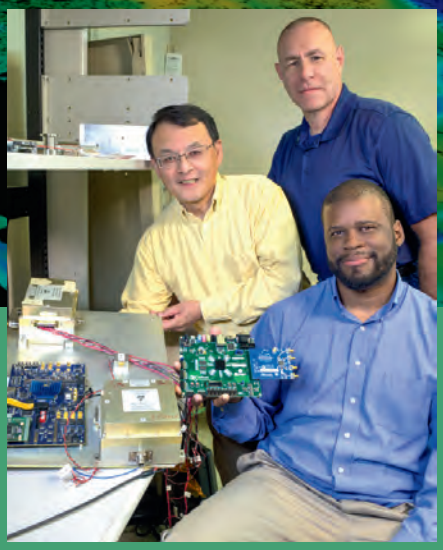
No external computer is needed to configure and operate the product. The integrated, intuitive GUI allows users to generate GNSS scenarios quickly and easily. Due to the multitude of instrument options, the product can be optimally adapted to individual user requirements.

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



NASA's Soil Moisture Active Passive spacecraft, which tracks global soil-moisture levels, is one example of a satellite equipped with a radiometer.

Below: The NASA Goddard ECHOES team with an electronics board that will be tested later this year.



IONOSPHERIC INNOVATION

NASA researchers are miniaturising radiometer technology used to probe the ionosphere.

NASA scientists and engineers at the Goddard Space Flight Center are upgrading and miniaturising the electronics on a prototype instrument called the Concentration vs. Height for an Orbiting Electromagnetic Sounder, or ECHOES.

The device could be used to 'sound' the ionosphere from either a ground-based observatory or ultimately a constellation of CubeSats.

Solar flares can cause a sharp increase in the number of ionised particles in the ionosphere, thus changing the altitude and density of the particles.

"Gravity pulls the denser plasma (ionised gas) down toward Earth to lower altitudes that are less dense. This is an unstable configuration," said the ECHOES project Principal Investigator and NASA Goddard scientist Mark Adrian. "This motion leads to a turbulent mixing of the ionosphere, not unlike pouring cream into your morning coffee."

To determine the electron density vertically in the ionosphere, scientists have long used radio sounders. A range of different radio frequencies are directed vertically to the ionosphere and a receiver then collects and measures the values of the returning signals.

The immediate plan is to use ECHOES on the ground, contributing to a network of instruments that support space-weather prediction and real-time mapping of the ionosphere. However, the instruments also could fly in space, such as in a constellation of CubeSats that would make simultaneous, multipoint soundings of the top side of the ionosphere, which lies 75 to about 1000 km above Earth's surface.

The sounding technique is at least a century old. However, it wasn't until the dawn of the space age that the technique was applied to sounding-rocket and full-fledged satellite missions, such as the Canadian-built and NASA-launched Alouette 1 in 1962.

More recently, NASA launched the Radio Plasma Imager on a mission called the Imager for Magnetopause-to-Aurora Global Exploration, or IMAGE.

"Basically, what we're doing is miniaturising a 100-year-old radio receiver signal-processing technology," said ECHOES Co-principal Investigator Damon Bradley, who led the development of the digital signal-processing system for the radiometer on NASA's Soil Moisture Active Passive, or SMAP mission, which tracks global soil moisture levels.

"ECHOES is essentially a low-frequency radar that uses space-based digital-signal processing, as on SMAP, but for probing the ionosphere as opposed to mapping global soil-moisture levels," he added.

Before the miniaturised instrument can fly in space, the team needs to prove that it's capable of obtaining density measurements in a relevant environment. As part of its technology development effort, the team plans to integrate ECHOES electronics and antenna systems with other instrument hardware and execute a test at the Goddard Geophysical and Astronomical Observatory.

Image credit: NASA/W Hrybyk. Image credit: NASA.adiometer. Credit: NASA.

electrodata

the recording specialists

Electrodata Group records critical video, voice communications and logs other vital data to provide a comprehensive time synchronized history of any emergency.

All products are the result of Quality Assured practices offering reliability and value for money.

AUSTRALIAN TECHNOLOGY

ADDRESS:
Suite 3.10, 56 Delhi Road,
North Ryde NSW 2113

CONTACT US:
Phone: 02 9889 0066
Fax: 02 9889 0155
sales@electrodata.com.au
www.electrodata.com.au

Radiocomms register search tool

MAPRAD.IO (https://maprad.io) leverages the latest web technologies to provide a unified, centralised view of radiocommunications register data that is free to use.

Optimised for mobile use, it provides a fast and flexible search tool to query and instantly map register data. Supported searches are based on geospatial references and proximity, licence/licensee identifiers, and advanced custom search queries incorporating radio operating parameters.

A key feature is a powerful filtering and categorisation system based on the modern faceted search concepts adopted by many large web-based search applications, coupled with up-to-date register data.

MAPRAD.IO intuitively correlates register 'site' information to licence information and related technical data such as device specifications and operating parameters. Other features include exporting to Excel and Google Earth and integrable services for an organisation's software.

Open Spectrum Pty Ltd

www.openspec.com.au

Microwave antenna and cable analyser

The Anritsu S820E Site Master is an advanced microwave antenna and cable analyser with a frequency range from 1 MHz to 20 GHz. It is available for rent from TechRentals.

It supports coaxial and waveguide system measurements which include 1-port return loss, VSWR, cable loss, distance-to-fault, Smith chart and phase measurements.

Supplied with K (m) type port (compatible with 3.5 mm and SMA), the S820E Site Master includes 'Classic Mode', which allows former users of the S8X0D series to increase productivity with minimal additional effort. The unit comes standard with USB interface, Smith chart and software management tools.

Features include 110 dB dynamic range; 650 µs/data point for fast field measurements; advanced and classic mode GUI; and single or dual measurement touchscreen.

TechRentals

www.techrentals.com.au

Spectrum monitoring for TETRA and satellite operators

Anritsu has released SpectraVision, a suite of software tools that creates a new generation of spectrum monitoring solutions to provide signal detection and quality analysis for TETRA and satellite signals. Also featured is a channel scanner designed to rapidly measure power levels in various frequency bands. Featuring standard as well as application-specific packages, SpectraVision provides government regulators, satellite operators and TETRA operators with the necessary tools to monitor signal quality and identify problem signals as they occur in real time before they adversely affect network operation.

TETRA operators can locate and test over-the-air performance of their network by combining a signal analyser and scanner. Users can select a frequency band to scan for any TETRA signals that exceed a user-settable power threshold. A signal can be further demodulated showing various signal quality parameters, such as RSSI, channel power, C/N ratio, Eb/No, data rates, EVM, MER and modulation/coding schemes. A summary screen provides information on the mobile and base colour codes, network codes and location area code.

Satellite operators can find, demodulate and display satellite signals using the DVB-S1, DVB-S2 or IESS standards. Once a communications link is established, SpectraVision will constantly monitor the satellite signal for quality parameters, such as MER, EVM and C/N. Alarms can be emailed in real time for remedial action.

Government regulators can use the channel scanner to examine occupancy usage in each frequency band. Real-time alarms notify regulators when violations occur and allow threshold violations to be recorded along with the date/time of their occurrence.

An innovative feature for SpectraVision's satellite monitoring system is the ability to perform moving averages of signal quality over time. These measurements allow the operator to observe trends in signal performance to discover problems before they cause major system failures.

Anritsu Pty Ltd

www.anritsu.com

4GX mast mount

The ZCG CM1600-4GX Telstra 4GX mast mount offers the maximum gain and reception range practical in an omnidirectional, mobile phone/wireless data fixed position collinear. Users can mount the product to a mast/pole or structure.

Features include omnidirectional mobile collinear antenna; Telstra 4GX; frequency range of 700–788 MHz; N-female in base: maximum power of 20 W; gain of 8.1 dBi; and it is 2.1 m tall.

ZCG Scalar

www.zcg.com.au

ICS Industries
an EnerSys Company

EVERYTHING YOU NEED TO STAY CONNECTED

ICS Communication Trailers now incorporate world-class Reserve Energy in our turnkey trailer solutions, ensuring vital communications remain connected.

- ✓ Ideal for harsh environments
- ✓ Fast recharge capability
- ✓ Highest energy density
- ✓ Up to 2 years shelf life
- ✓ 15 years design life
- ✓ Vibration resilient
- ✓ High reliability

EnerSys
Power/Full Solutions

1800 010 027

www.icsindustries.com.au
www.enersys.com

Contact us for more information on our Battery and Trailer Solutions

LEARN MORE

Backhaul

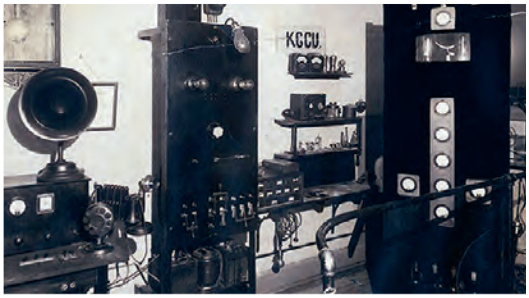
Backhaul takes you on a trip down memory lane as we look at what was happening in the comms field of yesteryear.

25 YEARS AGO. The cover of the December/January 1992–93 issue of *What's New in Radio Communications* featured the C Holden Intercommunications range of headsets developed by Greg Ackman, managing director of Sydney-based Mobile One and Carl Holden, a sound recording engineer and ultralight aircraft flying instructor. Inside the magazine, Hewlett-Packard's Helen Shanahan presented an article on the operation and testing of MPT 1327 systems, while David Picken (Rhode & Schwarz) explained the technical features and measurement requirements of GSM. We also reported on the Queensland Fire Service commissioning Omnitronics' 900 radio control matrix and 9200 telemetry SCADA monitoring equipment; OTC introducing Inmarsat Satcom-M and -B services; Stanilite Pacific's $2.5 million acquisition of Queensland-based TR Services; Bassett Consulting Engineers being awarded a contract by Telecom Australia to provide engineering expertise for the Jindalee Operational Radar Network; and OTC Maritime being selected to help China introduce the Global Maritime Distress & Safety System.

10 YEARS AGO. The cover of the November/December 2007 issue of *Radio Comms Asia-Pacific* featured the Simoco SRM9000 and SRP9100 radios, capable of P25 and MPT 1327 operation, and fully designed and programmed in Australia by TMC Radio. Inside the magazine, we reported on the slow pace of progress toward LTE; the demystifying of RF spectrum interference problems; the importance of getting repeaters sites right; and how to interpret space weather observations. We also reported on Peter van Rij being appointed chairman of Tait Electronics following the death of the company's founder, Sir Angus Tait; and an experimental VLF digital two-way radio system that can send signals to miners up to 300 m below ground. Paul Elmes (Tait Electronics) went in to bat for mobile radio's importance during natural disasters. And the Queensland Government was advertising for communications technicians to join its various emergency services agencies.

Spectrum

Are we learning from the past?



At a time when there are so many changes happening in our industry and in technology in general, we need to ask ourselves — are we learning from the past as we plan for the future? It is very important that we examine past mistakes and learn from them so we don't continue to make the same errors again. Consider a couple of current situations.

Review of the Radiocommunications Act. The federal government has put much emphasis on the fact that working with regulators should be a simple exercise and involve fewer restrictions than in the past — a great philosophy. The concern comes when we look back at the 1992 version of the Act. It was designed for its era, yet as we have progressed well beyond two decades since, many of its sections are no longer operating as they should.

As we look towards the present review, there is emphasis on allowing the market to decide outcomes — again, a good philosophy. When this is combined with a government goal of reducing the resources dedicated to governing and regulating — with the aim of putting much of the responsibility back onto licensees and industry — there has to be a workable set of principles and regulations in place to ensure the goal can actually be achieved. Without operable guidelines and a strong enforcement regime, the end result will be a polluted spectrum.

Mobile broadband. Many industries are heading towards using mobile broadband for productivity gains; a real benefit of the technology. At present, the idea of moving business-critical operations onto commercial carrier networks remains a concern. The answer, in many cases, would seem to be private networks, where the user has control over the resiliency and redundancy of the system… which is the case with most extant LMR networks. There are ways to ameliorate these concerns; however, there has to be spectrum available, a difficult yet not insurmountable problem.

The lesson for our industry is to look to the past. When mobile phones were introduced, everyone said LMR was dead, or would be shortly. Yet here we are a couple of decades later still going strong. The lesson is that if people in our industry embrace new technologies and combine them with existing business operations, they will not only survive, they will prosper. Private LTE networks are going to rely heavily on local knowledge for system design and operations, and the current suppliers know the topography and users' needs. So why not be involved in the move towards LTE and maintain the client?

As a 'grumpy old man' I have been fortunate to see many changes in technology. I began my trade in the valve era, learned to work with solid-state devices and eventually recognised some of those 'big black postage stamps' in modern equipment. Even though some components now defy my eyesight, many of the main factors still remain. Radio waves still operate the same way, they follow the same laws of physics. LTE signals are the same, only the transmission frequency and modulation are different. We can all still learn about these things — I have, so you can too. Your knowledge is still very valuable, so don't be afraid to use it and you will find that these new technologies are not so frightening after all.

Ian Miller is a founding member and executive officer of ARCIA, and a leading independent radiocommunications consultant. With a long history in the industry in Victoria, he is a strong supporter of Australian business and works towards improving professionalism and skill levels in the sector. He will be moderating the public safety mobile broadband panel discussion at Comms Connect Melbourne on Thursday, 23 November.

Image courtesy SHSND.

Hytera

Hytera E-pack 100

Digital Wireless Ad Hoc Repeater

- Wireless Mobile Ad Hoc Networking, Up to 32 hops Network
- Flexible and Reliable Networking, Link Automatic Detection
- Fast Deployment
- High Spectrum Efficiency
- GSM Link as Backup
- Caller Location Display
- IP67 Protection

ZETRON®

Unified Communications

Enhance Your Situational Awareness

Mission Critical Control Rooms

- Integrated Radio Communications
- Streamlined GUI
- Integrated Advanced Telephony / Mapping & AVL
- Live Camera Feeds Display
- Integrated Broadband PTT
- Redundancy You Can Count On

For more information, contact us

www.zetron.com | @ZetronInc

Zetron Australasia +61 7 3856 4888 | ausales@zetron.com
Zetron Americas +1 425 820 6363 | Zetron EMEA +44 1256 880663

The Power to Respond