EMERGENCY SERVICES: ON THE MOVE

A ROUNDTABLE DISCUSSION FEATURING EXPERTS FROM AIRWAVE SOLUTIONS, MOTOROLA SOLUTIONS, TAIT COMMUNICATIONS, AND TELSTRA.

Radio providers understand the world of mission-critical voice communications and how that has to be set on not compromising the mission of the customer.

***Rob Hockings,** Public Safety Specialist, Tait Communications*

From the Queensland floods to the Boston Marathon bombings and myriad other large-scale incidents, the role of emergency services organisations (ESOs) continues its primacy around the globe.

Time is seeing ESOs continue their technological reinvention, with increasingly pervasive wireless broadband, spatial information and mobile-computing technologies providing tantalising new opportunities for improving response speed and effectiveness. Yet there are challenges, too, as ongoing spectrum disputes, interoperability efforts and the pressure of everyday response continue to shape the development of the industry.

This issue, we bring together four industry experts who are involved with delivering and supporting a range of emergency systems across Australia. These include Malcolm Keys, CEO of Airwave Solutions; Paul Thompson, general manager – government and public safety with Motorola Solutions; Rob Hockings, public safety specialist with Tait Communications; Alex Stefan, national general manager for public safety and security, Telstra.

***GTR:** How are increasingly powerful mobile devices, and bring your own device (BYOD) programs, changing emergency-services strategies?*

Hockings: They have been a mobile workforce for quite a long time; it's just the nature of the business. But they are really looking at the mobile workforce now, probably more in the last 12 months than we've seen previously. They're quickly realising that in order to achieve this mobility they've got to provide a richness in the field that could possibly be richer than what they have in the office.

There's more rigour around the process and admin, and how you can get information to the field in a timely manner rather than forcing users back to their home environment [to sync]. Getting that information transaction completed quickly and efficiently means those resources are ready to deploy to another response sooner.

Thompson: We understand that BYOD is a very attractive to a CIO as a cost-saving initiative, but does the device have the integrity when it is potentially being exposed to harsh environments, enterprise grade applications and day to day duty?

Our view is that consumer-type devices just aren't going to cut it; they're potentially very dangerous in the wrong hands. If you think about using an iPhone in the field, just forget momentarily about the lack of ruggedness, reliability, call setup time, and those sorts of things that officers value from a safety point of view.

Once you start taking data – whether it be capturing images, capturing video or recording conversations – this stuff needs to be evidentiary grade in a policing situation and has to be able to be downloaded to a central and safe repository. For instance, we just developed a TETRA radio with a camera in it. It's timestamped, tamper proof, and it's all about capture security and integrity of evidence that's able to be used in court.

I think the public would be concerned about where that information lies, which raises questions about where you store that information on the network. Do you store it in a device or in a simple repository where it can be controlled and managed?

***GTR:** What considerations must be taken to ensure new solutions are effective for ESO personnel?*

Hockings: You've got to give them what's relevant. You can send a whole lot of information to them, but you run the risk of sending too much and leaving users to figure out what's relevant. You have to apply a business rule or operational context to filter information to make it relevant. The user interface is also really important because it's got to fit their behavioural traits, fit how they've been trained, and fit how they react.

Off-the-shelf is definitely extending to the mobile domain – but the challenge is for vendors to get on board and demonstrate how we've aligned with the journey. Smart devices are normal in the domestic world, but they're not as common in the public safety environment. There are training implications, and if solutions are more customised, away from 'normal', they need more training. The question being asked is less and less around the technology they use, and more on its fit and value. It's all about outcomes.

***GTR:** Custom emergency systems have historically been complex and difficult to manage. How can developers hope to keep adding so many new capabilities and devices to the ecosystem?*

Hockings: A whole lot of technology has to be brought together to meet the outcomes, knowing those outcomes are moving targets. It's not just about a single piece of connectivity; it's about providing connectivity through a number of parts. You have to look at the connectivity layer, data layer, and the data integration layer – and that means you have to apply business rules or interpretation.

The challenge for Motorola and other vendors will be getting those standards lined up to be able to accommodate the features which are specific to public safety that the Emergency Services Agencies will need.

Paul Thompson, *General Manager – Government and Public Safety, Motorola Solutions*

It's almost like the [seven-layer] OSI (Open Systems Interconnection) layers in what you see and what these layers look like. They are looking at trying to reduce the amount of customisation with a common off-the-shelf approach, knowing they're going to have to do more and more with these things. They are being very deliberate in the specific conversations they're having, and it's a real balancing act.

Stefan: One of the great outcomes we've seen this financial year has been the implementation of the Emergency Alert 2 system – Phase 2 by Telstra. Emergency Alert allows the emergency services to send alerts to citizens to warn them of potential incidents. The new service is now predicated on the location of the mobile phone rather than the registered account address, which has enhanced it quite significantly. The service will be available on the other carrier networks later this year.

GTR: *Social media has reshaped the reach and interactivity of emergency-services organisations. How can they best manage this change?*

Stefan: One of the things that's been really interesting is the ability of the community to communicate with ESOs themselves through social media. Through mobile phone, Facebook, Twitter, or whatever social-media engine you use, you can provide contemporary updates to the ESOs themselves. It's an invaluable tool when people are looking for a single source of truth during these events. Community engagement is increasing as a consequence of all these wireless technologies, and I would think can only continue to grow.

Hockings: If you look at the recent floods in Queensland and the way agencies used social media to inform the public, they've been extremely successful. The information was relevant, it got out there quickly, and emergency services were able to use that tool to affect public behaviour. The public were informed, and that made a huge difference on the response.

But if you look at social media being used as an addition to triple-zero type call information coming from the public, you've got to come from the other way. You have this incredible amount of information coming in and have to sort out what's real, what's not, what's duplicated, and what's additional. And I think that's the next challenge. It will be very interesting to see the journey they take, and how vendors can play a role to do something for agencies that allows them to achieve this outcome.

GTR: *With all this talk about new technologies, the old standbys are still important. How are voice radio solutions evolving, and how will they tie in with the other parts of the technology ecosystem?*

Hockings: Radio providers understand the world of mission-critical voice communications and how that has to be set on not compromising the mission of the customer. At the same time, these other technologies are becoming more and more important. So what we're doing at Tait in terms of our solution offerings is unifying the two worlds – the mission-critical communications and business-efficiency communications – into unified critical communications.

This is what customers want: they're not going to look at those two things differently, and not going to look at the expectations around networks like LTE much differently than they're going to do around their expectation that it 'just works'.

Thompson: Today, it's still about the P.25 and mission-critical voice that's been in the market for some time. But we're starting to see those emerging applications, like automobile license plate recognition, the ability to interrogate databases, and collaboration applications giving officers in the field situational awareness and better background data.

The one thing that sits beside that is the advent of video, which is going prime time. It really is impressive in terms of what's being done there technology-wise, and there's no question the analytical applications behind that are evolving every quarter, to look at things like unattended baggage at airports, congregation of people around ATMs and in public spaces, and so on.

That's the tsunami that is going to come across this sector, and it's going to be not unlike the change in the consumer and enterprise world from circuit-switched packets to IP. We don't see voice going away for a long time because it's a lifeline, it's instantaneous, it's resilient and it protects officer safety. But P.25 and LTE as a public safety-grade service, is where we're going to evolve to.

GTR: *Assignment of 4G radio spectrum has been a divisive issue, particularly with the recent 700MHz and 2.5GHz spectrum auctions. How will this affect delivery of next-generation emergency services?*

Keys: This is an area that we've been tracking for a number of years, and it's a major project to free up that spectrum. We've been strong advocates

for PPDR [Public Protection and Disaster Relief] spectrum to be allocated, but we also think that in terms of the 700/800MHz debate, ESOs have been given a great opportunity in the 800MHz band.

That band has fantastic propagation purposes for voice and data. I think it will be used only for data in the short term – LTE based data services for mission critical applications. The only negative is that ESOs have put forward an argument that they need more than the 5MHz+5MHz they've been given. It would be prudent for ACMA to reserve another 5% or so on the basis that the first allocation is taken up, and they should be planning for some additional frequencies, particularly in metro areas where demand will be highest.

I recently took a delegation of manufacturers to Canberra to discuss their support for the 800MHz band, and to make sure ACMA were comfortable that manufacturers would actually support that spectrum band. We had five or six vendors that said all they need is clarity about what's going on; the product design doesn't change with the spectrum band, but they just need 12 to 18 months' lead time.

Thompson: The auction results may become another dimension to the States' dialogues with the Federal Government about dedicated emergency services spectrum. This leaves the opportunities for the States to talk more realistically about what they need, in lieu of the 5+5 that's been nominated. When some of the scarcity is removed, there's a legitimate opportunity for states to justify a legitimate case for accessing some of that spectrum for emergency management.

The only two things we think about 700MHz and 800MHz are that Australia doesn't want to find itself in a non commercially viable spectrum that others in the rest of the world are not in. It's about making sure that we get something that's common with at least our territory, the region and the rest of the world. The second part is that we need to be careful of what bands they're in, in terms of the technical issue of interference. There's the bandwidth challenge, of course, but the much greater challenge will be the inter-agency, public-to-private agreements that can be set up as video becomes more pervasive.

Stefan: The availability of new digital dividend spectrum is only going to enhance communications capabilities in coming years. Telstra has advocated a roadmap in relation to mobile broadband for the emergency services, and we've seen wonderful work being done by the ESOs, including ambulance officers being able to get real-time data on patient information, or fire services using it to be able to stream video from the fire front back to operational centres. It's really a very pervasive technology and I can only see it growing.

Fortuitously, the technology these days lends itself to it: we are already implementing mobile broadband using the 850MHz domain and 1800MHz range, and have announced that we'll be expanding our LTE capabilities with the 900MHz range. We have also announced that we will undertaking spectrum augmentation utilising 900MHz and 1800Mhz spectrum. With the acquisition of the 700MHz spectrum at auction, at some point it will also be integrated with the Next-G network.

Hockings: If you look at the network itself, it's about coverage, capability, and connectivity. I think sometimes we get focused on an individual thing, and have to look at what makes a good network. It's more than just bandwidth – it's in the network's design, and in defining its deliverables.

Carriers and technology vendors are providing a diversity of connectivity and I think it's now up to the individual agencies and vendors to work out what this connectivity looks like, and how it's going to fit customers' public safety aspirations. Public Safety agencies want to talk more and more about business outcomes, and less and less about technological detail. And they don't need to think about MHz and lower level stuff as much; they are able to be more prescriptive in terms of the business, and are choosing to be less prescriptive in terms of the technology.

GTR: *When emergencies happen, the first thing most people do these days is to reach for their mobiles. How will ESOs manage demand peaks in major incidents, and is this justification for allotments in the 700MHz or 800MHz bands?*

Stefan: Telstra has implemented LTE, which has provided additional capacity – but we want to ensure we can continue to meet customer demand. In relation to the ESOs, we're recommending that the most efficient way would be to collocate the PPDR spectrum on the Next-G network and then augment it with commercial spectrum during major events utilising spectrum augmentation techniques. When we have a major event, and if there is congestion in that dedicated lane (PPDR

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Alex Stefan, *National General Manager, Public Safety and Security, Telstra*

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Malcolm Keys, *CEO, Airwave Solutions*

spectrum) for ESOs, it could be augmented by commercial spectrum holdings to ensure ESOs aren't limited with bandwidth during a major incident.

Another thing we're looking to do by the end of the year is trial HetNets [heterogeneous networks] to provide a specific capability in high-density areas like football stadiums, where you might have 50,000 people video-streaming their experiences. We want to be able to position [coverage] at different parts of the stadium, to carry that information through those particular cells.

Thompson: Some of this discussion has been driven by the advent of smart phones in the consumer space, and an understanding of the capabilities of applications and more IT-like features. But that's only going to get enabled with the availability of LTE broadband. And, because of the nature of the public safety agencies, they really need to see that as possibly not an enterprise grade, but as public safety mobile broadband grade.

Keys: There has been a very strong argument by commercial carriers that ESOs use a carrier grade service. There's an argument for roaming [to improve coverage], but they're really not emergency services-grade networks for a variety of reasons, mainly to do with the level of resilience in the network. They tend to fall over and get congested in high usage – and ESOs can't use priority access to take away capacity.

We saw this during the London bombings: the Airwave network continued to operate without any problem while the ESO response went into full swing. It was well utilised while the public network was heavily congested, and the Coroner's report spoke very strongly of the need to have these commercial networks operating for the public good, to keep the panic level down.

These are good reasons these networks need to be separated. Having said that, in remote and rural networks, if there are 4G networks out there we will design the products to roam between PPDR and carrier networks. It's just not going to be cost effective to build out to the same level the carriers can, and it's better to have the carrier grade service than nothing at all.

GTR: *How well do you feel efforts to standardise operating frequencies and systems between ESOs in different have progressed?*

Keys: There's a strong level of planning going on at the federal and state level, and with the industry, trying to learn from past mistakes about allowing agencies to go off and use the spectrum. I think around 2015 the planning agreement will be reached around overall funding models and the allocation of spectrum, how it's managed, and how it will be built – hopefully starting in metro areas and spreading out to regional areas.

Because each state has a large number of facilities they can use to build the network, they will be able to leverage a large amount of infrastructure to make it a fairly low cost implementation. It's important that you upgrade to the high-speed, best network – but it's a long term investment. I'd say LTE meets a lot of that requirement, and even P.25 and TETRA – the common standards we use today – will themselves be underpinned by LTE technology.

So, within a decade, the new networks for public safety will be on an LTE based platform – not the commercial carrier version, but a mission-critical version designed with emergency-services protocols built in – mission-critical functionality like pre-emptive teardown of calls to make higher-priority calls; push to talk; and other functionality the commercial networks don't support.

Thompson: Standards can be very important but they may also be a lagging indicator. When you consider that for many of the mobility vendors this is about an economic argument, and many vendors are focused on the much larger markets for consumer networks and handsets, therefore those standards are the ones that are predominant and a high priority.

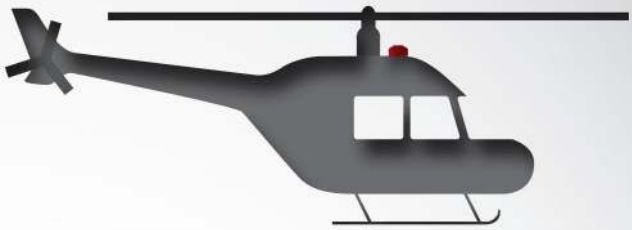
The challenge for Motorola and other vendors will be getting those standards lined up to be able to accommodate the features which are specific to public safety that the Emergency Services Agencies will need. For example, in the consumer world download speed is of much less significance than upload. But in public safety emergency management, it's going to be your upload capacity and speeds that become important, because you're trying to get information from an incident back to the command centre.

That's why today we talk about software defined networks, which offers the ability to have technologies that are predominantly around policy and control capabilities that are going to be needed by public safety agencies.

GTR: *How is the commoditisation of geospatial technology affecting emergency-services capabilities?*

Hockings: It's very much fitting into the situational management part of the equation, and the safety aspect as well. Consider the difference between data and information: geospatial takes data from the field, and represents it as a visual representation for a person to make a decision, undertake an action, and then in real time to see the outcome.

I'm seeing it as becoming more and more important now in its ability to turn data into



information. Agencies are applying response and risk rules over the top, and conversations with customers are very much around those sorts of metrics. A lot of agencies have these geospatial systems in place. They're just taking them to the next step, asking questions internally and coming back to the vendors saying 'this is what we need'. They're defining the outcome.

Keys: I really see a confluence of the data streams that is driving some real operational benefits. Mapping tools, at a consumer level, are basically free and have opened the door. As we deliver real-time GPS location data, vehicle and personnel location into the same mixup of geospatial data and mapping tools, suddenly your operational and situational awareness has increased.

You can visualise them with your geospatial data and your mapping data to create a whole range of new possibilities of understanding what's going on in the field. Suddenly, going from never being able to get any information from government about anything, government departments are moving to sharing everything through standardised interfaces. The next challenge is going to be to get that data into the hands of the people in the field, so their situational awareness is improved.

GTR: *How is the legitimisation of cloud computing affecting emergency-services planning?*

Hockings: We're seeing some quite deliberate moves in public safety in this area. Governments and organisations are now questioning whether they need to own their data storage and/or applications or whether they can have others own it. They're working through the risks, which are becoming seemingly complex – but they're going from the top down in these sorts of analyses, and that's a great approach.

Stefan: My observation is that ESOs have been using cloud for an extended period of time. Many phone and video services are hosted in the cloud. Emergency Alert is one of the best examples we have of an application that operates in a cloud based environment and delivers national, ubiquitous services.

One would hope one would never need to utilise the emergency alert services, but when you do have a particular flood, fire or other event, it can scale quite dramatically. As an illustration, 7 million messages were sent during the three weeks of the Queensland floods. We've also recently designed the Telstra Spatial Video Solutions services capability for the ESOs in relation to being able to host video in a cloud-based environment, which came out of recent bush fire experiences.

GTR: *What will be the next big thing for technology in Australia's ESOs?*

Stefan: One of the major events occurring in Australia is the G20 summit in Brisbane, which will obviously be an area of major endeavour for a number of parties. Communications will play a major role through that event, and there will be some wonderful opportunities to see how various technologies can assist in those sorts of events.

Another significant innovation has been creation of a hub, interfacing traditional radio with mobile broadband and traditional telephony services. To be able to speak to someone at the end of a smartphone with a radio, and to create the integration between these various networks, is important. All these opportunities are about obtaining common operating pictures within the emergency services – and unified communications, be it through video or IP telephony, is still a mainstay that is still evolving in ESOs.

Keys: The pace of change in IT is so rapid, but I have seen in the last five years a really rapid increase from a slow process, analogue, to digital and IP. That enabling benefit of IP is really starting to kick into the thinking of emergency-services networks, and they're on the cusp of really significant productivity improvement based on mission critical areas, and voice and data services, and the kind of devices we've been talking about – and the demand the users are now creating.

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CRITICAL COMMUNICATIONS
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