NOV/DEC 2018 Vol.6 No.1

critical comms

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Inside

Nov/Dec 2018

ON THE COVER

The KENWOOD Viking series P25 portable/mobile radios are designed with advanced ergonomics for today's public-safety agencies to meet mission-critical needs. The series comes with features including TrueVoice, an advanced noise-cancelling technology that works in analog or digital, works with any accessory and eliminates the need for programming noise profiles.

Combined with this hardware platform is the Armada fleet management software. Armada is an intuitive, easy-to-use trunked radio fleet management tool which has been specifically designed to program and maintain the radio codeplugs in a safe, efficient manner.

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

The Viking software licences are protected with a perpetual software licence program and are easy to manage with the vault cloud-based tool. Vault is a comprehensive, cloud-based asset management tool that provides users with an intuitive web interface. It seamlessly integrates with Armada fleet management software so users can manage their Viking radio fleet and easily transfer perpetual and non-perpetual software licences.

JVCKENWOOD Australia Pty Ltd
www.kenwood.com.au

Transmit

A growing concern within the traditional radiocomms community is the increasing age (and therefore accelerating retirement) of the workforce. Allied with this is the lack of gender diversity in what has long been seen to be a male-dominated industry. It's good to see, then, that some companies are taking steps to change the situation. RFI is one such company, and it's interesting to read the views of some of its female staff (see the article in this issue). What is your business doing to tackle this challenge? And what should the industry as a whole be doing?

Another challenge facing the critical communications industry is how to handle, and work with, the growing convergence with mainstream communications technologies. To this end, it was great for the local industry to have the opportunity to meet with leaders from the 3GPP in Melbourne in September (see Geoff Spring's article in this issue). It is vital that we work closely with those who are setting the standards for future communications, to ensure that the needs of the mission- and business-critical communications sectors are taken into consideration.

These and other topics will be on the agenda at Comms Connect Melbourne in November. As always, Paul Davis and the WFevents team have put together a varied program full of interesting and influential speakers, who will cover all of the hot-button issues of concern as we head into 2019. Make sure you register to attend, and don't forget that — if you can't make it to the conference sessions — there are free expo passes available. Check out the event website (melbourne.comms-connect.com.au) for full details. See you there!

Jonathan Nally, Editor
jnally@wfmedia.com.au

Calendar

November 2018

MilCIS 2018
13–15 November
Canberra
milcis.com.au

Comms Connect Melbourne 2018
20–22 November
MCEC, Melbourne
melbourne.comms-connect.com.au

PMR Expo
27–29 November
Cologne, Germany
pmrexpo.de/en/pmrexpo/

March 2019

Critical Communications Europe 2019
12–13 March
Ricoh Arena, UK
critical-communications-world.com

May 2019

Comms Connect Auckland
1–2 May
SKYCITY Auckland
comms-connect.co.nz

Critical Communications World 2019
18–20 May
Kuala Lumpur, Malaysia
critical-communications-world.com

August 2019

AFAC19
27–30 August
MCEC, Melbourne
afacconference.com.au/afac19-powered-by-interschutz/

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

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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

Editorial Assistant: Amy Steed

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

Caroline Oliveti Ph 0478 008 609
coliveti@wfmedia.com.au

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Mobile Network Testing

VICTORIA'S REGIONAL RAIL CONNECTIVITY PROJECT

Campbell A Rose AM, CEO, VicTrack

Commuters on Victorian regional rail routes now have almost 100% mobile phone coverage thanks to in-train mobile coverage boosters.

With the average Victorian regional commuter spending up to 20 hours per week aboard regional trains, there has never been a more crucial time to boost the state's livability by ensuring passengers can stay connected with friends, family and the workplace.

In 2015, the Victorian Government announced it would fix mobile blackspots along Victoria's five busiest regional rail corridors of Geelong, Ballarat, Bendigo, Traralgon and Seymour, which handle more than 17.9 million passenger trips per year.

Now nearing completion, the $18 million Regional Rail Connectivity Project has seen the installation of Australia's first in-train mobile coverage boosters. Coverage for Optus, Telstra and Vodafone customers has already improved from less than 50% to almost full coverage as a result of this new technology.

The project is sponsored by the Department of Economic Development, Jobs, Transport and Resources (DEDJTR) and delivered by VicTrack through two key phases (pilot and series rollout) in partnership with V/Line, CommScope, Bombardier, Telstra, Optus and Vodafone.

The in-train solution deployed in V/Line VLocity three-car train sets boasts:

- Roof-mounted antenna that receives the external signal and transmits it to the repeater.
- CommScope Node AM repeater and filter fitted to the centre car, enabling frequencies received by the antenna to be repeated and transmitted into the train cabin.
- Coaxial/radiating cable ('leaky feeder') and inter-car connectors. The single repeater services the entire three-car set; leaky feeder functionality is enabled across the three cars via specially

designed inter-car connectors that can be detached should the three-car set require separation (eg, for maintenance or repairs).

After the detailed design and successful installation of the in-train equipment, a pilot train travelled from Southern Cross station to Geelong and was able to maintain connectivity for most of the journey — a significant improvement — providing positive indications for the feasibility of delivering the technology across the entire VLocity fleet.

The success of the pilot was a result of aligning stakeholder priorities in determining the location of the repeater within the train and developing the associated technical solutions. This included ensuring commuter space and comfort was not disrupted, ensuring ease of installation of the equipment, as well as enabling stable and continued functionality of the system.

The solution was placed in the roof space of the train, providing a dry and temperature-controlled environment. A unique chassis with pivot arms enables technicians to safely access the overhead repeater, providing an innovative solution for key ergonomics and safety considerations.

Shock and vibration tests were conducted to ensure stability of the unit on a moving train as well as assurance of the equipment's longevity.

From pilot to operations

The successful pilot meant a quick transition to the rollout phase, which saw the entire VLocity train fleet equipped with mobile boosters by early September 2018. This was a six-month process, which involved the exceptional coordination of resources and technical skill sets of all involved.

As with any large-scale project or rollout of new technology, significant planning in

Images courtesy VicTrack.

the early stages was a key contributing factor to its success. Thorough technical risk assessments were conducted, with mitigation measures put in place to ensure project continuation. Members of the development team had a solutions-focused mindset, enabling technical advice to be conveyed in the context of ongoing collaboration.

VicTrack and Telstra will continue to work together to maintain the mobile booster equipment for a minimum of 10 years. Following this period, a reassessment will be executed in conjunction with the Victorian Government to determine future needs.

Key considerations will include analysis of the current technology at the time, and whether any updates or modernisation of the system will be required to offer the best connectivity solution.

> THE SUCCESSFUL PILOT MEANT A QUICK TRANSITION TO THE ROLLOUT PHASE, WHICH SAW THE ENTIRE VLOCITY TRAIN FLEET EQUIPPED WITH MOBILE BOOSTERS BY EARLY SEPTEMBER 2018.

The 10-year Operation and Maintenance (O&M) period has been agreed on and the entire in-train solution will be supported until at least 2028. Telstra as the design lead, in partnership with Optus and Vodafone, will offer its 4G services to the public.

Telstra remotely monitors and manages the system and VicTrack provides in-field support. This process is driven by integrating a fault management system from Telstra's Global Operations Centre into VicTrack's Network Management Centre. To achieve this in-field support, VicTrack has trained wireless technicians in maintaining the in-train repeaters to enable a quick turnaround should any faults be detected.

Passengers can report any problems to their respective mobile phone carrier as they would in any other location in Australia. CommScope, as the original equipment manufacturer and technology partner, will also provide support during the 10-year O&M period.

Coverage for the three participating mobile carriers will continue to be enhanced over the coming months as 35 new mobile towers are installed to complement the mobile booster solution.

The Regional Rail Connectivity Project is a great example of the private and public sectors working together to achieve the best possible result to the benefit of commuters across regional Victoria.

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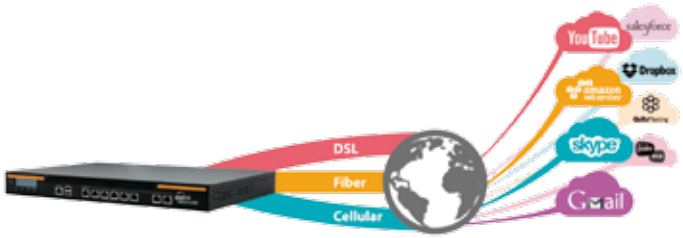
The Peplink SD World (Software-Defined World)

Software-Defined Wide Area Networking (SD-WAN) is a revolutionary way to approach the simplification of branch office networking and assure optimal application performance by using centrally controlled and managed WAN virtualization.



The Peplink SD-WAN Advantage

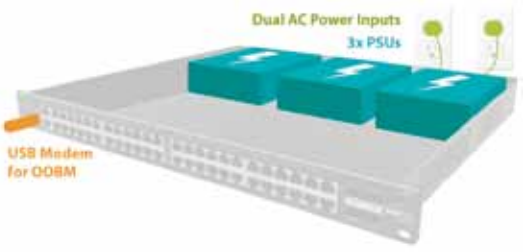
Over the years, Peplink has developed a potent combination of products and technologies that can help to build SD-WAN networks with unbreakable connection resilience, unmatched deployment flexibility, and intuitive ease of use.

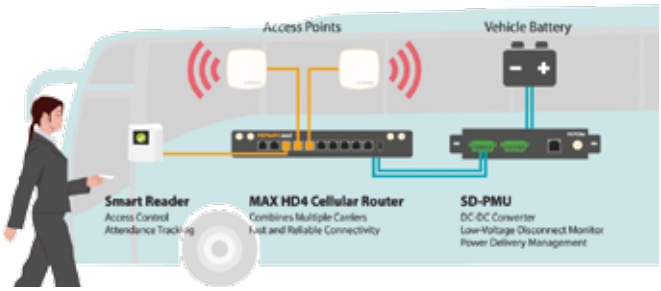
The Peplink SD-Switch Advantage

Centralized Reporting: View the status of every SD Switch, what ports are connected to which devices, and what firmware it is running, all on a single interface.

Tools to Quickly Find the Culprit: Use InControl2 (cloud-based management tool) to see all devices in your network. Search by MAC address and pinpoint the culprit's exact port.

Modern Cloud-Based Management: Centrally define VLAN and firmware update policy. Push configurations to device groups and remotely schedule PoE port operation.





The Peplink SD-PMU Advantage

Voltage Regulation and Boost: The SD-PMU can take power from sources with low or fluctuating voltage and turn them into a reliable streams of 52V. Then, it sends battery voltage information over the IoT Cloud for remote monitoring.

Low Voltage Disconnect: If the battery cannot deliver sufficient voltage, then the SD-PMU will automatically shut off access to the battery after a predefined delay.

WirelessTech

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peplink ABB Cambium Networks Siklu RAD ACTi L-com

HYTERA, SEPURA INTEGRATE MELBOURNE OFFICES

Hytera and Sepura officially opened their joint Melbourne office at a ceremony on 17 August. A number of channel partners were invited to join the opening and were given an office tour during the event. Since Hytera completed the acquisition of the Sepura Group in May last year, Sepura has become a 100%-owned subsidiary of Hytera. In line with Group strategy, each sales region is concentrating on leveraging the synergies and economies of scale inherent in the combined product lines, corporate talent and combined experience of the two entities, and this has been implemented in Australia.

CAMBIUM NETWORKS WINS TOP AWARD

Cambium Networks has been recognised with the Manufacturer of the Year award, as voted by the members of the US-based Wireless ISP Association (WISPA). Cambium Networks has now won this award two years in a row. "Wireless ISPs are on the leading edge in providing broadband connectivity around the world. We are honoured to be recognised by our network operator customers. Their insights and feedback on our technology have been instrumental in developing our 'wireless fabric' of end-to-end affordable, high-quality wireless solutions that bring an intelligent edge to their networks," said Atul Bhatnagar, President and CEO of Cambium Networks.

EMF personal monitor

Wavecontrol has developed the WaveMon EMF Personal Monitor to help protect against over-exposure to potentially hazardous electromagnetic fields, especially in a working environment.

WaveMon continuously monitors EMF exposure in accordance with the European Directive 2013/35/ EU, FCC, Safety Code 6 and International standards (ICNIRP, IEC, EN, IEEE, etc) depending on the selected model. WaveMon's isotropic sensors with RMS response measure E fields in the frequency range from 1 MHz to 8 GHz and the H field from 3 MHz to 1 GHz.

WaveMon's datalogging feature with configurable collection interval captures in excess of 1,000,000 measurements and incorporates a USB port for data downloading to an external PC for which software is included. This port is also utilised for equipment set-up and battery charging. WaveMon can be powered by either replaceable or rechargeable batteries and operates for up to 200 hours on a single charge. An optional in-built altimeter and GPS provide additional information with the downloaded data.

If safe EMF levels, determined by a user-definable trigger threshold, are exceeded, WaveMon triggers a high-intensity audible, visual and vibration alarm. The lightweight (190 g) WaveMon unit includes a convenient snap-in base that allows for one-handed operation. The base has been designed to be attached to the user's belt, harness or the included arm holder.

EMC and RF Solutions
www.emcrf.com.au

Antenna arrays

ZCG's omnidirectional air band, VHF or UHF binary and elliptical dipole arrays are engineered and designed for customers who are restricted by physical space but require maximised performance. Its range of DVA and DUA dipole arrays is suitable for these conditions.

Available in either 2 to 8 sets of dipoles and suitable for gain applications requiring 2–9 dBd, ZCG's dipole arrays can be multi-input configured for multiple-channel transmit/receive applications. The arrays are therefore suitable for multichannel applications within either air band 118–136 MHz, VHF 136–174 MHz and UHF 400–520 MHz. Alternate frequencies are available on request.

The omnidirectional or elliptical dipole arrays are constructed in either corrosion-resistant marine-grade aluminium or 304 stainless steel or, on request, 316 stainless steel.

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KAPOOKA SATELLITE STATION UNDER CONSTRUCTION

Construction has begun on the Defence Satellite Ground Station at Kapooka. Deputy Prime Minister Michael McCormack said the $24 million Wideband Satellite Capability project involved the acquisition and sustainment of a new Satellite Ground Station in the East (SGS-E) of Australia and the implementation of a Wideband SATCOM Network Management System (NMS). "Once completed in 2021, the ground station will provide the satellite communications gateway on the east coast of Australia and, in conjunction with the Wideband SATCOM NMS, will deliver a holistic satellite communications network management and situational awareness capability to the ADF," he said.

CoW LAUNCHED IN GRAFTON

The NSW Telco Authority and the NSW SES have launched the first agency-operated, fully mobile government radiocommunications site in Grafton. The cell on wheels (CoW) will provide public safety agency frontline workers with a deployable mission-critical solution for operational radiocommunications. "The CoW will provide significant support to emergency and operational response agencies as they work with communities during disasters," NSW Telco Authority Managing Director Kate Foy explained. "It is the newest addition to the state's supply of mobile radio assets and the latest product resulting from collaboration between the Telco Authority and NSW SES to improve frontline communications during critical incidents."

Power solution

EnergyHub is a complete lithium-ion power solution for critical network energy infrastructure including telecommunications providers, power utilities, transport operators and security providers. The product incorporates both DC rectifier technology and integrated lithium-ion battery modules.

Tight cell management integration in combination with Enatel Energy rectifiers offers optimised charging/discharging. As well, the energy density and depth of discharge inherent to the use of Li-ion batteries leaves more room for revenue-generating network equipment.

Modular in design, the product requires zero set-up, can be easily scaled up to meet changing load demands and shares a hot pluggable interface with EnergyPak battery modules that maximises usability. Greater safety is possible with the use of patent pending 'Cold Terminal Design', which stops voltage from travelling through the battery's power and control pins to cut off the supply of current when it's not connected to the charger.

The product integrates into network management and building management systems via a next-generation SM controller, enabling network operators to have remote monitoring and control of their valuable site assists. It offers transparency of all energy data including battery cycle life, depth of discharge information, cell temperature and end-of-life notifications.

Powerbox Australia Pty Ltd

www.powerbox.com.au

Ultra-rugged smartphone

The Logic Wireless Sonim XP8 ultra-rugged smartphone has been manufactured for mission-critical situations where smart communication, data collection/sharing and connectivity are required.

The XP8 is waterproof (IP68/9), drop proof, impact and chemically resistant, usable with gloves and has a dedicated PTT button. It is loud, has large battery capacity (4900 mAh) and is covered by Sonim's 3-year comprehensive warranty.

The XP8 also runs on the Android N operating system and is compatible with all Australian and New Zealand LTE Bands. With the release of the XP8, Sonim have also developed SCOUT, an MDM application solution to improve the UI, UX and EX of the XP8. It enables device provisioning, management and support, while providing a roadmap for advanced control capabilities on Sonim devices. Sonim SCOUT allows workers to more easily and intelligently accomplish their jobs without always having to look at their phones.

The XP8 also has a large range of product accessories available.

Logic Wireless Pty Ltd

www.logicwireless.com.au

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3GPP BRIEFING ON FUT

Geoff Spring, Senior Industry Advisor, CDMPS

In mid-September, members of the 3GPP leadership collaborated with the University of Melbourne's Centre for Disaster Management and Public Safety (CDMPS) to provide a briefing to representatives from Australian government, industry and academia on how the 3GPP ecosystem works.

The briefing covered progress to provide the interface standards essential to achieving interoperability and mobility through the continuous development of applications across a broad range of sectors.

The briefing was supported by the Australasian TETRA and Critical Communications Forum (ATCCF), the Critical Communications Association (TCCA) and the Australian Radio Communications Industry Association (ARCIA).

At the same event, the CDMPS provided a briefing on the development of a Blue Print Framework for the United Nations Sustainable Development Goals (SDGs). The framework was formally launched at the 'A Safe Sustainable Futures For All' (SSF) symposium held the following week.

The SSF symposium saw academics from around the world, together with representatives from the World Bank, converge on the university to discuss enhancing resilience in a changing landscape.

The CDMPS is working to identify how critical communications infrastructure and services contribute to the social and economic outcomes established by the SDGs.

PSMB update

The 3GPP event provided the opportunity for Luke Brown, Assistant Secretary for Emergency Management Australia in the Department of Home Affairs, to provide information about the next step in procuring a public safety mobile broadband (PSMB) capability for use by Australia's public safety and security agencies.

That next step will see the establishment of a pilot network to trial the specific requirements of a PSMB capability identified through the received responses to the RFI issued late in 2017.

In providing the update, Brown said that collaboration between the Commonwealth and state and territory departments on the PSMB had been strong, enabling Australia to catch up to the rest of the world. He acknowledged the role the CDMPS had played in helping to achieve this position.

In addition to illustrating the 3GPP ecosystem, the 3GPP representatives informed a near-capacity audience about critical broadband standardisation, the global mission-critical push-to-talk interoperability regime and the mission-critical open platform being developed for mission-critical push-to-talk applications and software development funded by a NIST–PSCR Grant.

Also covered were the radio aspects of the evolution of LTE-Advanced to 5G for mission-critical use, and what critical broadband will mean to government and industry through the transition from critical narrowband to critical broadband (including the use of hybrid solutions).

URE COMMS

Senior 3GPP representatives have briefed Australian experts on the development of standards for critical communications.

Importantly, the 3GPP presentations highlighted that narrowband land mobile radio will exist for many years, emphasising the critical work being done by 3GPP on the interworking between LMR and LTE and the need for ongoing investment by governments.

Openness

In discussion about potential hybrid models, much interest was shown in network roaming and network slicing. The complexity of this capability will require the use of artificial intelligence to provide the flexibility in services that users will require of mobile networks and their operators.

The 3GPP representatives emphasised the need for open standards and the risks associated with adoption of pre-standard applications.

Most importantly, they highlighted that the needs of particular sectors (such as public safety communications) may well be leveraged from work done for other sectors (such as automotive and the development of interface standards for driverless vehicles).

The 3GPP leadership indicated that it will continue its outreach to Australia, suggesting the need for the formation of industry communities of interest that can legitimately influence the work being done by the 3GPP through the production of evidence-based use cases, and the need for research activities to support these communities.

The 3GPP outreach will continue at the Comms Connect conference in Melbourne in November 2018.

Images from left to right: Steven Tsikaris (Executive, Infrastructure and Infrastructure Contracting, Victorian Government Department of Treasury and Finance), spoke at the 3GPP briefing.

Georg Mayer (Chairman, 3GPP Core Network and Terminals).

TCCA Director Tero Pesonen.

An audience of around 70 people attended the briefing.

KEEPING THE AIR-BANDS CLEAR

Tracking down an intermittent source of interference has safeguarded operations at a busy airport.

All airports need clear, reliable radiocommunications in order to operate efficiently and safely. But at one particular Australian airport — which has more than 100,000 aircraft movements each year — air traffic controllers in the control tower had experienced, over a long period of time, interference on aircraft radio channels.

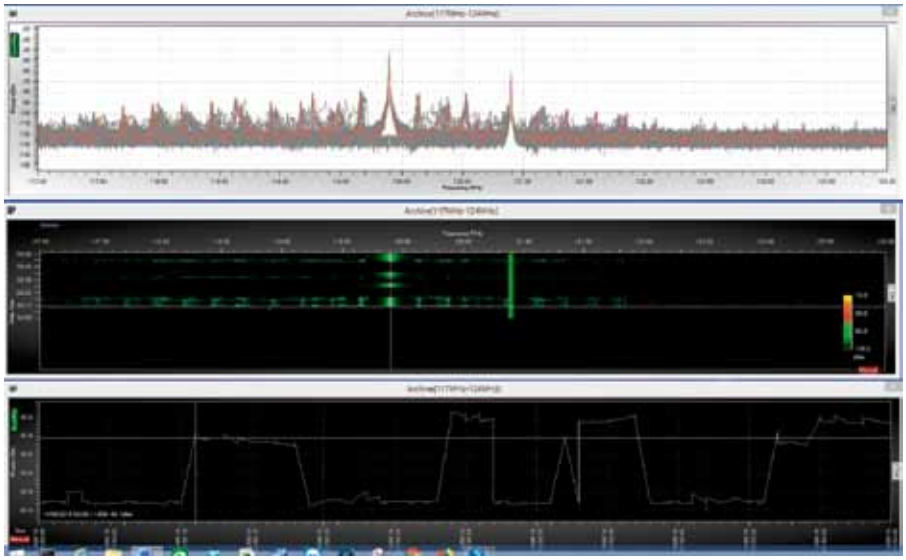
Previous attempts to locate the source of the interference had proved futile due to its short-term duration and spasmodic occurrence; typically it would be observed for only a few seconds at a rate of less than once per day.

Vicom provided the necessary engineering expertise together with nodes and software (manufactured by CRFS) to locate the source of interference and enable the airport to eliminate the problem.

The CRFS equipment was set up both within the equipment room and in the outside environment to monitor and record RF spectrum in appropriate bands. The aim was to determine if the interference was coming from within the equipment room or from a transmitter source outside, and identify its nature and source.

A scanning rate of twice per second was used, and data was captured over a one-month period. The timing of interference events was noted by the control tower operators. The collected data was then analysed for events at the times reported.

Using the analysis software it was possible to look at the spectrum at one-second intervals and match these with the timing of audio recordings of voice radio traffic. It became clear that the source of interference was external to the equipment room.



Several sources were identified. Some were illegally operated devices being used by workers in the area, but the majority were caused by aircraft transmitting on one frequency and producing spurious emissions on, or close to, other control tower frequencies. It was possible to recognise the interference signature of aircraft and relate these to the aircraft call-signs. The transmissions from both the tower and aircraft could be clearly identified.

Key factors in achieving this result were:

1. The ability to set up 24-hour-per-day continuous logging of spectrum.
2. The detail with which the spectrum could be logged (resolution bandwidth).
3. The rate at which the sweeps could be repeated to capture short-duration events.
4. The tools to analyse the resulting data to pick out relevant parts and display in detail the individual spectrum sweeps and integrated power-vs-time data.

An example of analysed data is shown on this page. The screenshot displays spectrum, waterfall and integrated power data over a one-minute period. Transmissions shown are 5 seconds from aircraft, 10 seconds nil, 3 seconds from the control tower, 4 seconds nil, 1 second from aircraft, and 5 seconds from the control tower.

As a result of the finding, remedial action was focused on cleaning up the transmissions from the particular aircraft identified.

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A CONCRETE COMMS TRANSFORMATION

Hunter Readymixed Concrete overcame the challenges of its ageing radio systems and embraced new PTT technology for better results.

Hunter Readymixed Concrete had long been using traditional radio networks for its fleet communications but was experiencing problems, including escalating coverage costs, a changing network infrastructure and hard-to-obtain replacement parts and equipment. The total cost of ownership was increasing and there was a need for better efficiencies for the business.

General Manager Scott Wiseman was looking for an innovative solution which not only provided benefits beyond the limitations of the company's existing system, but also futureproofed its investment through the availability of extra features and upgrades as technology and its business's needs changed over time.

The solution

Hunter Readymixed Concrete began 2017 with a proof-of-concept trial of PTT devices in two of its 40 trucks, and with a base unit with Bluetooth installed at one concrete plant. IMPULSE Wireless was chosen as the supplier based on the experience, expertise and support it offered.

"IMPULSE [Wireless] took the time to understand our business requirements and then tailor a solution that met our current requirements and offered the flexibility to build in more functionality in the future," Wiseman said.

The in-vehicle devices were Samsung smartphones, locked down and customised by IMPULSE Wireless to work only as a 'radio' and navigation tool, by running the IMPULSE Wireless PTT app and Google Maps. Rugged, wired, remote speaker microphones were installed, providing simple and familiar operation, enabling the drivers to use the new system in the same way they had previously operated their two-way radios, with no interaction with the phones needed.

The trial was a complete success, so the company rolled out the PTT solution to its entire fleet of concrete trucks. It now also uses the IMPULSE Wireless app on supervisors' smartphones to enable them to communicate instantly with all vehicles from anywhere, without the need to carry a radio.

The solution vastly improved communications coverage, efficiency and safety, and enabled integration with other systems such as GPS tracking, job dispatch, safety monitoring, emails and messaging.

The outcome

Remote support and built-in tools provide troubleshooting and diagnostic capabilities far beyond those of a radio network. The IMPULSE Wireless support team can see live diagnostic information for a device and provide network SIM connection diagnostics and more 'on the go'.

Technicians can remotely access a device to provide full troubleshooting, and even remote operator training or additional support. This provides immediate assistance, reduces downtime and almost completely eliminates the typical costs of troubleshooting, technician support, reprogramming, upgrades and repairs.

"Most issues can be sorted with a phone call. I'd recommend follow-up operator training post-implementation to get the best from the technology," Wiseman said.

Overall, Hunter Readymixed Concrete is satisfied with the outcome.

"It's been a pleasure dealing locally with a team who cares about our needs and responds positively when you call," Wiseman said.

"PTT was chosen as a cost-effective communication technology that offered additional benefits to voice such as navigation and messaging. The comms package implemented meets our current needs, with room for growth in the future."

IMPULSE Wireless
www.impulsewireless.com.au

Introducing the CM60 Series

Designed, engineered and manufactured in Australia for the toughest conditions, the CM60 Series provides a robust solution ideal for both the large systems integrator with an extensive network of mobiles, portables and repeaters, or the small operator with a single site.

The CM60 Series provides an analogue solution with optional licensing upgrades for P25 in Conventional, Trunk and AES 256-bit Encryption.

The advanced User Interface Control (UIC 600 Series) features an OLED screen for high-visibility characters, back-lit keypad, powerful front facing speaker and a secure in-vehicle interactive bracket.

All CM60 variants are compliant with AS/NZS 4295 (LMR). UHF variants are compliant with AS/NZS 4365 (CB) and all P25 variants are CAP (Compliance Assessment Program) compliant, conforms to TIA-102 Standards.

GME PROFESSIONAL

gmeprofessional.com

AUSTRALIAN MADE

P25

COVERING COLAC WITH

Jonathan Nally

CommSite will supply the Colac Otway Shire Council with a DMR Tier III, 10-year managed services solution.

CommSite Group has grown quickly to become one of Australia's largest privately owned service providers in the radio and mobile telecommunications sector. Its business covers most of the eastern seaboard of Australia, including Tasmania, with an expanding coverage area supporting 24/7 on-call services.

CommSite's latest success is a contract to supply the Colac Otway Shire Council with a DMR Tier III communications system.

Fast expansion

The CommSite story began in 2010 when Tony Biddiscombe, a 35-year veteran of the radiocommunications industry, relocated himself and his family back to Victoria's Gippsland area. The business began from Biddiscombe's home office before moving into its current headquarters in Traralgon in 2012.

The company has now evolved into multiple businesses supporting different facets of the communications industry.

CommSite Integrated Communications continues to deliver professional radiocommunication support, construction and maintenance contracting services, managed services contracts and large-scale project delivery. It supplies leading brands of commercial radio communications equipment and hardware, and has a turnkey project capability that includes civil works.

TelcoSite delivers professional support services for the mobile telecommunications industry. Turnkey, large-scale project deliverables include full greenfield site construction such as civil works and electrical, optical fibre projects including pit and pipe civils, technology upgrades, system rollouts or hardware replacement programs. It provides ongoing maintenance support including 24/7 on-call services for mobile carrier businesses in several states.

Radio Geek is an online retail business that provides a broad range of communications. And CommSite Security Services provides security-related services such as project delivery and contract maintenance of wireless digital cameras, surveillance software, access control and perimeter security systems.

Shire solution

In October, CommSite was awarded a 10-year managed services contract by Colac Otway Shire Council to supply, install and maintain a digital mobile radio network, based on DMR Tier III technology.

The system will enable the council to provide its staff with mobile and handheld radio services across the whole shire at a competitive cost.

The council has been operating a VHF-linked, low-band (35 MHz), two-way radio network from five repeater sites spread across the shire. Used for day-to-day communications and for safety communication in isolated locations, the network is well past its usable service life, comprising non-replaceable components and operating in a band for which the ACMA is no longer issuing licences.

The council issued an RFT in January 2018, with tenders closing the following month. CommSite and four other companies bid for the contract, each of them proposing a solution comprising five repeater sites. CommSite also suggested a seven-site solution, and it was this proposal that won it the contract.

According to council minutes, "This solution was most appealing as it significantly increases coverage around Forrest and the

Colac Otway Shire is home to Lake Corangamite, the largest permanent salt-water lake in Australia.

DMR

south east corner of the shire, which was affected by a significant bushfire a few years ago. In the event of loss of a site/tower in the network the two extra sites will help cover loss of signal."

The minutes also state that "The installation of the DMR system will lower Council's risk profile. Monitoring and GPS functionality inherent to the DMR-T3 structure will enhance worker safety. Specific features of the proposed solution include automatic worker down notification, lone worker monitoring, real time user and asset tracking."

The managed services include but are not limited to:

- operational communications
- emergency coordination
- local traffic and work zone control
- GPS and lone-worker services for fixed and handheld radios
- key-on/key-off utilisation events for mobile plant.

CommSite's seven-site solution is based on three talk channels and one data channel. The service base will be 17 heavy vehicles, 17 medium vehicles, 10 light vehicles, four fixed bases (for each of the council's services and operations depots) and 19 handheld radios.

Installation of the system commenced in early October, with a proposed completion date of the end of January 2019. The process for implementation will be:

- Perform tower and site upgrades and install new equipment.
- Link all sites and perform system coverage and performance testing to ensure the system meets the required standards.
- Upgrade all radios, work unit by work unit.
- Remove the existing system.

Andy Bulloch, General Manager, CommSite Group.

Further growth

In 2017, CommSite Group expanded its corporate team by appointing a dedicated health, safety and quality manager and bringing on board Andy Bulloch as General Manager.

According to Bulloch, the 2018 financial year has seen the company's operations grow healthily with the expansion of the team providing on-the-ground services across Victoria, and the establishment of the Queensland operation with a new office in Toowoomba.

"This was complemented by key clients taking on the option to extend and expand contracts, as well as being awarded many maintenance contracts through RFP processes, some of which had been held by incumbents for over 20 years," Bulloch said.

Other key customers and contracts include Exxon Mobile, Australian Paper Mill, AGL Loy Yang, Ericsson NBN wireless maintenance, Ericsson NBN Expansion Project, Nokia Networks, Gippsland Water and Latrobe City Council.

CommSite Integrated Communications Pty Ltd
www.commsite.net.au

News

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5G DEPENDS ON STREAMLINED POLICIES

The benefits of 5G will be severely compromised if the challenges of siting for outdoor cells are not addressed in a timely manner. This is according to 5G Americas and Small Cell Forum, which state that altering regulatory policies at the national, state and city level is imperative to reduce the time and cost of deploying small cells at scale. One of the biggest changes that operators will make as they move from 4G to 5G will be scale. Far more cells will be required for 5G, with a greater diversity of equipment form factors and site types.

INAUGURAL ACRNA CONFERENCE IN NOVEMBER

The first official Australian Control Room Network Association (ACRNA) conference will be held 27–29 November at the Mantra Parramatta in Sydney. The ACRNA committee of volunteers has been actively working to establish an exciting agenda of workshops, presentations, control room site visits and a networking dinner with a guest speaker. The inaugural event will also include the ACRNA's annual general meeting. The venue has been chosen to facilitate easy access for site visits, therefore keeping costs down. With support from corporate members, the ACRNA has been able to limit the conference registration fee to $800 per person, which also includes first-year membership of the association.

Speaker-microphone

The AINA Wireless PTT Voice Responder is a next-generation speaker-microphone that can be connected via Bluetooth to iOS and Android smart devices. The device is designed to work with most major push-to-talk applications including ChatterPTT, ESChat, RapidPTT, Zello, Tassta, Kodiak and many more.

The Voice Responder features several buttons in which application developers can assign different functions. Users can remotely control functions such as push-to-talk, phone calls, channel switching and emergency alerts, all while keeping their phone in a safe place and preserving their phone's battery.

The PTT Voice Responder has been designed from beginning to end with the user's needs and safety in mind. The device has the capacity to last through any critical situation, with several environmental MIL-STD 810G tests passed and an Ingress Protection of 67 (IP67). The device is designed to be durable and reliable, with a battery life of 24 h and only weighing 125 g. AINA also has an optional in-vehicle charger cradle to ensure the device is always ready to go when on the road.

Logic Wireless Pty Ltd
www.logicwireless.com.au

Dispatch management system

Omnitronics' altusomni is a new release of the DX-Altus Dispatch Management System. It has all the features of the current version — such as individual and group text messaging, individual and group calling, location services/GPS integration, emergency management, rapid recall, canned voice, RSSI voting, security encryption, redundancy, remote monitoring and so on — but includes upgrades across a number of crucial system aspects.

Enhancements include a much smaller hardware footprint (half the size of the current DX-Altus) and a more powerful processor, resulting in less rack space needed and lower maintenance time and costs. Up to 60 operators can be supported simultaneously on a single altusomni server, with up to 56 radio/phone/paging/SIP PABX/recorder interfaces to external equipment.

With Omnitronics' omniconnect interoperability technology (for both trunked and conventional systems), operators can simultaneously use multiple digital radio technologies such as DMR, IDAS, MotoTRBO, Nexedge, P25 or TETRA, or even IP connectivity for analog networks. omniconnect can join and patch together radios from disparate manufacturers, including metadata, onto the one network. In addition, Omni data reporting helps organisations monitor dispatch functions and productivity.

altusomni will be officially launched at Comms Connect Melbourne 2018, with sneak peeks available at the Omnitronics booth #112.

Omnitronics Pty Ltd
www.omnitronics.com.au

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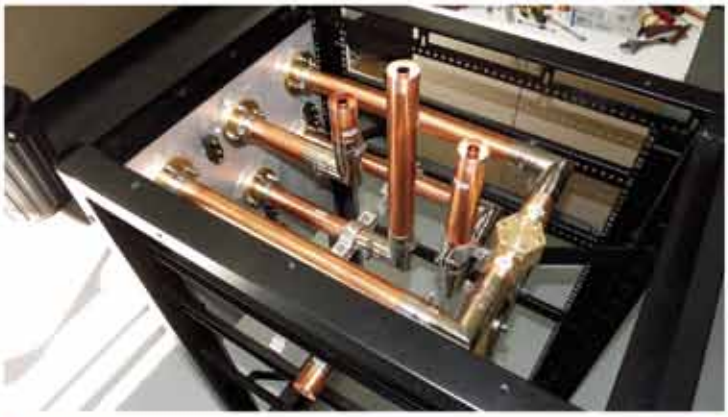

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News

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MISSION-CRITICAL LTE REVENUES ON THE RISE

Revenues generated by the mission-critical LTE ecosystem are expected to increase across all major sectors by 2021. This is according to analysis from IHS Markit, which shows that the utilities market is leading the way with 120% growth. In the public safety sector, revenues are set to double, while transport is predicted to see growth of 80%, just beating the 75% increase expected from the industrial sector. The successful evolution of the LTE critical communications market is dependent on the incorporation of critical users' specific requirements — features such as push-to-talk and group call which are not currently available on commercial networks.

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MOTOROLA FUNDS FEMALE ENGINEERS

Motorola Solutions is celebrating its 90th anniversary by providing $90,000 to fund a scholarship initiative for women pursuing engineering careers. The Motorola Solutions Foundation has donated these funds to the Society of Women Engineers (SWE), the world's largest advocate and catalyst for change for women in engineering and technology. The gift is expected to fund 18 scholarships — each valued at $5000 — to women pursuing engineering degrees from one of 3800 ABET-accredited programs at colleges and universities in 31 countries. Priority will be given to underrepresented populations as well as students demonstrating financial need.

Optical loss test set

The Fluke CertiFiber Pro Quad Optical Loss Test Set (OLTS) is a Tier 1 fibre certification solution and part of the Versiv Cabling Certification product range. It is available to rent from TechRentals.

The Versiv line also includes copper certification OTDR and Wi-Fi analysis modules. Versiv is designed around the ProjX management system which eases tasks from initial set-up of a job to system acceptance and Taptive user interface that brings advanced data analysis and easy operations to technicians of all skill levels.

The OLTS has 3 s Autotest optical loss measurement of two fibres at two wavelengths with distance measurement and optical loss budget calculations. It provides automatic pass/fail analysis to industry standards or custom test limits and identifies incorrect test procedures resulting in negative loss readings.

TechRentals

www.techrentals.com.au

ETSI RED radio

For outdoor critical infrastructure operations, cnReach transports process monitoring and control data from remote sensors or RTU/PLCs back to the operations centre supporting real-time automated decision-making and ongoing analytics. Covering large geographic areas, hard-to-reach terrain and challenging spectrum environments, cnReach is designed to deliver reliable, secure connectivity to the petrochemical, electric utility, water/wastewater/stormwater and transportation industries. cnReach eases the migration to modern networks by combining legacy serial and analog/digital I/O with TCP/IP and Ethernet connectivity.

Fully integrated into a 'single-pane-of-glass' management platform (cnMaestro), cnReach helps bridge the IT/OT sides of complex organisations. Combining cnReach's licensed and unlicensed narrowband radios with Cambium Networks' broadband technologies, industrial organisations are delivering end-to-end Industrial Internet of Things solutions today.

Features include licensed 450 MHz (406–470 MHz), ETSI RED Compliant w/ CE Mark (also available in an FCC model); secure communications with AES 128/256-bit encryption and password authentication; access point synchronisation and adaptive modulation; extensive I/O capabilities easing the transition from serial to all-IP networks with two serial ports, two Ethernet ports and optional analog/digital I/O built in; sophisticated network planning with LINKPlanner, a no-charge planning tool enabling network designers to predict both capacity and availability of networks crossing all of Cambium's technologies; supported by cnMaestro software for monitoring the status of entire networks; up to 8 W transmit (39 dBm); single and dual radio configurations for advanced back-to-back relay topologies; and point-to-point, point-to-multipoint and back-to-back relay configurations (dual radios).

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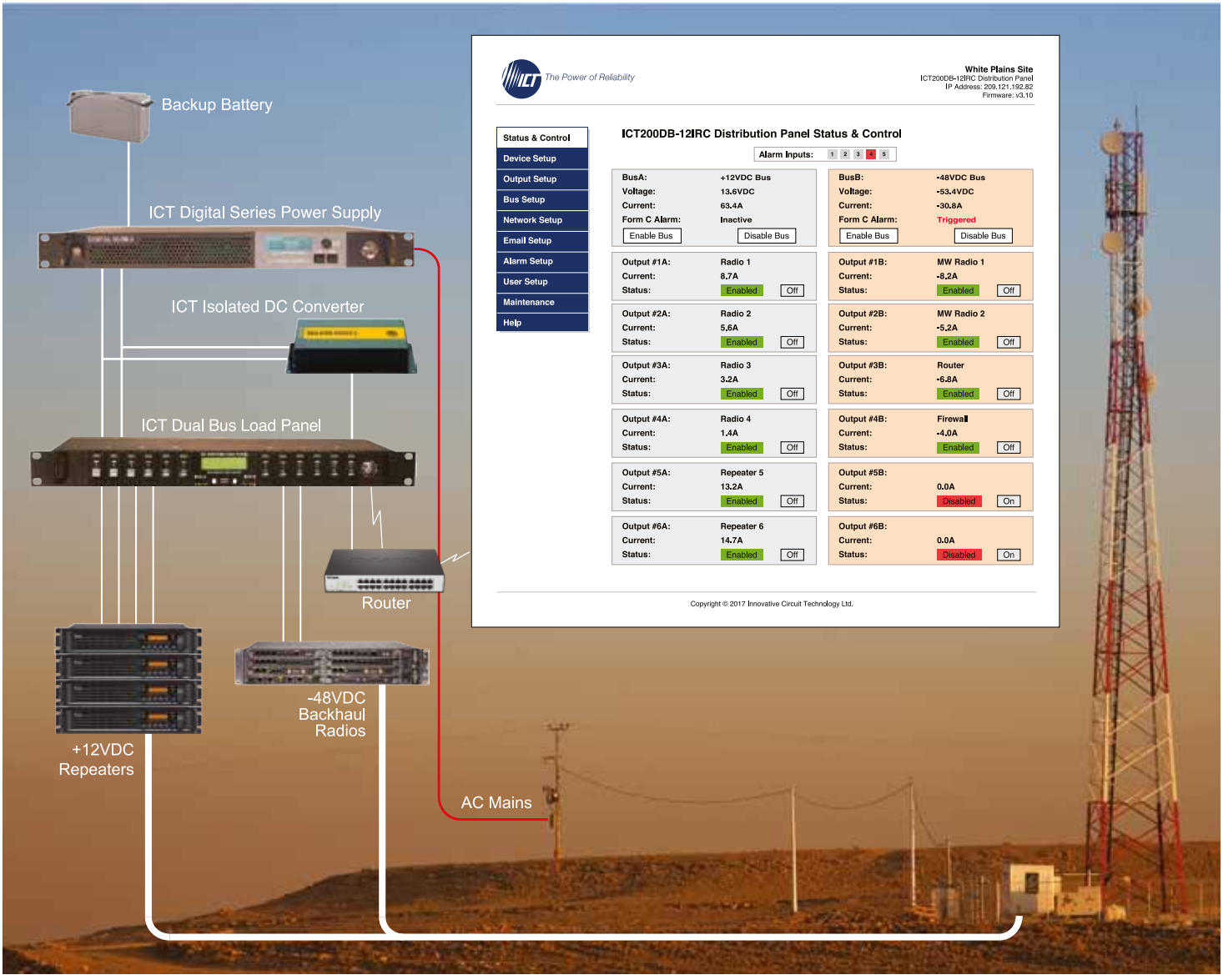
- Helps reduce unnecessary site maintenance visits



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COMMS 2018 CONNECT MELBOURNE

Local and international experts are gathering in Melbourne for Australia's biggest-ever Comms Connect conference.

This year's Comms Connect Melbourne conference promises to be the biggest and best ever, with a huge range of speakers, panel sessions, cases studies and preconference workshops presented by experts from Australia and overseas. The wide-ranging program will see a large variety of topics covered, from LMR to 5G, IoT to mobile broadband, public safety to spectrum management, LTE to smart cities, SCADA to Li-Fi, connected workers to control rooms, and much more.

There will be two keynote addresses on the morning of the first conference day:

- The importance of evidence-based research for the future of public safety communications — presented by Dereck Orr, Division Chief of the Public Safety Communications Division at NIST's Communications Technology Laboratory
- Innovation and partnerships in technology: how the LAPD is staying ahead of the curve — presented by Lt. Dan Gomez, Innovation & Strategic Planning Division, Los Angeles Police Department

The second conference day will kick off with three major plenary addresses:

- An update on the status of Australia's public safety mobile broadband — presented by Luke Brown, Assistant Secretary, Emergency Management Australia, Department of Home Affairs
- Empowering public safety with lifesaving technologies — presented by TJ Kennedy, Co-founder, Public Safety Network
- Mission-critical communication of the 21st century — presented by Karim Nejaim, Executive, Product Engineering, Telstra

The conference sessions will be split into three themes that will run across the two days: public safety and emergency management, technology and industry. On the second day, there will be a special fourth theme on critical communications in Finland (see below for information on the Finnish pavilion in the exhibition).

There are too many individual presentations scheduled for us to list them all here, but these are some highlights:

- Surviving Hurricane Maria: Lessons for P25 interoperable systems — Rudy Torres, Director, EF Johnson
- BroadWay: Procuring innovation to enable pan-European mobile broadband for public safety — David Lund, Vice President, PSCE and Coordinator for BroadMap
- Critical Communications roadmap for NSW — James Corkill, Director Engineering and Spectrum, NSW Telco Authority
- Getting to 5G using innovative fixed wireless technology — Eddie Stephanou, Regional Technical Manager, Cambium Networks
- Radio management systems and data analytics — Paul Whitfield, R&D Manager, Omnitronics
- In the digital economy, data is the new oil — Geof Heydon, Creator Tech Smart City Consultancy and the IoT Alliance
- DMR Tier 3 voice radio coverage testing — Nick Wigley, Powerco
- PTT over LTE for mining operations — Wireless Systems Specialist, Link Information Technologies
- Rethinking two-way radio intrinsic safety — Paul Barnes, Director IT Operations & Communications, NSW Fire & Rescue

The Finnish sessions will feature several presentations and a panel session, including:

- Success in cooperation on the road to broadband — Tero Pesonen, TCCA
- Operative field communication and training — Elina Avela, CEO, Beaconism
- Deep dive into key solutions to enable successful field operation — group presentation by Teemu Ekola (Insta DefSec Oy), Timi Harkonen (Codea Oy), Sami Honkaniemu (Mentura Group) and Simo Ruoko (ROGER-GPS)
- Requirements for broadband to meet the critical communications sector's demand — panel session with Markku Korkiakoski (Bittium), Mika Skarp (Cloudstreet), Barbara Noonan (Nokia) and Pete Peltola (Bandercom)

There are plenty more sessions and panels to choose from — see the full program on the Comms Connect website.

Industry workshops

The conference workshops are always very popular, and this year will include not only discussion, but also hands-on training in some cases. And the topics to be covered are both varied and vital:

- Critical messaging in the modern world
- Radio spectrum management — what's trending
- Community safety information management — an international perspective
- ARCIA professional development training workshop — multi-coupling
- Digital LMR and the mobile broadband landscape — key information for evolving critical wireless communications
- Critical control rooms for the next generation of operations

The moderators and participants will be drawn from a wide range of local and international businesses, and industry and intergovernmental groups, the latter categories including ARCIA, TCCA, ATCCF and BroadMap.

See the Comms Connect website for full details of the workshop program and registration details (which are separate to Comms Connect itself). Places fill quickly, so don't delay.

Exhibitors

Comms Connect Melbourne is your one-stop shop at which 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.

For the first time at Comms Connect, there will be a special pavilion for companies from a particular region of the world. For 2018 this will be Finland, and there will be a host of enterprises represented: Bandercom, Beaconsim, Bittium, Business Finland, Cloudstreet, Codea Oy, Critical Communications Finland, Dedicated Network Partners, Insta DefSec Oy, Mentura Group, Nokia, ROGER-GPS, Savox Communications and Wirepas Mesh. This will be a great opportunity for local communications operators and vendors to meet with these Finnish firms, see solutions demonstrated and exchange ideas. Head to stand 157 on the exhibition floor.

You can see a full list of local and international exhibitors at melbourne.comms-connect.com.au/whos-exhibiting.

And don't forget that even if you're not taking part in the conference, you can still get a FREE expo pass to visit the exhibition — see melbourne.comms-connect.com.au/pricing-and-registration for more details.

ARCIA dinner and awards

The annual ARCIA Gala Industry Dinner will be held on the evening of Wednesday, 21 November, at the Convention Centre. Each year the dinner gets bigger and better, with more than 500 industry professionals participating in 2017. This year promises to be even bigger.

Held at the same venue (the MCEC) as Comms Connect, 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.

So as you can see, this year's Comms Connect is packed full of essential speaker sessions, panels and workshops. Make sure you register as soon as possible, to ensure you stay up to date with all of the latest solutions, technical advances and developments in the field of critical communications.

Comms Connect Melbourne 2018

Workshops:	Tuesday, 20 November (9.30 am–5.00 pm)
Conference:	Wednesday, 21 November (9.00 am–5.00 pm) and Thursday, 22 November (9.00 am–4.30 pm)
Exhibition:	Wednesday, 21 November (9.00 am–5.30 pm) and Thursday, 22 November (9.00 am–3.30 pm)
Who:	1500+ attendees, 80+ speakers and 90+ exhibitors
Where:	Melbourne Convention & Exhibition Centre
Web:	melbourne.comms-connect.com.au

SATCOMS TO HELP SWEEP THE SEA

The Iridium satellite network will deliver critical data, imagery and video for The Ocean Cleanup project.

Iridium Communications has been selected as the preferred provider of satellite communications services for The Ocean Cleanup, the non-profit organisation deploying advanced technologies to rid the world's oceans of plastic.

The Ocean Cleanup is embarking on one of the largest environmental initiatives of this generation by cleaning up ocean plastic debris, starting with what's known as the Great Pacific Garbage Patch.

The Ocean Cleanup has chosen Iridium L-band satellite broadband services to support this important mission. The service is being delivered in partnership with Iridium service provider The AST Group.

By creating a system of 600-metre-long floating plastic collectors (floating screens, or systems) that include a 3-metre-deep skirt, The Ocean Cleanup collects plastic pollution through a combination of the wind, waves, natural ocean currents and the floating screen's ability to prevent plastic escaping underneath it, or flowing over the top, while avoiding ensnaring sea life.

Each system is equipped with two Iridium broadband terminals, and on full deployment of a fleet of 60 floating screens, there will be 120 Iridium broadband terminals operating as part of this project.

The Iridium terminals will relay critical systems data including compartment flood detection, position and location information, pictures, 360-degree video and system performance information.

"The opportunity to play a role in such an important and historic endeavour was a no-brainer for Iridium. It's an honour for us to be a part of The Ocean Cleanup's incredible mission to rid the oceans of plastics," said Iridium CEO Matt Desch.

"A reliable, predictable and redundant communication network that can work despite adverse weather conditions is critically important to this system, and that's when the Iridium network really shines.

"When the oceans aren't cooperating and several foot waves and powerful winds are causing havoc, the Iridium system will help make sure The Ocean Cleanup understands the operational status of each floating screen in the fleet."

The Iridium broadband terminals will receive data from a complex combination of sensors and data gathering equipment hosted by each system. That information will then be relayed to The Ocean Cleanup's headquarters in Rotterdam in real time.

Iridium's constellation of 66 interconnected low-earth orbit (LEO) satellites requires no local ground infrastructure and provides the robustness, reliability and redundancy needed to ensure this critical data is delivered as expected.

Iridium is nearing complete deployment of its next-generation satellite constellation, Iridium NEXT. The new constellation is completely replacing the previous network of 66 interconnected satellites. To date, there have been seven successful Iridium NEXT launches completed by SpaceX, deploying 65 new satellites. One launch remains before completion of the company's historic constellation refresh.

In total, 75 new satellites are being launched to LEO, of which 66 will be in the active constellation, with nine on-orbit spares.

> "A RELIABLE, PREDICTABLE AND REDUNDANT COMMUNICATION NETWORK THAT CAN WORK DESPITE ADVERSE WEATHER CONDITIONS IS CRITICALLY IMPORTANT TO THIS SYSTEM." — MATT DESCH, IRIDIUM

Images courtesy The Ocean Cleanup and Iridium Communications.

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- Backed by Cambium Global Support

HIGH-SPEED COMMS FOR HIGH-SPEED TRAINS

Ultrafast remote radio station switching can provide smooth communications for trains moving at 500 km/h or more.

The demand for smooth, high-speed communications is rapidly increasing, especially from users on fast-moving vehicles such as high-speed trains, due to the popularity of smartphones and other devices.

In current cellular networks, however, connections to internet networks during high-speed travel are frequently interrupted because of radio station handovers.

To overcome this limitation, researchers at Japan's NICT Network System Research Institute developed a high-speed, handover-free communication network for high-speed trains using a seamless wavelength-division-multiplexing (WDM) radio-over-fibre (RoF) and wireless network in EHF bands.

In particular, the proof-of-concept demonstration adopted a combination of a linear cell network configuration, a high-speed seamless fibre-wireless system in the millimetre-wave (mmWave) band and an ultrafast optical-path switching technique.

This work was funded by the Ministry of Internal Affairs and Communications and involved partner company Hitachi Kokusai Electric Inc.

In this work, NICT developed a technology to transmit 20 Gbps radio signals in the 90 GHz band from a central station to 50 remote radio stations using the switchable WDM-RoF and mmWave wireless network.

Switching of the remote radio stations in accordance with the movement of trains can be controlled from the central station, and a switching time of less than 10 μs was achieved using high-speed, wavelength-tunable lasers.

To reduce fibre dispersion effects, single-sideband optically modulated signals were transmitted over the WDM-RoF system. At the remote radio stations, the signals were directly up-converted to the 90 GHz band using reference signals, which could be generated and distributed from the central station.

The system comprised the following principal technologies:

- High-speed wavelength tunable laser sources.
- 16-QAM multilevel modulation/demodulation technology with a sampling speed of 5 GHz.
- High-speed optical-to-electrical converter for mmWave signal generation.
- Linear cell configuration for signal distribution to railway tracks.

In high-speed railways, the remote radio station that should be activated to communicate with a train can be determined precisely using information about the location of the train from the train control centre. By distributing signals to radio stations appropriately, a smooth and uninterrupted (handover-free) communication system can be achieved.

In addition, owing to the use of a centralised network, remote radio stations can be greatly simplified and, thus, the cost and power consumption of the system can be significantly reduced.

The use of seamless convergence of fibre-optic and wireless networks in high-frequency mmWave bands shows that the challenge of high-speed transport communications can be overcome, even when trains are moving at speeds of 500 km/h or faster.

In the future, in collaboration with Hitachi Kokusai Electric Inc, the Railway Technical Research Institute, the Electronic Navigation Research Institute (part of the National Institute of Maritime, Port and Aviation Technology) and other related parties, NICT aims to conduct field tests on real railway systems.

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SOFTWARE FOR SAFETY

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Modern critical communication systems have evolved from away from standalone, analog, voice-based solutions and have swiftly merged with the world of IT to produce high-tech, data-intensive, flexible voice and data systems that provide increased levels of safety and capability.

That transformation is being driven largely by software. So it's no surprise that some of the biggest providers in the market are focusing greater attention on agile software development. One of these is Motorola Solutions, which has reinvented itself from being a pure radio hardware manufacturer into an end-to-end 'communications and intelligence' provider for public safety agencies and mission-critical businesses.

To find out where Motorola Solutions sees the industry heading, we spoke with the company's first-ever Head of Software, Andrew Sinclair.

How does software fit into the bigger critical communications and safety picture?

Motorola Solutions has been serving the critical communications industry for 90 years internationally and 50 years in Australia. Today we are seeing a growing need for data-based technologies that provide our customers with the same value they have come to expect from mission-critical communications.

My organisation is responsible for bringing mobile applications and related services to users in the field, as well as enhancing control centre environments through our integrated suite of software. I lead a global team of software designers, developers and engineers who are responsible for a range of activities spanning user experience design, cloud computing and data analytics through to the application of artificial intelligence (AI).

How has your experience prepared you for what you need to achieve at Motorola Solutions?

I was at Microsoft and Skype around a decade ago when the telephony industry was installing a lot of large hardware in data centres and many people were focused on PBX phone systems and all of their features. After analysing the environment, we concluded that what enterprises really needed was a cloud-based communications system integrated with their daily workflow.

So the opportunity for Skype to disrupt the industry was clear — not only by kickstarting the voice-over-IP movement, but also by introducing a range of productivity tools to help organisations manage their workflows.

Although the customers and market I'm working with now are different to those at Skype, the principles and the opportunity are the same.

Motorola Solutions is best known as a hardware provider. What's driving the need for more software capabilities in the sector?

Emergency services and enterprises are dealing with more complex threats to safety and business continuity. At the same time, they have constrained budgets and are expected to do more with less even as expectations keep rising.

In many command centres you will see workers having to manage and transcribe information across disparate systems that don't integrate well. This wastes valuable time and can put lives at risk. Having the right software solutions that are properly integrated will help organisations to save time, save 'clicks' and, ultimately, save lives.

The same principle applies for field workers managing complex and challenging tasks, often under extreme pressure. Providing the right data at the right time can enhance their situational awareness, streamline their workflows and help them to make better decisions to protect their communities or business operations.

What impact are new data sources and apps having?

They are already having a major impact but there are many opportunities for innovation yet to be realised. For critical communications customers it's no longer about having devices,

The winning Hackathon team from Swinburne University.

infrastructure and software in isolation — it's about all of these elements working together as integrated, end-to-end solutions.

The availability of affordable and powerful cloud computing is driving new capabilities including AI, predictive analytics and other forms of business intelligence. And systems that can ingest large volumes of data, such as video, can be used to predict potential issues before they occur.

How do acquisitions, such as Gridstone, tie in with your plans?

Gridstone has been a smart acquisition for our company. It gave us more than 60 application

Andrew Sinclair, Head of Software, Motorola Solutions

developers in Australia with specialised skills in creating mobile apps to help public safety and enterprise companies overcome their workflow challenges. The team understands public safety and enterprise environments and develops intuitive, easy-to-use apps.

Motorola Solutions also continues to acquire and invest in new capabilities to round out its technology portfolio. Our acquisition of Avigilon added an advanced video surveillance and analytics platform to our stable, complementing the technologies we have for crime analysis and prediction and for digital evidence management through our CommandCentral portfolio.

We also collaborate with partners such as the artificial intelligence (AI) company Neurala to develop AI solutions that can learn at the edge and automatically search for persons and objects of interest.

Motorola Solutions held its most recent hackathon in Australia earlier this year. Why are hackathons important?

The thing I really like about our Australian hackathons is the way they bring together the software development industry and public safety agencies. This year's hackathon in Melbourne was significant because it was the first time a university team won the event, instead of a mature software firm.

The winning team from Swinburne developed a concept to help emergency services and community members identify and share information about potential hazards such as landslides and fallen trees. Since their win, they have presented their solution to senior management from the Victoria State Emergency Service and improved their application with further feedback.

Where will innovation take public safety and enterprise organisations?

I think we are still in the early stages of what software capabilities and the power of data can do for these sectors.

Video will continue to grow through the ubiquity of smartphones, CCTV cameras in our cities and body-worn video used by first responders. A simple piece of data such as a car's registration plate number can be quite powerful when correlated with other sources to determine where a vehicle has been or if it was involved in an incident.

We'll also see the emergence of more 'real-time crime centres' using video. Public safety agencies will be able to identify new data patterns through greater integration of their voice communication, computer-aided dispatch, records management and video analytics systems.

Software will get smarter and easier to use for critical industries, enabling field workers to use chatbots trained on the specific language of their industry, so that they can continue to work 'heads up' and 'hands free'. New capabilities in AI, machine learning and IoT will be developed from building blocks available in the cloud, helping organisations to better manage their daily workflows.

The era of digital transformation for critical industries has begun and it's an exciting time to be involved.

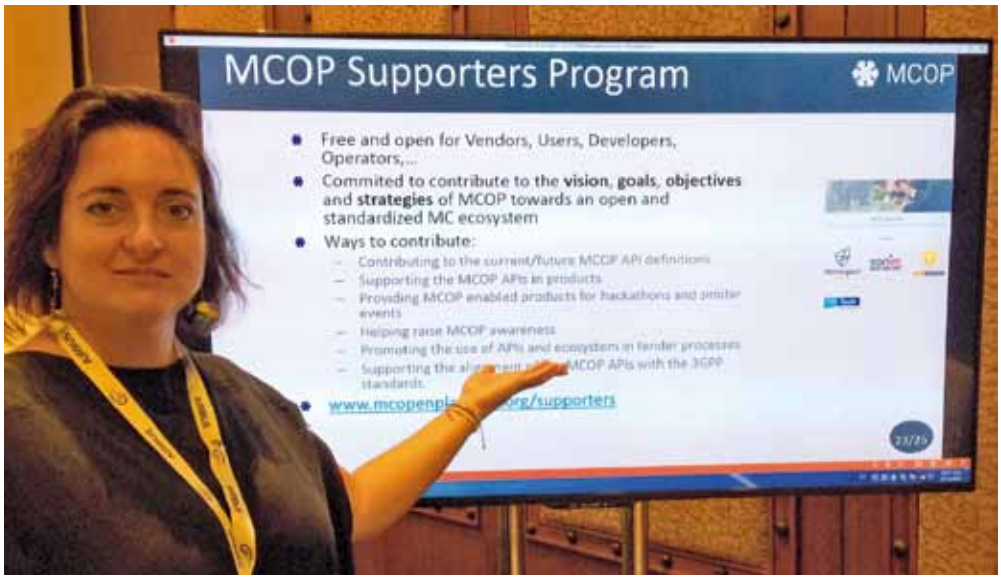
Motorola Solutions Australia Pty Ltd
www.motorolasolutions.com.au

MCOP PROJECT TO HARNESS INDUSTRY INSIGHTS

The Mission Critical Open Platform project has launched a Supporter Program, with a vendor workshop planned for November.

The halfway point in the first phase of the Mission Critical Open Platform (MCOP) project has been marked by the launch of an official Supporter Program to harness the enormous amount of interest that the initiative is creating.

MCOP is designed to catalyse the creation of standards-based, mission-critical PTT (MCPTT) applications, removing the entry barriers of the multiple technologies and proprietary platforms usually involved. MCOP will ensure interoperability and help to encourage more players to enter the MCPTT market by making the business case more attractive. All MCOP components are fully compliant with 3GPP standards.



Dr Bego Blanco, Lecturer and Researcher at the University of the Basque Country, which leads MCOP, presented the new Supporter Program at the Critical Communications Middle East and Africa event in Dubai.

The advances made by MCOP, and its demonstrations given around the world, have generated a great deal of industry and user enthusiasm for the project. To join the Supporter Program, qualifying organisations will be expected to commit to the principle of using open standards if they wish to formally support MCOP activities.

Supporters can contribute to MCOP in a number of ways, including:

- contributing to the current/future MCOP API definitions
- supporting the MCOP APIs in products
- providing MCOP-enabled products for hackathons and similar events
- helping to raise MCOP awareness
- promoting the use of open APIs and ecosystem in tender processes
- supporting the alignment of the MCOP APIs with the 3GPP standards.

"MCOP is committed to open and standardised mission-critical applications — we are delighted by the level of support for our work from the industry and are creating the Supporter Program to acknowledge this," said Fidel Liberal, MCOP project coordinator.

"MCOP Supporters have to commit to the vision, goals, objectives and strategies of MCOP. We hope this will give even greater strength to the project, and to open standards generally in critical communications, and grow the community as we move into the next phase."

Earlier this year, MCOP announced the release of the first version of the Open Source MCPTT SDK, including the source code for a sample MCPTT application, which is available from the MCOP repository. Both the app and the SDK can be remotely tested in a full 3GPP MCPTT system using the MCOP online Testing platform or a live LTE+IMS+eMBMS testbed hosted in the NIST/PSCR labs in Boulder, Colorado.

The first MCOP workshop for user equipment (UE) vendors is planned for November, to explain and help UE vendors how to implement the MCOP APIs on their devices. The workshop will cover technical aspects, licensing issues and the benefits to vendors for their application and customer base.

The MCOP project, funded by the US Department of Commerce's National Institute of Standards and Technology (NIST), aims to meet the challenges of the emerging and complex MCPTT ecosystem. The project, set to complete by mid-2019, will define, develop and validate an MCPTT client open platform that identifies neat open interfaces between the different technologies and reduces the integration efforts as well as delivering an online testbed for the applications. MCOP is led by the University of the Basque Country with partners Bittium, Expway and TCCA, supported by Nemergent.

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ORION GROUP EXPANDS NZ OPERATIONS

Orion Group uses Motorola Solutions' MOTOTRBO network to enhance communications at Christchurch Airport amid a tourism boom.

Orion Group has extended its advanced communications network across New Zealand using Motorola Solutions' digital radio systems, enabling further growth and success for critical industries such as the aviation sector.

As New Zealand's travel boom continues, the Orion Network is playing an important role in the delivery of efficient and safe operations every day at Christchurch Airport.

Each year, more than 6.5 million passengers travel through Christchurch, with that number expected to reach 8.5 million by 2025.

Key tourism statistics from the Ministry of Business, Innovation and Employment this year revealed international arrivals into Christchurch increased by 8.5%, while departures rose by 5.5% year-on-year to June 2018. The 2018 Botanic D'Lights festival in Christchurch during August attracted more than 136,000 people — more than the population of the South Island's second-largest city, Dunedin.

With such heavy passenger flows through the international gateway to the South Island, Christchurch Airport relies on its communication system to keep services running on time, keep staff and passengers safe, and to improve the quality of the overall customer experience.

Christchurch Airport worked with Motorola Solutions and TL Parker — a founding member of New Zealand's Orion Group of channel partners — to upgrade its existing communications network. This provided the airport with smart applications for seamless communication between staff using radios and other devices such as smartphones and tablets.

"Smart applications including WAVE enable instant communication between all employees regardless of the type of device they use," said Tim Morris, Manager of Airfield Operations at Christchurch Airport.

"Additionally, with GPS and messaging services we can locate and mobilise our resources instantly in an emergency. This improves situational awareness across the board so we can make better-informed and faster decisions when it matters most," Morris said.

The resilience of the airport's communications network was demonstrated during the Christchurch earthquakes of 2010 and 2011.

"Cellular communications went down during the 2011 earthquake but the radio network remained operational," said Garry Parker, Chief Executive Officer, TL Parker. "This was due to a single channel dedicated to all airline companies provided by TL Parker and Motorola Solutions. It proved its resilience through each aftershock and was used to help coordinate the safe arrival of civil defence and other emergency personnel into Christchurch within 90 minutes of the earthquake."

The airport's strong customer services philosophy, including investment in advanced communications, has enabled it to win multiple awards this year, including the prestigious SKYTRAX World Airport Award as best regional airport in Australia/Pacific.

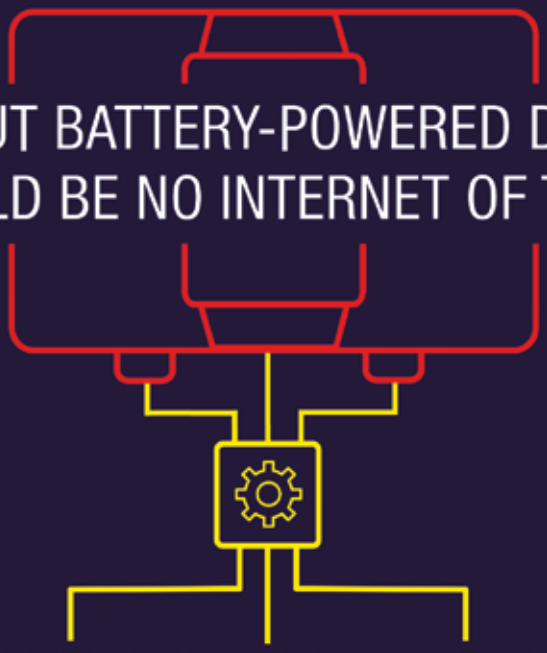
Motorola Solutions sees a wider trend of New Zealand enterprises investing in advanced communications to strengthen the country's economic growth forecasts over coming years. This includes vital industry sectors such as transport and logistics that continue to perform well in key economic indicators including the ANZ Truckometer.

"Airports provide a great example of organisations with staff working in a variety of different roles and functions who need to stay connected to instant, group-based communication," said Steve Crutchfield, Vice President and Managing Director for Australia and New Zealand, Motorola Solutions.

"Radio networks are no longer being designed only with two-way voice communication in mind. As new data created by the Industrial Internet of Things and other sources continues to grow, communication networks provide a platform for enterprises to add further innovation and new services over time," he said.

BATTERY LIFE IS IOT DEVICE LIFE

WITHOUT BATTERY-POWERED DEVICES
THERE WOULD BE NO INTERNET OF THINGS (IoT).



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THE COST OF REPLACING THE ENTIRE IoT DEVICE

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www.keysight.com/au/en/solutions/internet-of-things-iot.html

Crisis-proven alerting

Today's paging technology offers the coverage and resilience of a large, shared network with individual control by user organisations.

Users of public safety radio systems, including alerting networks, are demanding modern technologies that can improve their daily performance and trim operating costs. Some of today's most technically advanced and feature-rich alerting systems are being supplied by Swissphone, which has gained a solid reputation for performance and dependability across Europe and America. With these dedicated alerting networks, fine-tuned to their requirements, organisations such as rescue, fire and other emergency services can count on reliable communications to help them make the most of their personnel and resources.

With its extensive experience in building large-scale synchronised alerting networks for public safety users, Swissphone can offer the most efficient network with an optimum balance of its number of base stations while providing enhanced coverage both on the street and in-building. This is especially significant where volunteer responders are concerned. "In the volunteer community, sometimes their day-jobs involve being indoors," says Harald Pfurtscheller, CTO of Swissphone. "We want to make sure that a critical message gets to them in the most efficient fashion."

With Swissphone's synchronised alerting networks, an entire region or country can be alerted in seconds, yet a decentralised alerting input capability enables small areas to be addressed individually via local base stations. With full network monitoring at the control centre, every base station is monitored over the air and any alert can be tracked. At the same time, multiple user organisations and their local managers can undertake responsibility for independently running their own operation, a key requirement for many organisations.

In many such networks, radio base stations are fed via a local IP connection from the control centre. But in Swissphone's architecture, a feed can instead be taken over the air from any neighbouring base station. "If ever that network should go down, ours will still work because the base stations can communicate over the air," says Pfurtscheller. "So there is big redundancy. In case of a blackout, you still have a channel to communicate and alert people, even if all other networks are down." This, he adds, is a crisis-proven solution that will always work.

Replacing a wireless network need not mean having to replace all the user devices at the same time. Swissphone's POCSAG infrastructure can support traditional alphanumeric pagers. But by adding two-way pagers, agencies can give themselves some new resources, such as the ability for a dispatcher to see how many volunteers are available at the moment or have responded to an alert, and who they are. With this information, the dispatcher can ensure that the right mix of skills is being sent to each incident — and can swiftly put out a further call if the response is insufficient.

Complete system

Swissphone offers its customers three main benefits, as shown by its growing international references:

- Better radio coverage with less interference, through the use of synchronised base stations and a variety of further options. High-reliability network design ensures automatic fall-back and recovery in the event of a failure or loss of the data feed to a base station.
- Future-proofing options, including backward compatibility of new components to upgrade to two-way paging. High quality pagers equipped with the most up-to-date cellular modules can return pre-set messages or just a simple acknowledgement that a message has been received.
- Support for multiple user organisations sharing a single network. Each user organisation can retain full, independent control of its own service and messaging devices. Swissphone's s.ONE software collates responses from paging calls to show commanders exactly what resources have answered each call. The software also allows follow-up alerts to be sent out locally and provides convenient remote management and programming of the pager fleet.

"The DiCal system afforded us the ability to do a complete update with all infrastructure and terminal user equipment at half the cost of what traditional tone-voice infrastructure would have cost."— Josh Humphrey, Iowa County Sheriff's Department

USA: a full update at modest cost

In the United States, public safety voice communications have moved to P25 digital networks, leaving local emergency services in many rural areas to rely on deteriorating analogue radio systems. Their situation has been made worse by regulatory change (narrowbanding), which has weakened radio coverage.

One county in the state of Iowa decided to convert its alerting system to digital also, choosing a DiCal digital network from Swissphone. This now delivers fast alerting with much-improved indoor radio coverage. And because the Swissphone architecture does not require every base station to have its own IP connection, extra coverage can easily be added in any location where electrical power is available.

Josh Humphrey, who is responsible for emergency management at the Iowa County Sheriff's Department, commented: "The DiCal system afforded us the ability to do a complete update with all infrastructure and terminal user equipment at half the cost of what traditional tone-voice infrastructure would have cost."

"The fact that Swissphone guarantees backwards compatibility for new components with the old generation of equipment further strengthens the protection of our investment." — Jean-Yves Goncalves, Head of Radio Transmission and IT, Meurthe-et-Moselle fire and rescue services

France: enhanced coverage, faster alerting

In the Meurthe-et-Moselle department of France, volunteer firefighters previously relied on alerting transmitters installed at 80 local fire stations. But interference caused by unsynchronised transmissions in some cases resulted in poor reception, and volunteers often failed to receive their alert. But with the introduction of a modern Swissphone network, the number of base stations needed was slashed to just 39, radio coverage was improved, alerting times were shortened and interference became a thing of the past. And such was the success of the system, it soon persuaded the fire services in adjoining departments to follow suit.

"Our synchronised network allows us to save a lot of time, in particular when it is necessary to locate specialised officers at the departmental level," said Jean-Yves Goncalves, head of radio transmission and IT services.

"The fact that Swissphone guarantees backwards compatibility for new components with the old generation of equipment further strengthens the protection of our investment."

"Reliability is absolutely key, and this can best be guaranteed if all system components are optimally co-ordinated with each other. One manufacturer can guarantee this better than several manufacturers with different basic concepts."
— Rainer Buchmann, Director, Saarland's integrated command and control centre

Germany: hybrid alerting, delegated control

In Saarland, one of Germany's federal states, some 13,000 volunteers provide standby fire and rescue cover through 52 local fire brigades. A central emergency services control room alerts them via a Swissphone digital alerting network with end-to-end encryption to protect sensitive data.

Users carry Swissphone's RES.Q two-way pagers, which maintain a feedback channel over the cellular phone network for acknowledging paging calls. This cellular connection can also be used for 'hybrid' alerting, as an additional fall-back for the normal POCSAG network. At the same time, the RES.Q pagers act as a backup for the main TETRA radiocommunication system.

Swissphone's s.ONE software collects the responses and builds a visual display showing the availability of pager users. With a glance at this dashboard, the controller can judge whether deployment plans for various predefined scenarios are being satisfied.

"Alerting is a very important pillar in averting danger," said Rainer Buchmann, director of Saarland's integrated command and control centre. "Reliability is absolutely key, and this can best be guaranteed if all system components are optimally co-ordinated with each other. One manufacturer can guarantee this better than several manufacturers with different basic concepts."

"It is important to us that the individual districts are always able to alarm autonomously, even if the IT-backbone should not be available." — Walter Oberrauch, Head of Technology, LFV regional fire service

Italy: regional coverage, flexible control

In the mountainous South Tyrol region of Italy, a Swissphone digital paging network supports a number of volunteer rescue services as well as professional firefighters. It provides state-wide alerting within seconds, yet allows decentralised regional alerting by its nine districts and by designated commanders. Multiple fall-back modes enable radio base stations to interconnect over the air if their IP backbone is disrupted.

More recently, the brigade has gone further, migrating control of its local fire sirens over to the digital network. The fire sirens transmission is encrypted to prevent hacking of the system and false triggering.

"It is important to us that the individual districts are always able to alarm autonomously, even if the IT-backbone should not be available," said Walter Oberrauch, Head of Technology at LFV, the regional fire service.

SWISSPHONE

Swissphone Wireless AG
www.swissphone.com

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FREE WI-FI TRIAL ON TRANSPERTH SERVICES

A trial is underway to provide free Wi-Fi on Transperth public transport services in WA. The trial will take place at the Subiaco and Elizabeth Quay train stations, as well as aboard two buses. "As the McGowan government continues to progress METRONET, we are looking at other measures that could attract more people to public transport," said Transport Minister Rita Saffioti. Passengers are able to use up to 150 MB per device in a 24-hour period. The technology is being delivered by Optus and the contract arrangement allows for the trial to proceed with no direct costs to the state government.

ARCIA EXECUTIVE AND COMMITTEE ELECTED

ARCIA's annual general meeting was held by teleconference on 8 August. In addition to the tabling of reports, the occasion saw an election held for executive and committee positions, with the following people elected or returned: President, Hamish Duff; Vice President, Gary Botley; 2nd Vice President, Glenn Sneddon; Treasurer, Andrew Wyborn; and Secretary, Kathryn Askwith. One item of business was put forward for approval, that the executive group be authorised to investigate the transfer of the association from an incorporated body to a not-for-profit company, as well as consider changing the name of the organisation. Both of these will be longer-term projects.

Enterprise switching

cnMatrix Enterprise Switching, together with the cnPilot Wi-Fi portfolio and cnMaestro Cloud Management, deliver cloud-managed access solutions that make for easy and fast deployment of a unified wired-wireless network, and an affordable, enterprise-grade line of Layer 2, Layer 3 Ethernet switches with a rich L2, L3 software functionality, with Embedded Edge Intelligence.

Features include: site-survivable operation, whereby cnMatrix continues to operate with full functionality when connection to the cloud is lost (management is still available via several different interfaces); device profiling, whereby detection of connected devices (and their profiles) is automatic; smart network segmentation; security at the edge (auto segmentation); and wired and wireless devices can be seamlessly treated identically with common QOS and security settings.

Cambium Networks LTD
www.cambiumnetworks.com

UHF/VHF transceiver

The Icom IC-F52D/F62D handheld is a compact UHF/VHF transceiver that offers both analog and digital capabilities. Offering multiple operating modes including analog FM, IDAS NXDN Conventional and upgradable to NXDN Type-D trunking, the radio is suitable for integrating into an existing analog network or for futureproofing with the aim of moving to a digital network.

Features include: full dot-matrix display, rotary channel and volume knob for simple everyday operation; built-in Bluetooth, voice recording, active noise-cancelling functions; motion/stationary detection, man-down and lone-worker functions; OTAP for reconfiguring radios in the field; and intelligent battery management to extend the battery life.

Digital functions (voice and data) include: direct mode; individual, group and all call; late entry for group call; status call and polling; short data messages; call alert (NXDN); GPS position data (optional HM-233GP required); transparent data mode; AMBE+2 vocoder; and OTAP function (OTAP manager CS-OTPM1 required).

The unit is engineered to IP67/66/55/54 waterproof and dustproof standards, and MIL-STD 810 G for shock, vibration and temperature. It is 29 mm wide (including the battery) and weighs 230 g (with the battery and belt clip included).

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A US Air Force bomber on a raid over the German city of Marienburg. Courtesy US Air Force.

RAIDING THE UPPER ATMOSPHERE

Shockwaves from huge bombs dropped on European cities were big enough to weaken the ionosphere.

Bombing raids by Allied forces during World War II not only caused devastation on the ground but also sent shockwaves through Earth's atmosphere which were detected at the edge of space, according to new research.

University of Reading researchers have revealed the shockwaves produced by huge bombs dropped by Allied planes on European cities were big enough to weaken the ionosphere above the UK, 1000 kilometres away.

Scientists are using the findings to further understanding of how natural forces from below, like lightning, volcanic eruptions and earthquakes, affect Earth's upper atmosphere.

"The images of neighbourhoods across Europe reduced to rubble due to wartime air raids are a lasting reminder of the destruction that can be caused by man-made explosions. But the impact of these bombs way up in the Earth's atmosphere has never been realised until now," said Chris Scott, Professor of Space and Atmospheric Physics.

"It is astonishing to see how the ripples caused by man-made explosions can affect the edge of space. Each raid released the energy of at least 300 lightning strikes. The sheer power involved has allowed us to quantify how events on the Earth's surface can also affect the ionosphere."

The researchers looked at daily records at the Radio Research Centre in Slough, UK, collected between 1943–45. Sequences of radio pulses over a range of shortwave frequencies were sent 100–300 kilometres above the Earth's surface to reveal the altitude and electron concentration of ionisation within the upper atmosphere.

Although the strength of the ionosphere is known to be strongly influenced by solar activity, the ionosphere is far more variable than can be explained by current modelling. The extent of the effects of ionospheric behaviour on radiocommunications during the Second World War is unclear.

Researchers studied the ionosphere response records around the time of 152 large Allied air raids in Europe and found the electron concentration significantly decreased due to the shockwaves caused by the bombs detonating near the Earth's surface. This is thought to have heated the upper atmosphere, enhancing the loss of ionisation.

Although the London 'Blitz' bombing was much closer to Slough, the continuous nature of these attacks and the fact there is far less surviving information about them made it more challenging to separate the impact of these explosions from natural seasonal variation.

> THE EXTENT OF THE EFFECTS OF IONOSPHERIC BEHAVIOUR ON RADIOCOMMUNICATIONS DURING THE SECOND WORLD WAR IS UNCLEAR.

The Kölner Dom (Cologne Cathedral) stands seemingly undamaged while the entire area surrounding it is completely devastated. Courtesy US Department of Defense.

Detailed records of the Allied raids reveal their four-engine aircraft routinely carried much larger bombs than the German Luftwaffe's twin-engine aircraft could. These included the 'Grand Slam' bomb, which weighed up to 10 tonnes.

"Aircrew involved in the raids reported having their aircraft damaged by the bomb shockwaves, despite being above the recommended height. Residents under the bombs would routinely recall being thrown through the air by the pressure waves of air mines exploding, and window casements and doors would be blown off their hinges," said Professor Patrick Major, University of Reading historian and a co-author of the study.

"There were even rumours that wrapping wet towels around the face might save those in shelters from having their lungs collapsed by blast waves, which would leave victims otherwise externally untouched.

"The unprecedented power of these attacks has proved useful for scientists to gauge the impact such events can have hundreds of kilometres above the Earth, in addition to the devastation they caused on the ground."

The researchers now need members of the public to help digitise more early atmospheric data, to understand the impact of the many hundreds of smaller bombing raids during the war, and help determine the minimum explosive energy required to trigger a detectable response in the ionosphere.

The research has been published in the European Geosciences Union journal *Annales Geophysicae*.

5G field measurement

Keysight's 5G field measurement solution provides a complete measurement system for mmWave radio propagation. It includes the software and hardware needed to collect, analyse and visualise data, as well as generate statistical information that can easily be shared across an organisation.

The Nemo Outdoor is a scalable field test solution for measuring radio interface parameters in wireless networks. The FieldFox is a handheld RF and microwave analyser, covering frequencies from 4 to 50 GHz. Nemo Analyze is a post-processing solution for analysing and visualising field measurement results.

Keysight Technologies Australia Pty Ltd
www.keysight.com

Ethernet switch

The EKI-2525LI is an unmanaged, 5-port Ethernet switch that comes in an ultrasmall palm size. This makes it a suitable solution for environments with limited space, such as electronic boxes, cabinets and high-density plants.

Compact devices such as PLCs typically have a height of only approximately 10 cm. Conventional Ethernet switches, however, are usually taller than this, resulting in a waste of space. The EKI-2525LI overcomes this and can be easily fitted into a rackmount cabinet to maximise space utilisation, thus offering an easy and immediate upgrade for Industrial IoT applications. The product can also be fitted into any already wired electronic boxes or shelves where extra connectivity and communication services are required, but space is limited, therefore aiding businesses with key infrastructure upgrades.

The EKI-2525LI can serve as an embedded device in any working equipment such as kiosk, AGV and CNC machines. This ensures smooth data transmission between embedded devices and thereby promotes seamless information communication.

Advantech Australia Pty Ltd
www.advantech.net.au

Ribbon fusion splicer

The Fitel S123M12 Ribbon Fusion Splicer is a compact, handheld device available for all METRO/ FTTX/ LAN fibres, backbone or long-haul installations. It is available to rent from TechRentals.

Its lightweight, durable metal body frame and rubber-protected corners enable usage in challenging locations, all while maintaining splicer performance. Single- to 12-ribbon fibre splicing can be achieved with this machine and it also offers a splice-on-connector (SOC) solution.

Up to 160 cycles of splicing and heating can be performed using the large capacity dual-battery configuration, making field use faster and more consistently accessible. Its fixed V-groove allows simple operation while also being compatible with Seikoh Giken and Diamond SOCs. The tool-less electrode replacement/mirror-free alignment system allows for easy maintenance and software upgrades via the internet.

TechRentals

www.techrentals.com.au

Pager

The TPL Systèmes Birdy Slim Lite pager has the same look and feel as the Birdy Slim, however it operates as a standard receive-only pager with a portable USB charging base.

Lightweight and smaller than a mobile phone, it rests in the hand and is easy to carry in a pocket or on a belt. Despite this the Birdy Slim Lite is a rugged device offering high-performance features, including an IP67 protection rating, RFID tag, large high-resolution display with 7-colour backlight and up to 128 capcodes.

The Birdy Slim Lite is suitable for the healthcare sector, emergency responders, hospitality and the industrial and manufacturing sectors.

Similar to the current Birdy WP, the Slim Lite also includes specific features such as key word search, 12 user profiles, customised alerts and customised logos on start-up.

The modern design also brings one of the highest receiver sensitivities in VHF or UHF available for a POCSAG or Flex pager.

The Birdy slim Lite uses the latest Li-ion battery technology, which enables it to run for up to 7 days on a full charge depending on usage.

TPL Systems Asia-Pacific Pty Ltd

www.tplsystems.com.au

Oscilloscopes

Keysight's Infiniium UXR-Series of oscilloscopes enables high-speed serial and optical designers to quickly create comprehensive designs with higher margins. Good performance levels, combined with a wide selection of bandwidth choices, make the product suitable for engineers and designers working with any generation of DDR, USB, PCIe or other serial technologies, as well as PAM4, 5G, radar, satellite communications and optical designs.

The product delivers a low noise floor and high vertical resolution to ensure measurements are not impacted by oscilloscope noise and signals are represented accurately. As a result, eye diagrams are more open, and true margins and performance can be determined.

Features include 10-bit vertical resolution and signal integrity for effective number of bits (ENOB), leading to faster compliance testing with higher margins; sampling rates of 256 GSa/s per channel on 40 to 110 GHz models and 128 GSa/s per channel on 13 to 33 GHz models, creating accurate reconstruction of high-speed signals; up to four full-bandwidth channels with less than 35 fs (rms) of inter-channel intrinsic jitter providing accurate timing and skew measurements; an optional full factory-grade self-calibration module which ensures ongoing measurement accuracy while reducing the need to take the unit out of service; and a chipset based on an indium phosphide (InP) process that enables wide bandwidth and low noise floor.

Keysight Technologies Australia Pty Ltd

www.keysight.com

SIM cards

While NB-IoT will open up many new opportunities that are not possible today, Cat-M1 technology may in fact be more suitable for a majority of current IoT applications than NB-IoT with its higher throughput compared to NB-IoT. The majority of Cat-M1 hardware will also support NB-IoT, providing for seamless migration.

M2M One SIM Cards come Cat-M1 ready as a default without any additional charges or configuration required. Users can simply activate a SIM on their M2M One account and insert it into a Cat-M1 capable device.

M2M One will be showcasing this product at Comms Connect Melbourne 2018, on stand #66.

M2M One Pty Ltd

www.m2mone.com.au

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Industrial LTE cellular router

The Advantech SmartFlex SR308 industrial LTE cellular router provides secure internet connectivity for devices and LANs via the cellular networks. It can provide automatic wireless failover for wired networks, wireless connectivity for devices in remote locations where cable connections are impractical and wireless connectivity for mobile assets.

With upload speeds of up to 50 Mbps and download speeds of up to 150 Mbps, the product provides ample bandwidth, even for applications that require video. The router has a powerful Cortex A8 CPU at 1 GHz, 256 MB flash memory, 512 MB RAM and 128 KB M-RAM, providing full support for LTE speeds and applications.

A secure web interface allows users to configure and manage the router from remote locations. It can also upgrade its configuration and firmware from the operator's central server, allowing for simultaneous mass reconfiguration of every router on the network.

Users may insert Linux scripts and can create multiple configurations for the same router and switch from one configuration to another at any time. Modular SmartFlex can be configured for any application.

Standard configuration includes 2 Ethernet ports with 2 independent LANs/IP addresses and also includes 1 USB host port, 1 microSD card holder, 2 SIM card holders for automatic failover to an alternate service provider, 2 binary inputs(I/O), 1 binary output (I/O) and onboard GPS.

An optional built-in Wi-Fi module is also available, with industrial-grade operating temperature ranges from -40 to +75°C.

Further optional boards include: 3 x ETH (the router can be configured with up to 5 total Ethernet ports and 3 independent LANs/IP addresses) or RS232/485 (isolation strength up to 2.5 kV). The SmartFlex supports real-time data encryption and the creation of VPN tunnels using IPsec, OpenVPN and L2TP. It supports DHCP, NAT, NAT-T, DynDNS, NTP, VRRP, control by SMS, and numerous other functions, as well as additional software like SmartWorx HUB and R-SeeNet.

Advantech Australia Pty Ltd

www.advantech.net.au

IoT pager

The TPL Systèmes Birdy Slim V2 IoT pager is a next-generation device that receives and transmits over standard POCSAG paging. It also includes options to work on LPWAN IoT networks including LoRa and Sigfox to give redundant paths to deliver and receive critical messages. It will be released at Comms Connect Melbourne in November.

By adding multiple response paths Birdy Slim V2 can send an automatic acknowledgement when a message is received and a confirmation of response by the user advising if they are available to respond to the request.

Also included in the design is Bluetooth Beacon and GPS for indoor and outdoor location, which, combined with the in-built accelerometer, gives full SOS, man-down and lone worker capability.

The Birdy Slim V2 also includes a module enabling workforce management from the device so responders can easily change their status of availability depending on their circumstances.

Lightweight and smaller than a mobile phone, it rests in the hand and is easy to carry in a pocket or on a belt. Despite this the Birdy Slim V2 is a rugged device offering high-performance features including an IP67 protection rating, RFID tag, large high-resolution display with 7-colour backlight and up to 128 capcodes.

The Birdy Slim V2 comes with a sleek and compact fast charging cradle using the latest Li-ion battery technology, which enables it to run for up to 7 days on a full charge depending on usage.

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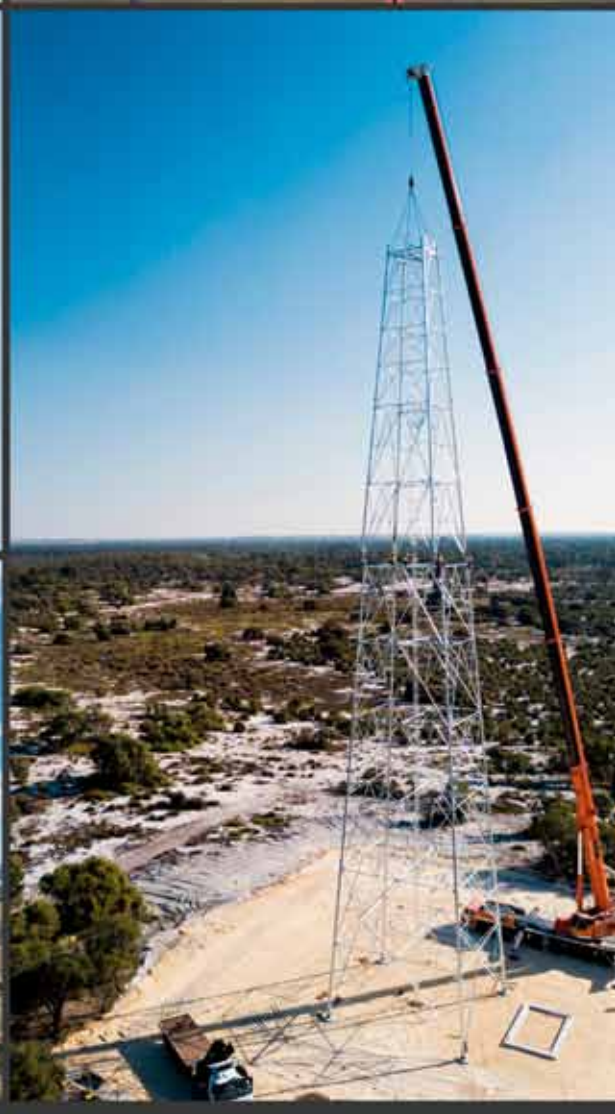


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DC load distribution panels

The Distribution Series 3 DC load distribution panels provide dual-bus architecture with a 200 A peak load rating. Fuse or breaker protected outputs are available. Each bus provides six outputs and supports 100 A peak. Available in standard unmanaged models or intelligent fully managed versions that include TCP/IP for remote management and power-cycling using HTML or SNMP.

For the 200DB version, the plug-in breakers are available in 5, 10, 15 and 25 A rating.

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

The Distribution Series 3 is suitable for distributing and managing DC power to radios, repeaters, microwave radios, WiMax, routers, bridges, multiplexers, as well as industrial DC power applications including security and surveillance, transportation, process control, and DC in-building power.

Helios Power Solutions
www.heliosps.com.au

High-power radio

The Cambium Networks PTP 820C HP is a high-power version of the PTP 820C multicore radio, operating from 6 to 11 GHz and providing transmit power of up to 35 dBm. PTP 820C HP supports cutting-edge capacity techniques, such as LoS MIMO, QPSK to 2048 QAM, head de-duplicable. Together, PTP 820C and PTP 820C HP are capable of high bit rates and long reach, suitable for diverse deployment scenarios.

The PTP 820C HP has field-changeable diplexers, meaning fewer spares, and is fully interoperable with the PTP 820C radio in all configurations.

Cambium Networks LTD
www.cambiumnetworks.com

Agile synthesiser signal

The PicoSource AS108 agile synthesiser is a compact, PC-based, fast-settling signal source. It can deliver sinusoidal CW, swept and hopped parameters and basic AM, FM and ØM modulations in a carrier range of 300 kHz to 8 GHz. Amplitude, phase and frequency agility all derive from IQ modulation, and all can be controlled from a comprehensive Windows user interface, DLL-based remote control or from a user-defined swept list of parameters. List mode and the fast settling of the product can be used to emulate popular modulation schemes such as QPSK, QAM, ASK and FSK, and trigger I/O can be used to synchronise sweeps, hops and list mode, either on a 'sweep start' or 'next point' basis.

The product is supplied with PicoSynth 2 software, which presents a clean, touch-compatible user interface for direct control of parameters such as amplitude, frequency, phase, sweep and hopping parameters, along with convenient selection of units of measure to suit an application. The user can also set a custom step size for each parameter and multiple instruments can be controlled over USB from a single PC and multiple instances of the application.

PicoSynth 2 includes a DLL pathway for remote control of the device from C and C-compatible languages and applications such as C++, C#, Python, National Instruments LabVIEW and MathWorks MATLAB, all of which Pico will support with downloadable SDK code examples.

Equally at home on the work bench, within a test system or as an embedded system component, the AS108 is designed to meet the needs of design, test and RF and microwave system engineers.

Emona Instruments Pty Ltd

www.emona.com.au

Industry Talking

As we look towards the end of 2018, I encourage members and supporters of ARCIA to download the 2018 Annual Report. The report demonstrates the effort that ARCIA is putting into the industry on behalf of members all over Australia. Our industry has a lot to be proud of and the Annual Report is a reminder just how broad an impact wireless has. It is gratifying to be part of a group that advocates in many ways to improve the industry, from spectrum matters to industry participation, from training programs to industry events.

The last ARCIA event was held in Adelaide on 4 October at the National Wine Centre, when some 60 members gathered to celebrate the industry in South Australia. Networking events such as these bring together people from different parts of the industry and the feedback we get is always very positive. I believe it is important to recognise the shared experience of the industry, and these networking events bring people together in great spirit.

The annual Gala Dinner in Melbourne will be held on 21 November at the Melbourne Convention & Exhibition Centre. Make sure you get your tickets in early so we can ensure your seats are allocated in good time, as each year there is a last-minute rush for spaces. Many people have no idea how difficult it is to plan and seat over 500 people with the limited resources at our disposal. So make sure you book early in 2018.

Comms Connect Melbourne 2018 will no doubt be a fantastic showcase for the industry, and for the first time ARCIA has helped to organise training sessions as part of the program. We are indebted to RFI for taking a leading role in providing the services of key staff to deliver a program for the benefit of members. My expectation is that ARCIA will be doing more of these in the future across the country. I feel strongly that we must actively help members to train staff and make it easier for business to improve the training levels of staff. At the same time the industry must find a way of attracting new staff, including recognition that the wireless profession has many possible futures.

While we consider the offerings of our industry as a career, over the past couple of months our committee members have been active in school careers events, taking the opportunity to speak to young people about the world of wireless. Out of these events we are now beginning to host students for work experience and this promises good things for our industry. If you are involved in our industry then take time to look at hosting work experience students and talk to a committee member about what is required.

ARCIA continues to be part of the debate around public safety mobile broadband and we expect there will be more streams on this topic during Comms Connect Melbourne. The recent 3GPP event held at Melbourne University was a good demonstration of how groups can work together well for the benefit of government and industry alike. Credit is due to ETSI, the University of Melbourne, ATCFF, TCCA and many others for bringing this kind of information to Australia. Our wireless world is full of possibilities and roadblocks. As Australia begins to understand how we will deal with these critical changes in technology, ARCIA welcomes all industry representatives and users to be part of the discussion and we look forward to further debates on key subjects such as spectrum access.

Hamish Duff, President
Australian Radio Communications Industry Association

Headset

The CRS Accessories Bone Conduction Headset with boom microphone is designed as a replacement for heavy-duty noise-cancelling headsets, and will enable users to wear standard earplugs for noise attenuation and receive audio via bone conduction, offering a lighter-weight, less-bulky alternative.

It is suitable for industries where traditional heavy-duty, full-muff headsets are currently used, such as motor sport, production work, construction and event security.

CRS Accessories
www.crsaccessories.com.au

Two-way radio control room dispatcher systems

The MOTOTRBO TRBOnet and SmartPTT Plus two-way radio control room dispatcher systems can improve efficiency, safety and fleet management.

They are suitable for a variety of industries including construction, transport, manufacturing, mining, oil and gas, and hospitality.

These systems give users the tools needed to effectively manage their teams. The feature-rich systems include GPS location/indoor tracking, event logging, job ticketing, voice recording, telemetry, text messaging, email, full reporting and more.

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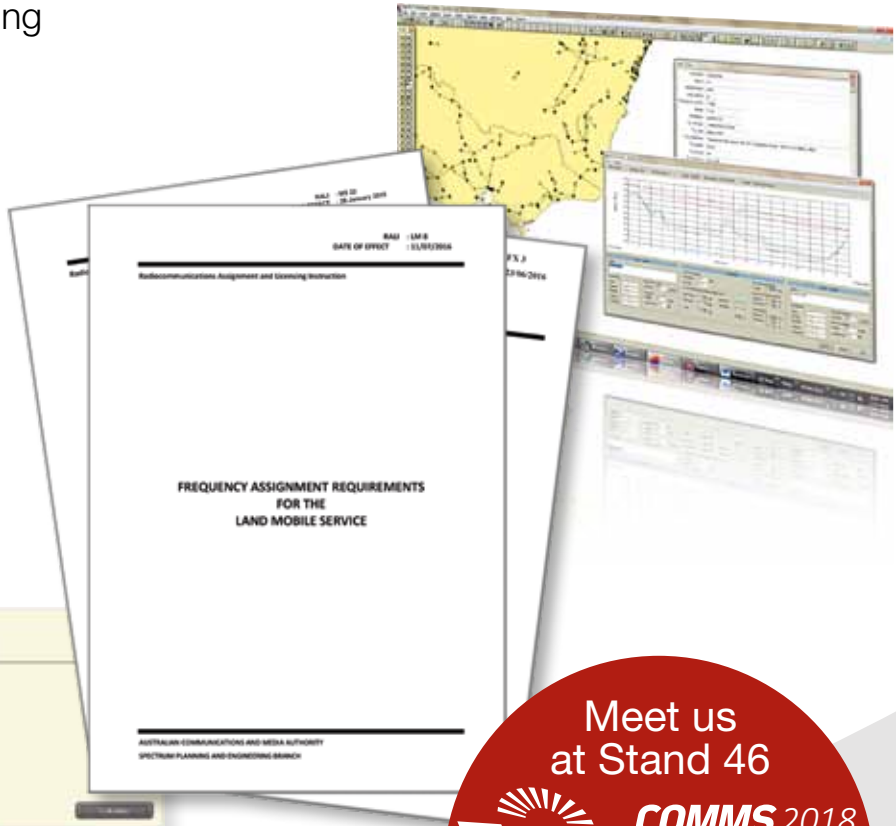

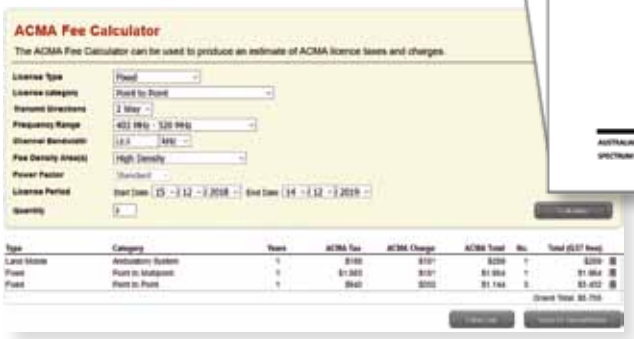

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Embedded network hardware appliances

The i-keytec Fusion Series self-contained embedded network hardware appliances monitor all on-site systems and distribute alerts to the appropriate personnel or device as critical events occur.

It helps to improve staff and customer communication with real-time two-way messaging to almost any wired or wireless device including smartphones, email, Wi-Fi/DECT handsets and low-cost pagers. All modules are self-contained embedded network appliances in standard 19″ rackmount enclosures — meaning that a server and software are not required.

The product has built-in web client GUI for configuration and two-way messaging. Users can configure escalations, common messages, reminder messages and configurable user access rights/privileges. The product is suitable for applications such as aged-care sites, nurse call/fire panel/BMS integration, mine site emergency notifications and IT or industrial site monitoring. All modules were built from the ground up with critical messaging in mind.

i-keytec

www.fusionseries.com

Mission-critical LTE device

The Motorola LEX L11 mission-critical LTE device is designed for the demands of public safety organisations.

The rugged Android-based smartphone allows first responders, and other field officers, to access secure apps for increased situational awareness.

The product connects office workers with radio users and broadband smart device workers.

Features include intuitive controls like a dedicated PTT button, dedicated emergency button and two programmable buttons to covertly initiate commands; extended reach with radio collaboration capability (including being able to intelligently route the audio from the LEX L11 to an ASTRO 25 and TETRA radio over the LMR network); best-in-class audio quality and performance (mission-critical noise and echo cancellation); end-to-end secure mobile platform (including integrity blocking and device malware blocking); performs in the harshest environments (MIL-STD-810G for drop and shock, IP67 rated); and accessories such as field-swappable battery, fast charging cables, holsters, vehicle and desktop cradles.

Motorola Solutions Australia Pty Ltd

www.motorolasolutions.com.au

Bring Your Own Coverage (BYOC) Solution Enables Resilient Coverage Anywhere for First Responders

BYOC use cases presented by BT at 21st GTI Workshop, Barcelona on 22nd Feb 2018.

BT presenting on its EE project and use of Parallel Wireless solutions at Mission Critical Africa, 2018.

Until recently, LTE has been used as a supplementary mobile broadband technology in the public safety sector to provide non-mission critical bandwidth for data applications unable to be delivered over existing narrowband LMR, P25 or Tetra systems. However, with the standardisation of capabilities such as MCPTT (Mission-Critical PTT) by the 3GPP, LTE is well on its way to providing a single, pan-agency communications platform for the delivery of multiple mission-critical services ranging from PTT group communications, real-time video surveillance and sensor IoT networks.

UK mobile network operator EE (BT) is moving rapidly with its Public Safety transformation project to migrate all UK emergency services from narrow band to a standards-based LTE public safety solution across the UK.

Parallel Wireless, a US-based company just named as the best performing vendor by Vodafone at the Telecom Infra Project (TIP) Summit 2018 in London, had designed a Public Safety LTE 3GPP-compliant solution that integrates with P25 and Tetra systems to provide seamless transition between narrowband and LTE sub-systems.

This solution provides a unified, resilient LTE network across police, fire and ambulance in tactical operations, in emergencies and during natural disasters — all at much lower cost. The technology can be deployed in various tactical and multi-cast environments from police station/military base, to deployable/man portable in ad hoc scenarios. The solution delivers reliable coverage across urban and rural areas, local organisational control, and resilience with self-healing features and flexible backhaul capabilities, including backhaul mesh or LTE backhaul to commercial or dedicated Public Safety LTE networks. It provides secure LTE communications consisting of voice, high throughput video, data, Push-to-Talk, MMS, and/or SMS for multiple users in daily operations or in emergency/tactical operations.

The United Kingdom Home Office is driving the UK Emergency Services Network (ESN) that will use British mobile operator EE's (BT's) commercial LTE RAN and a dedicated mobile core to eventually replace the country's existing nationwide TETRA system. As the demands of public safety wireless network call for coverage everywhere, Parallel Wireless built an in-vehicle LTE solution to eliminate these coverage gaps by providing the unique systems capability of Bring Your Own Coverage (BYOC).

BYOC enables emergency responders to have reliable voice and data communication within indoor locations such as multi-level car parks or outdoor spaces such as valleys where geographical limitations exist such as terrain, building construction, power outage, remoteness, etc. or where crowd density might otherwise prevent a good wireless experience.

The in-vehicle LTE base station allows Public Safety personnel to use standard or ruggedized commodity handsets within a 1000+ meter radius to get reliable coverage to receive high quality voice, data, and multi-media based on per user policy.

Additional vehicles can arrive and leave the operational area and the BYOC LTE cells will mesh together, extending the coverage area with full self-organizing network capability. The vehicles can cluster or daisy chain into tunnels or valleys extending the coverage into those areas. Hand-offs to and from in-vehicle cells to available macro cell coverage is seamless and secure.

The in-vehicle system from Parallel Wireless that was used in this first operational testing is lightweight so first responders can bring coverage with them wherever they go (can easily fit in a backpack or a trunk of a car). This allows them to fill coverage holes or tactical areas where there is no existing commercial network infrastructure available.

These in-vehicle nodes are also self-configured by software from Parallel Wireless, so installation is easy and almost instant. This saves precious time in emergency response. Not only is the installation made simpler, but ongoing network maintenance and optimization is also improved as the Parallel Wireless solution provides self-healing and self-optimization. As a result, public safety networks experience best performance without any human intervention to provide network resilience to allow first responders to save lives and do their jobs.

To learn more about the Parallel Wireless Public Safety LTE commercially available solution that has been also selected by US government organizations including FirstNet early adopters and has been tested and deployed in over 25 global military, police, and fire organizations, please visit: https://www.parallelwireless.com/products/public-safety-lte/

Parallel Wireless

Parallel Wireless Inc
www.parallelwireless.com

TELSTRA TESTS LONG-RANGE NB-IoT

Long-range Narrowband Internet of Things (NB-IoT) data connections have been successfully deployed and tested by Ericsson and Telstra.

The data connections were successfully tested up to a distance of 100 kilometres from a base-station in Telstra's commercial network, making it the longest-range NB-IoT connection of its kind, and a key milestone towards increasing Telstra's LTE footprint in rural and regional Australia.

The technology breakthrough, designed by Ericsson, extends the 3GPP standards-based limit from around 40 kilometres out to 100 kilometres and is activated entirely through software upgrades, with no changes required to NB-IoT devices. The development helps cement Telstra's position as Australia's only operator (and one of the first globally) to offer both NB-IoT and Cat M1 technologies.

Telstra launched Cat M1 coverage in 2017 over an approximate three million square kilometres before deploying NB-IoT technology in its IoT network in January 2018. With this new capability, Telstra's NB-IoT coverage increases to more than three and a half million square kilometres and will provide enhanced accessibility and reliability.

"Telstra already had Australia's largest IoT coverage with Cat M1 across our 4G metro, regional and rural coverage footprint. With this NB-IoT extended range feature, we have now extended our coverage to more than three and a half million square kilometres, delivering our customers the best IoT coverage and capability in the country. Once again Telstra, working closely in partnership with Ericsson, has delivered innovation that ensures the benefits of IoT technology can be enjoyed by the largest number of Australians, not just those in the cities and towns," said Channa Seneviratne, Telstra's Executive Director, Network and Infrastructure Engineering.

"This game-changing capability builds on Ericsson's long history of delivering extended range cellular solutions. We're partnering with Telstra to deliver its customers a world-leading capability in NB-IoT extended range cells and demonstrating the huge opportunity that IoT represents in rural and regional areas for both Australia and globally, particularly for logistics and agriculture," said Emilio Romeo, Ericsson's Managing Director Australia and New Zealand.

The extended-range NB-IoT network capabilities were demonstrated on Telstra's mobile network at the Telstra Vantage Conference held at the Melbourne Exhibition Centre on 19–20 September 2018.

The extended-range capability of Telstra's mobile network was shown with a Captis NB-IoT temperature sensor, sourced from mIoT, located 94 kilometres from the Telstra base station on Mount Cenn Cruaich in New South Wales, Australia. The network's ability to reach difficult urban locations was demonstrated with a Captis sensor from mIoT located three floors below ground level in an underground parking lot in central Sydney that was beyond the reach of regular LTE signals. A solar-powered Metos weather station from Pessl Instruments was also on display reporting temperature, relative humidity, rainfall and leaf wetness.

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Powering Progress

RF models expected to improve with new built environment data

Daniel Crowley, PSMA Australia

Mobile and fixed wireless broadband networks provide the backbone for communicating voice, text and data, yet accurate RF modelling remains a challenge for the telecommunications industry.

Fixed wireless broadband services are increasing across Australia as an alternative to fixed line services, particularly in rural and urban fringe areas. And, as mobile technologies evolve, higher frequency bands with a shorter range and greater potential to be impacted by environmental conditions are being adopted. 4G and 5G RF signals, while being faster and more efficient, can be absorbed, reflected and scattered.

To accommodate these technology changes and maximise their potential, RF modelling and network planning is becoming more of an exact science. RF models that don't accurately reflect the built environment can give rise to unexpected network black spots, delay service rollout and require additional field testing and site visits. Access to more granular data that accurately describes potential environmental impacts on RF signal becomes more critical in ensuring connectivity.

PSMA Australia hypothesised that by incorporating built environment data from its Geoscape dataset into RF models it could improve RF model accuracy and support better network design.

Geoscape is a digital representation of Australia's built environment across the entire continent. It captures every building with a roof area greater than nine square metres (15,243,669 buildings), tree heights and surface cover at two-metre resolution for urban and remote communities with a population greater than 200, and surface cover for the entire continent at 30-metre resolution. Geoscape data useful for RF modelling includes building location, elevation, maximum roof height, eave height and footprint, and tree heights and surface cover. The use of three-dimensional, vector-based buildings data in RF modelling would previously only have occurred in pockets across Australia, because the data has not been available on a national level until now.

PSMA Australia added three-dimensional building polygons to an RF propagation model, introducing RF shadows, which may assist with more accurate identification of black spots. (See Figures 1 and 2.)

In general, lower resolution RF models with less data layers generate coverage models that inaccurately predict a good signal across a larger area. Adding data layers — building polygons and clutter — to the propagation model had a significant impact on the count of buildings that were considered to have a good signal. This intelligence could support planning decisions at a macro scale before conducting field tests.

All Geoscape buildings are attributed with query-able data. Geoscape has linkages to other standardised, national datasets such as property, cadastre and the Geocoded National Address File (G-NAF), which is available under open data terms at data.gov.au. Those buildings deemed to have poor RF coverage or be in a black spot area can easily be queried for building attributes and address details.

At a micro level, an address point has traditionally been used to determine if a property falls within a fixed wireless network coverage area. However, address points do not accurately reflect building locations on a property. Incorporating Geoscape data attributes, such as the building centroid, tree and roof heights, can help assess coverage, signal strength degradation due to obstructions and possible antenna install options before a site visit is conducted.

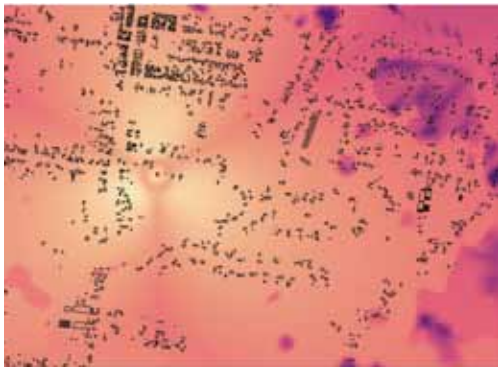


Figure 1: RF model without 3D buildings data

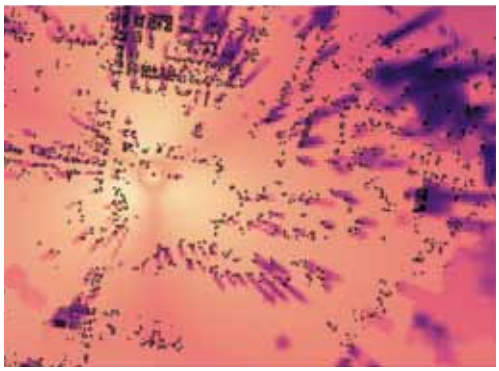
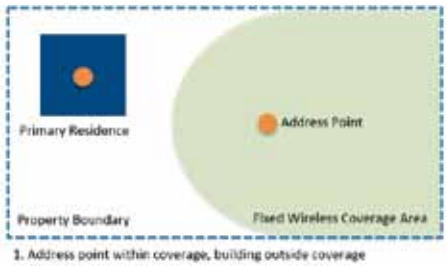


Figure 2: RF model with 3D buildings data

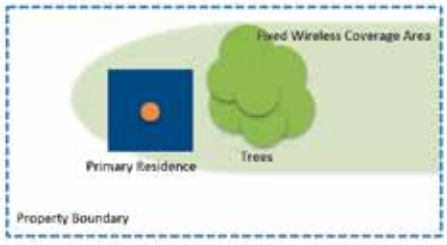
Three-dimensional building and high resolution clutter data can also be used within a RF model to enable identification of areas of strong and weak signal across a single building or property. Modelling variations in signal strength across a building or property may support the identification of alternate and optimised install locations for fixed wireless receivers.

The next step for PSMA Australia is to tune and validate the generated RF models against drive test data and subsequently prove the concept.

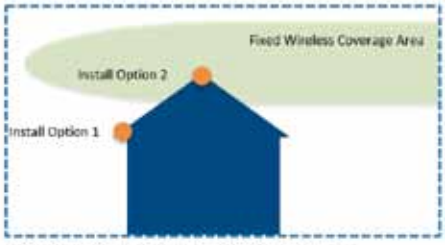


1. Address point within coverage, building outside coverage

2. Alternate building within coverage area



3. Residence identified within coverage area, but obstructed by tree



4. Max roof height within coverage, eave outside coverage

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BROADNET — EUROPE'S PUBLIC SAFETY PLAN

Ian Miller, Executive Officer, ARCIA

Europe is halfway into an ambitious project to deploy a cross-border public safety mobile broadband communications system.

Public Safety Communications–Europe (PSCE) is an organisation that comes under the umbrella of the European Union and is the co-ordinating body for a pan-European public safety mobile broadband communications project.

The project has three stages:

- BroadMap — now finalised, which covered the investigation, design and outline of the project requirements (based on user surveys).
- BroadWay — now underway, being the pre-procurement stage where industry reviews the project's needs and the final system configurations are prepared.
- BroadNet — the final stage, which will involve commissioning and operating the common systems.

The present scenario across Europe is that there is minimal inter-country interoperability (a limiting factor for pan-European response collaboration), old technology (voice and short data only, 2G equivalent) and systems are vendor-locked.

The way ahead is for a pan-European system that provides:

- secure, mission-critical broadband communication that is operable everywhere
- applications and the Internet of Public Safety Things (IoPST) ecosystem
- future evolution as technology advances, standardised with no vendor lock.

The ultimate aim is to improve collaboration between responders from different agencies in

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different countries, and to enable mobility of responders between different countries.

Project status

The BroadMap stage of the project has been completed. The BroadWay stage is underway and will run to 2021–22. Following that will be the rollout of the system under BroadNet.

At present, the BroadWay project encompasses 11 procurers in 11 European member states. There are 49 responder agencies involved, with the lead agency being the Bavarian Red Cross.

In addition to the main BroadMap/Way/Net project, PSCE has several working groups. These cover, broadly, users, suppliers and research, and have been user-orientated to develop a realistic outline of actual needs. The supplier groups will now translate the outlined needs into actual system definitions, while the research groups are already developing data options.

Another project is E2mC, which aims to provide improved mapping capabilities. The E2mC system will integrate social media information as well as crowdsourcing to improve the reliability and accuracy of data. The eventual aim is to provide real-time input to improve incident management and responses for better control and safer outcomes for the public.

While this sort of data will be of real benefit to emergency services, data on its own can be more trouble than it is worth. The challenge will be to ensure that the extra data really gets to the users who need it most, while being mindful of the added impost on control rooms and the operators involved.

Control rooms — key to using data

Public expectations from control room services is much higher than it ever was, driven by widespread citizen adoption of online and social media, mobile devices and the demand for multichannel access to emergency services. There is also less capacity for failure at any level. Added to this are the influence of technologies such as the cloud, IoT and machine learning, and the increasing demand to do more with less.

Already, control rooms are dealing with multicontact needs: both solicited (voice calls, texts, posts to monitored social media accounts) and unsolicited (social media chatter and other online posts). Commercial CRM-style tools are being adopted, along with the provision of knowledge bases as FAQs. These technologies enable, for instance, the scheduling of non-urgent responses at times that are more convenient to the public.

The data and data patterns produced by these processes are ideally suited for the application of automation and machine learning. It is forecast that within five years, artificial intelligence and machine learning will automatically:

- provide crime scene/SAR prioritisation and resource allocation
- coordinate communications with all entities involved in an incident
- augment overwhelmed dispatch centres for major disasters by providing 'call triage'
- scan social media for illicit activity
- provide intelligence via drones, robots and cameras.

In reality, all these changes won't come at once. There will be a time of dual economy (old and new technologies), and the old ways won't be replaced completely.

Only constant is change

The one common thread from the PSCE conference is that technology is driving change. All of these changes are going to improve the ability of first (and second) responders to effect better outcomes for the public while making their jobs safer and easier.

Big data, social media, crowdsourcing and safe city technologies are all going to produce issues for responders, but more importantly, they will give them better tools and management to respond.

Your author has attended the first two FirstNet International fora, the most recent of which attracted representatives from 17 countries. At the first forum in 2017, the major lesson learned was the value of the open method used by FirstNet to implement its system.

The 2018 forum covered several areas, but to me there was one primary message to take away — the recognition that 3GPP standards are purely terminal and network operators' standards, and that governments have little or no input (although see the article in this issue on 3GPP's recent Australian briefings).

Although there is planning for mission-critical PTT and other mission-critical features in Release 13/14 and so on, these are necessarily the market's view of these needs. In broad terms, only 1% of the population are actually public safety practitioners, so the tail cannot wag the dog.

From the 2018 FirstNet International forum, the suggestion was made that nations initiating public safety broadband communications systems need to develop their network/terminal needs and pool their thoughts. Then, out of two or three coordinating groups, they should take the worldwide mission-critical needs to the 3GPP working groups (and have MNOs support these needs).

In this way, real mission-critical needs might be incorporated into standards. Such a step might allow for improved features and accommodate other technology advances suited to public safety agencies.

The author acknowledges the following for their assistance and material used in this article: BroadWay, David Lund (PSCE Brussels); E2mC project, Barbara Pernici (Politecnico di Milano); and control rooms, Nick Chorley (Hexagon Safety & Infrastructure). Don't miss David Lund's presentation on BroadWay at Comms Connect Melbourne in November.

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The Panorama Antennas LGMQM4 is a range of 9-in-1 antennas.

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Although the LTE elements are designed for 4 x 4 MiMo operation, it is possible to utilise these as 2 pairs of 2 x 2 MiMo for a router that has 2 SIMS (radio) in a failover configuration, making the antenna suitable for public safety telecommunications needs.

Combining different technologies into a single housing, the antenna promotes ease of installation, thus reducing antenna footprint on the vehicle, reducing installation lead time and cost, and improving vehicle resale. The 9-in-1 does not require a metallic ground plane and maintains a high level of performance even when mounted on a non-metallic surface.

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WIDENING THE WORKFORCE

Jonathan Nally

Tech company RFI is serious about widening its talent pool by ensuring diversity within its workforce.

It's no secret that Australia's mission-critical communications sector is facing a shortage of skilled staff, with a rapidly ageing workforce and an impending retirement cliff. One way to tackle the problem is to be more proactive in attracting more women into the field. Many companies and organisations have seen the merit in this idea, and none more so than RFI Technology Solutions, which operates in both the wireless communications and energy fields. We asked several female RFI employees to share their insights into working in the world of technology.

Wei Mu, who hails from China, is an antenna design engineer with a four-year background in designing internal antennas for mobile phones. Currently she's working on Yagi arrays for RFI. "I design our new antennas for production and also I develop antennas that are already in the production line; so if they've got some issues, as an engineer I will go to production and help them to fix the problem," she said.

Can the industry do more to attract female engineers? "Yes, I think so," she said. "I think a lot of women, they will be very careful when doing the job and with great organisation and better attention to detail, so I think if we can have more ladies in this industry it would be a big improvement."

Ava Shiri is from Iran and already had nine years of experience in telecommunications before joining RFI, where she is responsible for cable and connector product management. What does she think could attract more women into the industry? "I don't like the fashion or trend that we should increase the number of females in the industry. I think that companies like RFI should attract talented people, the best people for the job, whether they are female or male."

Monique Merino studied bio-medical science, but after finishing her honours year found that she "absolutely hated it, [and] decided I never wanted to work in the industry at all! I ended up going through a graduate program where they pair your skills with a company", which in her case was RFI.

Now part of the internal sales team, Merino says she finds the industry interesting. "What I'm really enjoying is the technical side of telecoms, because it's something I'd known a little bit about previously... but diving in deeper has been really, really interesting."

Merino agrees that communications engineering traditionally "hasn't been an industry that women have gone into, [but] I think that's very much changing though as we get more diversity in a lot of different spaces for women".

Has she ever felt like that people think a woman shouldn't be in her role? "I do occasionally get surprise that I can help someone [over the phone]... but not hostility or the feeling that I shouldn't be there."

Jessica Forder came into RFI when the company acquired Maxon. Although her role is mainly that of product manager, she wears a number of different hats across operations, product management and R&D.

She thinks the industry has been predominately male "because that's who the courses were aimed towards. The admin roles were aimed towards women. But... more women are getting involved in technology, which is great; it just sprouts new ideas, new directions. I think change is good when it comes to technology. We can't have growth without change."

But like Shiri, Forder doesn't think that a company should hire a woman over a man just to hire a woman. "It should be equal; it shouldn't matter if you're a boy or a girl, you should be able to stand on your merits," she said.

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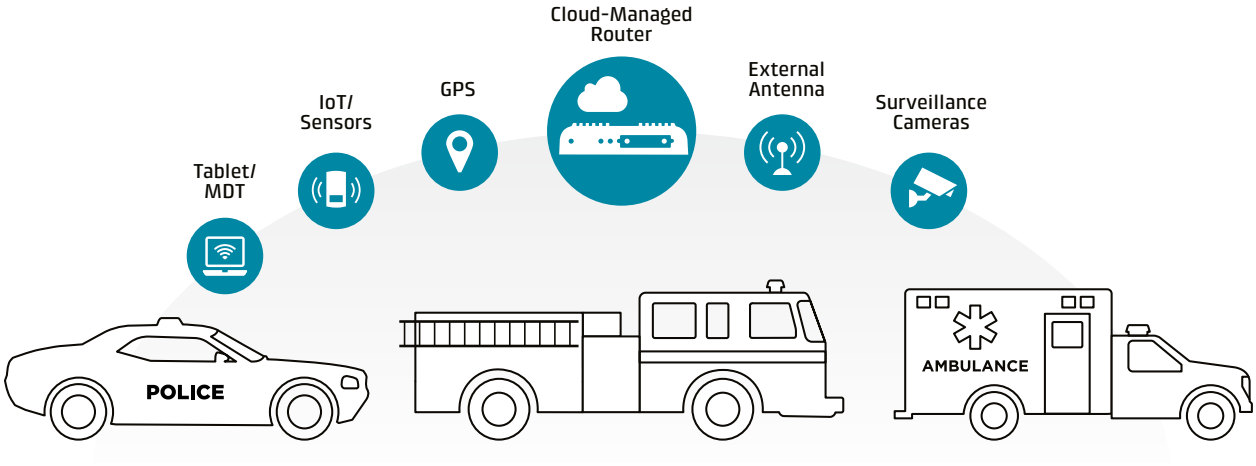

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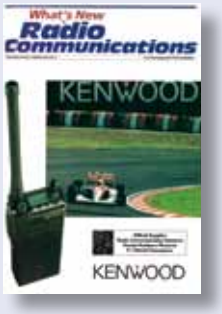
Backhaul

Take a trip down memory lane as we look at what was happening in the comms sector of yesteryear.



25 YEARS AGO. The cover of the Dec/Jan 1993–94 issue of *What's New in Radio Communications* featured the Kenwood TK-240D/TK-340D compact VHF/UHF synthesised FM portable radios and a photo of a race car — Kenwood was the official supplier of radiocommunications systems for the world champion Honda Marlboro McLaren F-1 team. Inside the magazine, an article by Keith Thompson of Mobile Technology Australia covered developments in switching and controlling within large mobile radio fleets. We also reported on Wegener Communications winning a contract to supply satellite receivers to Queensland's TAB, which operated a captive radio network providing live horse racing coverage to off-track betting shops. We reported on Siemens being chosen by Telecom as a strategic partner for a five-year term and Stanilite being awarded a $16 million contract to supply, install and commission the first phase of a national cellular telephone network in Argentina. In fact, it is clear from the number of news items and product announcements in this issue that cellular technologies were definitely on the rise in the early 1990s.

10 YEARS AGO. The cover of the Nov/Dec 2008 issue of *Radio Comms Asia–Pacific* featured the Simoco SAMS 5000 automatic vehicle location and duress system, developed in Australia in response to two-way radio user needs. Inside the magazine we had an article from Paul Harriss of Trio DataCom, about the benefits of spread spectrum technology. We also reported on the completion of the Western Australia Police metropolitan radio network — the new system enabled a boost of patrol officers' person, vehicle and location queries from 800 per day to more than 12,000 per day. The Australian Antarctic Division brought us up to date with the operation of its ANARESAT satellite communications network across the frozen continent. And Grant Pitman, then Superintendent of Queensland Police, described the benefits the service was experiencing from the introduction of GPS vehicle positioning and tracking.

Spectrum

On the cusp of the next industrial revolution

Nokia has more than 120 years' heritage in Australia, tracking back through organisations such as Siemens, Alcatel and STC. We've supported the national telecommunications infrastructure for generations and today provide networks and systems for players across the market. Meanwhile, we have a track record in Australia of building a business aligned to the global Nokia strategy to grow mission-critical capabilities in markets such as public sector, transport, energy and resources. This has included some very large-scale works delivering private LTE for Rio Tinto to operate driverless trucks and other plant at open-cut mine sites. We've been building our presence in rail communications and utilities, at the same time as working closely with different stakeholders to ensure Australia can fully appreciate the potential of public safety mobile broadband and the end-user applications it could deliver.

Our job is to work with our customers to make sure they are laying the right foundations to get the most out of their technology investments. Public safety is clearly a big focus, but we also see huge appetite in Australia from organisations from across the industrial spectrum for technology and strategies that will support new levels of efficiency and resilience in their operations.

Looking at the telecommunication industry, there is no doubt that the coming years will be the ones of 5G, with the deployments of the first commercial networks around the world. 5G in the near future, but also existing technologies, such as 4G/LTE, SDN and multi-cloud, are a strong driver for the fourth industrial revolution. Lots of innovation will also be introduced in many industrial markets, which will rely on mission- and business-critical broadband connectivity combined with cognitive analytics (based on machine learning and artificial intelligence) to turn data into meaningful insights and automate decision and actions.

To date, two main obstacles have held back the deployment of next-generation critical communications networks: spectrum availability and support of mission-critical features on broadband networks.

With spectrum availability, the situation varies from country to country, but with the adoption of LTE for next-generation mission-critical networks, alternative models such as Secure-MVNO or hybrid networks are possible and being adopted by the market. They enable acceleration of the introduction of mission-critical broadband networks by leveraging existing commercial networks, without compromising on network reliability, particularly in the case of crises or disasters.

Concerning the support of mission-critical features by 3GPP (which defines the 4G/LTE and 5G standards), the situation is now really improving — lots of mission-critical features are now part of the 3GPP standard and vendors such as Nokia are supporting them. A very high level of reliability can be offered to support mission-critical grade data-based services, which remains the primary driver for deploying these networks.

As these key barriers are being overcome, we are seeing growing traction across the globe, be it for public safety or for other vertical markets such as utilities, mining or transportation. Today we stand at the cusp of the next major industrial revolution, which will combine the best of information and operational technologies (IT and OT) to bring a massive improvement in productivity for mission-critical industries.

As Global Public Safety and Defence Segment Leader at Nokia, Philippe Agard currently leads a team which develops this segment globally, including defining market requirements, driving discussion to define solutions and developing a partner ecosystem. He has spent his entire career in the communications industry, within Alcatel, Alcatel-Lucent and Nokia. He also represents Nokia at TCCA, Public Safety Communication Europe and the Cyber Excellence Cluster in France.

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