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BRITISH APCO JOURNAL

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Volume 19 Issue No 4 • November 2013 • £3.50


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Front cover artwork by www.mattmurphy illustration.com.

NEWS

FEATURES

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Printed in the UK by Latimer Trend & Co, Plymouth, Devon.

Published by **Hemming Information Services** 32 Vauxhall Bridge Road, London SW1V 2SS

BRITISH APCO
Knowledge Exchange for Public Safety Communications

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British APCO is where active and advising members of our public safety community exchange and advise on all critical communications subjects. British APCO participates strongly in the Global Alliance of APCO Interational.
British APCO's aims include solving realtime critical communications problems, participating in research programmes (eg EU projects), showcasing technologies, and lobbying on issues such as spectrum and harmonisation.
British APCO holds an annual exhibition and development event, many regional events as well as training sessions, and is respected as the UK's (and Europe's) leading – and only – forum of knowledge exchange and transfer specific to communications in public safety.
To find out more details on how to contribute and draw from of this vibrant community, by becoming a member,
contact Tracey Langmaid, Tel: 01522 548325, admin.manager@bapco.org.uk
For more information visit www.bapco.org.uk

British APCO: President's address

Sue Lampard, President

Since the last Journal life has been very busy. Within our four main areas of focus (ESMCP, MAIT, NG999 and Public Safety Spectrum) there is much activity, although sometimes not always appearing to be entirely joined up. Whilst each is, quite rightly, a separate programme of work, in my view they are all interdependent in terms of delivering future seamless public service.

The journey of contact made by a member of the public into any of the public safety agencies (whether an emergency or not) needs to begin with access to smart technology – enhanced location services, video and data streaming, social media, telematics and so on. For emergency contact, the Government needs to recognise the urgency for an NG999 programme – and start to take positive steps to deliver it. In terms of non-emergency contact, there are already many great examples (especially within local authorities), but they are ad hoc and generally limited to single organisations. Linking to the MAIT work programme would begin to deliver some agreed standards through which data is received into the public safety services.

The next part of the journey often requires interaction between agencies. The ability for electronic information exchange between agencies is not only sensible, but will significantly reduce cost and improve efficiency in years to come. The MAIT programme will ultimately deliver this, but there are many challenges to achieving true interoperability in this area.

Contact out to, and between, staff on the ground will be delivered through the Emergency Services Network which is currently being developed and procured by the ESMCP team. Inclusion of enhanced data services within the requirements should enable information from the customer to transfer seamlessly through to the ground – the need for a link with NG999 and MAIT is therefore clear.

Finally, contact back out to the customer or the wider public is a critical part of how our public safety services work. Again, there are many very good schemes for updating customers and 'warning and informing' for wider information. In terms of the seamless technology and customer journey, I've yet to see much evidence that any of this is linked to the other programmes.

Perhaps somewhere there is clear vision and a plan to deliver such seamless service and technology for our public safety sector? If anyone is aware of the existence of either – and who might be driving it – please let me know! If not, I would ask that in your own areas of work, you do your bit to work towards a bigger and longer term picture through involvement with some of these programmes, so that we don't continue to reinvent wheels and spend unnecessary money.

Rant over, I hope those who came to our Autumn event in Windsor found it worthwhile, and we look forward to seeing everyone in Manchester 2014.

Awards to recognise public safety innovation

To recognise the three significant areas of B-APCO membership we are launching three new awards for 2014. The three key groups will be operational staff, ICT colleagues (who support operational delivery) and the commercial sector (who provide much of the innovation). We've designed the three awards to be presented at a special ceremony and we're looking for sponsors and individuals/teams to be nominated for the awards. Each award will be presented with a certificate and small memento to recognise the achievement. If you'd like to be the first sponsor of one of the British APCO awards please get in touch. The three awards are set out here.

If you know a worthy individual or team please nominate them. Details will be outlined on our website www.bapco.org.uk (closing date is Friday 24 January 2014). A panel of representatives from our operational, ICT and commercial members will scrutinise the entries, and winners will be informed prior to the ceremony, dates to be confirmed.

Operational Service Delivery: an individual/team within a public safety organisation that has taken innovative steps in the use of communications technology to enhance the operational public safety environment.

ICT Support: an individual/team within a public safety organisation that has made significant contribution or innovation in the introduction or use of technology to enhance the delivery of public safety communications.

Commercial Sector: this award will recognise an individual, team or company which has made a significant contribution to enhancing public safety communications. This will include areas of technology that support voice, data, resource/demand management, GIS or any other appropriate area that supports the work operational communications. This can include environments from call handling through control rooms, to ground operations and associated command.

Ofcom consultation published: Spectrum management strategy

On 2 October Ofcom published consultation document: *Spectrum management strategy: Ofcom's approach to and priorities for spectrum management over the next 10 years*.

The document identifies that a number of important trends that could have a significant impact on spectrum use are emerging, including mobile broadband growth, the emergence of new uses such as machine-to-machine (M2M) communications and increasingly sophisticated techniques for sharing spectrum.

The consultation includes a work programme in support of its proposed priority areas. This includes supporting Government in considering future emergency services communications needs, and representing UK interests in international spectrum PPDR spectrum harmonisation negotiations.

It points out a recent study undertaken for Government indicated that spectrum contributes over £50bn to the economy each year.

The document's findings are envisaged to play an important role in Ofcom's contribution to the Government's plans to create an overarching UK Spectrum Strategy, as outlined in the *Connectivity, Content and Consumers* paper. Government expects this strategy to be published in early 2014.

The consultation acknowledges that emergency services in the UK, as elsewhere in the world, are currently considering what they will require from their next generation of communications technologies.

'In the UK the existing contractual arrangements to deliver critical voice applications for the emergency service are coming to an end between 2016 and 2020. As a result, the UK is considering the future provision of both voice and broadband ES applications. Decisions on whether and how emergency services will require changes to the wireless communications services they use is a matter for Government, and we note the ongoing activities of the emergency services Mobile Communications Programme to address the future communications requirements of mainland UK ES. As Government progresses with this work, we anticipate that our advice may be required, particularly in matters that relate specifically to spectrum availability and the potential for network sharing,' says the document.

To comment on the consultation, visit http://stakeholders.ofcom.org.uk/binaries/consultations/spectrum-management-strategy/summary/spectrum_management_strategy.pdf

Tough mobile rack

BVM Mobile has developed the VRS-100, a low power 1U 19-inch rack mounted server/workstation platform, designed primarily for use in emergency services' vehicles as a mobile control room server or as a platform for a mobile first-responder incident centre. The vehicle-optimised 250W PSU operates from 9-30VDC and draws less than 1.5mA on standby, allowing it to be continuously powered-on. Control is by ignition or main system switch.

MDT award for telent

Warwickshire and Northamptonshire County Councils have jointly awarded local company telent Technology Services, a contract to supply, install and provide maintenance services for replacement Mobile Data Terminals (MDTs).

The upgrade of these systems is part of Warwickshire's Fire and Rescue Service Control Programme to improve fire control provision and resilience.

A partnership with Northamptonshire County Council, with whom it is purchasing the MDTs, is an integral part of the drive to share resources, boost resilience and save money. Cllr Les Caborn, portfolio holder for community protection, said: 'This is one of the projects we are undertaking as part of our partnership with Northamptonshire. It will enable both authorities to have a greater level of resilience and greater access to information about the incidents they are attending.'

Highways Agency reaps the benefits of fewer voice messages

Airwave has worked with the Highways Agency to implement a programme that makes greater use of the capabilities associated with the Airwave TETRA radio terminals used by the organisation.

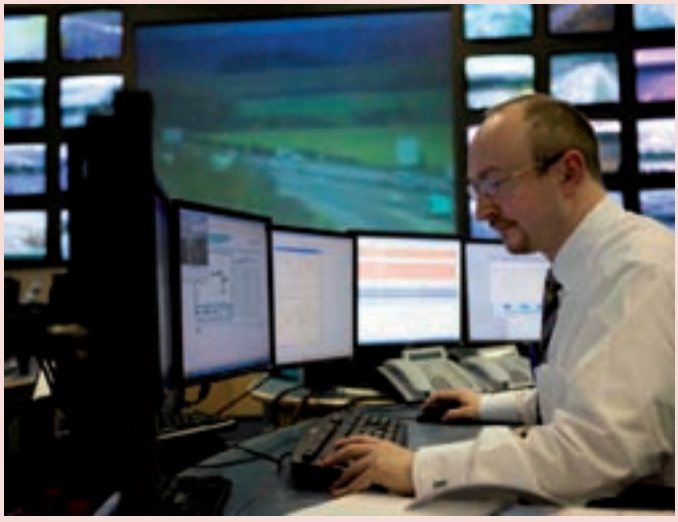
Highways Agency has replaced a number of the voice messages previously used with data transmissions that carry the same message – a more effective, accurate and economical way.

According to Al Edwards, Highways Agency Traffic Technology: 'Traffic officers traditionally generate a large volume of voice traffic. We have used the Airwave Network since 2004 – it is an integral part of our communications. By scrutinising the information relating to voice messages, we can now focus on making efficient and economical use of the features and functionality available to users.'

Making greater use of the functionality of the TETRA radio terminals includes the introduction of non-urgent messages sent via the short data service in much the same way as a text message is passed to a mobile phone.

'These messages relate to basic information about routine incidents to which patrols are deployed, and have proven invaluable in saving time and improving the information flow between the control room and on-road resources,' adds Al.

The Highways Agency will also gradually replace spoken updates on a patrol's status (such as 'on patrol' and 'arrived at scene') with a 'status code' message delivered by data.



AFFORDABLE ANPR FOR ALL

CIVICA and TETRAtab have announced a strategic partnership to deliver affordable ANPR on demountable rugged, multi-purpose tablet computers.
According to Civica and Tetratab, the ability to provide simple ANPR facilities to all general patrol vehicles is now a practical and affordable reality.
The new system is not designed to replace full ANPR multi-camera systems on specialist ANPR patrol units. Instead, it is designed specifically for more routine patrol units – where the primary function is not to deliver ANPR patrolling. The system is designed to provide occasional 'proactive' HITS, but mainly an ability to constantly gather ANPR intelligence information throughout a routine beat patrol.

Correction

'Lynx to deliver Ka on your back', Volume 19, Issue 3, September 2013, incorrectly displayed a caption and image. The correct description should have read: 'Avanti Communications Ka-Band satellite HYLAS 1.'

Community Resilience – new Exec

David Cloake has been appointed Chief Executive Officer of Community Resilience UK, succeeding founder George Cook, who will take on the new honorary role of President.
A former Emergency Planner of the Year, Cloake, 43, has been with CR since November 2012 as their Chief Operating Officer, after leaving Kent County Council as Head of Emergency Planning. He is also a former head of emergency planning at the London Borough of Southwark, and is currently Finance Director for the Emergency Planning Society.
As a not-for-profit social enterprise, CR is dedicated to helping people and communities prepare for, and recover from major emergencies. The company is also partnered with Business in the Community (BITC), one of HRH Prince Charles's business-led charities, and is an active member of its Business Emergency Recovery Group (BERG).

ECHRC's new WAN

The East Coast & Hertfordshire Control Room Consortium (ECHCRC) – a group of four fire and rescue (FRSs) services from Hertfordshire , Humberside, Lincolnshire and Norfolk – has selected Updata Infrastructure (Updata), a specialist managed service provider for the public sector, to design and manage a new shared Wide Area Network (WAN), connecting the Consortium's emergency control rooms. The WAN will be built to PSN accredited standards and will enable far greater asset utilisation and operational efficiency, help increase community safety and lay the foundations for wider shared services amongst the group and with their respective Local Authorities. Updata will also provide perimeter security, remote access and application security services to deliver a secure data communication framework between each of the four control rooms.
The contract is worth £1.2m over five years.
Helen Dowse, Programme Manager for the East Coast & Hertfordshire Control Room Consortium, commented: 'Designing our own collaborative solution based on proven sustainable technologies ensures it is tailored to meet our joint and individual needs and thus will mitigate many risks and reduce costs. The solution design will provide an ICT roadmap to satisfy future demands by conjoining the control room requirements with the wider business needs of the FRSs.'

NEWS IN BRIEF

Guernsey Fire and Rescue has gone live with 3tc's Guardian Command solution. Tim Falla, Guernsey Fire and Rescue Training Manager, explained: 'Guernsey Fire and Rescue Service needed to maximise efficiency and resilience for delivery of command and control services; 3tc Software's Guardian Command mobilising system provides both. We needed a control room solution that would integrate easily across our existing systems and 3tc Software has the right skills and experience to deliver. We are pleased to continue this relationship with them.' 3tc is also currently working with Durham and Darlington Fire and Rescue Services to integrate Guardian Command into their control rooms.

MDNX has announced that Nottinghamshire Fire and Rescue Service (NFRS) will be using MDNX's services to replace their existing Wide Area Network (WAN) requirements. During the three-year agreement, worth over £400,000, MDNX will replace NFRS's existing WAN with a fully Public Services Network-compliant solution that will not only enable NFRS to meet its current and future requirements, but will also provide a solid and flexible foundation to accommodate the integration of broader network based services such as Voice over IP and a platform for unified communications. The primary objective for NFRS was to ensure a smooth transition from an old legacy network before its impending withdrawal, whilst improving speeds for as many sites as possible, particularly upstream for those currently using ADSL. It was essential that provision to replace the existing ADSL and ATM connections was in place before the end of October 2013.

Secure Android tablet for government

Becrypt and Getac are launching the first secure Android 4.1 tablet solution suitable for defence and government markets.
This follows an announcement of a new technology partnership between the two companies to develop future-proof systems for industries where security is critical. The fully integrated solution made its debut at this year's defence and security exhibition, DSEI, in London. The Getac Z710 7" Android 4.1 rugged tablet is aimed at sectors that require a fully portable device. It weighs just 800g and has a battery that gives more than 10 hours of operational time. It includes a 1D/2D barcode reader that enables rapid data capture.

Requirements for assured mission critical voice and future harmonised spectrum for UK public safety

A high-level summary for public safety professionals, by B-APCO Executive Director Tony Antoniou.

The UK public safety sector needs to operate on a reliable communications platform for its voice and data services. We are at a pivotal and critical point with plans to replace the national TETRA system. It is imperative that colleagues in the public safety sector understand what is required – and the risks if these requirements are not delivered. The requirements depend on available spectrum, especially when normal forms of communication become disabled or ineffective.

The British APCO '4C s' model summarises what must be provided for public safety comms to function effectively. Our position is that there are two fundamental requirements:

1. Assured mission critical voice requirements inclusion in the Emergency Services Network Platform being developed by the Emergency Services Mobile Communications Programme (ESMCP).

2. Provision of identified spectrum for public safety harmonisation within the 700MHz band, including Ofcom representation for this at the World Radio Conference in 2015.

Spectrum requirements – background

Prior to describing the background and position specifically relating to mission critical voice and future spectrum harmonisation, it is imperative to understand both the requirements in terms of public safety needs, and (later) British APCO's independent position as the unique association representing communications issues for the public safety community within the UK.

Assured mission critical voice

British APCO's position is focused solely upon the user requirements; this is simply a clear statement on what the new communications platform for public safety must provide to save lives.

Simply, assured MCV (mission-critical voice) has been well provided on the current TETRA platform. British APCO fully supports the ESMCP approach to providing the Emergency Service Network, through use of 4G/LTE as the platform, and the need to drive down cost through use of commercial networks.

It is widely recognised that data has become mission-critical within some parts of our emergency service sectors and that this requirement will grow significantly in future years, becoming increasingly critical to saving lives on the ground. Assurance must also factor in current and future mission critical data requirements.

Identified spectrum

Looking to the future, British APCO takes the view that there is need for identified spectrum for future public safety harmonisation, and that provision should be made within the 700MHz Band to support on-going global harmonisation.

This would mean that harmonisation with provisions in the 700MHz Band in other countries and continents is reflected in the way that 700 Band parcels are released here, eventually, following the recovery of the spectrum some time approaching the next decade, and in line with any rulings from WRC and Ofcom's governance going forward.

This is a one-off opportunity, and British APCO is looking for reassurance from Government and Ofcom that some provision is made, somewhere in the parcelling of the 700 Band, using whatever special licensing and spectrum-efficient techniques are most appropriate, for harmonised public safety spectrum with the other countries, the EU members, other continents including the US, of course.

This is not some kind of entire block allocation – this is smart use of spectrum-efficiency across one or more parcels, giving support for public safety harmonisation.

The requirement here is simple; this has no direct relevance to the ESN program currently under way – ESN must run somewhere on available 4G/LTE spectrum, whoever the underlying provider(s) may be. The British APCO focus, with respect to spectrum, is upon getting Government to confirm that Ofcom must have an approach for future harmonisation within the 700 Band, such that it can represent UK public safety needs forcefully at the forthcoming WRC 2015 event.

Star trails around a FAA radar dome atop Mount Laguna, California, US. Picture by slwolking2 (Flickr).

Why is British APCO a respected voice on public safety communications requirements?

British APCO holds a respected position of knowledge exchange, relevance and influence across the professional public safety community that is directly affected, in the gravest sense, by technology change. The strapline, part of the British APCO logo, states: *Knowledge Exchange for Public Safety Communications*.

British APCO values highly its member base of public safety professionals, and its 'close friends' relationship with Home Office, Cabinet Office, and other non-Government groups, to give informed feedback to its community (including its members) without the constraints associated with other non-independents (eg trade associations or supporters of any particular technology, standard or commercial backing, who could be grouped cynically as 'well, they would say that wouldn't they').

Simply put, it's British APCO's members (who are active public safety professionals), who underpin the positions herein, along with extensive consultation with Government and industry. This position paper is intended to represent the interests of the blue-lights public safety community.

British APCO is making it clear that its position (with blue-lights requirements in mind) remains that we require:

· Assured MCV requirements inclusion in the ESN platform program in progress under Home Office governance

· Confirmation of agreement to impose identified assured spectrum for public safety harmonisation by a 'special license' mandate onto at least one 700MHz Band block on eventual availability of this spectrum, to be included in Government representation of UK needs at WRC2015.

Maintaining public safety requirements for mission-critical voice over 4G/LTE

British APCO hosted a session on future communications needs for public safety at our April Annual Event in Manchester, where ESMCP announced that the new platform for public safety mission-critical communications is 4G/LTE. This involves ceasing to renew Airwave TETRA contracts at some point and a consequent migration to new technology. British APCO fully supports the move to this new platform, and we will continue to work closely with ESMCP to see this succeed. But there is work to do.

The concerns about how this will support MCV (mission critical voice) are beginning to be understood, in no small part thanks to our efforts to ensure that the requirements as we genuinely understand them (and many don't) are consistently applied in the provision.

A pre-procurement engagement has commenced by the Home Office, and British APCO were the only independent people present, along with 170+ commercial suppliers under strict NDA. Our task is to remain vigilant on MCV especially, including being advisory and the friendly voice of reason, as this process trundles along. Whether it's the original stated target of 2016, or 2018, or even 2020, is unimportant; the key factor is does MCV work, as it is needed to, in order to continue to save lives and protect public safety professionals in their work?

We are maintaining a close relationship with the ESMCP team to ensure the public safety voice is heard. British APCO perceives a thorough understanding, within the ESMCP program, of the criticality of all of the 4 Cs (see below) with respect to readiness to move to the new ESN platform, and indeed enjoys fruitful dialogue on such subjects.

Of course, myths and truths, and diverse opinions will continue. There is a wealth of opinion on likely 3GPP readiness dates, apparently adversely affecting likely outcome time-frame of a compliant platform that will support the mission-critical requirements of front-line public safety professionals.

At British APCO and other events, we have heard concerns that somehow public safety will be 'pushed' onto a platform not yet fit for purpose for MCV.

British APCO takes a position that it is assured that ESMCP fully understands and supports the criticality of MCV. And we perceive a readiness to accept, if needs be, re-timetabling of implementations so that the new ESN-based MCV is a success even if unforeseen delays or technical challenges adversely affect the plan. In taking this position, British APCO understands its responsibility to monitor and report back to its member base as the program proceeds.

Right: the 4 Cs of Mission-critical Voice (MCV) and the impacts of the other 2 Cs.

Identified spectrum for future public safety harmonisation

Following the April event where the announcement was made that the ESN would migrate to 4G/LTE technology, British APCO recognised that there appeared to be a number of different (and often passionate) positions on spectrum. These seemingly disparate views within the commercial and public safety user communities were not helpful in terms of consistent messaging back to government bodies. It seemed that everyone had their own vision of how the result should be achieved – but in

reality the fundamental agreement was for MCV as the minimum requirement with MCD recognised as becoming increasingly more critical.

British APCO saw the need to become actively involved, having participated in the USA D Block campaign, and that the need was for both consensus and a mandate. We instigated a series of meetings with key stakeholders including public safety staff from across the blue lights, commercial providers, wider public safety and military staff and other groups, including TCCA, FCS and RUSI.

At the first meeting (July 2013) British APCO received a mandate from all assembled to identify and agree a clearer statement on its demand on behalf of its blue-lights constituency, and to build a plan for campaigning.

The assembled meeting expressed various supporting positions for harmonisation at 700MHz. These positions and the pros and cons for each included:

· 700MHz is the 'sweet-spot'. Nothing below this Band would have the characteristics required, and this is where the other significant countries have gone ahead and made their provisions. This includes the US with FirstNet, and the EU with plans for a future post-TETRA world (Germany is currently building the world's largest TETRA network – some time will elapse before economies support such change in our view).

· Guaranteed availability for critical voice (and in future broadband data). UK MNOs (commercial 4G operators) have indicated a willingness to prioritise public safety communications on their commercial networks, this should achieve the same outcome. In a post-ESN world (say, after 2021 when such spectrum can become realistically available), additional to the commercial 4G/LTE platform, identified spectrum within this band could present genuine harmonisation benefit for public safety.

· A larger population for user devices – driving down price point. Once 3GPP (and OMA) develop open standards to support public safety requirements (covered within this document), this should open the market up to many more commercial devices and skins, and achieve the same outcome.

· Pure harmonisation, for the sake of interoperability of public safety devices across borders. The incidence of this requirement, compared in volume to day-to-day traffic, is extremely small. There are, however, specialised groups of public safety professionals who do cross borders on daily operations. An identified spectrum within the 700MHz band (not allocation of spectrum) on a spectrum-efficient basis could satisfy this.

In September this group met for further discussion and agreed the syntax of statements required to define the public safety spectrum debate. The syntax needed to reflect the needs of public safety from a requirements standpoint, but also to support the EU and global initiatives. This position paper is produced as a result of that meeting.

The next session on spectrum issues was held at our Autumn event (12-13 November 2013) – just after this article was going to press.

British APCO had invited Ofcom to respond to this position at the Windsor event, with some feedback from Ofcom consultations in which we have also participated, for our public safety community. As British APCO understands it, Ofcom will be supporting public safety and UK Government in terms of the benefit to UK public safety of identified spectrum at WRC15 (World Radio Congress 2015).

Moving forward, we will continue to work with other spectrum groups, ESMCP colleagues and key stakeholders in the public safety community to ensure that the 4 Cs requirements are delivered within the ESN network, as well as to continue to focus on spectrum harmonisation needs for future public safety requirements beyond the provision of ESN. British APCO also provides a regular dissemination and dialogue bridge between ESMCP, and Ofcom, and the public safety community that it believes will continue to be vital to the community and to saving lives.

THE LAST WORD

Thank you to our sponsors, without whom successful events like Windsor would not be possible. Thank you also to our members, commercial and public safety, partners in Government offices, and to our speakers and participants.

I hope that by the time you left you understood more about what British APCO is delivering for public safety in:

· MAIT
· Next Gen 999
· ESMCP and the Emergency Services Network
· Identified spectrum for public safety
· Advances in body worn video (and the work between technology and being evidential)
· TacAds development
· Telecomms SubGroup update day with Cabinet Office.

You can join here! Being a member is vital to the work that B-APCO does, delivers tangible benefits for you and to public safety, and will save you money over the year. Tracey and Geoff will take care of this with you.

I have dedicated most of my column over to space needed to reproduce our position paper on spectrum and mission critical voice, issued end of October, with respect to the huge changes to the public safety communications platform generational renewal.

This is a landmark time, and I hope that our paper reflects the huge amount of meetings, debates, consultations and effort in being able now to be your voice on this subject.

See you in Manchester Exchange, 1-2 April 2014, when most of the themes and sessions you've seen at Windsor will continue in their progress.

There is precedent for securing spectrum

Jeppe Jepsen, Director of Broadband Spectrum, TETRA + Critical Communication Association, outlines some of the challenges ahead.

The TCCA has been actively involved in the issue of dedicated, harmonised spectrum for a number of years and it believes that spectrum is a fundamental issue of mission critical communications. As Jeppe Jepsen says: 'If you do not control your spectrum you do not control your destiny.'

The issue as he sees it is that there are a number of organisations competing for what is essentially a limited resource. He points out that the current opportunity to acquire spectrum in the 700MHz band is one that will not be repeated for the next 10-15 years. 'Everyone agrees that the spectrum has to be below 1GHz otherwise it would be too expensive to implement – and below the 1GHz range the only opportunity available for a harmonised solution in the next two years is in the 700MHz band.'

On the plus side is the fact that this range is already harmonised because it is being used by broadcasters. This is likely to change at the World Radio Conference (WRC) scheduled to happen in November 2015, where a decision is expected that will result in broadcasters having to vacate the band to make space for the explosive growth in mobile data services.

Preparation for this is already taking place by The European Conference of Postal and Telecommunications Administrations (CEPT) which covers the entire geographical area of Europe – 48 countries.

CEPT's main role is to establish a European forum for discussions and coordinations in the field of post and telecommunications, promoting harmonisation to facilitate interoperability and enable economies of scale to be realised.

Although spectrum is a national matter, radio waves do not recognise borders so there is a strong tradition in Europe to cooperate on spectrum. 'They are working on finding a common position in preparation for the World Radio Conference in November 2015 – if they can come with a coordinated position then they stand a better chance of getting their ideas through.' As a result, Jepsen explains that significant discussions are taking place in each CEPT member country between regulators and relevant government agencies responsible for public safety. 'The problem is over time the regulators have been highly successful in mining spectrum to get funds for finance ministries, and that income is now taken for granted. So the subject is highly political; are the needs of the ministries responsible for public safety communication more important than the needs of finance ministries? Ultimately, the subject might end up on the prime ministers' tables.'

There is precedent for success in securing dedicated spectrum for mobile broadband, however, and Jepsen believes that UK and Europe could learn from what public safety users did in North America. There, a five-year battle ended in the allocation of spectrum for mobile broadband for emergency services, with a $7 billion federal investment to build it.

In the US there were major concerns about public safety practitioners being able to come together – but come together they did, in the form of the Public Safety Alliance. The ability to speak with one voice managed to convince politicians to turn their backs on billions of dollars of auction revenue during tough economic times. 'The Americans have a saying that they "marched on the Hill" – in this case fully uniformed chiefs of all the services came together and said, "We cannot deliver the quality of service that the public wants from us without this".'

Large scale disasters have also played their part in the US (and Australian) adoption of a mobile broadband network. In the US it was hurricane Kathrina, where it became obvious that communications were not working. 'And I hope the political world of the UK does not need a disaster to get wiser.'

QUANTIFYING MOBILE BROADBAND

The TCCA has commissioned two research documents – one from the London School of Economics and one from WIK-Consult – to help quantify the economic benefits of mobile broadband for mission-critical applications.

Results include:

– £1.2-1.7bn annual socio economic benefit from an estimated 10-14% current homicide, serious wounding and sexual assault crime costs benefiting from mobile broadband to derive a favourable outcome.

– If mobile broadband can be used to assist ambulance crews deliver faster and more direct responses to treat heart attack victims, for every 560 lives saved, an estimated £1bn socio economic benefit could result, with the current target being 3,000 'extra lives' by the Ambulance Service.

– If UK Traffic Police achieved comparable results to some US Highway Patrols in increasing their efficiency by reducing traffic stop times due to the enhanced and integrated use of mobile broadband, the potential socio economic benefits from averted fatalities and serious injuries could be between £0.5-5bn per annum.

– The socio economic cost of a 5% degradation of service availability to emergency services in times of mission critical dependency, particularly for large scale emergencies, could result in a socio economic cost of over £5bn, whilst even a 0.5% decrease can yield a socio economic cost of £0.5bn. Such a reduction in service could occur where spectrum in not available in a dedicated manner for public safety.

Let's look at real incidents

Jennifer Cole, Senior Research Fellow, Resilience and Emergency Management, National Security and Resilience Department, Royal United Services Institute (RUSI), is carrying out some practical research on behalf of British APCO.

RUSI is currently working with British APCO in its aim of identifying dedicated spectrum that could be harmonised for emergency services. As a think tank and not a lobby group, RUSI is carrying out independent research that specifically analyses B-APCO's proposal and will explore arguments both for and against. The work builds on a previous report – unfortunately classified – that RUSI prepared on behalf of the Ministry of Defence, around the subject of MOD spectrum release. 'The conclusion from that report was that there were many good reasons for a public sector dedicated network.'

However, as for dedicated spectrum that is harmonised with Europe, Jennifer Cole is slightly sceptical, pointing out that opportunities for harmonisation have cropped up for the best part of 20 years, 'And if they haven't happened yet, it is difficult to see how they will in the future. Harmonisation is a tricky issue – it would be a nice idea but I struggle to see it as a reality. But that doesn't mean we should throw away the opportunity.'

Cole will research specific case studies where – during major incidents – a network failed, and find out why it failed and what were the consequences. 'We will look at how those instances would have been strengthened or made less vulnerable by certain options – for example particular use of spectrum or dedicated spectrum.'

Naturally RUSI is taking into account the ESMCP work being carried out. 'The vast majority of the ESMCP's work relates to day-to-day operations, which concern 99% of routine emergencies. We are probably all confident that such routine business will be sufficiently covered by whatever contract is specified for the Emergency Services Network.

'There is a concern, however, that having a solution that relies more on off-the-shelf technology and is less dedicated than the Airwave network may end in more weaknesses at the edges of those day-to-day operations. The result could be less spare capacity to act as a buffer during something like 7/7, when there was a large overload of the network due to volume of traffic.'

Other concerns regard coverage of rural communities, where there is no real incentive for commercial networks to install an infrastructure – at shadow ministerial level there have already been concerns mentioned about consumer broadband coverage, 'and that is before you take into account the emergency services.' Cole admits that there will always be one-in-a-thousand-years events where a network will be overloaded, and she accepts there is a point where it is unreasonable to expect a network to operate as normal, 'And that is why we are also looking at methods that could be used to mitigate that, for example using satellite phones in remote areas where there isn't any embedded infrastructure. The question is can and should those edges be patched in, rather than expecting 100% coverage in the first place.'

RUSI is also interested in finding out the causes of so-called failures in the Airwave network ie whether these were genuine or caused by people not using the network intelligently, or even perhaps due to damage to base stations as a result of natural disasters. 'We are looking at case studies in other countries such as Japan, Haiti and New Zealand, and how communications were used after their major earthquakes. Was it the case that some networks went down and not others? Does splitting comms between more than one commercial network offer some form of added resilience?'

A good point worth bearing in mind, says Cole, is that part of the reason the Airwave network is being upgraded is that technology has moved on. Today is the first time that the average member of the public has as much advanced technology in their pockets as the emergency services have at their disposal. 'When Airwave first came in and trials were being done, the public had basic mobile phones. Now an 11-year-old has a phone they can video conference with. There is an expectation that everyone has this technology and that it enables everyone to do everything immediately.

'One of the things we are looking at is, what value can this advanced technology actually add for the emergency services? Is there a real benefit to video conferencing from silver to gold? Where is there proof of that? There may be parts of the old-fashioned network that are more suited to certain situations than the shiny bright new technology.'

As for the chances of success in attaining dedicated spectrum, Jennifer Cole emphasises that timing is important and – as the UK heads into a period leading to the next election – she points out that politicians will shortly become more open to voter-friendly ideas. It may be that Labour try to appeal to traditional Labour voters in the public sector by supporting public safety services. There may be opportunities to pick up on comments regarding the lack of broadband coverage in rural areas, tagging these on to concerns about public safety. 'But one of the things that is always an issue with the emergency services is that rarely is there a minister prepared to stand up for them. If somebody can take on that baton of champion, even if only in the lead up to the election, and put up some promises through, then these are promises they can be accountable for if they get in.'

Unfortunately the emergency services are up against the very high expectations of the public and the media that things will run like clockwork during a major incident like 7/7. 'My personal view is that it is unrealistic to think that everything will be perfect. It is people working in the most horrendous conditions in a situation where they get no thanks. So I can understand partly why no minister is going to stand up and say, "I'm going to take responsibility for that", because they would be the ones apologising when the response is not perfect next time.'

Brimmond Hill radio tower (Aberdeen), picture by David Neale.

What is 'mission critical'?

Euros Evans, Chief Technology Officer, Airwave, believes that public safety mission critical comms will be served by LTE in the future, but until 'mission critical' is defined industry cannot develop the technology.

'People speak a lot about using LTE in the future for voice and data, and if you have your own spectrum you are far better placed to decide exactly what capacity you have where. However, not all consumer capacity accurately reflects public safety needs. I can illustrate this simply with a real example: In Milford Haven you need to be sure you have sufficient capacity from a public safety perspective in case there is a major incident in the oil refinery. And it wasn't so long ago when we did. It is also about making sure you have sufficient capacity in places outside Westminster – and by having your own spectrum you can control and manage those scenarios.'

Euros Evans is fully aware that there is a real possibility that spectrum may be sold off, which could drive the emergency services to rely on commercial networks to prioritise public safety (over consumers) when necessary. But perhaps the safest option is to reserve spectrum at the outset and if it turns out that it is not required, then to sell it off at a later time. 'Nobody is making any more spectrum: it is a finite resource and once it's gone and allocated the chances of getting more are slim. My personal view is that you should have a portion of dedicated spectrum and then be able to use commercial networks where appropriate.'

Enough spectrum for Evans is 2x10MHz or 20MHz, which would be sufficient for critical aspects of voice and data. 'You would then effectively be able to decide which traffic you are prepared to handle or offload as prioritised – but not necessarily removing other users – to commercial networks.

'It needs to be fit for purpose both operationally and from a cost perspective. By having enough spectrum to manage that voice and critical data – 20MHz – and the ability where there is capacity and coverage to offload to other commercial networks, allows you to balance that risk and keep the cost perspective.'

As for Airwave and TETRA, Evans very much sees a future for TETRA in Great Britain beyond 2016 – a migration at 2016 would potentially present a risk from a number of directions. This is because there are questions whether LTE will be ready for 2016 – standards are still being discussed by relevant committees. Evans recognises LTE is being used, but the complexities and additional developments required for mission critical public safety voice are not in use anywhere.

'2016 is about risk at the end of the day – your appetite for it and whether it is possible to deliver the mission critical services that are required.'

Evans adds that although there is an assumption that everyone understands what mission critical services are, there is very little in writing. 'In the USA they have published what they believe makes up mission critical services. It is a high-level definition but at least someone has started the ball rolling. Being absolutely clear about what it actually is will dictate how and what services are migrated to LTE.' It isn't until clarity is reached on this point that industry can work on a process to establish the technology that will meet the needs of the emergency services, taking into account aspects such as service assurance, resilience and capacity.

As for spectrum harmonisation in the 700MHz band, Evans recognises that it is a debatable point but he underscores it with the belief that public safety mission critical communications can and will be served by LTE in the future. 'To be able to leverage scale is fundamental, because we are talking about ruggedised devices with emergency buttons and IP ratings. From a point of view of public safety communications, if you can hit millions of users globally then you are doing well. And we are not far from a few million commercial customers on LTE in Great Britain by the end of this calendar year.'

Airwave mast, Broadmeadows (Scotland), by Richard Webb.

Analysing the bottom line

Can MNOs offer outsourcing services for public safety networks, and is this a new revenue stream for them? The commercial operator will face technical risks in meeting the requirements, but there is the prospect of significantly increased revenue from professional 'blue-light' organisations, writes David Taylor, Lead Consultant, Mason.

The three fundamental requirements for public safety networks are availability (coverage), resilience and control.

Public safety networks need a higher degree of coverage and availability than commercial networks because they have to be available during major incidents. We can see from the Boston Marathon bombing in April 2013 that standalone mission-critical networks played a key role in the swift response of the emergency services when the commercial networks were unavailable for voice calls because they were overloaded – MNOs were telling users to send texts instead.

Resilience ensures that networks continue to provide service when there are outages and is provided through duplicated links and long battery standby times on radio sites. Again, recent events in the USA such as Hurricane Sandy in New York in 2012, illustrate how cellular networks struggled to provide service at a critical time, because of flooding and power loss.

Finally, control over ownership of the assets used to provide public safety services is crucial because the networks need to carry restricted traffic, and although agreed levels of control can be built into contracts with commercial operators, assets can be at risk if ownership of the operator changes. As an example, a new owner may change the network and reduce coverage in areas that the public safety user considered vital. However, although public safety organisations have favoured private networks, it should be remembered that many public safety networks already use commercial technologies, because traffic that is not mission critical – particularly data traffic – can be transferred cost effectively in this manner.

Public safety users are showing similar trends to those in the wider society in that they are demanding more data-rich applications. They need access to databases, pictures, graphics and video. These cannot be carried on the existing narrowband networks, such as TETRA.

Commercial operators can enter this arena in two ways. They can encourage public safety organisations to outsource their services on to their existing commercial networks. This is not yet viable for all voice traffic for the reasons discussed above, but is possibly an option for the longer term. Indications are that commercial networks will need to become more resilient over time given that the public increasingly relies on mobile communications – a reported 15% of homes in the UK no longer have a landline phone.

They can work with public safety users to build private networks using commercial technologies such as LTE. This is the case in the USA where FirstNet is developing a nationwide interoperable mobile broadband network based on LTE for the emergency services, using public safety dedicated spectrum at 700MHz. The aim is for FirstNet to supplement mission-critical voice services (and critical data services), but this could be developed into a fully fledged public safety mobile broadband network in the future. Certainly, LTE networks have lower latency than 2G/3G networks, which is crucial to fast call set-up times for the emergency services.

In other countries, just as in the USA, higher-bandwidth data services via LTE (or 3G) can be arranged with a single MNO, or with all national MNOs via an arrangement with a roaming operator (MVNO). A good example of this is the planned ASTRID MVNO in Belgium. ASTRID is the Belgian public safety operator, which already has a TETRA narrowband national network. It is setting up an MVNO working through a roaming partner into all four mobile networks. This arrangement will include preferential access and improve availability and resilience, because if one network does not provide coverage, another probably will, and if one network has a site failure, the other networks will continue to operate.

In time, it is expected that LTE networks will support full mission-critical voice and all data services. These may be dedicated networks, or commercial networks that have been 'enhanced' to meet the three fundamental public safety requirements. But given the discussions on public safety spectrum in Europe ahead of the World Radiocommunication Conference 2015, and the fact that PMR contracts such as the one with Airwave in the UK are due for renewal, now is the time for commercial operators to engage with public safety users, standards organisations and government on enabling public safety operations on 4G networks.

The commercial operator will face technical risks in meeting the requirements, and reputational risks should the network fail during a major incident, but there is the prospect of significantly increased revenue from professional 'blue-light' organisations.

The previously mentioned Airwave network recorded revenue for the year ending June 2012 of GBP421 million (note that this includes revenue from other sources), which while still less than 10% of the annual revenue of a typical UK commercial operator, is not an insignificant figure.

David Taylor's article first appeared in Analysys Mason's quartlery newsletter, October-December 2013 edition.

Driving success

Vehicle telematics is just one of a number of initiatives that Northamptonshire Police has implemented as a result of austerity measures. Head of Transport & Travel Graham Crow highlights some of the benefits and work that has culminated in a new framework that any police authority in the UK can now tap into.

The story of telematics and Northamptonshire Police harks back to 2010 when austerity measures were beginning to be examined. Telematics was regarded as a way of potentially making fuel savings whilst at the same time increasing safety for drivers and the general public. Two mini trials were run and the percentage of fuel savings as well as general feedback were so significant that a business case was compiled for consideration by Northamptonshire Police Authority in May 2012. A 'spend and save' strategy promised that fuel savings would recoup costs by Year Three.

The solution currently being rolled out by Northants Police is APD's modular Artemis solution. Graham Crow was aware that APD had been working closely with the ACPO ITS team for some time, and he'd seen Artemis installed in Vauxhall cars during a session at Milbrook Proving Ground for fleet managers.

The technology that drives the telematics system is largely invisible to the driver. In the cab, explains Graham, is a small bezel surrounded by LED lights. As the driver switches on the ignition the LEDs surrounding the bezel turn red. These turn green when the officer swipes the ID warrant card across the bezel, which records the details and identifies the driver.

The system constantly 'reads' the driver's behaviour, monitoring cornering, revs, acceleration, and breaking (CRAB). According to predetermined parameters, the bezel will turn different colours. If a driver accelerates hard the LEDs will initially turn amber. If the acceleration continues the LEDs turn red. If the bezel stays green nothing is recorded against the driver. When the 'blues and twos' go on, the bezel lights are automatically deactivated – but the system continues recording. The data relating to the driver is visible to the supervising officer, who may decide to bring this to the attention of any driver whose behaviour is constantly in the red. 'And you can educate the driver and ultimately, if they don't improve, you can go back to driving school and show them how the cars should be driven to keep the LEDs green.'

The new system is already having an effect on driver behaviour and hence fuel savings. Northants Police is ordering less fuel at some of its bunkered sites, a fact that is mirrored by the telematics system's own fuel economy data. 'So it is a true correlation – the telematics system says it, and physically we are buying less fuel.'

Artemis comprises APD's Inca 2 system, which is enhancing the communications between the vehicle and the control room. Previously, vehicle location information was transmitted via the vehicle's TETRA radio. Now, the control room can identify not just the vehicle's location, but also who is in the vehicle, via the officers' own personal radios. Seeing what resources are available against which cars is regarded as enabling more effective resource planning for the control room.

Most of Northants Police cars have been fitted with incident data recorders that – amongst other things – act as 'black boxes'. Should an accident occur, investigators can ascertain location, speed, time, and driver behaviour etc, all the important elements for building a comprehensive picture of the accident. Similarly, if a member of the public makes a complaint regarding a vehicle being driven excessively fast, the data can easily be downloaded for review.

Another benefit of the Artemis – and one that was originally unforeseen – is the reduction in bureaucracy with vehicle logbooks. These logbooks have to be filled in manually whenever a driver initially picks up a vehicle (eg name, mileage, fuel, vehicle check). 'That information is passed to supervisors, then it is sent to admin who then forward it to us. We store the logbooks for seven years after the vehicles have been disposed of. All that will be eliminated because the process will be automated and the data stored electronically.'

Vehicle utilisation

So far there have been no big shocks as regards the driver behaviour side highlighted by Artemis. What has been very informative, however, is what the system is revealing as regards vehicle utilisation.

'Some teams are out based and they take a car, park it somewhere, and then work on foot. They then pick up the car and come back. That shows a downtime for the vehicle when, actually, they are out there doing their job. You could argue that

rather than having a car parked somewhere all day, you could have a minibus dropping people off and then picking them up again later. So you have three vehicles rather than four. It is still early days but it is exciting to see that kind of data. It may point towards having a pool of vehicles in the station rather than individual team vehicles.' Graham doesn't want to jump the gun however, as he is keenly aware that different teams use cars in different ways.

Predicting project costs and savings is an uncertain science. Originally the project was worked out to pay for itself in two and half years' time. Some unexpected costs for additional fitting assistance added to the budget and the pay back time was extended to three and a half years. However, with actual fuel savings looking better than originally predicted, it is likely that pay back will be in less than three years – and that is without factoring in any potential reduction in cars.

Moving forward

The next step for Graham is to fully formalise the governance of the telematics system. 'We need to ensure there is a top down formal policy in place on how we are gong to be managing this. Whilst we have an overview and people are used to it, we need to set it all down in a process. It won't be difficult because people have been kept up to speed and are reassured there is no hidden agenda. But our professional standards need to have an input, along with senior officers, to ensure we have a fair assessment in place.'

The project is being so successful that Graham is now thinking of future telematics enhancements. On the 'wish list' is upgrading the system so that vehicles can be deployed via the onboard sat nav screens. 'So the control room can send data messages via Artemis, providing incident information as well as any intelligence such as whether vulnerable children are involved.'

Another enhancement would be to upgrade the collision investigation of the incident data recorder so that greater detail is recorded.

Northant Police's hard work has culminated in a framework that is available on the Bluelight Emergency Services eTendering Site. 'People can see what is available and the price list. Forces can pick and chose – someone may not want driver management, for example, and instead choose the collision investigation and location part. Doing the initial business assessment, business case, prequalifying questionnaire – all of which has been done for you. The framework means that you don't have to spend 100s of hours, and I think it is the biggest saving in terms of the process.'

Nottinghamshire Police have joined Norhants in the framework, and Graham believes a couple other forces are 'on the cusp' of signing up.

To find out more, contact Graham on graham.crow@northants.pnn.police.uk.

MAIT moves closer to reality

The MAIT momentum is gathering speed. For too long people and organisations have regarded MAIT and DEIT as hazy projects discussed in far-off places – but they have now convincingly proved themselves as worthy of take-up by the whole public safety sector. B-APCO Journal speaks to some of the key people behind DEIT/MAIT to find out why these projects are so potentially beneficial and what challenges still remain.

For some years now Direct Electronic Incident Transfer (DEIT) has been used by the Highways Agency and some Police Forces to send key incident details electronically to each other's mobilising systems. The DEIT protocol uses an open standard XML schema to facilitate interoperability between mobilising systems from different manufacturers.

A decision was taken earlier in the year to rename DEIT as Multi Agency Information Transfer (MAIT) to reflect that the protocol was being developed further in order to cater for other types of data exchange.

The main driver for using MAIT within the fire and rescue service and across the wider public safety family is its delivery of quick, reliable information exchange between control rooms and call handling centres, saving time and providing a clear understanding of the assistance required to resolve an incident.

In 2012 a proof of concept project was organised and run by the Cabinet Office, the Welsh Joint Emergency Services Group (JESG) and Welsh Government involving South Wales Fire and Rescue Service, Gwent Police and Newport City Council. The project also explored the use of a 'resilient data hub' hosted on the National Resilience Extranet (NRE) and utilised the National Land and Property Gazetteer (NLPG) to provide common address information.

Tony Bracey, DEIT/ MAIT Project Manager, JESG Wales.

The lessons from Wales – and next steps

Tony Bracey is the DEIT/MAIT Project Manager, JESG Wales. He manages the DEIT project in Wales and is currently finalising a detailed business case and implementation plan for Wales so that DEIT/MAIT can be rolled out as quickly as possible. He is also developing a UK business case.

The original pilot between South Wales Fire, Gwent Police and Newport City Council is currently being scaled up in the business case to include all emergency services in Wales and possibly the Maritime and Coastguard Agency, British Transport Police, local governments, and Environment Agency at a later date. The goal is to present the case to the Welsh Government with a view to begin implementation in the next financial year. Roll out is expected to take no more than 12 months.

There were two significant findings of the pilot for Bracey (apart from 'it works!'). First was that the technology side was relatively easy. It was the cultural barriers that required the most efforts, providing the reassurance and confidence that the technology could actually replace the telephone call during an emergency scenario. 'It was agreed that, because this was a pilot, each electronic incidence transfer should be followed up with a telephone call. The sign of success was that by the end of the six-week period we were getting asked by staff whether they really needed to make that call. And when the pilot ceased, there was disappointment that the technology was being switched off.'

"I think in the future we'll not only be sharing information related to emergency incidents, but also overlaying those with other public sector-relevant information."

The second key finding regarded the importance of developing and putting into place data sharing protocols. Wales has an accord for sharing personal information (WASPI), and by using that as a base line the team developed individual protocols that were signed up to by the Chief Constable of Gwent Police, Chief Fire Officer of South Wales Fire and Rescue, and Managing Director of Newport City Council. 'Within those agreements the type of information that would be shared was very clearly defined.'

Although the technology is 'there' and could be turned on relatively quickly, Bracey explains that Wales is holding back to ensure phase 2 of DEIT aligns with MAIT. 'We are working with B-APCO on the data standard and schema for MAIT, and we don't want to turn DEIT on and then find we are not aligned with MAIT. So we are proceeding at a rate that ensures we are aligned with the processes put together by B-APCO. That will provide that extra quality assurance and ensure the new hub uses the data schema that is part of an open standard.'

Going forward, Bracey is keen to emphasise that DEIT will link with other information sharing projects currently underway in Wales, for example a Vulnerable Intelligence 'Hub' and a Public Protection Unit 'Hub'. 'I think in the

future we'll not only be sharing information related to emergency incidents, but also overlaying those with other public sector-relevant information. For example property-linked information such as oxygen cylinders, firearm licences or vulnerable adults.'

In the future, this could even involve sharing information on mobile devices able to handle media such as video streaming, images, and social media data.

England and the FRS

Jamie Orr, Fire Control Projects Support Team, CFOA National Resilience, is part of a team that was set up to support Fire and Rescue Services deliver their new mobilising systems post FireControl. During the course of their activities it soon became clear that many FRSs were unfamiliar with the detail of the work being carried out by the Welsh Joint Emergency Services Group on DEIT. The result was a DEIT steering group for FRS set up at the end of 2012, comprising around 17 FRS representatives, some representing two or three FRSs.

The group's first task was to examine the lessons learned from the Welsh multi-agency pilot, which revealed a number of potential benefits for the FRS, explained Jamie Orr: 'In June 2012 we had a wave of nasty weather that swept through the Midlands and north, which had a devastating impact in the Northeast with Tyne and Wear particularly being badly affected, leading to an unprecedented number of emergency calls. In situations like this the calls are passed to other FRS or agencies such as the police. In the control room every line was taken with

"In the control room every line was taken with people calling to report flods, and those that couldn't be answered were then passed to another agency."

people calling to report floods, and those that couldn't be answered were then passed to another agency. The end result in situations like this is that partner agencies are trying to call the relevant control room to report those calls, and basically making a bad situation worse – like tipping water into a full bucket.'

Under DEIT, the partner agency would answer the calls and then pass the information onwards directly from its mobilising system, vastly reducing the stress on the telephony system.

'Tyne and Wear has a "flood buddy" arrangement with Derbyshire FRS who had also been impacted by the adverse weather. This is where we see FRSs benefit, because a buddy agency can take the information and pass it back to Tyne and Wear at the push of a button. The operator at Tyne and Wear can then read the information when they get the chance and make a determination depending on whether a response has already been initiated.'

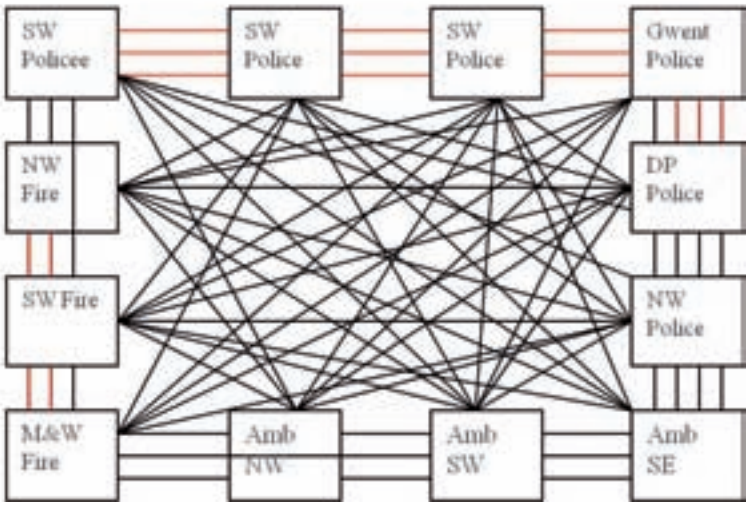


Figure 1: number of 'point-to-point connections that may be required to enable organisations to exchange information (ie no 'hub' present).

Therefore key benefits identified by MAIT are:

· The speed with which real time incident data can be sent to organisations required to attend an incident. A few button presses take the place multiple phone calls.

· Improved levels of accuracy as there is less scope for information to be misheard or misinterpreted.

· Frees up staff time because it reduces the 'double keying' of data and time spent on engaged telephone lines during busy periods.

· Call queuing for these types of calls is eliminated.

· Better information sharing.

Challenges – common gazetteer

It is envisaged that one of the things that organisations using MAIT would benefit from is a shared gazetteer. The protocol caters for the passing of unique property reference numbers found in AddressBase Premium and other gazetteers. This would enable all of the services responding to an incident to be confident that they were all responding to the correct location. However, just how all organisations participating in MAIT would have access to each other's gazetteers is still a work in progress.

Tim Gilberts is the Chair of the MAIT steering group set up by CFOA Fire Controls Projects Support Team. He is also the ICT Systems Manager for South Wales FRS and he played a pivotal role during the Welsh phase 1a pilot.

Having looked at several gazetteer options, Gilberts recognises that having a common gazetteer for the whole of England Cat 1 and Cat 2 responders in each organisation would be impractical – it would have to encompass several millions of records.

A solution may be for agencies to access two gazetteers. One gazetteer that is a slim-down, 'everyday' gazetteer covering primary service, border areas and those agreed for buddy cover, and a super national one for incidents further afield, 'And if you want to search wider there is no reason why you can't have a slower centralised search for the odd occasions when you need to do that. This would be an ideal service to deliver as an extension to the hub or through a similar national shared solution much like the OS

Tim Gilberts, Chair of the MAIT steering group set up by CFOA Fire Controls Projects Support Team, and ICT Systems Manager for South Wales FRS.

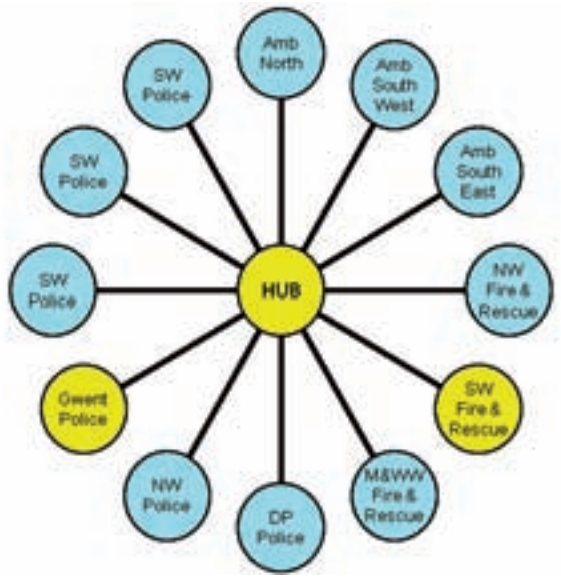


Figure 2: number of links needed to link to a central MAIT hub.

are developing with web services.'

Such a solution would not be perfect for all occasions, such as when non-standardised locations are transmitted, but Tim doesn't see that as insurmountable – it just means the process may not be automatic in all cases, or there would be a reliance on the other services' geospatial location only. 'This will probably be the case for the MCA and British Transport Police, and they will be the agencies that will probably need a web service where they can tap into incidents nationally.'

In Wales the problem has been overcome in this way. For example, each of the Fire Services have a local database for their primary areas and a secondary one for elsewhere, all maintained centrally. Each Police Service manages its own areas only, in a similar fashion.

Challenges – linking the hub securely

Central to the MAIT project is a resilient data hub that acts as an enhanced data switchboard between all the organisations taking part in MAIT.

The advantage of a resilient data hub is that it reduces the number of connections an organisation needs to establish and maintain in order to connect with other agencies.

Figure 1 (previous page) shows the number of 'point to point' connections that might be required to enable these organisations to exchange information, in comparison to the number of links needed to link to a central hub (B-APCO is currently working on the specification for the MAIT hub).

Regardless of whether organisations use point-to-point connections or a hub, the connections need to be secure. Mobilising systems are mission critical and need to be protected, and the more secure the connection the more information organisations are likely to be willing to share.

The baseline security level is likely to be Business Impact Level 2 (IL2) but the preferred level would be IL3 which would enable organisations to transfer data currently classified as 'RESTRICTED' which can generally be considered 'OFFICIAL – SENSITIVE' under the Government Security Classifications Policy which is due to take effect on April 2nd 2014.

The Public Services Network (PSN) is most likely to be the network of choice to form these connections. PSN authorities, explains Tim Gilberts, have carried out much work on base line assurance, and MAIT could provide the leverage to bring organisations on board that historically have not had the need for such security – becoming PSN accredited would provide a base line of competence for all.

Some emergency services are also looking to drive PSN because of a noted overlap with the types of services envisaged to be supplied by the Emergency Services Network – there is growing realisation that convergence could bring the two together.

'Having PSN open to transmitting incidents is probably too risky,' admits Gilberts, 'so the concept of a hub service with resilience and redundancy means the security side is easier to undertake because you would have one organisation running it to a level of availability that everyone is comfortable with.'

"A sharing protocol needs to be in place, and it may be you just use the hub to share the fact that certain information exisits, but not the information itself."

What the hub will develop into in the future is debatable, but Gilberts believes it may eventually resemble something like Cisco CallManager or XMPP, a message directory service which doesn't send out large data sets such as live video streams, but rather exchanges links to those streams. 'Organisations need assurance that they are in control and comfortable with the information they are sharing. A sharing protocol needs to be in place, and it may be you just use the hub to share the fact that certain information exists, but not the information itself.'

Gilberts is aware that some emergency services may be reluctant to put all their eggs in one hub, as it were, but he points out that organisations will still have the option to retain or install point-to-point links using the same standard. 'The reality is you might find point-to-point still has a place for local resilience. If central resilience fails we can still fallback to phone each other or use Airwave hailing groups.'

Moving forward, almost every Fire and Rescue service in England has specified that their mobilising systems be ready to handle MAIT messages in the future.

There are many instances of police-to-police links (and a few police to ambulance), and it is worth noting that the National Police Air Service uses DEIT with other forces on a point-to-point basis. With services such as West Yorkshire and South Yorkshire FRSs already planning to exchange real time incident data with the Police (and working with the Ambulance Service to do the same), the future is looking more MAIT-friendly than ever.

GPS jamming threat

Law enforcement agencies and critical infrastructure organisations are begining to wake up to the dangers of GPS jammers – and now there is a fixed detection solution.

Illustration of Signal Sentry 1000 in action (actual sensor pictured below).

Type in 'GPS jamming' on Google and a Google ad instantly offers a whole host of jammers; vehicle car anti-tracker mini GPS; portable jammers disguised as cigarette packets and mobile phones, all the way to deluxe versions that shield signals of CDMA, GSM, DCS, PHS, and WiFi, in addition to GPS. The cheapest costs only £28.69.

The explanations for the jammers' applications on the website sound innocuous; they can be used to render communications devices useless by educational institutions during examinations (to avoid cheating); by concert halls during performances; in large prisons; and explosive areas such as oil depots and refineries.

Such reasons may sound innocent, but in the last few months/years there has been a growing realisation that GPS jammers are being used for other reasons altogether – mainly to block GPS trackers on vehicles – and they can actually have dangerous side-effects.

In 2012 North Korea used big lorry-mounted jammers to block signals in South Korea, causing over 1,000 aircraft to report disruptions. In 2010, Newark Liberty International Airport's GPS landing system suffered disruptions on a daily basis. The culprit turned out to be a lorry driver using a jammer to avoid paying toll charges on his daily journeys.

In September this year, the US Department of Homeland Security reported during the Institute of Navigation's ION GNSS+ conference held in Nashville, that a GPS jammer could disrupt signals in an entire region of the US.

There is some evidence that GPS jamming is something that happens in the UK on a regular basis.

In August this year, The Economist reported that every day the London Stock Exchange suffers from GPS disruption for up to 10 minutes – the reason is still unknown but it is suspected that the culprit could be a delivery driver disrupting his boss' attempts to track his vehicle.

As reported in The Guardian in February, jammers could be being used by thousands of people in the UK every day. This was revealed when engineers monitored traffic on a dual carriageway outside London and on roads inside the City of London. They found 10 incidents per day on some roads, which was extrapolated to 1,000s of users around the UK.

Exelis, a global aerospace and defence company that for 40 years has been supplying GPS and navigational components used in GPS satellites, recently launched a fixed system that detects and locates GPS interference sources.

The Signal Sentry 1000, as it has been called, is the first of its kind and it is receiving interest from critical infrastructure operators as well as law enforcers, including the FBI and Department of Homeland Security.

Program Manager Joe Rolli is excited about the launch because not only has the Signal Sentry 1000 the ability to detect that a jamming condition is actually taking place, but also to locate it, 'It gives the law enforcement community, critical infrastructure authorities and other agencies the ability to take actionable steps to mitigate.'

Senior Technical Engineer Joe Iaquinto explained that the system is basically an array of sensors wired up to a server. The data that comes back from the sensor to the central hub results in a geospatial calculation that is based on a comparison between signal time of arrival and energy at arrival. 'Depending on where the jammer is in the array of sensors, the energy and time are impacted. These impacts depend on how close or far away the jammer is from each of the sensors, and from the data coming in we can calculate the jamming source.' On a display back at HQ the location is then indicated by a symbol on a map.

Exelis recently tested the Signal Sentry 1000 at the Vidsel Test Range in northern Sweden. Vidsel is a strategic national test and evaluation asset operated by the Swedish Defence Materiel Administration (FMV), in a region with extremely low population and little air-traffic. 'We set up a 450m x 150m array and we detected and geolocated each jamming condition,' explained Iaquinto.

The first system has been installed and is 'live' in an area that for security reasons must remain nameless. It encompasses a port, a mass transit hub, a financial district, and a highway with a high incidence of drug trafficking, explains Joe Rolli: 'In this case we have a broad range of interested parties. The law enforcement side is interested in monitoring the highway, and they want to keep an eye on the port too. The Department of Homeland Security has an interest in critical infrastructure, the financial district and the mass transit district. And as the airport is close by they can also monitor that there are no interruptions.

'The federal agencies want to understand what is the possible threat level they may need to prepare for – a low or high wattage jammer. There is a lot of interest in understanding how to set up this system in terms of requirements and spec.'

As the first to market with the GPS jamming detector, Exelis is still identifying where the market needs are in order to provide the most suitably configured system. 'We attended the Institute of Navigation conference this year, where global satellite system companies get together to discuss upcoming technology.

'We met with many parties who are looking to understand the nature of the threat. They know they are being jammed, they just don't know how often, and they don't know how big is the system that is doing the jamming. And our system can do that too.'

Change: alter, modify, vary, transform, revolutionise, adjust, amend

The launch of ControlWorks by Capita coincides with key messages from Government regarding the drive for organisational change and the role of technology in making that change happen. Good timing then?

Home Secretary Theresa May's speech at the Police Federation Annual Conference reiterated a few technology-related objectives and examples. Reducing bureaucracy; using body worn cameras to improve the collection of evidence; the use of toughbooks and smartphones for witness statements; the collaborative use of technology across forces; these were all specifically cited as positive outcomes.

The fact that recorded crime has fallen by more than 10% and it is at its lowest level for 30 years (Crime Survey of England and Wales) during previously unseen tough budgetary conditions has been repeatedly cited as proof that reform can happen with less.

It is in this context that, at the Police Superintendents Association of England and Wales, Capita introduced the audience to ControlWorks. This single solution for all police contact centre and control room operations is predicted to attract much interest not least because it ticks many of the political boxes outlined by the Home Secretary, including cost savings (cashable); enhanced operational efficiencies and data sharing; and better resource planning. In a nutshell, many of the elements that fulfil the criteria of the oft repeated buzz word of 'doing more with less'.

ControlWorks represents a multi-million pound investment and is a project that has been in existence since the back end of 2010. Capita's Matthew Palmer, Head of Control Room Futures, is adamant that the new platform is not just another version of an existing command and control, ICCS, mapping, or CRM solution. Rather, it represents a significant evolutionary product that has pulled together all the in-house expertise available in the company and opens the door for a more collaborative emergency services in the future.

It is no secret that even some of the larger metropolitan forces around the country are using some old technology in the control room – old-fashioned green screens are not unheard of even today. These obsolete systems are difficult to maintain and they have serious limitations in their ability to interoperate with more modern platforms.

A typical call centre/dispatcher has to be trained to be able to operate (simultaneously) a number of different systems (command and control, mapping, communications), each requiring a different set of user behaviours (eg touch screen). The training can take up to two weeks, which in the context of staff turnover can be significant.

ControlWorks is a single platform that replaces the traditional – and separate – functions of command and control, communications, customer relationship management, and mapping. The key aspect, says Palmer, is that collaboration, interoperability, coordination, and communications are all brought together under the same umbrella.

What all this means is that the system is not limited to the control room or contact centre. Although it is perfectly aligned for dealing with 999 and 101 incidents, it is equally suitable for use at the front desk and by the officer on the street – yes, the platform can be used on a mobile handset or tablet, with all the same functionality as the platform back in the office.

Taking this concept further down the line translates into scenarios such as: during spate conditions additional police staff can be taken on to handle emergency calls from their own desk – or, dare I say it, even from their own homes, if the security links are in place.

Demonstration

At the beginning of a demonstration at Capita's headquarters in Chippenham, Karl Price, product owner, highlights how ControlWorks has sought to turn the traditional concept of blue light solutions on its head. 'Before it was, "this is the solution, make your business process fit". Now it's, "What's your business process, we'll make it fit."

The screen sits in idle state, and the call comes in. The system is taking an EISEC feed (Enhanced Information Service for Emergency Calls), and even before the call is answered by Palmer the system creates a record of the contact with the caller ID, history of calls (including warning markers), possible duplicates, previous incidents – all the information associated with that number and address including whether this is a vulnerable or repeat caller. The location comes up on a map, and at this stage it is worth noting that all this is on one screen as opposed to the more usual three.

For the sake of the demonstration we have an 'old school' domestic incident, ex-boyfriend 'causing problems'. Using the SmartText field, the call taker can type in free style without having to pull down different boxes. SmartText identifies if something is being typed about a person, vehicle or location, and then automatically populates the form, which in turn then drives further backend searches.

It turns out that the suspect, John Smith, has 'previous' and the call taker realises an immediate response is necessary. At the push of a button the incident moves to the dispatcher with all the data, and they in turn acknowledge receipt. The distressed caller is still on the phone, and as further information is conveyed and input, it appears in the dispatcher's screen too. The call taker initiates a PNC check (for audit reasons this is a manual process but it can be automated too).The system has also checked the force's Crime and Intelligence system as well as risk and contingency planning processes that drive the deployment of assets. The PNC reveals a hit for John Smith with warning markers – a right click assigns those to the incident.

The dispatcher can let the system propose resources (ie police officers) based on resource skills (dictated by type of incident, eg firearms)and 'time to scene'. To deploy a source, the dispatcher just clicks on the appropriate resource on the map or on the list of resources. The dispatcher can also

contact the resource directly via their radio (point to point/group call) or mobile, alternatively text to radio or text to phone, at a click of the mouse. 'If I wanted to talk to him, I'd just use my foot switch for push to talk. I don't need to worry about what talk group they are on – the system automatically selects the correct talk group. But the officer will already know about the incident, because it is on their mobile data terminal and they have probably already acknowledged receipt.'

All the incident information is now also with the officer, including warning markers. The officer can add status updates such as 'at scene', as well as narrative such as 'no further assistance necessary', cutting down on TETRA voice calls.

This same demo was run at the Police Superintendents Association of England and Wales' conference in September and from the time the call was answered to the point a resource was on route took just under a minute, recalls Palmer, 'And that was informed throughout with warning markers, resourcing to that incident based on skill sets, and without cutting corners. We appreciate there are other peripheral processes, but you would be lucky to do the core processes within two to three minutes with separate systems.'

Benefits

The challenge for Capita has been to develop a solution that could pay for itself, so a large part of the launch of ControlWorks concentrates on the bottom line – what are the efficiency savings that such convergence can deliver? And what does that mean in terms of cashable savings?

'If I went out and bought separate market-leading systems for command and control, ICCS, mapping, and CRM products, then compared with ControlWorks as a single solution, we'd certainly shave a chunk of the price. But that is not where the real savings are – they come from the operational side,' says Palmer, adding, 'It comes from the operational agility it delivers; the efficiencies and flexibility in people being able to do more with their time; and in smarter policing. It is all about making the best initial decision and sending the most appropriate resources with the best skill set for that incident.'

Taking a small shire police force as a hypothetical example, with a typical call duration of five minutes, Capita contends that ControlWorks can reduce call handling by one minute. 'Each call handler can now handle 15 calls per hour rather than 12, which frees up a capacity for other tasks.'

For this small shire force, which receives half a million calls per year (90,000 of which are 999), and which has 18 dispatchers and 23 call takers, that 20% reduction in call handling and dispatching staffing equates to cashable savings of a million pounds per year.

Capita has identified further potential savings, namely; cutting down training time of a new member of staff from 12 days to five days (as there is only one system, not three); plus savings on system administration (configuring new starters on one system only). 'Over a five-year period, if you factor in savings from call handling and dispatching, training, admin, and initial deployment for a small shire, we calculate £6 million savings over an implementation cost of £1.2m. So the return on investment in this case is about 12 months. We know the answers are different for every force, so we have produced a white paper that explains how the savings are achievable, and how calculations are made.'

Cashable savings are all well and good, but Palmer is keen to emphasise that the level of automation within ControlWorks improves the interaction with the public as well as the safety of officers. Every contact with the public is recorded – whether by text, email, or phone call – so each time a person calls, that caller history appears on the screen, facilitating a smarter response. 'It doesn't matter whether it's a 999 or 101 call, all the history is shown, so there is less of a chance of missing some important bit of information, or of not identifying vulnerable people.' The system records all conversations (radio or telephony) and a call handler can even replay previous calls made by a particular caller, at the click of a button.

Enabler for change

ControlWorks is described by Palmer as an enabler for change – to do things differently – and as such any savings and operational benefits are dependent on how far forces are willing to embrace transformation. Capita believes the system is flexible enough to adapt to the 43 different ways of doing things in England and Wales. 'Some forces are looking for a more centralised approach in the future, others want the opposite. It is up to us to show each how they can work differently and take advantage of the new technology. For example, the mobile platform enables the officer on the street to do pretty much everything that the call handler or dispatcher can. So it provides flexibility and geographic independence, to the extent of enabling home working or mutual aid. For us, call taking and dispatching are roles – the people are not bound to a desk with a PC. Yes you do need a secure link to wherever ControlWorks is hosted, but provided you have the security of that link any device can perform the role.'

There is no proprietary hardware on the desktop, so as long as a user has a USB headset, and the app to download the tech, they are only one click away from becoming a call taker. 'The system is virtualised and architected to run on a cloud infrastructure from day one. It could be hosted so a number of forces could share one system from a central data centre. There are many options.'

It is worth noting that there is a road map for further development of ControlWorks. Yes the system has SMS integration, but it is not yet built to handle video streams and that is something for the future. 'ANPR, social media, voice biometrics, speech to text, vehicle telematics – these are all things we are looking at for the future. Version 1 doesn't offer everything, but it offers something that does considerably more than what police forces have at the moment and is built to expand with future requirements. Importantly, we have the expertise to go beyond just delivering a product – we can guide police forces through the changes that are coming down the line, whether it's integrating social media tools or navigating the next geration of communication networks. '

First roll out

Capita have been working with an existing client who is likely to be the first to roll out ControlWorks. The client has been heavily involved in a focus group to design the system and validate each stage of the development. It is envisaged that the platform will be delivered during Q2 2014 and go live Q4. 'However, we are in discussions with another force that is looking at rolling out the CAD module initially. ControlWorks is a modular solution, so we can deploy modules such as CAD, Communications, Contact Management or Control Room first and in any order – whatever the customer needs until their existing solution reaches the end of its life.'

Going beyond the 'wow' factor that has characterised most responses to the degree of convergence on offer, Palmer admits that some officers may feel a single all-encompassing solution may be a bit of a risk. 'We of course think that one solution from one supplier is a fantastic benefit. And we remind people that as a large organisation Capita is in a strong financial position. You can mitigate the risk of putting your eggs in one basket by defining in the contract the system and performance criteria. And let's not forget – if you have multiple suppliers and modules it can become a bit of a "blame game" when things go wrong. With us, if there is an issue there is just one phone call to make.'

What we learned at the ESS 2013

Messaging specialist PageOne Communications was hoping to be able to announce its first contract alongside the launch of its new triple resilience paging solution but the timing was a bit off, unfortunately. Nevertheless sign off has since been given meaning that **Durham Fire & Rescue** will be the first FRS in the UK to roll out a new paging solution that goes beyond the traditional local system that is used for paging retained firefighters.

Nigel Gray, Director at PageOne explained how around a year ago a dual-frequency paging solution was developed that is programmed to listen primarily to the local site but with capability to fall back to the national PageOne paging network if there is a failure.

This double resilience has now been further enhanced with a third feature – pagers can now fall back to the mobile network if there is no paging signal, using SMS for triple-resilience.

Many fire brigades in the UK are still using legacy onsite paging networks that are mainly used to alert local retained firefighters to attend an emergency. These systems are not only old but also expensive to maintain, and they often have no fall-back option. 'Our approach is to encourage brigades to start thinking about whether they actually need an onsite solution. Going from an onsite service to a PageOne network may be a step too far for some, but by providing a fall-back SMS service to the PageOne network perhaps is a more attractive proposition. Not to mention the potential attraction of cost savings associated with not having to maintain communications hardware in remote fire stations.'

This ties in well with the recent trend for the replacement of legacy command and control systems and PageOne's introduction of two-way paging. 'We have had a number of brigades take on two-way paging, which is quite challenging because they have to be able to handle getting real time information back about whether personnel are able to attend. It needs the command and control software to be able to handle that information and use it in a meaningful way to improve resource management.'

Gray also explained another benefit to embracing a national network for paging – retained firefighters would not have to live within a tight range from the local transmitter, which would potentially enlarge the catchment area for retained firefighter recruitment. Something that ties in well with recent comments by the Fire Minister Brandon Lewis: 'On-call firefighters are part of the solution for the delivery of fire and rescue services in England and a proportionate way to respond in a low-demand environment.'

The key message at the Excelerate stand was that its new Ka satellite broadband (**SuperSat**) offering should not be regarded as a replacement for its enhanced resilient satellite network.

A handy Q&A factsheet for buyers and specifiers of satellite-based comms for the emergency services aimed to outline the differences between Ka and Ku satellite, highlighting the differences between the two technologies. A rapid response vehicle on the stand kitted out with the new Ka SuperSat tech served to exemplify Excelerate's position: KA is a good solution for incidents that may only require a lesser response via a rapid response vehicle. For larger, more protracted incidents, the Enhanced Resilience KU network remains the recommended solution for incident command units.

'Excelerate has spent the last year refining an emergency services-friendly Ka solution,' explained **Nicola Savage**, and the fruits of its labour are now visible. It has secured a partnership with satellite operator **EutelSat** and has carried out extensive testing to ensure it is fit for purpose. 'SuperSat is now accredited by EutelSat as a satellite platform.' The offering for the emergency services entails a three-year contract at 4MB up and 10MB download, with a limit of 180GB (through the three years), and no monthly limits.

Another feature of SuperSat is that it does not require bespoke hardware for its deployment – an app installed on a tablet or PC is sufficient for its operation. And that is not all, Savage commented: 'A user could take the tablet inside a building, and using one of our body-worn wireless nodes all information could be quickly pushed out back to the vehicle and from there to anywhere in the world. That is the beauty of this, it is about rapid mobile response.'

Feedback to the technology has been positive and one ambulance service is considering the benefits of beaming live images from an incident to a hospital, so doctors or surgeons can assess casualties. 'We also have a project which is looking at the monitoring of casualties' vital signs via patches, which provide live information. It is a good talking point – are we looking at the future of rapid response?'

Another gadget being introduced by Excelerate to the emergency services market was a **portable satellite platform** which could be used in either Ku or Ka band (swapping cartridges) and which only weighs 120kg. The satellite is deployable in minutes and is manually adjusted for signal lock. All that is needed in terms of outside kit is a power cable. It has been built to military standard spec and designed for non-technical users. 'Anybody could be trained to use it in 15 minutes, that was the idea from the start.'

Fire Service College had two stands at the ESS and bearing in mind the transformation process it is currently undergoing since its purchase by **Capita** not to mention the high-tech wizardry it is embracing and showing off it perhaps could have done with a show all for itself.

An excited MD **Jez Smith** welcomed visitors to an impressive 'Igloo' experience, consisting of a 360-degree environment that used projected interactive simulation software to enhance learning.

In the Igloo, Helen Tooley took the lead in a road traffic incident demo using the latest technology to give visitors a realistic flavour of life as an incident commander.

Following this Igloo experience, visitors were encouraged to test cutting edge simulation software being developed in partnership with **G2G3**. After donning the '**Oculus'** goggles, visitors were literally immersed in a house fire incident – an initially disorienting experience but one that impressed by its level of realism. Jez Smith had intimated that such an experience 'would blow your minds' and it wasn't far off. 'It is the sort of technology we'll be bringing to bear in the Fire Service College. Think about the possibilities, think about gaming where you are playing around the world, and think about that with really immersive training. Why can't we use it to go down and train incident commanders at RDS on the station? So there are huge possibilities.'

Change your thinking on communications

Technical developments are stepping up a gear as the critical communications landscape readies itself for the next step of its evolution. With major changes looming on the horizon, communications staff are under pressure to prepare for the arrival of a new data-rich future that promises huge benefits – but also greater complexity.

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