NOV/DEC 2015 Vol.3 No.1

comms critical

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www.CriticalComms.com.au/magazine

ON THE COVER

The 8800S digital radio test set expands upon its already extensive features with optional P25 Phase II capability and a DMR repeater test option.

Equally at home in the field or the workshop, the 8800S has enhanced spurious performance and FM deviation measurement accuracy, which ensures users can optimise and align their digital radio communication systems to deliver the performance they have paid for.

The 8800S combines the performance and features of a bench-level test set with the portability and ruggedness of a field-level instrument. A weight of only 7.75 kg, an internal battery with >2.5 h of operation and rugged 30 G shock rating mean that test professionals no longer have to compromise portability for critical test features, and vice versa.

The 8800S is designed for maximum test efficiency. With an extra-large display, ultrafast store and recall presets and a 'Fast-Stack' user interface that enables test tiles to be stacked on one another and quickly accessed, test professionals can set up tests in seconds and have instant access to more displayed meters and test functions.

Other time-saving features include colour-coded meters for quick indication of pass/fail test results (measurements that exceed set limits will display red for values above the limit and blue for values below the limit) and a frequency list capability that eliminates lengthy and cumbersome frequency entry.

A white paper (available on the Vicom website) shows how radio test set performance can make a difference.

Visit Vicom at Comms Connect Melbourne, Stand 61, to find out more.

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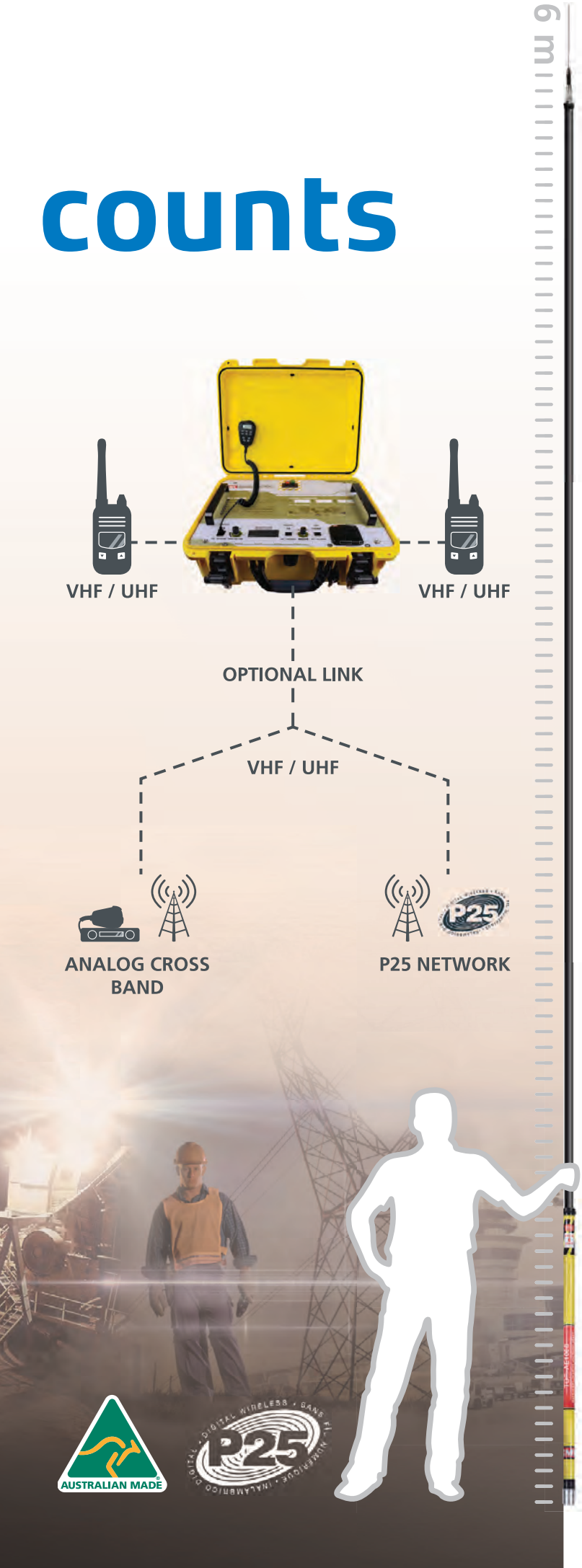

Additional Accessories

DIGITAL CONTROL MIC

UIC600BC interface for local control of optional P25 link applications. Has a high visibility OLED screen and powerful on board audio for noisy environments.

ANTENNA MAST

Lightweight 6 meter telescopic field antenna fibre glass carbon composite construction. Intended for rapid deployment into temporary installations.

ANTENNAS

Optional top whip sections for the AE1000MAST. 1/2 wave ground independent antennas:

VHF	136 – 174 MHz bands
UHFL	403 – 480 MHz bands
UHFH	450 – 520 MHz bands

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BC018 - Standard sealed lead acid batteries

BC019 - LiFeP04 batteries

Each unit can provide up to 72 Ah supply.

BRACKET SUPPORT

Field bracket supports the repeater case and AE1000MAST.

POWER SUPPLY

100 – 240 V AC input with a 12 V DC 16 A continuous output suitable for SLA or LiFeP04 batteries.

ANALOG CONTROL MIC

MC522BC control microphone for local control of the repeater.

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REPEATER NETWORK

Transmit

The critical communications landscape has changed a lot in recent years, and the pace of change will only increase. No longer is our industry just the domain of traditional two-way radio — it hasn't been for quite a while, in fact. These days it is also about big data, analytics, live streaming video, location services, geofencing, UAVs, convergence, digital disruption and so much more.

As Lawrence McKenna pointed out in his opinion piece in our last issue, the whole industry is ripe for disruption. LTE is coming, commercial carriers are muscling in on the public safety market and the largest contracts (ie, government) are drying up. How many of the 'big name' comms companies will still be around in five or 10 years' time? When will the Uber of the critical comms world come along, who will it be and which sectors will it disrupt? Will your business profit from it, or will it succumb? It's something that everyone has to think about and be prepared for.

In just a few days' time (1–3 December), the Comms Connect Melbourne 2015 conference and exhibition will kick off, and it will be bigger and better than ever. A glance at the speaker and exhibitor lists shows many new faces and companies represented, covering a wider-than-ever range of business- and mission-critical fields. Many of the technologies on display, and points under discussion in the speaker sessions, will be directly relevant to the questions of disruption I mentioned above. So if you're interested in the future of critical communications and where you and your business will fit in, you'd be wise to ensure you don't miss Comms Connect. See you there!

Jonathan Nally, Editor
cc@westwick-farrow.com.au

Calendar

December 2015
What: Comms Connect Melbourne
When: 2–3 December
Where: Melbourne Convention & Exhibition Centre
Web: comms-connect.com.au

March 2016
What: International Wireless Communications Expo 2016
When: 21–25 March
Where: Las Vegas Convention Centre
Web: iwceexpo.com/iwce16/

What: Critical Communications Asia 2016
When: March
Where: To be confirmed
Web: criticalcommunicationsasia.com

May 2016
What: Australian & New Zealand Disaster and Emergency Management Conference
When: 30–31 May
Where: Jupiters Gold Coast
Web: anzdmc.com.au

What: Critical Communications World
When: 31 May–2 June
Where: Amsterdam Rai
Web: criticalcommunicationsworld.com

June 2016
What: Australian & New Zealand Search and Rescue Conference
When: 1 June
Where: Jupiters Gold Coast
Web: sar.anzdmc.com.au

August 2016
What: APCO 2016
When: 13–16 August
Where: Orlando, Florida
Web: apco2016.org

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

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CONNECTING THE NASDAQ AND NEW YORK STOCK EXCHANGES

Rowan Gilmore, CEO and MD, EM Solutions

An E10G radio mounted on a building that houses New York Stock Exchange servers, with Manhattan in the background.

Australian technology has produced the world's fastest backhaul radio, and it's finding important markets overseas.

Brisbane-based microwave company EM Solutions and its links subsidiary, EMClarity, have recently completed installation of a network of 5 Gbps radios to interconnect New York Stock Exchange servers with those of the NASDAQ exchange.

Designed, developed and manufactured in Australia from intellectual property contributed by both organisations and CSIRO's Digital Productivity Flagship, the network is currently undergoing commissioning and acceptance testing, and will shortly provide unprecedented speed and latency to financial traders.

The multimillion-dollar development resulted in a commercialised product that transmits and receives data at fibre-like rates, but with 20% faster end-to-end propagation time than fibre. The new E10G radios, operating in E band at 80 GHz, support data throughputs three times faster than the closest radio competitor, over link distances twice the length, at benchmark latency.

The advantage of radio

Because radio waves propagate through air faster than through fibre, wireless links achieve lower end-to-end latency. This makes radio preferable to fibre for applications where microseconds matter, such as with high-frequency trading.

However, microwave wireless systems lack the capacity of fibre to carry large volumes of traffic. Because mmWave systems can use much larger bandwidths to support data rates of several gigabits per second, E-band systems are growing in popularity to carry data traffic as volumes explode. Unfortunately, the transmission distance of E-band links has been limited, preventing their widespread adoption for wireless backhaul.

The classic way of increasing hop length between radios is to increase the transmitter power, but at mmWave frequencies the power is limited by the available transistors and power amplifiers. An alternative is to increase the antenna gain — doubling the diameter of an antenna increases the link budget by four times (6 dB) per end, or 16 times (12 dB) for each hop. The most common E-band antennas are 300 mm in diameter; therefore, using a 1200 mm antenna achieves a significant improvement in link budget and, consequently, range.

Unfortunately, such a large antenna will have a beamwidth of just 0.25° at E band, a pencil-thin beam narrower than a laser pointer. This makes it impossible to manually align two ends of such a link several kilometres apart, or to maintain such alignment when the antennas and their towers are subjected to wind or temperature changes that arise during normal operation. Even smaller antennas that have a broader beamwidth can otherwise take hours to manually point towards each other using optical telescopes, with no resilience to any small motion at either end.

To overcome this limitation, E10G antennas are mounted on steerable gimbals driven by motors. By measuring the strength and phase of a separate broader beam tracking signal transmitted from each end, a sophisticated pointing system can drive the motors to re-centre the antenna along boresight and ensure both ends 'see' each other prior to transmission. Such a system proves remarkably effective at acquiring the remote end in a matter of seconds and maintaining lock even when the towers at both ends are moving.

In this way, large antennas can be steered to transmit data at the speed of light along relatively long paths and to provide sufficient gain to traverse even a path made lossy by the effects of rain and fog.

The latency that the radio itself adds to the propagation time is so small as to be almost negligible — particularly since the serialisation delay with a 10 GigE interface is even smaller than lower speed radios. This has ensured the

A pair of E10G radios being readied in production.

> THE SYSTEM HAS PROVED REMARKABLY EFFECTIVE AT ACQUIRING THE REMOTE END IN A MATTER OF SECONDS AND MAINTAINING LOCK EVEN WHEN THE TOWERS AT BOTH ENDS ARE MOVING.

E10G a captive market in the financial sector and, as the product matures and its cost is reduced, ongoing markets in public telecommunications.

Australian technology

There have been several contributing factors to this successful commercialisation and manufacture of an Australian advanced technology product. The first has been the early identification of a lead customer, prepared to advise on specifications and invest in development. In fact the customer first approached CSIRO based on its research publications, but CSIRO then astutely sought an experienced commercialisation partner in EM Solutions and its subsidiary, EMClarity, to develop the product.

The second factor was the collaboration that brought a unique combination of technology and skills from both organisations and shared the risk. EM Solutions provided the innovative automatic pointing technology and RF integration skills needed to steer big, high-frequency antennas, while CSIRO contributed its broadband digital radio modem technology that enabled the extremely low latencies to be achieved.

A third was the judicious use of overseas supply chains where appropriate, in order to take advantage of lower-cost materials and labour and to undertake initial product assembly.

A fourth has been the company's exposure to global markets, where the incessant pressures of both demand and competition have sharpened skills. Finally, a lower Australian dollar has undoubtedly improved the competitiveness of pricing in global markets.

The biggest barrier to advanced Australian manufacturing may well be penetrating the home market first. Exporting almost all of its products to blue-chip customers overseas through competitive tendering processes, EM Solutions' biggest challenge has been entering Australian supply chains dominated by foreign multinationals. Too many potential Australian buyers prefer to procure advanced manufactured product from offshore suppliers.

Whether they work in telecommunication or utility companies or defence, purchasing officials feel safer buying from a large offshore corporation than an innovative Australian small business. The attitude that 'nobody ever got fired by buying IBM' is pervasive in our culture. But as the Queensland Health payroll fiasco has proven at taxpayers' expense, bigger is not necessarily better, nor risk free. Our very own procurement people need to innovate themselves and see the bigger picture.

The next step in the product development is to upgrade the speed to 10 Gbps, with product release scheduled by the end of 2015. This will entail the use of higher-order modulation formats and symbol rates and a higher receiver signal threshold, potentially shortening the hop length or reducing the availability. However, typical link distances will still be approximately double those of equivalent E-band implementations due to the use of larger antennas.

Apart from applications in financial markets, telcos are expected to begin trialling the product to service their anticipated backhaul requirements as 5G mobile applications are deployed. Wireless backhaul is still the dominant backhaul technology for cellular systems worldwide due to its lower total cost of ownership and quicker installation time.

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NSW GRN

A PROGRESS REPORT

Jonathan Nally

We check in with the NSW Telco Authority to get an update on recent achievements and plans for the next 12 months.

The New South Wales Government Radio Network is one of the largest in the world, and it's still only partially complete as the responsible agency, the NSW Telco Authority, works to consolidate decades' worth of development of individual networks into one, sustainable whole.

To get an update on the status of the GRN, and what to expect in the near future, we submitted a number of questions to the Telco Authority.

CC: What sort of progress is being made on rationalising the use of spectrum for government purposes in NSW?

TA: When the ACMA reviewed the 400 MHz band and introduced dedicated spectrum for government use, it provided the Telco Authority with an opportunity to look at the way spectrum is used by NSW government agencies, and determine if any efficiencies could be gained.

We have since implemented a number of strategies to rationalise the use of spectrum by government agencies. In effect, we have centralised spectrum management of NSW Government licences into the Telco Authority, ensuring that licences used by agencies are authorised and monitored. This has enabled efficient demand management of this scarce resource and ensures that spectrum is only used to support an identified and assessed need. We are finding real value in managing spectrum for government use in a centralised way and it will continue to be implemented across the government's spectrum holdings.

CC: What input did the Telco Authority make to the Productivity Commission's recent study?

TA: The Telco Authority prepared a response to the Productivity Commission highlighting a number of issues that should be considered in its study. A copy of our submission can be viewed on the Productivity Commission's website: www.pc.gov.au.

CC: Can you detail what headway you are making on tackling the 'spectrum squeeze' in the Sydney basin?

TA: The centralisation of spectrum management is showing improvements in resource management, with efficiencies being delivered across government as we continue to work with all stakeholders to deliver further improvements.

Efficiencies are being driven by a number of agencies migrating on to the Government Radio Network rather than refreshing their existing conventional networks over the last few years, as well as better planning and use of spectrum for other agencies.

CC: A couple of years ago there were 50,000 end users across the state, with 30,000 on the GRN. Have those numbers changed significantly?

TA: The number of end-user devices on the GRN has increased slightly to just over 31,000 handsets. Over the last couple years the Telco Authority has been working with agencies to enhance the existing voice capabilities that we provide via the shared network. This work will continue to explore with stakeholders solutions to improve communication between agency staff and front-line GRN users.

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> THE CENTRALISATION OF SPECTRUM MANAGEMENT IS SHOWING IMPROVEMENTS IN RESOURCE MANAGEMENT, WITH EFFICIENCIES BEING DELIVERED ACROSS GOVERNMENT.

Images supplied by Telco Authority

CC: Still on that topic, what's the status of bringing the NSW Police onto the GRN?

TA: Certain teams within the NSW Police have been using the GRN for a number of years. The Telco Authority will continue to work with NSW Police on this and many other matters to do with their communications needs.

CC: What progress is being made on rationalising infrastructure, eg, having separate towers on the same site for different users?

TA: Over the past two years a number of significant projects have been completed in partnership with agencies, which consider the benefits, costs and service improvements from infrastructure rationalisation. This has included expanding the footprint of the GRN at key locations. Over the last year, three new sites have been commissioned, with a further eight to be delivered early in the new year.

The Telco Authority is continuing to work closely with agencies on future planning for the sector, including opportunities for shared services and infrastructure.

CC: Some in the industry are critical of government agencies having to pay 'over the top' fees to house comms equipment on Crown land. Is this a fair criticism?

TA: As part of adopting of the IPART recommendations for rental levels on Crown lands, the NSW Government agreed that the Telco Authority be consulted as changes are implemented. We will continue to work with Crown Lands as new arrangements are implemented.

CC: In our conversation two years ago, Shaun Smith mentioned that there needed to be improvements in areas such as active network monitoring. Has there been any progress with this?

TA: Initiatives to improve network monitoring have included remote terminal units deployed at each GRN site that can actively monitor site environmental factors such as main power, battery, physical security and air conditioners. Also, the deployment of a suite of operational support tools which enable fault and performance data from multiple systems to be viewed by a variety of stakeholders in real time.

In the future, these tools may also be used to simplify operational processes associated with managing multiple technologies such as MPLS and microwave linking.

CC: Can you give some details of the pilot infrastructure rationalisation program?

TA: To date, we have received funding for the current financial year for planning infrastructure rationalisation and to carry out a pilot project in the north-west NSW. The pilot will inform our detailed implementation planning for future rationalisation work by allowing us to validate assumptions, technical feasibility and delivery approaches.

CC: What are the most important points of the new Corporate Plan?

TA: At the forefront of whatever we do needs to be our stakeholders — the users and providers of our services. Because of this we really push hard to ensure that vision and direction for the sector is done in partnership with agencies and industry, especially as we move towards creating a more fit-for-purpose shared radio network.

To support this, and the wider NSW Government priorities as set out in NSW Making it Happen, our 2015/16 Corporate Plan has four objectives: improve services to meet stakeholder needs; lead spectrum management across NSW; deliver more cost-effective access to radio services; and strengthen sector-wide capabilities.

CC: Can you outline the progress you hope to achieve over the next 12 months?

TA: Our broader work program is to meet our corporate goals and the government's reform objectives, along with the ongoing work associated with infrastructure rationalisation planning.

The key goals we aim to achieve in the next 12 months are: to successfully deliver the majority of the rationalisation pilot in north-west NSW; lay the foundations for a number of initiatives to continue improving the services provided to our users; manage NSW Government's spectrum holdings in an efficient and effective way towards the ACMA compliance dates; and continue to build strategic partnerships with industry and agencies to deliver savings and better services.

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News

2016 TETRA AWARDS

The 2016 International TETRA Awards are coming up, and the organisers are calling for nominations in seven categories, including Best use of TETRA for public safety, Best TETRA innovation, and the Green TETRA award. The awards are designed to recognise excellence in the installation of TETRA radio communications. The wide range of award categories offers opportunities for products, services and solutions of merit across the full range of TETRA activity. Entries close on 30 November 2015. A shortlist will be announced in January 2016, with the awards ceremony to take place in London in February.
More info: bit.ly/1RNnbqb

ADVANCED HF TRAINING

Following the supply of Barrett PRC-2090 HF Tactical radio systems to the South African National Defence Force, Barrett Communications undertook on-site training exercises for experienced HF operators of the South African Army Signal Formation team. The course included the programming of radios for use within networks using both Selcall and ALE Systems. Selcall was an unfamiliar feature to the class, but due to class competency, the concept and instruction was quickly understood and well received. The training was hands-on and concluded with a field exercise where operators were tested on their knowledge and application of all features and functions of the PRC-2090 systems.
More info: bit.ly/1Sl4v22

DMR TIER 3 INTEGRATION

Omnitronics has announced the integration of its RediTALK and DX-Altus Dispatch Solutions with Simoco's DMR Tier 3 base stations. The introduction of the DMR Tier 3 interfaces adds to the suite of solutions Omnitronics can provide wfor Simoco users, which also includes P25-DFSI and analog systems. By integrating with RediTALK or the DX-Altus, organisations can add significant value to their radio networks by creating greater visibility of operations, increase efficiencies and improve safety via the added capabilities digital radio provides. Omnitronics said the integration is an example of the strong partnership between the two companies.
More info: bit.ly/1NoikNj

Comms Connect STAND NO 84

Spectrum analyser

The Rohde & Schwarz Spectrum Rider is a low-weight, hand-held spectrum analyser that offers long battery life, solid RF performance and high accuracy for measurements in the field and in the lab.

The instrument can assist users during RF transmitter installation and maintenance or support measurement tasks in RF development labs and in service. The device has a sensitivity of -160 dBm and measurement accuracy of typically 0.5 dB between 10 MHz and 3 GHz. The frequency range can be extended via software upgrades. The base model covers the frequency range from 5 kHz to 2 GHz, which can be expanded to 3 GHz or 4 GHz to support applications that require higher frequencies.

The Spectrum Rider has been optimised for mobile use. The battery lasts up to 8 h, making it capable of working a full day without recharging. Its large buttons and touch screen make it easy to operate.

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

Comms Connect STAND NO 27

Parabolic antenna

The Polar Electronic GKB18-17 1700–1900 MHz grid parabola antenna incorporates a fully welded reflector constructed from 6000 series aluminium tube.

The unit is supplied with two 1.5 m-long struts that attach the reflector to a mounting tower to provide azimuth adjustment. An azimuth adjuster (model PAA-GKB) is also included for finer adjustment. The feeder is enclosed in an ABS UV-protected enclosure. All mounting clamps are galvanised, and clamp assemblies have a screw thread adjuster to allow for ±4° adjustment in the vertical plane.

Other features include: a driven element that utilises two antennas as an array thus exhibiting identical vertical/horizontal radiation patterns; engineered for strength and to attain high front-to-back ratio; minimum assembly time, thus quick and simple installation.

Polar Electronic Industries Pty Ltd
www.polarelec.com.au

Comms Connect STAND NO 72

Cellular UHF antenna

The GID-M90T series of Cellular UHF antennas, from ZCG, are useful for wireless data link applications in Next G (825–890 MHz) or GSM (890–960 MHz) bands of frequency.

Both models have the ability to be used as cellular improvement antennas — either in a fixed position on a structure or mobile on vehicles. They can also be used for wireless monitoring, telemetry or wireless control of electrical systems or equipment.

The product comes with a powder-coated stainless steel whip and stainless steel and nylon body, which can withstand any extreme condition.

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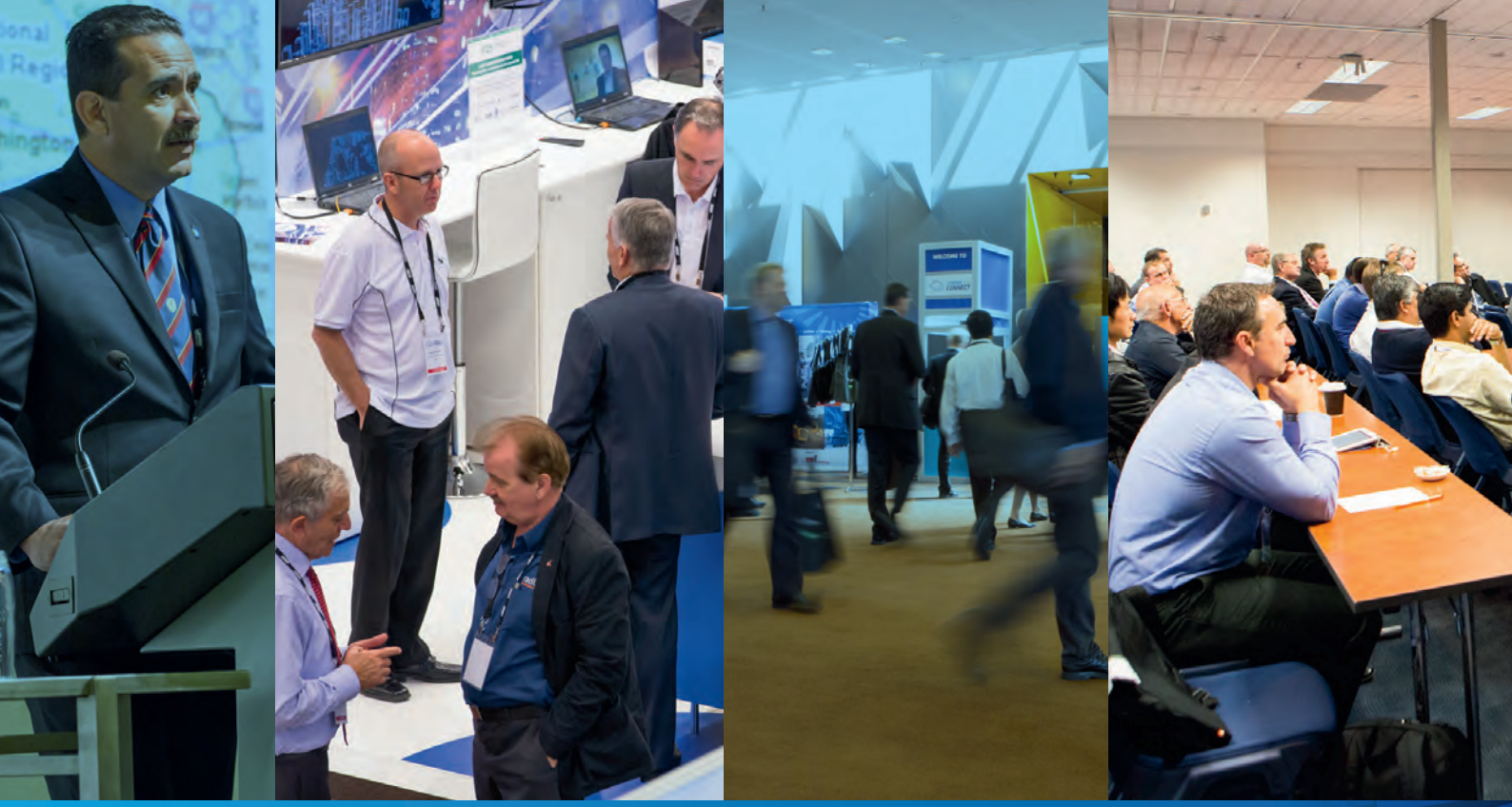


CONVERGENCE, COMMS & INNOVATION

COMMS CONNECT MELBOURNE 1–3 DEC 2015

Jonathan Nally

The biggest national showcase of technologies and trends for business- and mission-critical communications.

Since 2007, Comms Connect Melbourne has been the number one meeting place for Australasian critical communications users and industry. This year, 80-plus expert speakers, 80-plus exhibitors and over 1400 professionals — from first responders to mining professionals, from utilities providers to enterprise end users, from manufacturers to developers — are expected to take part in this highly targeted and energised event.

The conference will include concepts not previously included in the program and technologies on the show floor that are being displayed by exhibitors for the very first time.

Topics to be covered cover the gamut of the business- and mission-critical communications sectors: public safety mobile broadband, body worn video and biometrics, situational awareness, push-to-talk, defence comms, spectrum sharing, Next-Gen Triple Zero, government radio networks, research and development and security and cyber attacks.

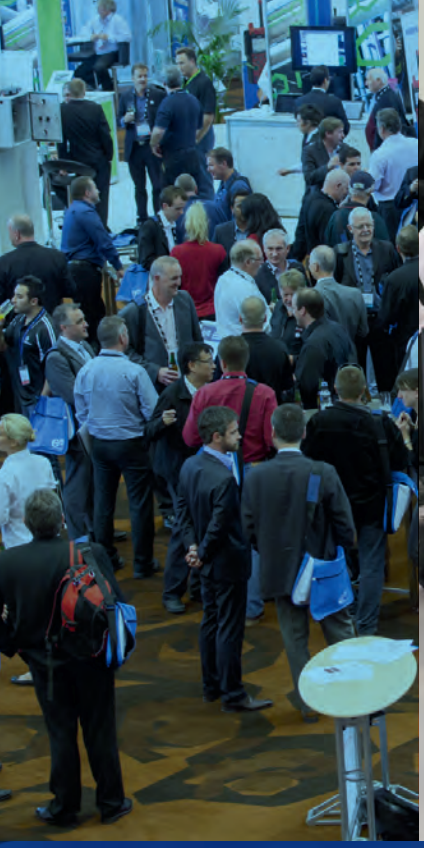
In addition, there will be sessions covering strategic developments, information management, IT and operational convergence, big data and virtualisation, GIS systems, disruptive technologies and smart cities.

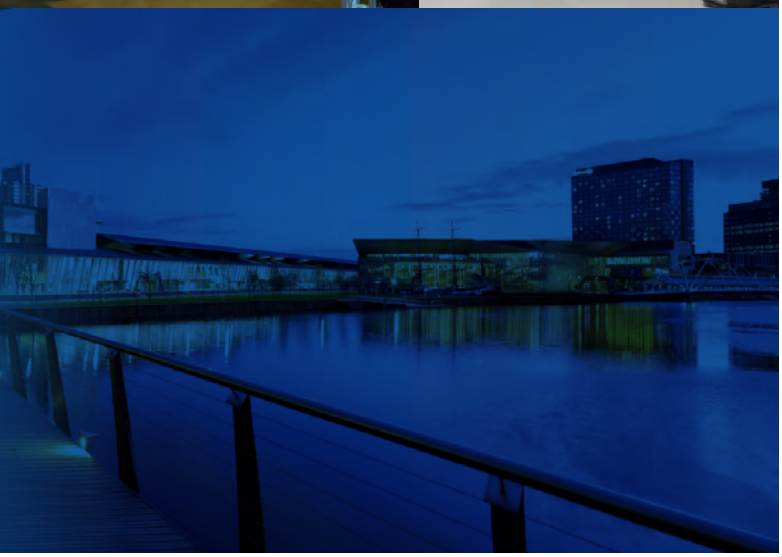
Technologies covered will include LTE, TETRA, 400 MHz, satellite comms, SCADA and DMR.

Expert speakers

The organisers have lined up a stellar cast of local and international speakers from the top echelons of the communications field. The full list of speakers is available on the Comms Connect website (melbourne.comms-connect.com.au); here's just a small selection:

- Dale McFee is Deputy Minister of Corrections and Policing in the Ministry of Justice for the Saskatchewan government, Canada. He will give a keynote address on the first morning of the conference on the importance of information management in building a national community safety model.
- Declan Ganley is CEO of Rivada Networks. He will give a presentation on the second day of the conference on the topic of dynamic spectrum arbitrage — a new model for building, sharing and paying for public safety mobile broadband.
- Rod Gilmour, Chairman of the NSW Telco Authority, will give a keynote address on the first morning on the topic of strategic developments in operational communications.
- Chief Superintendent Gregory Wild is the Assistant Director Operational Communications in the Operational Capability Directorate, Fire & Rescue NSW. On the second day of the conference he will give a presentation on Next-Gen Triple Zero.





• How does DMR fit into today's market?

These workshops tend to fill up quickly, so make sure you get your registration in as soon as possible.

Registration packages

Different registration packages are available to suit different needs. There are group discounts (register three delegates and get a fourth registration free); single-day and two-day conference packages; half-day workshop registrations; and free exhibition passes are available for dealers, consultants, radio users and those responsible for organisations' radiocommunications system (for a small fee you can have lunch thrown in too).

Volunteers have not been forgotten. Discounted rates apply to volunteers from these organisations: rural/country fire services, SES, ambulance services, NSW Volunteer Rescue Association, land management services, Coast Guard, surf lifesaving, Australian Red Cross and St John Ambulance.

Comms Connect
www.comms-connect.com.au

- Margaret Kimber is Program Director in the Queensland Department of Science, Information Technology and Innovation. She will speak on the second day of the conference on the topic of the Queensland Government Wireless Network (GWN) — a secure, fully integrated radio communications network for police and emergency services.
- Peter Hudson is Head of Technology and Innovation at Sepura. He will take part in two workshops on 1 December, the day before the conference proper starts, on the subjects of DMR, and evolutionary paths from 2G PMR to critical LTE.
- Mark Loney is the Executive Manager, Spectrum Operations & Services Branch, ACMA, who will speak on the first day on the subject of the 400 MHz implementation.

Workshops

Pre-conference training workshops will be held on 1 December, the day before the main conference begins. The topics will be:

- Advanced Radio over IP
- Dispelling the myths of microwave radio
- Evolutionary paths from 2G PMR to critical LTE
- Public safety mobile broadband: governance, operating models and funding

Comms Connect Melbourne 2015

Speakers: 80+

Exhibitors: 80+

Conference streams: Industry/Technology/Public Safety & Emergency Management

Where: Melbourne Convention & Exhibition Centre

When: 1 Dec (pre-Conference workshops), 2–3 Dec (Conference & Exhibition)

Web: comms-connect.com.au

Register today!

COMMS 2015 CONNECT

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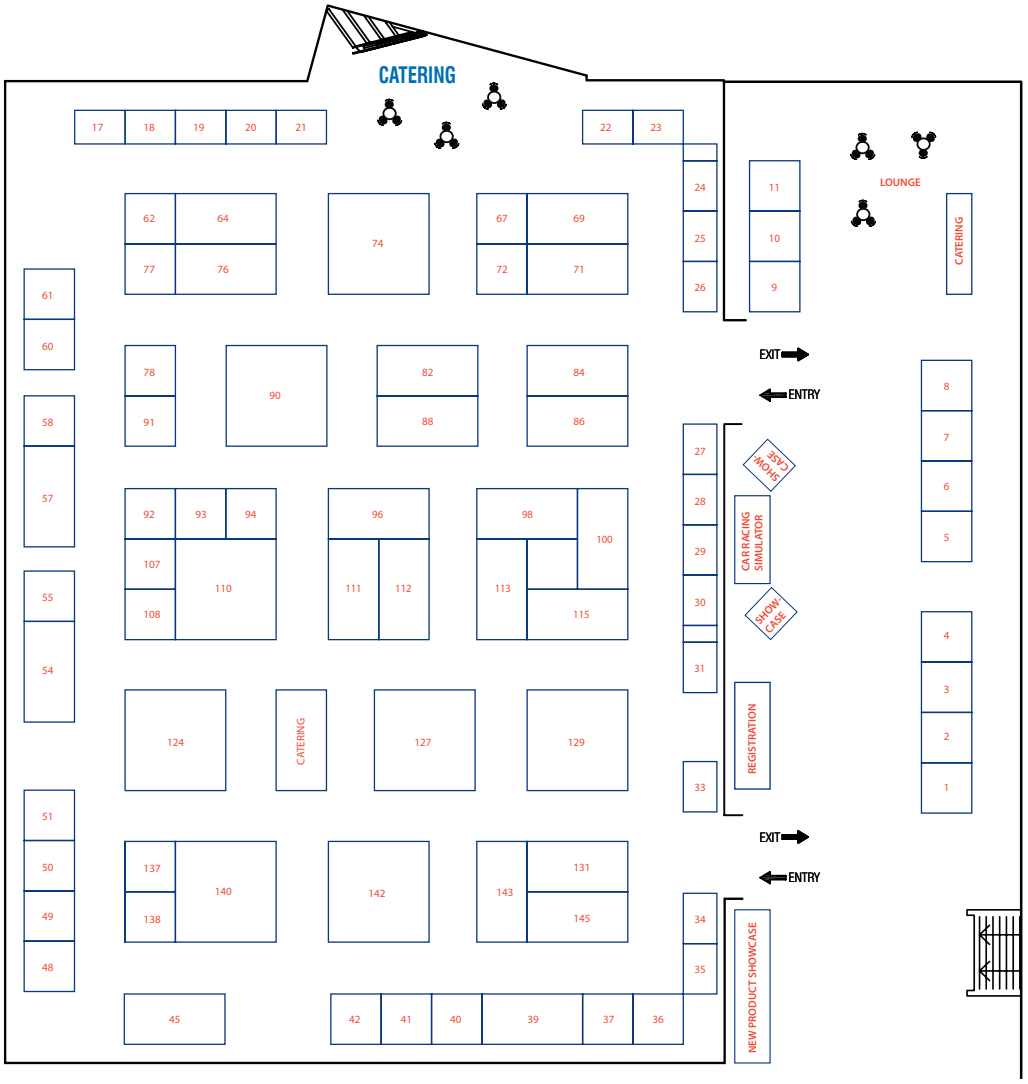

R&S®Spectrum Rider FPH

Small form factor to handle big tasks

The new handheld spectrum analyzer from Rohde&Schwarz:

- Capacitive touchscreen like a smartphone
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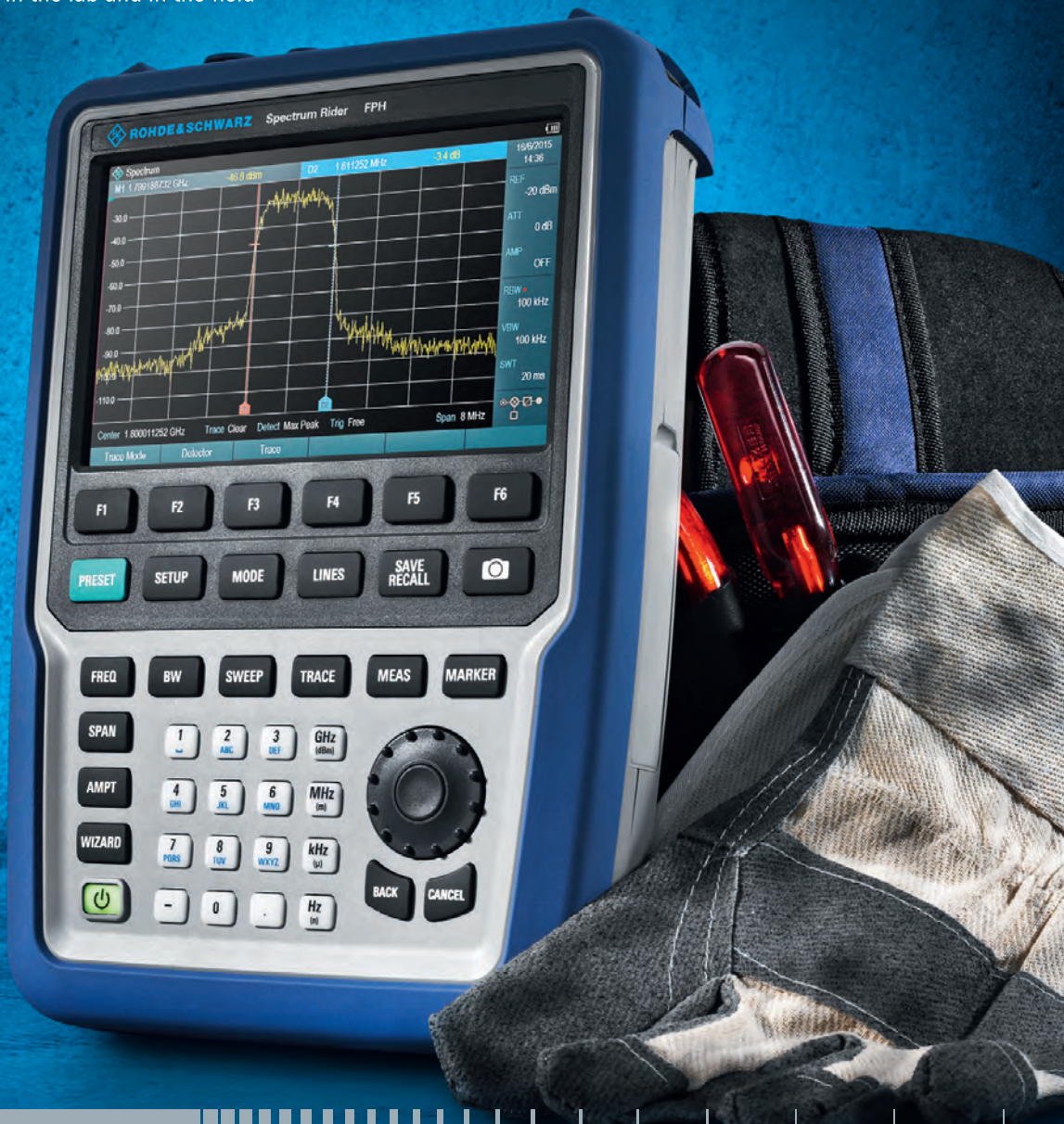

Want to know more?
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ROHDE&SCHWARZ

News

CLOUD-BASED ALERTS

New Zealand-based application developer and emergency network provider CLOUD M has migrated its emergency alert tools and system to IBM Cloud to improve reliability and performance. Through an easy-to-use mobile app, a simple web interface and a back-end database and distribution system, Alerter enables government agencies, communities and families to broadcast emergency updates in real time, helping people coordinate responses to avoid harm and establish recovery plans. Audio and visual alerts can be sent to emails, text addresses, smartphones or social networks. "When you're in the emergency alert business, seconds matter," said Richard Gill, CLOUD M CEO and founder.

More info: bit.ly/1M9g8oz

25 KHZ PHASE-OUT IN NEW ZEALAND

Radio Spectrum Management in New Zealand has extended the deadline for the phase-out of 25 kHz-channel LMR equipment to 31 December 2019 for all licences operating in frequencies above 470 MHz (F band and TS band). On that date, all such licences will be revoked. It says the deadline has been extended because the level of congestion in those bands is not significant relative to the cost of transition for users of the bands. The Ministry of Business, Innovation and Employment (and its predecessors) has been encouraging the phase-out of 25 kHz channels in LMR bands since the early 1990s.

More info: bit.ly/1MekEp0

LANES TRIAL AT AFL GF

Telstra, in conjunction with Ambulance Victoria, conducted a trial of its LANES technology at the AFL Grand Final. Paula Rujak, general manager of Telstra's Network Technology & Innovation division, said that it was the culmination of months of work. The trial encompassed the full Emergency Grade LTE Advanced Network for Emergency Services (LANES) capability, including access prioritisation. "When 100,000 fans all wish to jump online, post selfies at the game, stream instant replays and comment on social media, it can make the network very congested and difficult for Emergency Services to use their data effectively among teams on site," said Rujak.

More info: bit.ly/1Wwdk9O

Comms Connect STAND NO 17

Free-standing towers

The Flight Bros free-standing tower comes in a modular design of 10 sections as well as several special-purpose sections that can be mixed and matched to create a total of over 30 tower designs. These range from 16 to 60 m in increments of 4–5.5 m.

The tower components are manufactured using production line jigs to ensure tight tolerances. All welds are AS1554 Structural Purpose compliant using modern electronic MIG welding machines operated by certified welders, as well as being cyclonic rated. The hollow sections are provided with drainage holes to prevent the build-up of condensation for maximum corrosion protection and to ensure full internal galvanising protection.

All towers are supplied with each section packed in a purpose-built stackable transport stillage, while all fasteners and accessories are preassembled for immediate use.

Flight Bros Pty Ltd

www.flightbros.com.au

Comms Connect STAND NO 100

Six millimetre-wave handheld analysers

Keysight Technologies has added six millimetre-wave models to its family of FieldFox handheld analysers, including the N9950A, -51A and -52A; as well as the N9960A, -61A and -62A. The models allow users to replace three or four single-function instruments — benchtop or handheld — that are typically used for maintenance and troubleshooting of systems that operate at or above Ka-band frequencies. They also deliver laboratory-grade measurements that enable field personnel to fully characterise demanding radar and satellite systems.

Three combination-analyser models cover 32, 44 or 50 GHz and provide spectrum analysis, vector network analysis and cable and antenna testing in a rugged, portable unit. The three spectrum analyser models cover the same frequency range, and in all six models, it is claimed the spectrum measurements are up to eight times faster than those made with comparable analysers.

The range is optimised for field testing and the fully sealed enclosure (no fans or vents) is compliant with US MIL-PRF-28800F Class 2 standards. They are also type tested to meet MIL-STD-810G requirements for operation in explosive environments (Method 511.5, Procedure 1) and meet IEC/EN 60529 IP53 requirements for protection from dust and water.

The analysers can be upgraded with vector voltmeter, TDR cable measurements, built-in power meter, pulse measurements, spectrum analyser time gating, interference analyser (with spectrogram) and GPS receiver.

Keysight Technologies Aust Pty Ltd

www.keysight.com

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For more information, please contact: Matt Kelly 0409 999 917

Voice logging and call recording

Total Recall VR LinX Neos is a compact, professional, robust and highly configurable desktop voice logging and call recording system for smaller capacity or space limited audio recording applications.

Enterprises, governments and military worldwide use the product to log and create electronic records of many forms of audio communication including telephone (analog and VoIP), 2-way radio (analog, DMR and RoIP), broadcast radio (analog and AoIP), public address (analog and IP), intercoms (analog and IP), room microphones and more. It supports hybrid recording mode on up to 24 analog and 30 IP channels in any configuration.

Specifically designed for mission-critical applications, the product offers reliability and interface flexibility in a compact industrial enclosure. It works as a standalone audio recorder or can be integrated with business, infrastructure, government, military and cloud recording communications systems.

Prolancer Pty Ltd

www.prolancer.com.au

Comms Connect STAND NO 50

Tracking antenna system

BATS Tracking Antenna Systems provide a proprietary software and hardware platform that locates, locks and tracks wireless broadband communication access points. Its platform enables organisations to rapidly deploy self-healing, fixed or mobile links over long distances, delivering high-bandwidth, high-availability intelligent networks for critical data and communications.

The system automatically stabilises, optimises and tracks broadband communication links to provide improved communication distances, additional mobility to terrestrial-based communication systems and increased bandwidth to end users. The technology can extend, offset or aggregate a variety of network resources such as fibre, Ethernet, Wi-Fi, LTE, WiMax, microwave or satellite. It is suitable for the energy, defence, mining, broadcasting, oil and gas, and public safety sectors.

By using the power of directional microwave links, the system is able to offer a more stable and reliable high-capacity signal with a range of more than 30 km. Through re-transmission, the microwave links are able to provide the high-capacity signal required without the latency or increased cost of satellite. This augmentation allows for an array of improved functions ranging from VoIP calls between at-sea vessels and critical communications between cruise ships and their operations base at port, to gaming and credit card purchasing on ferries and in-port cruise vessels.

Amber Technology Limited

www.ambertech.com.au

Explosion-proof camera

The Orbit X IECEx and ATEX Zone 1 explosion-proof camera has an HD imaging sensor, two LED lights and a laser pointer fitted into a compact form, enabling the user to capture images and video as well as conduct live video conferencing and CCTV-type video streaming sessions wirelessly in any hazardous area.

The unit offers crisp and colourful 1080p imaging and video that can be stored locally on the device or streamed in high quality over Wi-Fi. It is designed to be used in confined, dark and hard-to-reach areas.

The product can be used as a helmet, inspection or surveillance camera. It can be used stand-alone or in combination with the Intrinsically Safe Smartphone Impact X or Intrinsically Safe Camera Gravity X. It is IP68 rated, has 16–32 GB of memory and features dual-band Wi-Fi.

BARTEC Australia Pty Ltd

www.bartec.de/au

Comms Connect STAND NO 8

ICOM

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IP 100H

Icom Australia has released a revolutionary new IP Advanced Radio System that works over both wireless LAN and IP networks.

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To find out more about Icom's IP networking products email **sales@icom.net.au**

WWW.ICOM.NET.AU

ICOM5000

EVOLVING TO FAST DATA

TF Smoak

New technology promises to transport public safety communications to the next level, including spectrally efficient streaming video.

Following the US FCC mandate to limit most modulation formats to 2.5 kHz bandwidth after 1 January 2013, on the most commonly used public safety channels below 512 MHz, there have been some big changes in best engineering practices. Despite the doom and gloom of losing that almost studio-quality voice afforded us for years under the old analog, 5 kHz deviation (20K0F3E), recent updates in both audio recovery and data transfer designs have opened new possibilities.

Operators have settled on solutions for voice dispatch using the new narrowband analog standard or converted to one of the popular digital formats. LTE continues to evolve, and we now see some progress in the US on planning for the nationwide FirstNet system. Mandatory updates for push-to-talk dispatching have been a boom for the OEM and system providers, and the integrity and feature sets have actually improved on some systems. But what about mobile data?

We have also seen an evolution in Radio over Internet Protocol (RoIP) that demonstrates the possibility of using the same back-office infrastructure, plus end-user devices capable of good data-to-audio conversion. If perfected, they would serve both the PTT (voice) requirements and the transfer of data that holds so much promise for improved first-responder dispatching and communications.

Yes, these attributes were all promised by the now-popular P25 format, but how many applications have you seen in common use that access the rather slow data bandwidth of most available devices? The majority of P25 end-user offerings are not even compatible between vendors for simple text-style messaging.

Humble beginnings for public safety

There are multiple formats, but they all evolved from the 'error corrected packet' methodology originally running at speeds less than 5 Kbps. To meet that dated speed restriction, operating systems were greatly simplified and amounted to 'fill in the blanks' on most mobile computer terminals (MCT) and mobile data terminals (MDT). It worked for most applications, saved a lot of lives and put a lot of offenders on the path to a very rigid lifestyle. Those of us within the end-user community were essentially the 'first texters' long before Twitter and the other forms of SMS. We called them 'AMs', or administrative messages, and soon found they could be accessed by the local press and department administration. We developed some abbreviations that would impress the best of the 'LOL, BFF, PIR' crowd.

Complex matters were handled by the dispatchers using voice, usually the 'teletype' operators who had full access to a broadband data platform integrated into the local, state and national databases. It all worked, and many agencies in the United States dispatch the majority of their calls by data terminal, greatly increasing privacy and security… and incidents of minor vehicle mishaps! The latter issue still has to be addressed due to the common legislation against driving and texting. 'Do as we say, not as we do!' applies here. I couldn't afford all of the fines if these laws were enforced on first responders.

Common carrier, cellular approach

The majority of public safety agencies — law enforcement, fire suppression/rescue and emergency medical — have adopted some form of mobile data to handle the complex file transfer formats demanded by first responders. We now commonly exchange photos, floor plans, GIS (mapping) information, criminal and call history, and verification of public records. For smaller agencies, and some larger ones, the 'air card' or mobile wireless Wi-Fi router has been their data gateway, with a level of performance and reliability adequate for most users. In addition, for small agencies, it is cost-effective.

Rather than have a dedicated channel or channels on substantial wireless sites, paired with the associated hardware and software infrastructure, the air card was developed for multiple applications and played well with most end-user devices and operating systems. Even when the only available data channels were the CDPD analog 'control' channels still used by some common carriers, it worked rather well. The cellular carriers were quick to identify this potential market as their capacity increased — first through the evolution to 3G, EVDO and EVDO(a), and more recently through the well-publicised 4G/LTE multiple formats. With preferred client tariffs ranging from US$15 to US$50 monthly per card or cellular modem, this made sense for many users.

Dedicated regional data channels

This was often not a viable approach for many service providers and first responders. If you operated an agency with hundreds or even thousands of mobile assets, that monthly billing became a large budget item. All agencies are feeling the effects of a prolonged downturn in local sales and property tax revenues. Grants have been greatly curtailed and are not likely to soon return.

Again, the OEMs and system vendors had an opportunity, and used this as a sales tool in persuading agencies to create their own bandwidth to serve their mobile devices. If properly engineered and maintained, this approach often gave the end users a superior quality of service within their normal geographic footprint. Since their operations were now on bandwidth assigned to the task, with no other subscriber competition, it offered certain advantages.

There have been some MDT and MCT systems in operation on public safety-category licensed channels since the 1970s. Most still use frequency-shift keying (FSK), now in emission standard 11K2F2D, or a variant approved by the FCC.

The evolution to fast data

First responders are not the only end users of fast data. The military and transportation industries use a multitude of devices. SCADA networks that control and monitor most of the publicly and privately owned utilities in the United States are major data clients and have spent a good bit of their budgets on these systems, motivating the industry OEMs to make it 'better, faster and stronger'.

This has produced some greatly improved engineering and chipsets. We're now seeing some demonstrated speeds that actually enable streaming video applications and error-corrected baud rates in excess of 128 Kbps. This has been demonstrated on VHF and UHF channels over kilometres, not metres.

With the right overall system design, using all of the rapidly developing technology, it actually challenges the current industry darling, LTE, in its multiple core offerings. When paired with technology already developed for other mobile communications, it has the range, capacity and speed necessary to meet the requirements of critical and essential applications.

> WE'RE NOW SEEING SOME DEMONSTRATED SPEEDS THAT ACTUALLY ENABLE STREAMING VIDEO APPLICATIONS AND ERROR-CORRECTED BAUD RATES IN EXCESS OF 128 KBPS.

Companies serving the SCADA, military and transportation sectors abound. We've seen solid system performance on narrow channels from multiple vendors, such as IP Mobilenet (IPMN), CalAmp (DCI), Data Radio, Electronic Systems Technology, Motorola Solutions and others. Based on their published specification sheets, they are still only delivering 32 to 64 Kbps raw data rates for narrowband 25 kHz channels. With FEC, the higher of these rates deliver approximately 48 Kbps to the user (Motorola and IPMN).

Meeting speed and capacity goals

In a rather complete paradigm shift, Australia's CSIRO has introduced a methodology to obtain some substantial gains in both capacity and user speed, coupled with the ability to run substantial power levels and agile software-defined radios (SDRs), giving the correct propagation for extended coverage. Here's the overall approach:

- Multi-user MIMO beamforming
- Antenna array and processing at the base station forms spatially separate beams to each mobile user
- Each beam uses the full spectrum all the time: simultaneous, independent, continuous transmission to each mobile user
- Simple mobile hardware and antenna
- Base station antenna array and processing maintains beam alignment with mobile users
- Dynamic selection and digital aggregation of non-contiguous spectrum, with no interference to adjacent channels

The hardware platform comprises:

- Software-defined RF front end that preserves signal phase and amplitude with minimal distortion
- High linearity, high dynamic range and FPGA processing, producing any modulation, narrowband or broadband
- Bandwidth up to 20 MHz
- Agile frequency tuning of 30 to 900 MHz
- High RF power
- Simultaneous voice and data/video, multiple protocols (P25, Ethernet, TETRA, DMR, DPMR) in one radio, with native simulcast
- Common front end for mobiles and base station

Delivering on public safety requirements

So what does all of this evolution mean to a typical public safety-grade communications system? Here's an abbreviated list of the CSIRO system attributes:

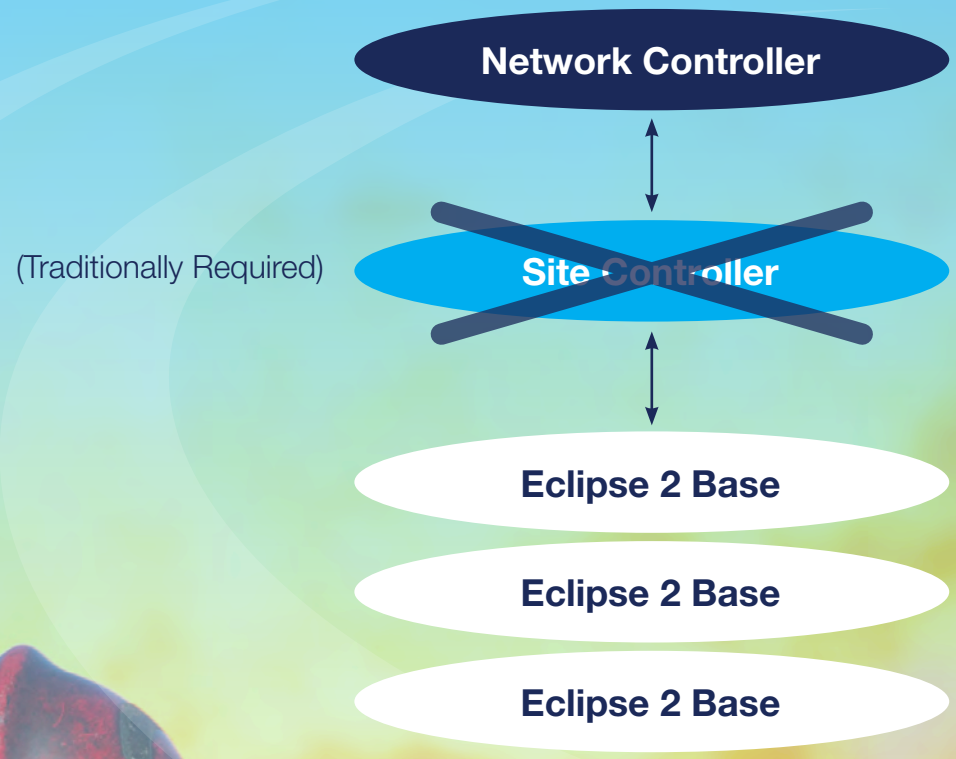
- World's highest data rate in 12.5 kHz (160 Kbps MAC throughput, raw data of 260 Kbps, up to 8 P25 channels) while travelling at 110 km/h currently achieved
- Ability to aggregate up to eight 12.5 kHz channels for increased bandwidth and data rate: 320 Kbps for 2 channels, multiplying up to a maximum of 2.5 Mbps for eight channels
- Predictable, video-capable performance for all users on the entire cell: no shared bandwidth, no reduced performance at cell edges
- One hardware platform from 30 to 900 MHz, and a common front end for mobiles and base station
- Incremental capital investment: no forklift upgrades of existing P25 equipment
- Voice and data/video in one radio
- Increased coverage = fewer towers
- Minimum greenfield cost: 25–40% vs LTE equivalent
- Spectrally efficient — uses all available existing narrowband public safety spectrum, contiguous and non-contiguous, scalable from 12.5 kHz to 10 MHz, dynamically allocated by base station or mobile (will later be compatible with broadband public safety spectrum, eg, FirstNet)
- High spectral efficiency and dynamic spectrum management means minimum spectrum use for the application
- Intelligent RF management means greater frequency re-use
- High security, sure delivery
- Physical separation from public network, and secure gateways
- RSA security, total visibility and control across the network
- RF modulation has built-in security to avoid snooping
- Targeted applications and services
- Native IP delivery equals easy customisation and efficient delivery of public safety applications

CSIRO has a commercialisation partner that will be deploying this technology.

With this much evolution arriving just before the start of some pilot wireless broadband systems, it might be time to evaluate the narrowband, frequency-agile approach to eliminate some of the major obstacles to system construction: access to enough sites, strategically located to meet the requirements of a low-power LTE network.

TF Smoak is an experienced emergency strike team commander and first responder who works as a project manager and compliance engineer on large wireless projects. He will give a presentation at Comms Connect Melbourne on 2 December 2015.

P25 Single Site
TRUNKING CONTROLLER



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REBROADCAST RADIO
SYDNEY HARBOUR TUNNEL'S AM/FM UPGRADE

Trantek MST chose RFI to supply a rebroadcast system for the Sydney Harbour Tunnel intelligent transport system upgrade project.

Sydney-based company Trantek MST was given the task of designing and installing an upgrade to the intelligent transport system (ITS) of one of Sydney's busiest transport routes, the Sydney Harbour Tunnel. The project involved upgrading the AM/FM radio rebroadcast system, providing audio break-in capabilities, ensuring compatibility for a future DAB+ digital radio upgrade and implementing a performance monitoring capability.

The AM/FM radio rebroadcast system is a relatively minor, but vital, component of the ITS — not only to maintain the rebroadcast of AM and FM radio stations within the tunnel, but also to ensure that vital incident management capabilities can be maintained in the event off a subsystem failure.

An audio break-in capability enables prerecorded or live audio announcements to be inserted into the AM and FM rebroadcasts to notify drivers of incident information via their car radios.

Trantek MST sought a partner that could design, install and commission the rebroadcast system upgrade as a turnkey subcontractor and meet stringent operational requirements.

Trantek MST selected RFI to provide the rebroadcast system due to the latter's experience and expertise with this technology. RFI delivered a flexible and feature-rich system utilising a comprehensive suite of its products and services, including RF surveys, system design, equipment manufacture, integration, factory acceptance testing, installation, commissioning, site acceptance testing and coverage testing.

"We chose RFI because of their proven technical, manufacturing, installation and integration capabilities," said Trantek MST Managing Director Lionel Ascone.

"They have provided the Sydney Harbour Tunnel with an upgraded rebroadcast system that has met the customer's operational requirements, whilst also providing a feature-rich capability that allowed us to incorporate it into our fault-resilient intelligent transport control system."

The key components of the upgrade were:

- rebroadcast AM and RM repeaters;
- broadband multicarrier power amplifiers;
- AM/FM crossband couplers;
- a custom-manufactured RF changeover unit enabling switching between the redundant subsystems, either manually or automatically by Trantek MST's fault-resilient ITS system;
- performance monitoring of the radiating cables at both ends of both tunnels, implemented to continuously monitor the performance of the system and contribute to the switching control of the system redundancy in the event of a fault condition; and
- fibre-optic cable to link equipment in the various installation locations.

RFI's project manager actively liaised with Trantek MST and Sydney Harbour Tunnel personnel during the project. Working closely with Trantek MST and its customer enabled several unexpected issues that arose to be addressed and resolved with minimal impact to the customer's operations and tunnel motorists.

"RFI performed well within the often challenging multidisciplined environment that exists in a major project and has delivered their system to the project on budget, assisting Trantek MST to deliver another successful project to its customers," said Ascone.

RFI
www.rfi.com.au

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ICT designs and manufactures a complete line of high reliability DC power products and solutions for a variety of applications including mission critical wireless voice and data networks, trunked radio systems, repeater sites, broadband and SCADA networks. Ethernet communication options allow for remote monitoring of DC power conditions at a site, and remote power cycling of the connected devices from a PC or smartphone, reducing the number of site visits required.

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Comms Connect STAND NO 90

DMR radios

Simoco Group has launched the Xd 700 series of DMR portable and mobile radios, featuring full-duplex calling and an application-friendly design. In addition to full-duplex calling, the SDP760 portable radio delivers digital and analog operating modes and an application partner interface (API) that enables customised applications to be delivered on the device and displayed on the large HD screen.

The range also includes a digital mobile radio, the SDM730, which features full-duplex audio, multiple operating modes, a large HD screen and a customisable API. The unit is capable of high levels of transmission power to bring clear coverage to the edge of operational areas. The radio also features Bluetooth, which facilitates the connection of a wide range of accessories.

Simoco Australasia Pty Ltd
www.simocogroup.com

Comms Connect STAND NO 108

Wireless access network platform

The Cambium Networks PMP/PTP 450i wireless access network platforms have IP66/67 capability in all components and include a 900 MHz, solution the PMP450i 900 MHz.

The 450i High Gain Integrated Sector Module, High Gain Connectorised Module and High Gain Integrated SM Module feature dynamic interference filtering, IP66/67 enclosure, multifunction AUX port, triple the power and range of a 450 product and are available as PMP or PTP.

Cambium Networks LTD
www.cambiumnetworks.com

Comms Connect STAND NO 129

Picture messaging solution

Sepura has launched a feature-enhanced version of its IMAGE application which allows the transfer of pictures from a control room to a wide variety of devices, including TETRA radios.

The application is scalable for use in networks of any size and can be accessed simultaneously by multiple client applications and multiple users in different geographic locations, thereby supporting either multi-agency or multi-organisation use. It can be used from a client application provided by Sepura or integrated into existing command and control systems via an API.

Sepura PLC
www.sepura.com

Singlemode OTDR tester

Available to rent from TechRentals, the Anritsu MT9083B ACCESS Master Singlemode OTDR reduces testing times to install and maintain FTTx, CATV, LAN, Access and Metro Networks.

The device tests PONs with both high resolution and a high dynamic range and has been optimised for verifying single or closely spaced, cascaded PON Splitters. Included analysis software identifies problem splices, connectors and macrobends. Other features include: a rugged and portable sealed design for challenging environments; in-service testing without the need for external filters; and a 6.5″ colour TFT-LCD display with simple menus. The device is ready for measurement about 15 s after power-up and has up to 8 h battery life with a quick recharge.

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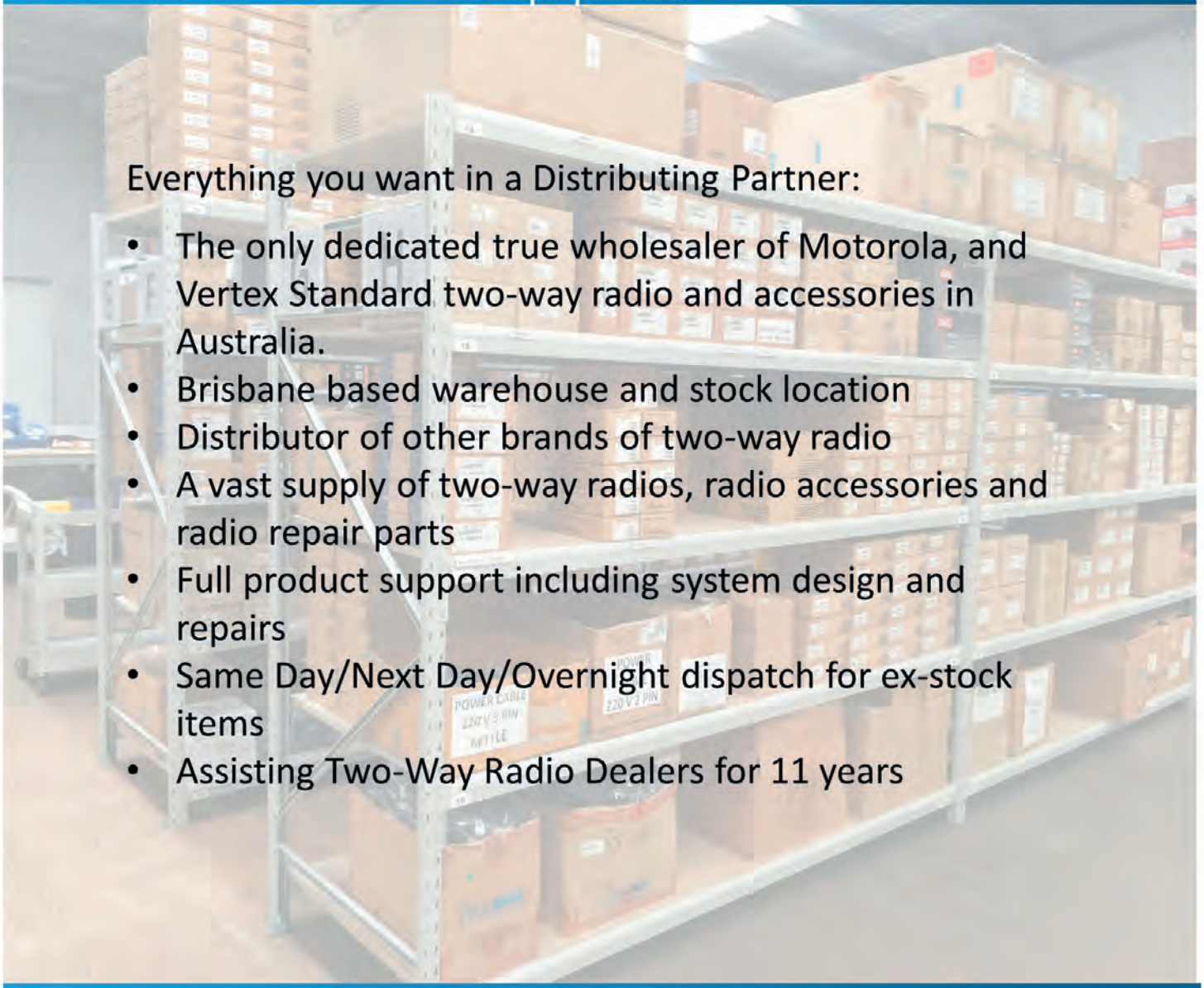

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GOING FOR GROWTH

Jonathan Nally

A focus on innovation and relationships has seen Icom NZ's business boom by 30%.

Icom NZ was established 22 years ago by Dave Dawson; the company is now owned and operated by his daughter, Sharon Dawson. It's one of only three Icom businesses out of 80 globally that isn't owned by the Icom parent company. This gives it the flexibility to be completely stand-alone while still having the backing of a global brand that supplies more than a million radios per year worldwide.

The company moved to new premises close to Auckland Airport last year, more than doubling its storage capacity, and distributes to more than 100 radio dealers and outlets across New Zealand.

Icom NZ has experienced rapid growth in recent years. We spoke with its general manager, Simon Green, to find what's driving that growth and where the company is headed.

Growth in this industry is always welcome news. How have you made it happen?

Over the last three years we have doubled our staff numbers and increased sales by 30%, which is really bucking the trend of radio manufacturers in New Zealand. Our analog radio sales have held steady along with the massive growth in digital. We were probably a little slow in getting the facts about our technology into the marketplace but, now that more and more users understand the benefits of NXDN, we are rolling out some pretty big projects around the country.

I'd put our success down to strong relationships with our dealer base, with whom we work very closely, as well as being very active in the marketplace.

Are there any standout projects that Icom NZ is involved with?

Our highest profile project is probably Christchurch City Council, which rolled out an Icom multisite, multichannel network for their Civil Defence and Emergency Management (CDEM) and Rural Fire unit. Since then, though, we've supplied systems to a wide range of organisations — from the Coastguard, through to our most recent project with the Fullers ferry and tourism group.

Probably the biggest shock to the industry, though, was when we replaced a DMR system in Auckland, that had been in place for less than two years, with an Icom digital network.

What trends do you see in the NZ two-way industry?

I think the next couple of years are going to be challenging for everyone. The recent change to narrowband has pushed a lot of businesses into updating their radios to be compliant, which will leave a bit of a vacuum that we will need to fill.

The future for Icom, though, is really exciting. We have more than 300 development staff working on next-generation communications, with a huge focus on IP-capable equipment. Earlier this year we launched our first IP-only radio (the IP100H) that operates across Wi-Fi and has the ability to link with wider-area radio networks. It's really opened up new markets for us — the IP100H is even being used to communicate on a project sending rockets into space from Canterbury.

It used to be that we would have RF engineers who knew a little about networking; now, the trend is to have network engineers

who know about RF, and I think that's probably a good pointer to future trends.

What's the status of narrowbanding in NZ, and how have Icom NZ and the wider industry been dealing with it?

Narrowbanding has pretty much been completed now, with the deadline upon us. Icom NZ was pretty well placed to support the changeover as we'd already been supplying narrowband-capable radios for many years. In fact, we're all set for any potential future change, as all our digital radios operate to a true 6.25 kHz channel spacing.

The biggest challenge has been in the forestry industry, where there seems to have been a lot of wideband equipment still in use. It's been handled on a very sensible basis, with the deadline being extended a few months to allow radio dealers to cope with the logistics of upgrading equipment in some very difficult locations.

Are there any problems or trends that are NZ specific from a technical or regulatory point of view?

New Zealand is a really interesting market due to it being the home territory of a reasonably large global supplier. With that influence in mind, it means that discussions about new technology have been very one-sided.

The introduction of digital radio has also presented its own challenges from a compliance point of view, with new standards having to be introduced to allow Radio Spectrum Management to continue to manage the radio spectrum effectively. With changes to testing and type-approval labelling of equipment, we're having to keep a close eye on legislation to keep up to date.

What lessons have you taken from the Canterbury earthquakes?

When the earthquake hit, there was a fantastic response nationwide. Icom NZ donated 200 radios to the region as quickly as we could to help with on-site communication. It really brought home the need for emergency response organisations to have a totally independent method of communicating effectively, something two-way radio is still the best at. Moving forward, this had a strong bearing on the CDEM project and led to them rolling out their own Icom network.

Icom was also affected by the 8.9-magnitude earthquake in Japan 2011, where the same quick action with stand-alone communications helped emergency services cope with their immediate response.

Can you explain your project to integrate different modalities?

We have launched a product called VE-PG3, which is more exciting that the name would suggest. Essentially it patches multiple communication technologies together, with each unit having up to four independent inputs. These can be as varied as UHF, VHF, cellular, landline and PC-based devices. It's really taking away the barriers between the differing technology bases — and the best thing is that it doesn't need a network engineering background to set up.

In the lab, we are even now patching P25 to NXDN, though still only at a voice level. We're still realising the full potential of the VE-PG3, but it's something that could be a real game changer.

Finally, on a personal note, how did you get into the radio business?

I started in the radio industry in the UK 15 years ago, working in sales at a Motorola dealership. From there I went into project management, at one point running a commercial radio project for the UK Ministry of Defence, rolling out single and multisite networks across the world, including the UK, Cyprus, Gibraltar and even the Ascension Islands.

After that I spent seven years as managing director of Sedgewall Communications, a design and manufacturing business working on developing TETRA equipment for organisations such as Airwave Solutions, the UK Fire Service and Funkwerk Kopenik in Germany.

A move to New Zealand in 2013 was followed by a very fortuitous meeting with Sharon Dawson, Icom NZ's managing director, and I ended up as general manager.

Simon Green
Icom NZ General Manager

MARINE COMMS

Jonathan Nally

The Port Authority of NSW has installed an Omnitronics DX-Altus Radio Management System to control communications across Sydney Harbour and Port Botany.

The Port Authority of NSW is a state-owned corporation that manages the safe navigation and operation of commercial shipping on Sydney Harbour, Port Botany and Port Kembla, as well as the ports at Newcastle, Eden and Yamba. It also operates the cruise terminals at Circular Quay and White Bay, operates the dry bulk facility on Glebe Island, and looks after emergency response and clean-up efforts (such as for oil and fuel spills).

In terms of communications, the Port Authority has both a primary control centre and a backup centre in the Sydney region. Communication with vessels is done via marine VHF bands, but the Port Authority also has its own internal digital radio system.

When the Port Authority decided that it needed a new, highly configurable yet simple-to-use dispatch solution, it chose the Omnitronics DX-Altus Radio Management System, supplied by Omnitronics itself and installed and commissioned by Australian Mobile Radio — the latter has been working with the Port Authority for around 20 years.

The DX-Altus system was installed at the primary control centre and interconnected via fibre to IPR RoIP gateways at five sites across a wide geographical area.

Key to its success has been the customisability of the Alto dispatch console, which has enabled administrators to configure the screens to suit their specific requirements and minimise operator error. Additional features, such as simple foreground and background control and Rapid Recall, have increased operator efficiency.

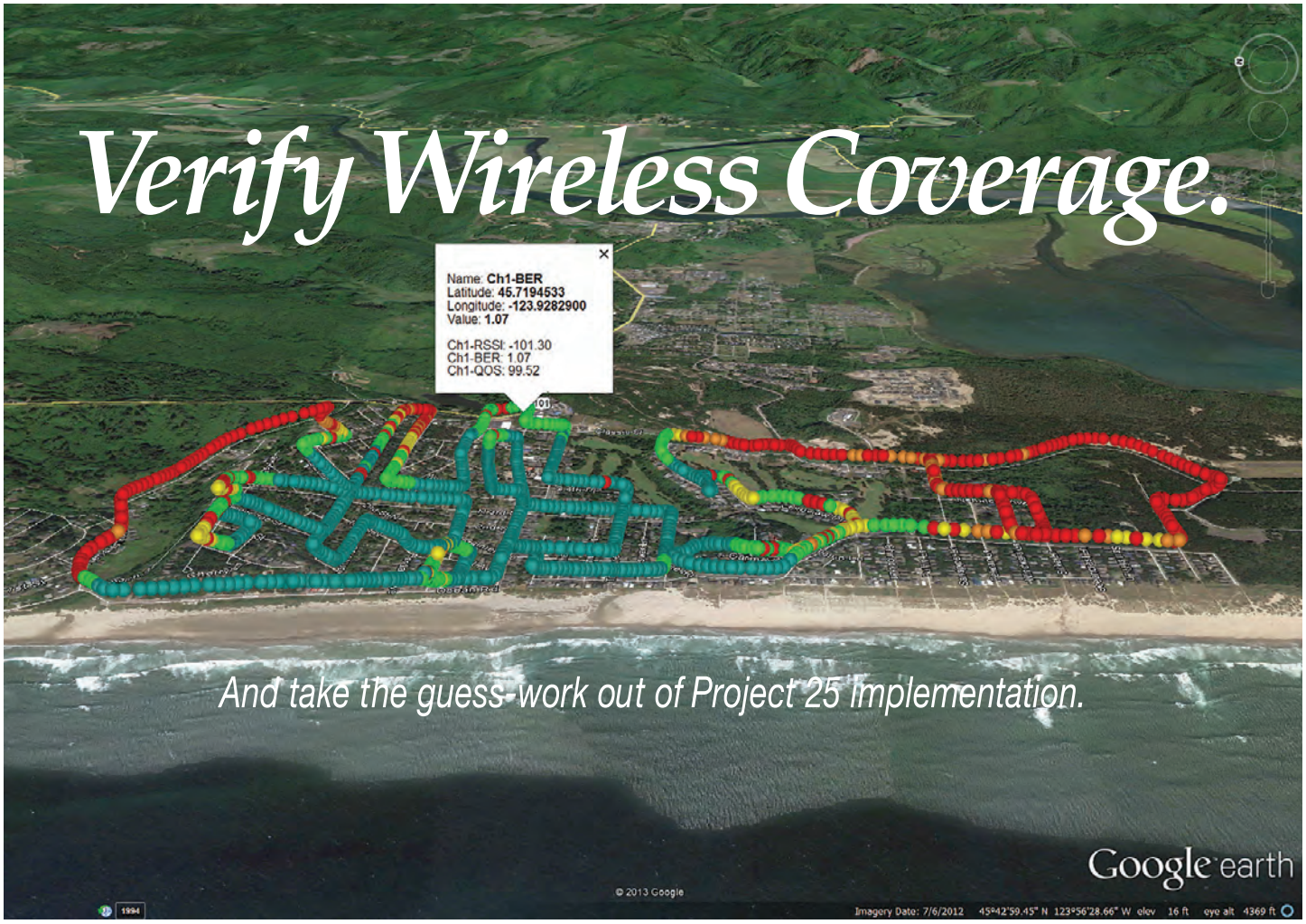
Jeremy Gibson, the Port Authority's asset manager, marine, says a big advantage of the system is its simplicity.

"It's been quick and easy to set up," said Gibson.

"Initially the system didn't have some of the features that the Port Authority required, although Omnitronics were quick to provide new updates to their software that included these.

"This responsiveness to meeting our needs was a key contributor to the success of the installation."

In terms of the rest of the Port Authority's radio network, Gibson says it is proving to be a settled, strong and robust system.



Project 25 coverage testing solutions are rare. But none are as flexible and complete as STI Field Test 7.

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Industry Talking

The end of 2015 brings on Comms Connect Melbourne and the ARCIA annual gala dinner. So much time and planning goes into these events; I would sincerely like to thank everyone who helps bring our industry together. It certainly has been a big year for the association with events in Perth, Sydney, Brisbane and finally, Adelaide. Also, in October, ARCIA again did a presentation on our industry to a group of visiting Chinese led by Mr Li Wei of the Ministry of Industry and Information Technology. This is valuable exposure for our association and the industry in general.

Perhaps more importantly is the ongoing work going on behind the scenes on spectrum policy, public safety mobile broadband, training, industry position papers and growing the association's relationships with other industry stakeholders. In particular, I would like to highlight the relationship that ARCIA and the ACMA are continuing to work on. ARCIA believes strongly that we need a level of regulation and applicable standards to provide important protection, while at the same time be in a position to review productive changes to regulation for the mutual benefit of the industry and the regulator. I am pleased to report that the relationship between the ACMA and ARCIA is continuing to grow as we invest more time, and I would like to thank the ACMA staff members involved.

The most recent state event was in Adelaide, and both the Comms Connect mini conference and the ARCIA dinner event were well attended and, judging by the buzz in the room, was very well received. Members will recall that ARCIA has started to recognise industry contributions at a state level. The latest winner at the ARCIA South Australian event was Andrew Birks from Gambier Electronics. Andrew was commended for his long-term commitment to his business and recent investment in a local trunk radio network to improve services in the south-east of South Australia. Regional operators such as Gambier Electronics face special challenges in making new investments in modern networks, and Andrew and his team are to be congratulated on their efforts.

As the public safety community absorbs and begins to dissect the Productivity Commission report on Public Safety Mobile Broadband, in my view the entire industry needs to collaborate around better outcomes for this vital sector. Regardless of the technology chosen, we all want the public safety community to have the best possible options to enable them to meet community expectations every day. As LTE reaches maturity and assumes a position to provide critical services sometime in the future, we need to recognise that Australia is a big place and there are many needs to be met. I believe that one thing we can agree on is that there is no one-size-fits-all technology.

So as a community of vendors, practitioners, users and government, we need to work on a plan including spectrum, funding and technology. For some users this is already past the 'use by' date, as movements to harmonise government spectrum are expected to happen shortly. During the Adelaide event the project team from the South Australian Government Radio Network provided a presentation on their methodology for a successful network transition. The methodology started with a focus on outcomes and gaining the trust of public safety users. After all, the people keeping us all safe are our most important asset.

Hamish Duff, President
Australian Radio Communications Industry Association

Location services solution

Comms Connect STAND NO 86

Omnitronics has introduced the Advanced Location Services solution, which adds to its GPS Essentials solution to give dispatchers access to powerful features such as geofences, speed control, event history, reports and more through RediTALK or Alto dispatch consoles. This information is instantly shared across dispatchers, supporting collaboration and minimising workload.

Advanced Location Services is a self-hosted solution that gives a choice of using both licensed and unlicensed mapping providers, or users can upload their own maps and add user-defined points. And the company has worked directly with many radio manufacturers to ensure interoperability across both digital protocols and the individual manufacturer's technology.

Omnitronics Pty Ltd

www.omnitronics.com.au

Comms Connect STAND NO 131

Dispatch console system

Zetron has announced that its upgraded MAX Dispatch v3.0 for mission-critical control rooms offers various improvements, including expanded support for the Digital Mobile Radio (DMR) Application Interface Specification (AIS) Tier II and Tier III. This enables additional DMR features, such as console high-priority transmission and emergency outbound calls.

The product also provides an enhanced radio user interface that is now available for use with NEXEDGE, DMR and the Project 25 (P25) Digital Fixed Station interfaces. This is designed to improve the user experience by giving dispatchers greater control over audio routing options and other functionality. It is offered as an opt-in feature to ensure that operations are not disrupted by an upgrade to MAX Dispatch v3.0.

The upgraded product has also been tested successfully with Hytera DMR Tier II and Tait DMR Tier III.

Zetron Australasia

www.zetron.com

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Comms Connect STAND NO 112

Video speaker microphones

Motorola Solutions has introduced three-in-one combination body worn video camera, radio speaker and microphone units, along with a cloud-based content management system, suitable for public safety agencies.

The 'Smart Interface' (Si) Si500 and Si300 Video Speaker Microphones (VSM) reduce the equipment officers carry by combining a state-of-the-art video camera and high-quality radio speaker microphone into one easy-to-use device. Using the Si500 or Si300 VSM in combination with 'CommandCentral Vault', a new cloud-based storage solution that meets US Criminal Justice Information Services (CJIS) standards, will make evidence management significantly easier while lowering costs.

The Si500 VSM extends the mission-critical performance of Motorola Solutions APX radios. The unit features: a 210° range-of-motion camera lens; display that can face in or out; adaptive audio engine that automatically adjusts audio settings based on the user's wearing position and environment; five integrated microphones and a 0.5 W rated speaker; integrated Wi-Fi to improve the speed of uploading multimedia and device updates; and a tempered-glass display.

Users have the ability to control radio channels and talk groups, view recorded video and photos, tag videos and listen to audio recordings.

CommandCentral Vault is a cloud-based application to securely store, review, manage and share digital evidence. It completes a digital evidence management solution when paired with the Si Series VSMs but can also stand alone and accept evidence gathered from any device. The system ensures end-to-end security that reduces any challenge to chain of custody for agencies.

CommandCentral Vault features a streamlined ability to search, review, annotate and perform other evidence management, and an auto-redaction feature to help public safety agencies remove identities of individuals in videos seamlessly.

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Comms Connect STAND NO 94

Two-way radio

The MOTOTRBO DM4601 mobile radio bundle features a slender casing and a convenient handheld controller with digital display and keypad. Easy to install, the controller enables users to hide the console in the dash of a vehicle, improving use of space, and ultimately bringing the controls and visual display closer to the user.

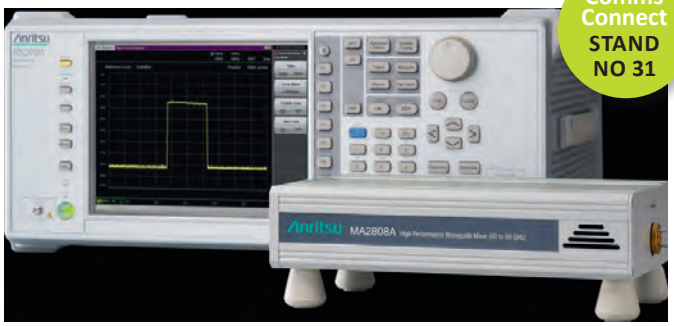
The DM4601 is suitable for fleet operators that require enhanced safety, digital voice quality and handheld controls. Existing DM4601 users can also purchase the upgrade kit for radio conversion to the handheld controller.

Features include: 3 programmable side buttons; 4 programmable front buttons; 5-line colour LCD; full keypad; channel up and down; volume up and down; microphone and speaker; home button; and 4-way navigation button.

Orion Network

www.orionet.com.au

Comms Connect STAND NO 31



Waveguide mixer

Anritsu has added the MA2808A high-performance waveguide mixer (60 to 90 GHz) to its MS2830A Signal/Spectrum Analyser series.

Combining the mixer with the MS2830A analysers in the 26.5 and 43 GHz configurations supports measurements for E-band (70/80 GHz) wireless backhaul, automobile collision avoidance radar (77/79 GHz), and other millimetre-wave wireless applications. The device supports millimetre-wave measurements that legacy harmonic-mixer and down-converter methods are unable to. The combination provides good sensitivity performance with a wide measurement span in a simple configuration, and achieves P1dB performance of better than 0 dBm and a minimum sensitivity of 150 dBm/Hz.

An additional (patent pending) function for extending the measurement span supports measurements up to a bandwidth of 7.5 GHz.

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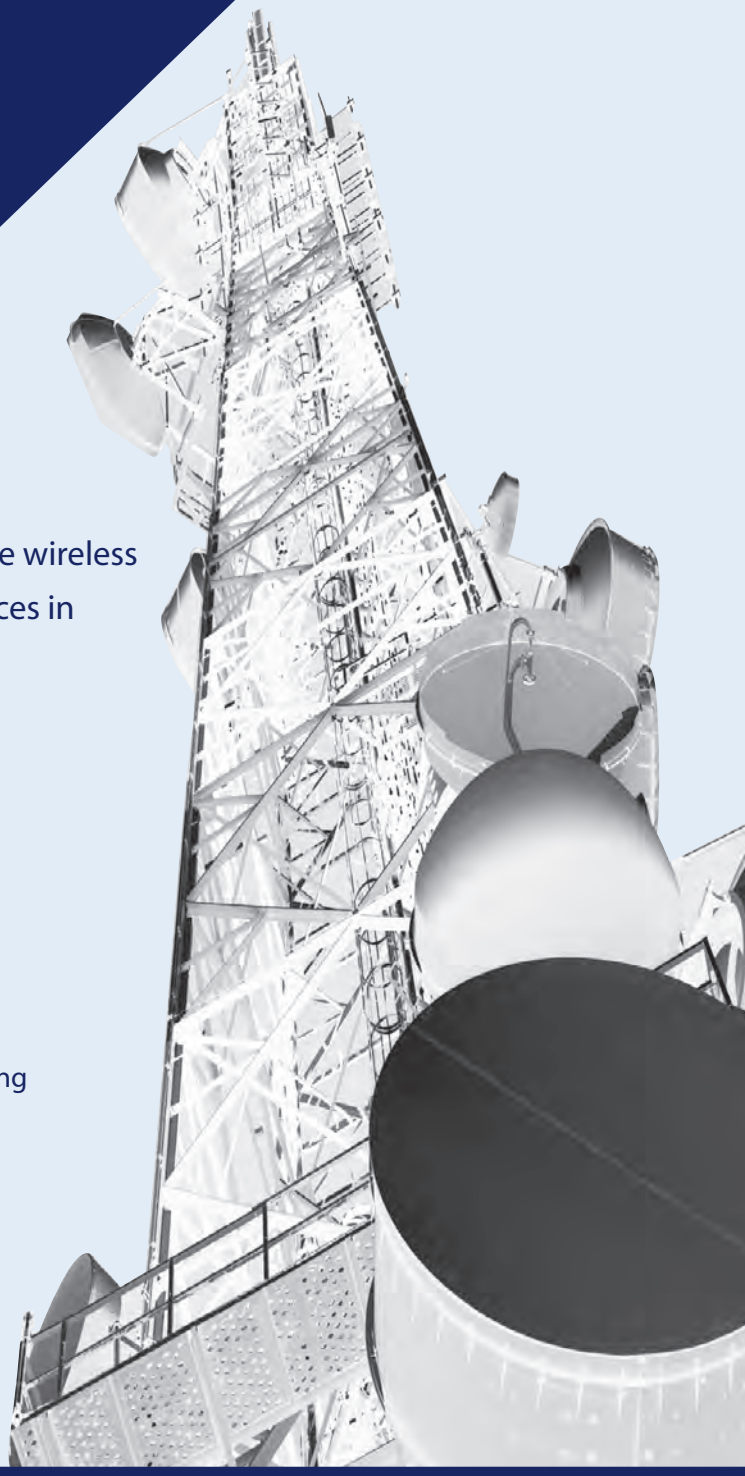

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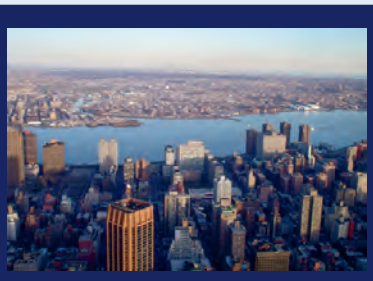

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MISSION CONTROL

Jonathan Nally

Zetron's mission is to 'own the control room'. We find out how the company plans to do it.

Through one form or another, Zetron has had a local presence for around 25 years. Ranjan Bhagat, VP and GM of Zetron Australasia, came to Australia in 2005 to run and grow the APAC business. He has a master's degree in electrical engineering from Washington State University and started off as an engineer before diversifying into project management and then management of technology businesses.

"While I certainly enjoyed the technological aspect of things, what I really enjoyed more was dealing with customers, setting technical and business strategy," said Bhagat. "It's nice to be in a role where you can actually try and set a business strategy and, more importantly, continue to course correct along the way."

We spoke with Bhagat to get a feel for where Zetron is heading, and how changes in the industry are challenging the company.

CC. You must have seen some enormous changes in last 10 years?

RB: There is no doubt that, like all industries, we're not immune to change. We've seen LMR systems changing from analog to various flavours of digital trunking. And now, of course, you hear about LTE. These are all technology changes. The main thing I think that I've personally seen is in a term that is commonly used in industry right now, and that's 'digital disruption'.

To give you an example, if you take plain old telephony, from the time it was launched in 1878, it took over 75 years to reach 100 million users worldwide. And then came mobile phones, launched in 1979, which took only 16 years to reach the same number of users. And you fast forward to a few years ago, with things like WhatsApp — WhatsApp took only three years to reach 100 million users. The pace of change is quicker than it ever has been, and it's primarily due to what I call the rapid speed of innovation velocity, and what that really is, is innovative ways to solve problems.

CC: So does Zetron see digital disruption as a threat or an opportunity?

RB: We see it as a very, very good thing. To give you an example of digital disruption in our industry, say, PTT over mobile — it is forcing many LMR handset vendors to rethink their whole strategy. The way Zetron sees it, historically we've been very good at integrating the different flavours of voice, whether its P25 or TETRA, analog or digital or DMR. And now because of this digital disruption, as well as the emergence of broadband, data applications are becoming almost as important, and probably will become more important in the future. From our perspective, we are what we consider [to be] the 'intelligent glue' that ties it all together, whether it's data, video or location services.

Our mission has been unchanged for many years — our mission is to 'own the control room'. We're continuing to focus on making sure that the command and control room converts all these forms of communication and information into decisive, actionable intelligence, because that's the end game.

CC: So apart from being the glue, how heavily does Zetron get involved with innovation?

RB: We are continuing to improve our breadth of capability through our own R&D. We invest about 17% of our turnover annually in R&D, which is about three or four points above average for the industry. And secondly, we realise we can't do it all. So that's when you partner. So as an example, we just launched a few months ago, a security and analytics business. What we're understanding now is that in the control room, it's not just the voice, but in a lot of control rooms — especially with homeland security and so on now — we're getting a lot of video feeds, and some of that video needs analytics.

Each vertical market is different as well. So with public safety for instance, body-cams are going to be very important for troops in the field. Well, the body-cams are only any good if that information

is being fed back into a Zetron console that is intelligently taking that information and then translating it into actionable methodology.

Now that may not necessarily apply in the utility business, or oil and gas. So we have to continue to listen and understand the different requirements of the customers, because they are going to be different.

CC: What's the next step for control room operations and interoperability?

RB: One of the other things that's important is to try to work toward open standards. We've worked very hard toward that on the voice side, with P25, TETRA and DMR — we're very actively involved in the [standards] bodies, ensuring that the interfaces with different vendors are based on open standards. That's good for us, but it's also good for the end user. The same thing needs to eventually apply to data applications, because if each one is doing its own thing, well you could still interface to them, but it's not going to be very efficient, and certainly not easily repeatable.

So take LTE for instance, which is starting to gather momentum in some parts of the world. Some people are looking at public safety, saying "maybe my next-generation system will be LTE". Well that's all well and good, but it's no fun if Vendor A's LTE is different to Vendor B's to Vendor C's in terms of interfaces to applications or to companies such as Zetron. So open standards are an extremely important part of this.

Businesses generally are getting mature enough to understand that the world and the market is big enough, and we'll all be better off, and able to sell more, if we follow open standards. Open standards means customers will be happier, which means they'll be buying more.

> THE WORLD AND THE MARKET IS BIG ENOUGH, AND WE'LL ALL BE BETTER OFF, AND ABLE TO SELL MORE, IF WE FOLLOW OPEN STANDARDS.

CC: What do you think will happen to companies that don't go down that path?

RB: I'll give you a perfect example. I call it, 'just Uber it'. The businesses that will survive 10 years from now are those that are continually adapting and course correcting themselves to the rapidly changing needs of the market. And when I say adapting, it's a mindset, but it's also reflected in technology and their use of technology.

Ranjan Bhagat, VP and GM of Zetron Australasia.

Comms Connect STAND NO 71

LTE small cell solution

The NEC MB4300 Series LTE all-in-one Small Cell solution with built-in Wi-Fi hotspot emphasises tailored network performance through the capacity-based network design with strict QoE control and self-organising network (SON).

It features extensive automation technology, minimising the installation effort and cost, as well as a cost-efficient, compact and light-weight all-in-one (RF+BB) design.

This combination is a promising solution for securing high-speed mobile communication while drastically minimising the total cost of ownership (TCO), in contrast to focusing on a conventional coverage-focused network.

NEC's LTE view also concentrates on the broadband wireless access (BWA) concept, which effectively expands LTE service providers' service coverage by removing the boundary between fixed and mobile high-speed data access businesses.

NEC Australia

www.au.nec.com

Comms Connect STAND NO 50

Antennas

The MARS Antennas range of in-building, triple/quad and five-polarisation MIMO antennas is compatible with IEEE 802.11ac.

The range also includes antennas designed for LTE, fixed and mobile applications, plus other RF applications from domestic through to security and military applications, as well as repeaters for cellular and Wi-Fi coverage.

Amber Technology Limited

www.ambertech.com.au

Comms Connect STAND NO 31

Remote spectrum monitor

Anritsu has introduced the Remote Spectrum Monitor, a platform of modular and scalable products, without a display or keyboard, that automates the method of conducting radio surveillance, interference detection and government spectrum policy enforcement.

The device features two spectrum monitor modules at introduction: the MS27102A and MS27103A. Each module has power of arrival (POA) algorithms to monitor for interference and approximate the position where the interfering signal is being generated.

The MS27102A is designed to maximise network capacity by efficiently solving issues associated with the presence of illegal or unlicensed signals that interfere with authorised transmissions. Certified with an IP67 rating, it is suitable for outdoor monitoring applications and can be wall or pole mounted. With an operating temperature range of –40 to +55°C, one (or optionally two) weather-resistant RF In port, a rugged weatherised case and splash-proof design, the product performs well in harsh weather conditions.

The MS27103A is designed for multiple antenna applications that cover wide frequency ranges and is a rack-mountable multiport RF In probe that constantly monitors the spectrum to ensure optimal performance. It is suitable for cellular operators requiring spectrum monitoring coverage for multiple sectors and numerous frequencies per sector at their BTS locations.

Covering 9 kHz to 6 GHz, the probes have sweep rates up to 24 GHz/s, allowing capture of interferers, including periodic or transient transmissions as well as short 'bursty' signals. The modules also have low power consumption of <11 W.

Anritsu Pty Ltd

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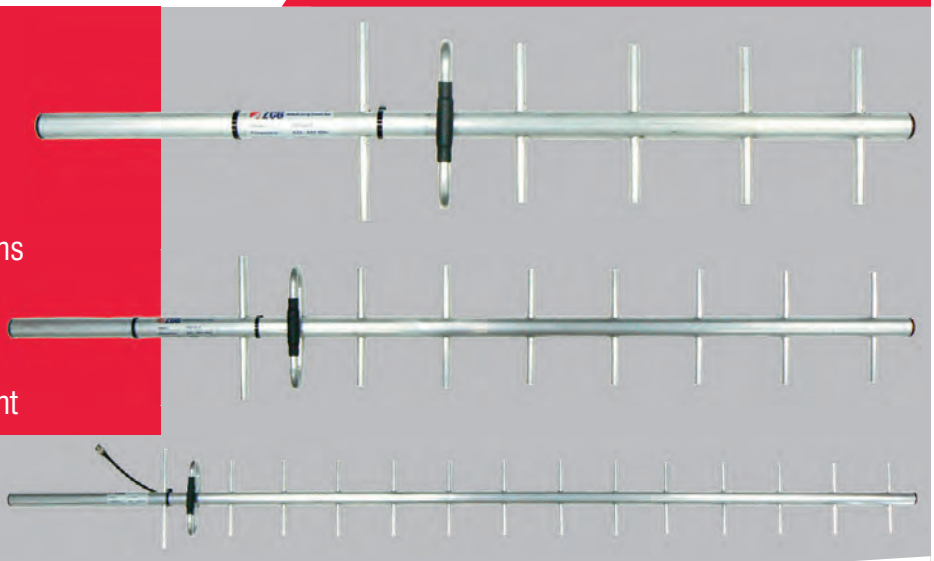

For more information on our full range please visit
www.zcg.com.au

Comms Connect STAND NO 71

Mobile access controller

NEC Australia has released its second-generation Mobile Access Controller (MAC), a mobile workforce communications platform that provides highly reliable voice and data coverage for emergency services and field workers. This product is suitable for industry, government, public safety and logistics organisations.

Utilising multiple networks such as 3G, 4G LTE, UHF/VHF radio, satellite, P25 and Wi-Fi, the MAC will intelligently route voice and data to the best available network at the lowest cost, based on defined business rules.

The MAC provides safety features to support OHS initiatives, in particular for remote field workers, including: automatic vehicle location (AVL) and personal navigation via GPS, and duress and emergency alerting, both in-vehicle and up to 3.5 km away from the vehicle, via a handheld radio. In addition to this safety component, the product is designed to improve employee productivity and business efficiency, and reduce operational costs.

The Management Centre application (MAC-MC) also provides central control, configuration and reporting for all the units deployed in a fleet of vehicles. It offers a suite of operational functionality as well as system administration capability in the one integrated package.

NEC Australia

www.au.nec.com

Comms Connect STAND NO 138

Communications terminal

The SkyWave IDP-782 communications terminal from M2M Connectivity is designed for fleet management applications. A single device for both cellular and satellite network coverage over the Inmarsat IsatData Pro network, the IDP-782 offers cost-effective, continuous connection to assets, sensors and people.

The IDP-782 is suitable for situations where the relay of critical information requires reliable, ubiquitous connectivity. With always-on backup satellite communications, this dual-mode device increases safety and improves operations without the added costs of roaming charges.

Feature rich, the IDP-782 has numerous applications for fleet management providing: complete visibility and tracking of transport vehicles and its cargo in and out of remote areas; continuous collection of location, telemetry and sensor data for the protection of valuable heavy equipment and driver safety; lower cost cellular for vessels near-shore and reliable satellite services elsewhere; and SCADA monitoring of fixed oil and gas equipment with Modbus and sensor capabilities and power loss notifications with the built-in backup battery.

The IDP-782 provides quick configurable out-of-the-box software or the development of custom applications. In addition, the IDP-782 features an optional 2.5 h backup battery option to send GPS and other information when no vehicle power is available.

M2M Connectivity

www.m2mconnectivity.com.au

Comms Connect STAND NO 60

Safety mat

The EPR Safety Mat provides a simple means for mitigating step and touch voltage hazards via a three-layer design that complies with IEC61111, IEEE Std.81 and ENA EG1 standards.

The central, electrically conductive layer rapidly equalises the electrical potential across the mat. The upper layer insulates the asset from the electrically conductive layer. The lower layer is a special electrically conductive elastomer that protects the central layer and provides electrical continuity to that layer.

The mat is constructed from coarse non-slip PVC rubber fabric (layer 1), fine wire mesh stainless steel 316L (layer 2) and medium non-slip PVC rubber fabric (layer 3), and is sufficiently flexible enough to be rolled and unrolled as required in temporary and semi-permanent applications. Standard dimensions are 1 x 1.5 m with a nominal thickness of 3.2 mm (complete with bonding strap). Other sizes are available on request. Weight is less than 7 kg per lineal metre.

Lightning Protection International Pty Ltd

www.lpi.com.au

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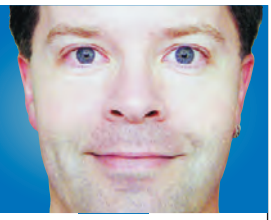

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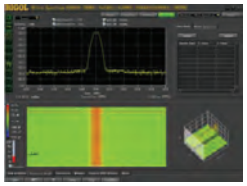

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RADIO MANAGEMENT
THE BENEFITS OF A SYSTEM APPROACH

Ralph Becker, Testadvance Pty Ltd

A radio management system can maximise cost-benefit over both the short and the long term.

Implementing a radio management system (RMS) typically follows a common process. First, stakeholders develop objectives, needs and constraints into a scope. Then, the specific needs and requirements are developed from that scope, deliverables are designed or sourced to meet requirements, and project-, change- and risk-management controls are applied.

While this is a sound approach, it relies on the scope and requirements to be fixed at some stage. An RMS typically represents a substantial and long-term commitment. As an organisation's primary concern is the effective and efficient exchange of information, radiocommunications more and more need to evolve with technology, business and operations. Whether that is via IP networks, phone or mobile, or two-way radio depends simply on which method is best suited. Thus, many requirements an RMS needs to meet go beyond readily identifiable needs and objectives. That is sensible, as no organisation will want to risk investing in an RMS that cannot support its operational or business objectives in the future.

Substantial effort is afforded to projecting which future capabilities need to be considered now, even though it is often not clear when, or even if, they will actually be required. A common practice is to 'work backwards' from these projected needs to determine the relevant requirements today.

Yet this can be particularly difficult in view of major changes in technology; for example, new or developing radio technologies and standards, or the advance of IP-based communications and 'smart' mobile devices.

It can be costly, and even risky, to attempt to address these diverse needs, both current and future, within a single specification. Is it better to settle on one radio standard? Or will that create constraints? Should future needs be addressed now, and at what cost? What is the risk of not doing so? What are the returns, and when will they be realised? What can change in operations and business that may impact on radiocommunications and systems?

Needs and benefits

To resolve this dilemma requires accepting that change and uncertainty are not necessarily negative — they can be addressed in better ways than simply avoiding them. It also requires revisiting the basic purpose

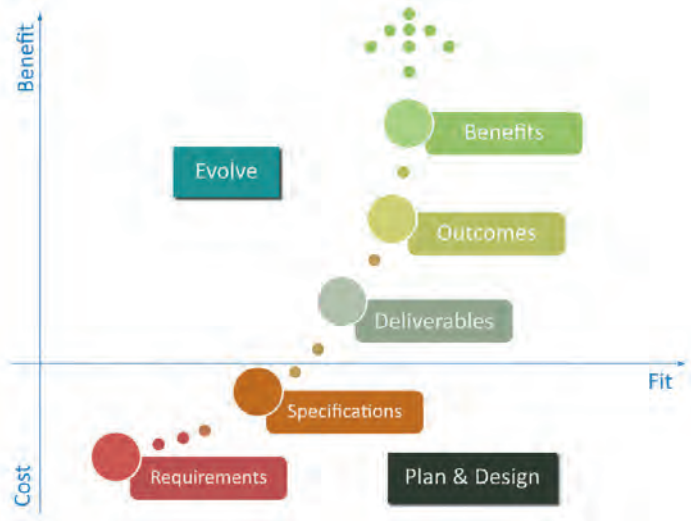


Figure 1. Cost-benefit in system implementation.

of an RMS. If this seems obvious, consider applying the following questions to the scope and design of an RMS:

- What is the measurable benefit from a required capability, and when is that benefit realised?
- What does it cost to implement that requirement now?
- What risks and costs may arise from not meeting the requirement now?
- Is there a risk that making that decision today creates constraints on future opportunities?
- What else may change between now and when benefits are supposed to be realised?

Of course, the answers to these questions depend on just how certain or uncertain the variables are. The approach therefore should be to revisit purpose and key objectives, and break these down into functional needs and requirements according to their predictability and the relevant time frame (see Figure 2).

Certain needs are those where the solution can be clearly defined, and where a measurable benefit or return can be quantified, and can be delivered within a specified time frame.

Uncertain needs typically fall into three categories:

- Perceived needs are typically short to mid term and may be reasonably predicted from past experience or other knowledge, but the benefit is uncertain.
- Perceived opportunities indicate a future benefit, typically short to mid term, but this benefit cannot be quantified in the present, and when it will be realised is uncertain.
- Uncertain needs and opportunities are perceived needs and opportunities that cannot be reasonably defined in time, likelihood or benefit, but which may pose a risk if not addressed.

Some basic examples of certain and uncertain needs include a need to connect operators with more than one radio (current, with a clear cost-benefit), the need to be able to add more radios to a console at a future stage (perceived need, with a predictable cost-benefit), an opportunity to interconnect analog HF radios to digital trunked radios (perceived opportunity, with a predictable cost-benefit), and an opportunity to allow all terminals to interconnect with each other (uncertain as availability and cost-benefit cannot be predicted, but risky if not considered as it pertains to a widely implemented standard).

Figure 3 shows a typical evolution cycle. Here, the main approach to dealing with uncertain needs and opportunities is to define requirements today that should ensure, as best as possible, that future needs and opportunities can be met. The disadvantage in this approach is for one that it is very 'specification heavy', and secondly, it is costly and complicated as it needs to address a whole range of possible permutations.

For example, a lot of attention has been focused on 'interoperability' at a standards level. One can argue that this is more interconnectivity than interoperability — after all, what determines operability is specific to the organisation and its needs. One can also argue that standards should not try to be all-encompassing, and certainly not create unnecessary constraints on organisations using the technology. Instead, they can provide a foundation to move from a predominantly technological view to an operational one. The internet and mobile telephone are two excellent examples.

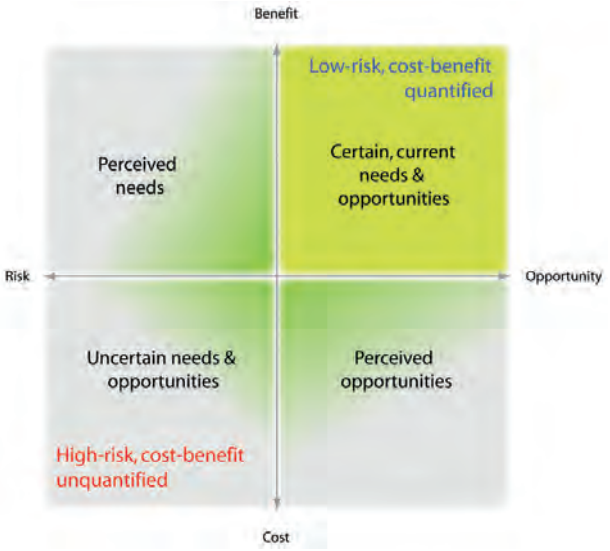


Figure 2. Needs, cost-benefit and risk.

Figure 3. The typical 'evolution' cycle.

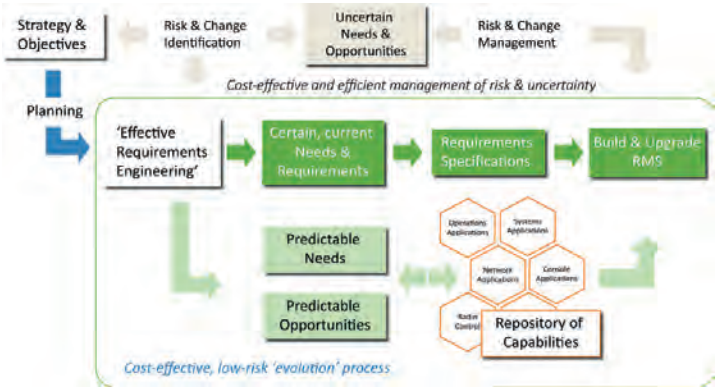


Figure 4. Building an 'evolve-able' RMS.

Indeed, an organisation's primary concern is not how radiocommunications 'work', nor the features they provide. An organisation's key concern is how effectively and efficiently 'radio' works within its specific context — and this cannot be standardised. It is a very basic premise that investments in radio capabilities only deliver a return when and where they are put to productive use. What is productive is not determined by the technology or solution used, but by the purpose and the context within which it is used.

So, if standards and 'forward requirements specification' are not the answer, what is?

Allowing for 'evolution'

An RMS is a key interface between the radio network and the communication of information within, and often beyond, the organisation. As such, any RMS needs to consolidate the capabilities of the radio network for it to work effectively and efficiently. As described previously, issues arise when the focus is predominantly on technology and functionality. Instead, organisations may first focus on determining what they really need, and when — and indeed, what — they don't need.

An RMS is a substantial investment of resources and time, and at some stage the design of the RMS needs to be agreed on. But what if that didn't need to be the case for every capability? What if all the future needs and opportunities didn't have to be addressed through detailed specifications in advance? What if capabilities could be added when the need arises, and real, measurable benefits can be had?

To achieve this requires flexibility in scope and requirements. It also requires confidence in the ability to meet future needs. In fact, radio networks have always evolved, typically built up over time using a range of assets of different types and technology. And that makes perfect sense. Just as the organisation's needs for radiocommunications evolve, so does the radio network.

Organisations seek to maximise return on invested capital, return on assets and usable lifetime of assets and infrastructure, while managing expenditure and costs. Thus planning and investing in 'radio' involves making trade-offs between functionality, cost and time frames. Sometimes it may make technological, but not financial, sense to replace an asset. What makes these trade-offs possible is the knowledge that an organisation can source the capabilities it needs when it needs them.

Why not apply the same rationale to radio management systems?

Figure 4 shows how such an approach can work to deliver excellent fit and cost efficiencies. Allowing for additions from within the RMS, rather than prescriptive requirements specification, allows an RMS to evolve... just as the radio network described earlier. Such an 'evolve-able' system does not need to specify all possible permutations — instead it matches predictable needs and opportunities to a repository of capabilities. This is done once during the initial system concept.

Organisations can address needs and opportunities by adding the relevant capabilities, when and where it makes sense. Since these capabilities are held in the repository, organisations can add capabilities in increments that fit their schedule and budget. For example, adding a single HF radio, a group of DMR, TETRA or P25 radios, or all together. Other capabilities can also be added, such as VoIP phone lines, voice recording and location mapping.

Organisations can do this without having to repeat the specification and design process; it can all be done within the design of the RMS itself. What remains are the truly uncertain and unquantifiable needs and opportunities, which in any case are best managed using suitable risk and change management processes.

TestAdvance Pty Ltd
www.testadvance.com

Comms Connect STAND NO 100

DC power supplies

Keysight Technologies has introduced the E36100 series of compact DC power supplies to its portfolio of bench power supplies. The series has five models with up to 100 V or 5 A output that offer LAN and USB interfaces as well as accurate, reliable power for testing and validating designs.

The models' compact form factor (2U, ¼-rack) saves space on the bench or in a rack, and standard LAN (LXI Core) and USB interfaces make it suitable to connect the power supplies to a computer. An intuitive on-screen menu system allows engineers to perform manual tasks quickly, and overvoltage and overcurrent detection helps engineers protect their DUTs.

Each of the five models comes standard with: measurement capability for very small currents; a high-contrast OLED display to view the screen from anywhere, even from sharp angles; support for BenchVue software, IVI drivers and SCPI commands; and a three-year warranty and the company's worldwide support.

Keysight Technologies Aust Pty Ltd
www.keysight.com

News

BROADBAND COMMS FOR FIRIES

The City of Oakland, California has deployed CalAmp's Fusion multinetwork broadband routers in Oakland Fire's engines and fire trucks. The deployment was a key element of the core infrastructure upgrade that enables broadband communication of mission-critical information to first responders, particularly in the area of situational intelligence. Fusion provides first responders in Oakland with access to resources including building plans, fire records and inspection reports via 4G LTE. It also facilitates access to essential databases such as GIS data for the Port of Oakland, providing occupancy and other information on the map using Esri mapping software.

More info: bit.ly/1KVXTRx

URBAN NETWORK UPGRADE

Siemens selected Teltronic to provide a new TETRA system for the urban transport network of the city of Monterrey, Mexico. The network consists of 40 kilometres of metro lines, as well as Transmetro, the rapid transit bus system (BRT) with a fleet of around 200 buses. Part of the Sepura Group, Teltronic will supply a complete solution, combining TETRA infrastructure, a control centre application, video surveillance in stations and onboard radio equipment for trains and buses. Maintenance and operation teams will use HTT-500 hand-portable terminals and DT-410 desktop radio units.

More info: bit.ly/1Sl3cAg

Ethernet tester

The JDSU SmartClass 10 Mb and 1 Gb Ethernet Tester is an entry-level tester for copper and fibre. It is available to rent from TechRentals.

The compact device allows for assessment of Carrier Ethernet services and active Ethernet (point to point) access deployment, traffic generation and QoS verification. Multiple streams testing also enables simultaneous measurement to verify integrity of services from eight sources.

Users can verify if the network transports frames with the expected priority and bandwidth, or whether they reach a destination at all, by examining frame loss, throughput and identifiers per stream. Other features include: complete upstream and downstream testing; physical layer integrity verification; automated RFC2544 preset to determine bandwidth; graphical test reporting; and asymmetric RFC testing.

It is suitable for service installation, turn-up and maintenance technicians supporting Metro and Enterprise Ethernet networks.

TechRentals

www.techrentals.com.au

Outdoor mesh router

The Tropos 6420-XA outdoor mesh router is designed to deliver high reliability and performance for utilities, oil and gas exploration and production, mining and industrial process control industries. The product has a special alloy, nickel-plated case that is highly resistant to environmental stress in extreme environments.

The router provides a communications foundation for deploying multiple, concurrent mission critical applications by accessing 653 MHz of RF spectrum using automatic interference avoidance capabilities of Tropos Mesh OS. It also uses the 802.11a/b/g/n wireless standards to deliver 600 Mbps total wireless data rate, 300 Mbps at 2.4 GHz and another 300 Mbps at 5 GHz.

The device can either serve as a gateway interface for capacity injection into the network or as a node to extend or reinforce network connectivity. Capable of creating or expanding higher-capacity networks, the router supports 2x2 MIMO in the 2.4 GHz and 5 GHz frequency bands, as well as enabling meshing and client connectivity in both frequency bands.

The product can be ordered with two ethernet ports, which can be used to inject capacity into the network and attach devices such as video cameras, or with one ethernet port that can be used to inject capacity into the network. Its antennas can be mounted remotely from the router itself.

A 2.4 GHz single-radio version, the Tropos 6410-XA, is also available.

Wireless Tech (Australia) Pty Ltd

www.wirelesstech.com.au

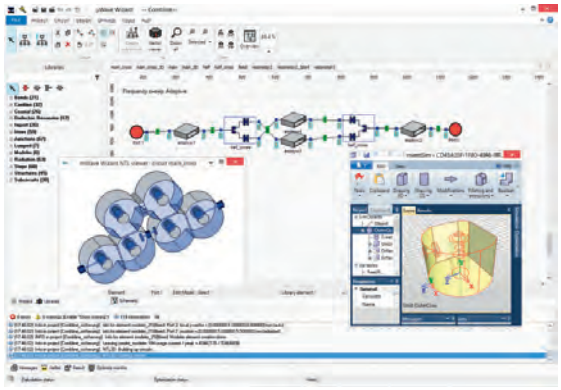
Comms Connect STAND NO 30

Simulation software design tool

Mician's μWave Wizard is a software design tool that combines the flexibility of 2D/3D FEM with the speed and accuracy of traditional Mode Matching techniques.

The benefit of using Mode Matching lies in its ability to perform and combine subcircuit-type full wave simulations, in conjunction with full parameterisation of structural geometries for use with built-in optimisers. The quick composition of complex RF structures using basic building blocks eliminates the need for creating a full-up 3D model of the entire structure and speeds up the development process, which significantly reduces cycle time.

In addition to its fast and powerful numerical methods, the product also offers an appealing and ergonomic GUI that enables flexibility and openness including CAD export formats interfacing with most mechanical design tools.



Delta Gamma Consultant

www.delta-gamma.com

Comms Connect STAND NO 145

DMR base station

Tait Communications has added the TB7300 base station to its DMR Tier 2 and 3 network solutions.

The product is a cost-effective base station/repeater equally suited to operation in the Tait DMR Tier 3 trunking environment as well as in the conventional DMR Tier 2 world.

The slim 1U base station is rugged yet simple to transport and install on difficult-to-reach sites. It integrates seamlessly with the Tait 9300 series of portables, mobiles, high-performance base stations and network management software applications.

With features including good receiver performance, powerful diagnostic capabilities and straightforward migration across analog, and DMR Tier 2 and 3, the product provides a flexible and futureproof investment.

Tait Communications

www.taitradio.com

Wireless 4G M2M router

NetComm Wireless has launched the NTC-140-02, a wireless 4G machine-to-machine (M2M) router that brings speed, reliability and security to data-intensive applications such as video surveillance, in-vehicle communications, digital signage and business continuity.

The device is part of the NTC-140 series and is designed to drive M2M uptake from a wider market base of industries while facilitating the migration of existing assets from 2G to 4G LTE. Developed to support demanding M2M deployments over the long term, the industrial-grade device provides real-time M2M data connectivity and remote management over 4G, featuring two Gigabit Ethernet ports, vehicle voltage support, GPS and ignition input for mobile assets.

The router enables M2M applications such as video surveillance where power is available but fixed-line internet access is not. Business continuity and reliable connectivity is also assured with automatic failover to 3G when outside of 4G coverage areas, plus instant fallback to 4G when the Gigabit Ethernet ports are used as an alternate internet connection.

The device also supports remote management protocols such as LWM2M, TR-069 and SNMP to allow quick and easy integration with a wide range of remote management platforms.

NetComm Ltd

www.netcomm.com.au

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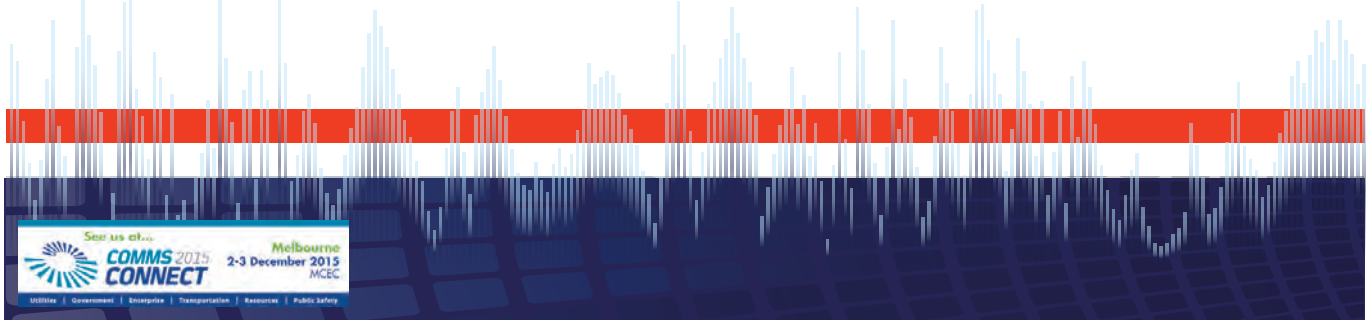


DIGITAL DIVERSITY

We speak with Vertel's Andrew Findlay to find out how the company's DMR network is going, and where technology is heading next.

Jonathan Nally

Earlier this year, Vertel announced plans to establish a national DMR network to complement its MPT and fixed wireless Carrier Ethernet access and WAN offerings. We recently sat down with Andrew Findlay, the company's executive director, to see what the market reaction has been, and also to dig into some related issues such as networking, infrastructure sharing, security and the convergence of comms and IT.

CC: You launched your DMR network earlier this year. How's it been going?

AF: We've really been focusing on the upgrade to and transition from our national MPT analog network to a DMR Tier 3 offering, which has been going smoothly. We've done about half of our sites in each of the geographies.

In the domain of our larger customers we're trying to articulate the fact that now it's digital… just another IP stream… there's the ability to make these networks talk to other fixed and mobile networks. We are positioning the digital network with some of our larger LMR customers like Holcim and Boral as something that can interoperate with their dispatch consoles, their job booking systems, their OHS technologies and their broader fixed network. We can also integrate with other standalone or third-party provided mobile services. The final piece of the puzzle is to look at how the push to talk over cellular and Wireless LAN offerings are going to be integrated with our overall LMR service offering.

CC: What was it that drove you to introduce DMR?

AF: Some of our bigger customers have been on our national MPT 1327 network for more than 10 years. They had got to the stage where their overall hardware needed refreshing. Most have implemented some sort of 3G/4G based mobile data service to improve their operational efficiency but they understand the value of having an alternate voice and niche data service that is independent of the public mobile services. We know that the issues around occupational health and safety are major drivers for them, keeping a separate voice component on their radio network, but it has to work well with their other communications. Our smaller customers with 20, 30 or 40 subscriber units are the ones that are thinking that the question is an 'either/or' when looking at LMR and 3G/4G.

CC: Are there any customers who would want DMR just for data?

AF: DMR is more suited to low-speed data as opposed to what the mobile carriers offer. Applications such as location-based

services and real-time reporting are, in our opinion, much better suited to run over a 3G/4G network. Where we're really focused on the data component to it is in really low-speed but critical messages — we're even looking at, potentially, once we get a certain network coverage, might it be an option to go to some of the state GRNs to say, "Look, we know that some of your ambulances or police cars have multiple network connections, could this be another one of those connections?"

TAIT, who is our technology partner, has a value-add to DMR called GridLink, and they've rolled that out successfully in the US for a couple of big water and electricity utilities. As we go through and target some of the local councils to upgrade their networks from analog to digital we are saying, "This network can also handle what were previously separate SCADA and telemetry requirements." If we can handle both voice and SCADA use cases on the same network then we're starting to see some interesting business cases for a council that is undecided about its LMR future.

CC: What do councils see are the benefits of new comms solutions?

AF: Councils have a number of radio sites and water towers that they're currently using in their networks. But for them to go and build the backhaul between all those sites… we're saying, look, rather than putting in a low-speed, 900 MHz link between those sites, we're willing to put in a high-capacity microwave link so you get the carrier-grade backbone between all of your network sites. But then we can use that same network to start to provide our own fixed services to address nbn or Telstra blackspots in terms of fixed coverage.

But also, our view is that once we've got that carrier-grade layer network in and across your region, we can start offering other services including Wi-Fi, some CCTV, etc. We're even seeing some of the councils that are saying, "Could we start to look at sharing some of our core infrastructure and telephony and conferencing services?" So we're trying to really get the story out there to say when you can start layering these different technologies and different access systems on top of one common infrastructure, you've got some really interesting commercial and technical possibilities.

We've taken the ACMA database and done a full analysis of what bases are on what sites with what links, and we are really quite interested to see that there isn't a lot of interoperability and/or resilience in these networks. So we're going to councils and saying, apart from getting these services at better quality and at a better price point, we can start now to show that by you being involved in these infrastructure builds, [that] you can be proactive in adding some resilience to your networks and your regions.

CC: What're your thoughts on the industry eventually moving to LTE?

AF: We've got a couple of different vendors in our lab at the moment for the push to talk over cellular (PoC) option, and we really do see that the smaller end of the market — the 10–30 vehicles — are the ones who are really suited to going to this technology and service. And whether they do that in exclusion to radio or whether they still have a radio and a PTT client… our overall pitch is that we want to bundle the two together. You can actually have the benefits of both in an affordable package. So we're now just crafting that offer together, and we're just working out technically how we do that.

CC: How are general IT trends affecting this sector and your business?

AF: In the fixed space you have SDN and NFV starting to shake things up. But in the mobile world everyone's talking about Cloud-RAN. That's where you have an industrial server sitting on a site with redundant power, and it's got a number of protocol stacks sitting up there [from which] you could offer some sort of 'any channel on demand' service.

One of the real barriers to Cloud-RAN in the 3G/4G space is the latency and the amount of capacity you need in that fronthaul part of the network. By virtue of the fact that PTT already has the half-duplex and call set-up delay built into it, the actual latency doesn't really count. The concept would be to have a QoS-enabled Ethernet connected site and a virtual base station that allocates a channel on a certain frequency on a certain protocol and through a custom antenna system. How that plays out with the incumbent vendors like TAIT and challengers like Etherstack will be interesting to see.

CC: From a public sector perspective, are networking issues on the radar or are they hidden away?

AF: We're starting to see government more generally starting to think more strategically about network diversity. We've been really busy rolling out the first six of the seven rural Local Health

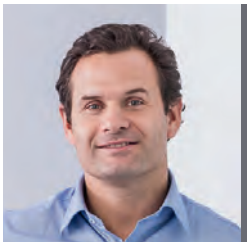
Districts for the NSW Government's eHealth project, which is about upgrading their 930-site WAN. We were selected as the non-fibred solution — we're providing wireless-based services as primary where no fibre exists and redundancy for critical sites that already have fibre. We want to start building our extra DMR coverage off the back of these sites and backhaul networks that we are building for these types of customers.

We're pleased now to see that people who are driving some of those conversations are starting to unpick what the incumbent carriers are saying about their path and media diverse services. And so from our perspective, we've been saying for a long time, the best diversity you can have is to have carrier diversity from carriers who use completely separate infrastructure. With us being a wireless-based carrier, we have towers and airwaves rather than pits and ducts. In the instances where we do use a backhaul partner, they've been really stringent in saying, "Show us your detailed network maps and prove to us that there's no common point of failure between your network and the network of our primary provider."

CC: With all of this networking for some very sensitive customers, how big a challenge is it to keep it all secure?

AF: In the last six months, we've been fielding a lot of calls from our enterprise customers, who are starting to move towards the cloud. They're talking about bandwidths and quality of service, and interconnect and cross-connect. We're now getting some of our bigger customers saying, "Hey listen, now that we've got this stuff set up, we're really starting to question our security policies." And I think it's going to be the next generation of big issues in broadband networks.

Customers who have critical infrastructure in water, power, public transport etc are also becoming aware of the issues around security. They are worried about the situation where a hacker might turn off a water pumping station, mess with traffic signals, change the lane indicators on the [Sydney] Harbour Bridge etc. Stuff that can be done remotely but [which would] cause a massive amount of impact for the general public. They're starting to get concerned about all the SCADA and telemetry systems, which in many cases have very little security. And because [those systems] have often been the domain of the radio group of a utility, as opposed to the IT group, they're really worried that there's not the same level of thought about the security of those networks as there would be in a corporate WAN.



Andrew Findlay, Vertel's Executive Director.

News

ARTS CENTRE CHOOSES ICOM

Toronto's Sony Centre for the Performing Arts, a 3000-seat theatre, has adopted Icom's IP Advanced Radio System to assist the management of the venue. The centre required a radio system that could provide reliable coverage throughout its 250,000 square-foot facility with durability that could withstand typical wear and tear. Trials of Icom's IP100H found that its functionality complemented the theatres' existing Wi-Fi infrastructure — approximately 74 wireless access points in a mesh system. The radio also met the centre's physical requirements with IPX7 waterproof ratings.

More info: bit.ly/1KVXZsk

AWQ NOW AVAILABLE

The marine radio Australian Waters Qualification (AWQ) has been launched by the Australian Communications and Media Authority. The ACMA has approved the AWQ so that boaters who use a VHF marine radio in Australian Territorial Waters (within 12 nautical miles of the coast) are now able to apply for the more appropriate marine radio AWQ. While all marine radio users (except those operating 27 MHz marine radio stations) must be qualified, until now boaters had to obtain a Certificate of Proficiency or an equivalent overseas qualification. But the approval of the AWQ gives a more streamlined option to relevant boaters.

More info: bit.ly/1GJicXB

TAIT'S SYDNEY HQ

Tait Communications has announced that it will open a new Asia-Pacific headquarters in Sydney. The office will increase Tait's Australian presence alongside its existing regional sales and support centres. Dean Brookes, regional GM of Tait Asia Pacific, said opening a new regional headquarters in Sydney demonstrated Tait's ongoing commitment to customers in the region. Tait's Brisbane office will continue to host sales, engineering and support teams, including specialised support for Queensland accounts. The Melbourne office has a sales and service team, including a repair centre and a dedicated support team for customers.

More info: bit.ly/1GJhw4r

Comms Connect STAND NO 61

DMR repeater test set

The Cobham AvComm 8800S radio test set now has DMR repeater test capability that enables it to measure the critical transmit parameters of the repeater's physical layer.

Testing of DMR repeaters in digital mode has long been a frustration as the repeater will not transmit without being provided with special signalling from an external device. Until now only the most advanced workshop test sets have had the capability to 'Sync' the repeater.

Option 06 on the 8800S will command the repeater so that it can repeat the pattern received, giving professional radio technicians all the benefits of a rugged, field-portable, battery-operated package and fully functional DMR repeater testing.

Vicom Australia Pty Ltd

www.vicom.com.au

Comms Connect STAND NO 67

Wideband antenna

The LGE-7-27-24-58 antenna has been added to 'The Fez' range from Panorama Antennas. The product features a high-performance wideband LTE-cellular capability covering 698–2700 MHz. It also has a 2.4 and 4.9 to 6 GHz Wi-Fi element as well as an active 26 dB LNA GPS element.

Housed inside a robust, low-profile housing, the unit is also ground plane independent and maintains a high level of performance even when mounted on a nonmetallic surface. Yielding 2 dBi peak gain on its cellular/LTE and Wi-Fi elements, the product is built to provide dependable performance within a small and discreet form factor. Needing only a single hole to mount, it consolidates several antennas inside a single product, making it a true combination antenna.

The unit is supplied with short fly-leads to keep connections simple, while a range of low-loss extension cables of various lengths is also available.

Panorama Antennas Australia

www.panorama-antennas.com

Comms Connect STAND NO 88

Body-worn camera

The Axon Body 2 single-unit on-officer camera features upgraded capabilities such as unlimited HD video, Wi-Fi video offload and security enhancements.

The hardware supports full wireless connectivity for triggering, streaming and integration with a suite of mobile and cloud applications. With feature improvements and updates every 30 days, Axon Body 2 is a scalable, futureproofed video solution for police officers.

Features include: low-light video that records in HD; a battery that lasts for more than 12 h; a pre-event buffer that captures up to 2 min before an event; capable of wireless offload to the cloud; wireless activation that starts the camera with light bar and other sensor activation; a mobile app that streams, tags and replays videos right on a phone with Axon View; optional mute ability to disable audio in the field to support dual-party consent; in-field tagging to mark important points in a video; advanced data encryption.

The unit is built to withstand extreme weather and brutal conditions, and has versatile mounts that keep the camera steady during tough situations.

TASER International / Axon Evidence

evidence.com

Comms Connect STAND NO 82

4G LTE cellular mobile antennas

RF Industries has released the CD7195 and CDQ7195 4G LTE cellular mobile antennas to its 7100 Series, which feature Meander radiating elements.

The Meander circuits are coupled together to deliver good consistency in gain, coverage pattern and bandwidth, allowing the device to operate across all mobile phone networks globally. The CDQ7195 is designed with the Q-Fit system that allows for simple removal of the whip section, while the CD7195 has a fixed, heavy-duty black chrome stainless steel spring, suitable for installations in commercial vehicles, four-wheel drives and trucks.

Both mobile antennas feature a PCB-based collinear design, offering pattern and gain stability, and are suitable for 4G LTE networks with true multiband coverage. The antennas also have high gain across all bands, suitable for fringe and rural applications.

RF Industries Pty Ltd
www.rfi.com.au

Micro-ohmmeter

The Megger DLRO 10X micro-ohmmeter is suitable for technicians and electrical engineers looking to perform low resistance measurements. It is available to rent from TechRentals.

This fully automated unit selects the most suitable test current up to 10 A DC to measure resistance from 0.1 $\mu\Omega$ to 2000 Ω, on one of seven ranges. The lightweight and portable instrument uses a menu system controlled by a two-axis paddle, allowing the user to manually select the maximum test current.

The 10X uses the four terminal resistance method, which shows the true resistance of the item under test. It also automatically applies forward and reverse currents that cancel out any standing voltages across the sample under test. Other features include: auto current reversal cancels standing emfs; protected to 600 V; automatically detects continuity in potential and current connections; multiple operating modes including fully automatic; alphanumeric keypad for entering test notes; user-selectable high and low limits.

TechRentals Pty Ltd
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PUBLIC SAFETY VISION

Jonathan Nally

Motorola Solutions has launched is Next Generation Mobile Intelligence ecosystem.

Motorola Solutions Australia has launched its Next Generation Mobile Intelligence ecosystem, which ties together multiple devices, communications modes and data sources to provide enhanced situational awareness.

At a ceremony to inaugurate the Public Safety Innovation Centre at the company's Melbourne headquarters on 9 November, senior Motorola executives were joined by industry partners, public sector users and the Victorian Innovation Minister to launch the new system.

"It's not just about innovation, it's also about collaboration," Steve Crutchfield, managing director of Motorola Solutions Australia and New Zealand, told the audience.

"Today, we're bringing to life the culmination of a vision that has been underway for some time, and importantly, born here in Australia, and [which] is now part of the global blueprint within the [Motorola Solutions] Chief Technology Office," said Crutchfield.

"This vision is dealing with, in large part, the extreme volumes of data that surround us in our everyday lives, and the changing ways in which we communicate and collaborate. A large part of that is in and around the pool of social media, that surrounds us in our work life and our personal lives as well," he added.

"We call this vision Next Generation Mobile Intelligence (NGMI), which is taking this large volume of data and turning it into… real information or intelligence that is useful for people like first responders out in the market, putting it in the hands of the right users, on the right device for their particular purpose, over the best available network where [the user] is physically located at that point in time."

Prabhakar Rajagopal, the company's VP for Solutions and Services, APAC and the Middle East, has led the development of NGMI.

"I think there is a difference between being a fast adopter and being an actual innovator. I think there is a lot of opportunity in Australia. It's a fertile ground, and that's why we are leading it with the NGMI," said Rajagopal.

Demonstrated vision

Greg Bouwmeester, Motorola Solutions Australia's general manager of business development, led a demonstration that took the form of a simulated hold-up at a local venue. He showed how the NGMI ecosystem — which combines Motorola and third-party solutions — could be used to seamlessly link a CAD system, two 'officers' in the field (one with an iPad, the other with a Samsung smartphone), standard LMR radios, plus Motorola's 'police car of the future' and various other sources of data.

It was really quite impressive. A map showed where each officer or asset was located, updating automatically as they moved. Messages sent to or from one device showed up on all the others, keeping eve-

> AND THAT'S THE KEY HERE, A REALLY GOOD APPLICATION ECOSYSTEM THAT MANAGES THE DEVICE, THAT MANAGES THE DATA STREAMS THAT YOU HAVE.

Left to right: Steve Crutchfield, Managing Director, Motorola Solutions Australia and New Zealand; Victorian Minister for Small Business, Innovation & Trade, Philip Dalidakis; and Paul Steinberg, Motorola Solutions' Chief Technology Officer.

ryone in the loop. Information was pulled from intelligence databases; vision was streamed and still images displayed from the car as well as from security cameras; a floor plan of the building was accessed and sent to the various devices; possible accomplices were spotted in the area using facial recognition technology; a passing 'off-duty police officer' was able to offer support via his authorised mobile device. Social media could be consulted too.

All up, it presented a seemingly very easy-to-use system for quickly assessing and controlling a public safety incident.

It was also apparent — and Bouwmeester pointed this out — that the system could just as easily be used in a variety of private sector environments where safety incidents are a concern, such as mining and transportation.

Motorola Solutions' 'police car of the future' demonstrator.

But the NGMI solution goes even further. Through collaboration with third-party providers such as New Zealand's Wynyard, the overall solution enables users to access and assess data before events occur. For instance, police officers can consult maps that show them historical crime hotspots in their area. But not only that, data analytics enables the system to predict where the next crime might occur, enabling officers to proactively patrol locations of concern.

Power to the frontline

Present at the ceremony was Julian Cross, senior business consultant at Gridstone, an Australian software house that is at the forefront of mobile emergency incident management solutions with multiple significant deployments across a number of emergency services and policing agencies, including the Queensland Police Force.

Critical Comms asked him about the sort of efficiency gains users could expect from the new world of mobile intelligence.

"There are quite a number of studies that are currently being undertaken with Queensland Police, but there's anecdotal evidence in terms of, for example, random drug testing," he said. "Previously, the officers on patrol were able to do somewhere in the region of about seven to 10 per day on paper, and then have to go back [to the police station] and fill it all in.

"They're now recording close to 100 per officer per day. The Queensland Police Force itself is talking about [a saving of] 30 minutes administration time ... per officer per shift. You look at a frontline police force of 7000 and you think about 30 minutes of officer time per shift, [and] you have a massive increase in the opportunity to help people on the ground.

"What our applications give, first and foremost, is situational awareness, and that's where it's being looked at — not only in the frontline policing, but also in areas such as child protection and domestic violence," added Cross.

"And that's the key here — a really good application ecosystem that manages the device, that manages the data streams that you have — whether that be through CAD or whether that be instantaneous from all the resources on the ground.

"But situational awareness is where the real power of mobile technology comes in, because all of a sudden you have not just the officer facing the situation, but all of the officers in the vicinity able to team up, and participate and understand and have [the kind of] insights that just 12 months ago no-one had."

Innovation is the way forward

The Victorian Minister for Small Business, Innovation & Trade, Philip Dalidakis, was on hand to officially open the centre and speak about the technology sector in Victoria.

"There are a lot of people around the country talking 'innovation' but not doing anything about it," he said.

Commenting on innovation in general, and using the federal coalition government's nbn plan as an example to criticise, the Labor minister said that politicians who "want to talk the talk, need to be prepared to walk the walk".

"One of the reasons why I was only too happy to come out here today was to thank all of you in this room for what you're doing, because you're living it; you're absolutely the very breathing embodiment of what we're trying to do and create and foster."

Motorola Solutions' US-based chief technology officer, Paul Steinberg, highlighted the importance of broadband innovation for the future of public safety and enterprise industries.

"It's a critical time for public safety and industry in Australia when constrained resources, costs and growing expectations from stakeholders and customers are adding pressure on performance," Steinberg said.

"Sustained, mobile broadband innovation is the way forward for public safety organisations and businesses to capture the data sources that are growing rapidly all around us — putting it to better use to reach higher levels of safety and productivity.

"That's the challenge that Motorola Solutions and its growing community of technology partners will be collaborating on together at our new Australian Innovation Centre."

Shock rack cases

The SKB 19″ Shock Rack cases are designed to protect and transport valuable and sensitive 19″ rackmounted equipment that must arrive intact and function seamlessly from the moment it is switched on. The cases are suitable for applications such as military, aviation, emergency services and rescue organisations.

Built to meet military standards, the shock racks have an internal frame mounted on adjustable elastomer shock absorbers on all eight corners to control the effects of shock and vibration on all three axes. The sway space around the internal frame provides natural airflow to keep equipment cool.

The product allows easy transportation by way of retractable spring-loaded cushion grip handles and can also be supplied with integrated or removable wheels to make for simple handling and storage.

Switches Plus Components Pty Ltd

www.switchesplus.com.au

Comms Connect STAND NO 142

Long-range digital radio

The Codan Envoy smart radio series is a range of intuitive and reliable long-range digital radios (LRDR) with clear and dependable high-frequency (HF) digital voice and data communications independent of infrastructure.

The product range features Ethernet and USB connectivity, a large high-resolution colour display and multi-language user interface, which enables simple operation and minimises the need for user training.

LRDR represents the evolution of HF long-distance communications from analog based to digital for voice, messaging and data communications. LRDR uses the HF spectrum to provide a voice quality and data transmission experience similar to cellular and digital land mobile communications, while also providing the capability for encryption and all standard HF capabilities, including ALE and Selcall.

The series is simple to install in a vehicle with a space-saving design that enables users to mount the handset and RF unit separately. The company claims the range is the only HF base system with a purpose-built smart desktop console that gives users maximum operational flexibility and full remote control capability of all HF radios on a network.

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Since 2007 Comms Connect Melbourne has helped deliver information to critical communications users and industry that helps them make informed decisions. In 2014 Comms Connect Sydney launched, followed by one-day conferences in Perth, Brisbane and Adelaide.

In 2016, for the first time, Comms Connect Wellington, in association with the Radio Frequency Users Association of New Zealand, joins the line-up, ensuring users and industry across the region have access to some of the very latest technologies and expertise currently available.

We are seeking case studies and technology presentations for inclusion in conference programs throughout 2016 and would like to hear from you if you are interested in sharing your knowledge and expertise with attendees.

First and foremost, we seek New Zealand-focused case studies for Comms Connect Wellington, 14–15 April 2016, Museum of New Zealand Te Papa Tongarewa.

Closing deadline for Comms Connect Wellington — 17 December 2015

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THE NETWORKED NATION

Network consolidation will enable the most cost-effective use of critical network assets, improve consistency and ensure efficiency.

As technology evolves, the community's demand for more efficient and effective services increases. And none more so than the demand for more responsive and economically efficient outcomes from Australia's emergency response agencies.

State and federal governments across Australia, including first responders and public safety authorities, are faced with significant challenges around the capacity, coverage, efficiency and interoperability of their disparate networks.

Consolidation and upgrade of legacy communications networks is needed to reduce the number of operable sites, increase coverage and minimise operational costs.

For the end user, emergency responders, this means better coordination and interconnectivity than ever before, with access to rich, real-time information in and from the field.

State governments across the country are investing in the next generation of mission-critical infrastructure to reduce risk, eliminate unnecessary duplication and improve their communications networks. Earlier this year, NSW Telco Authority began consolidation of its government radio networks, a development echoed by Emergency Management Victoria as it moves to provide broadband data services and a resilient voice and narrowband network for all agencies. It is expected that other Australian states will follow suit, with similar investment plans.

Partnering for success

One of Australia's largest ICT network services companies, Visionstream, is helping to drive this innovation, leading the design and development of some of the country's largest mission-critical and communications networks across a wide range of fixed and wireless technologies.

Visionstream General Manager Communications Rupert Holloway believes consolidation efforts will enable the most cost-effective use of critical network assets, improve consistency and ensure efficiency of approach across the overall program — something that is not possible when individual networks are delivered by different vendors.

"Network consolidation is the next step in the evolution of mission-critical infrastructure. It not only ensures the efficient and cost-effective delivery of services, but more importantly, improves coordination and therefore improves community safety," he said.

"It will involve the coordination of key disciplines to provide an end-to-end turnkey approach, from strategic planning and network architecture, through to construction, configuration and network monitoring and maintenance."

Most recently, Visionstream supported Victoria's Emergency Services Telecommunications Authority (ESTA) under a PPP arrangement to deliver its market-leading Emergency Alerting System (EAS). The mission-critical messaging system provides on average over 80,000 pager messages during a busy month to 40,000 emergency services members of the Victorian CFA, SES and Ambulance services.

Originally constructed by Visionstream, the EAS is owned by the state of Victoria and comprises 224 transceiver sites providing pager coverage across over 98% of the state. Visionstream continues to manage the network and operates a 24/7, every-day-of-the-year Network Operations Centre (NOC) and call centre which monitors the network and sends paging messages.

"EAS was a flagship project for Visionstream and for Victoria," said Holloway.

"The scale of delivery and unique operational requirements required strategic collaboration with both ESTA and our network of project partners, providing significant project agility, to develop a state-of-the-art, whole-of-life solution," he added.

"The result has been a great outcome for the Victorian CFA, SES and Ambulance services, and the Victorian community as a whole, and we look forward to delivering these successes across other states."

Visionstream's Peter Humphreys, Executive Manager for Intelligent Infrastructure Networks, will speak at Comms Connect Melbourne at noon on 3 December, on the topic of the 'Challenges in rationalising government radio networks'. The company will also be taking part in the exhibition, on Stand 92.

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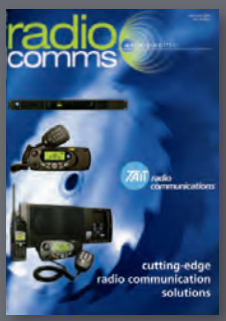
Backhaul

Backhaul takes you on a trip down memory lane as we look at what was happening in the critical communications field 25 and 10 years ago.

25 YEARS AGO. The cover of the December 1990/January 1991 issue of *What's New in Radio Communications* presented the Midland FM portable radio range from Exicom. The different units came with between 16 and 99 channels, some crystal controlled and others programmable. Feature articles in the issue included a summary of mobile radio signalling (CTCSS, ANI, Selcall, CAD) by John Barber of Signalling Technology; Timothy Burke, from Andrew Corporation, discussing the ins and outs of cellular coverage in building and tunnels; and Ron Bertrand bringing us up to date with intermodulation interference issues. It's really interesting to flick through the pages of a 25-year-old magazine, spotting company names that have disappeared (eg, OTC) and others that are still around (eg, Barrett Communications, Rohde & Schwarz, Emona Instruments).

10 YEARS AGO. The cover of the November/December 2005 issue of *Radio Comms Asia-Pacific* featured the Tait TM8100 and TM8200 radios, TB8100 and TB7100 base stations and 9000-series P25 radios. Inside, Peter Schlusser from Infostream presented the merits of paging systems; we had a case study on a high-bandwidth radio link between a company's two separated offices in Brisbane; Ron Gatzke from Maxim Integrated Products gave a primer on RF modulation/demodulation; and we had another case study on providing wireless internet services aboard UK rail fleets. Martin Cahill also went on the attack against Ni-Cad batteries, calling for them to be banned for environmental reasons. We also had an update on CSIRO research into more efficient spectrum usage, out of its then ICT Centre in Marsfield, Sydney.



Spectrum

The best strategy – public or private?

Mobility can boost productivity, employee satisfaction and automation, but when the end-goal is wireless connectivity, what's the smartest way to deploy the capability?

The combination of applications and telecommunications networks is reshaping and in some cases completely disrupting all manner of everyday life through real-time and location-based services, enhancing everything from taxi, tram and bus schedules, to parcel delivery tracking and OHS. These capabilities apply also to agricultural businesses, resources and transport companies, and utilities and government agencies.

As well as employee satisfaction and safety, the coupling of applications and the mobile network is enabling a sharper response by enterprise and government through the use of private voice, voice and data, or data only private networks.

But mobility can do so much more as radio, wireless backhaul and LTE converge to provide enterprise and government a third option to improve outcomes beyond the use of public networks or class spectrum licences — privately licensed spectrum.

Traditionally, private networks in metro, regional and rural areas in Australia have relied mostly on public networks, or unlicensed spectrum for data services, and public or licensed spectrum for narrowband voice services. As users gain experience of value extraction and cost control approaches, initial designs and networks may be modified to achieve the actual service and cost levels demanded by the business case. 'Second time' or experienced customers better understand their business drivers and in many cases can confidently consider a private solution.

Companies that run applications on public networks are increasingly seeing the value of private networks that deliver applications on an exclusive, licensed-spectrum basis.

Fundamentally, it's a matter of cost and control — a customer may not have full public network coverage of their field work area, so some other strategy is required to meet the business goal, and that's generally a private network since only it can align outcome and cost. Or, existing network approaches may be cost prohibitive at the bandwidth or transaction rates now required; so again, some other strategy is required, generally a private network aligned to business need.

Finally, if shared access wireless connectivity has been deployed, it may become evident that the shared network is a 'best efforts, when available' type of resource rather than enterprise or mission-critical grade, again trending towards control of destiny through a private network.

Frictionless information exchange between the network and remote devices lies at the heart of ambitions for the emerging mobility standard 5G, which will eventually improve mobile network operators' capacity to support mobility and commercial IoT and M2M deployments. 5G will mark a crucial step in the mobile journey. The catch? It won't be commercially available until at least 2020.

In the meantime, organisations can choose between public and shared networks that meet part of tomorrow's promise or a private network over which they have more control. Investment in the latter means costs can be allocated to the specific business unit, giving the enterprise control over its performance, efficiency and effectiveness, as well as transparency of any trade-offs, and delivering unparalleled accountability.

David Cooke is Group Manager, Telecommunications, at NEC Australia. NEC will be exhibiting at Comms Connect Melbourne in December on stand 71.

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