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FEBRUARY 2021

Back to business as usual?

With a variety of COVID-19 vaccines now being rolled-out across the world, *Critical Communications Today* editor Philip Mason asks if this really could be the beginning of the end of the current global crisis

MISSION STATEMENT

Critical Communications Today provides the global mission-critical community with insight into the latest technology and best practice required to ensure that its members always have access to the instant, one-to-many wireless communications that can make all the difference in moments of crisis.

We are dedicated to providing our readers with the knowledge they need when determining their critical communications strategies and procurements, though delivering up-to-the-minute accurate information on industry trends, developments, and deployments, as well as the latest new products and services. Our journalists are committed to easing out the little details from your peers that will allow you to draw on the industry's collective experience of deploying and implementing new projects and systems.

We work to stimulate and focus debates on the topics that matter most and provide our readers with a means to raise their concerns and speak frankly about their work and the lessons they've learned while delivering the devices and networks that the world's blue light organisations depend on.

Welcome to the latest issue of CCT, the leading resource for professionals operating within the critical communications sector.

Our previous edition was published towards the end of last year, just prior to the inaugural Critical Communications Week in November. At the time, experts were predicting several difficult months ahead, during which communities were expected to be hit by second and even third waves of COVID-19.

As it turned out, this is exactly what happened, certainly in the UK, which is where this is being written from. Infection rates shot up, as did hospital numbers, as well as, tragically, the number of lives claimed by this appalling disease.

As difficult as the past few months have been, however, there is now cause for hope, not least in the form of several – apparently effective – vaccines being rolled out around the world. As the nights get shorter, meanwhile, at least in gloomy London, we have solid evidence that spring is finally on its way. Potential light at the end of the tunnel indeed.

With that in mind, in this issue we have deliberately attempted to keep mentions of the virus to a minimum, concentrating instead on the innovative, customer-focused, work which is being carried out across the sector.

> **"As difficult as the past few months have been, there's cause for hope"**

For evidence of this, skip to Richard Martin's report (page 14), looking at how critical communications technology is helping to sustain the oil and gas industry in difficult times. Those with an interest in utilities, meanwhile, should turn to page 18, where Motorola Solutions discusses its ICCA-winning work with Polish electricity distributer Energa-Operator.

Perhaps the most compelling article in the issue though – certainly for those interested in public safety – begins on page 24. Here, network operator Erillisverkot and manufacturer Samsung give their respective views on the challenges facing emergency services when it comes to broadband device procurement.

Finally, turn to page 29 for a preview of March's BAPCO Online, a new, UK-focused public safety comms event combining three days of virtual networking with a full conference schedule.

Stay well, and enjoy the issue.

Philip Mason, editor

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Who, what, where

EUROPE

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UK police force deploys integrated BWV

Lancashire Constabulary has rolled out Motorola Solutions' 2100 VB400 body-worn cameras.

According to Motorola, the cameras will be used across the force, alongside a back-end evidence management software solution.

The devices are also integrated into the company's mobile working application Pronto, enabling officers to tag recordings while in the field.

Speaking of the deployment, Lancashire chief inspector Dave Hannan said: "This investment is about giving our officers the best tools for the job. This technology will be a vital tool in bringing offenders to justice, especially those who take part in crime that is more difficult to prosecute, such as domestic abuse and public order offences."

Macedonian narrowband network upgrade

Hytera has been awarded the contract to expand the nationwide TETRA network for those working in public safety in the Republic of North Macedonia.

According to the company, the focus of the expansion is a complete upgrade of the system to its ACCESSNET-T IP technology. Deployment of the network is being carried out in collaboration with Hytera's local partner, Saga MK.

Speaking of the roll-out, Hytera's sales director for east and south Europe, Tsvetomir Benchev, said: "This [deployment] means that police and security forces will be communicating completely via an IP-based solution.

"In addition to the upgrade of the existing system, more than 20 additional base stations are being deployed."

French motorway communications roll-out

Airbus has provided interim critical communications to the Paris Rhine Rhône Motorway Group, as part of the latter's Axelia project, upgrading the RN79 road into a motorway.

The company – along with its partner Altech – has rolled out its LTE-compatible Tactilon Agnet and Tactilon Dabat solutions in order to provide push-to-talk until a permanent TETRA network is in place.

The technology will be accessible to those working on road patrols as well as maintenance employees.

Road operator APRR already uses an Airbus TETRA network, covering around 2,300km of motorway.

The RN79 runs between the French cities of Sazeret and Digoin.

MIDDLE EAST

Irish police upgrades control room with Saab tech

The Republic of Ireland police – An Garda Síochána – has chosen Saab's SAFE solution to kit out its control rooms.

According to the company, it will be the first deployment of the technology to a national police force.

Roll-out began at the end of 2020, with the solution expected to go live within two years. It will operate in four control rooms across the country.

According to a spokesperson for the company, SAFE will "increase efficiency through multi-channel public contact, intelligent resource management and officer dispatch. Officers in the field can access and update incident details, as well as capture and share information via their SAFE web and mobile apps."

Romanian authorities choose TETRA for public safety

Motorola Solutions is providing 40,000 TETRA radios to the Romanian Ministry of Internal Affairs.

The agreement – which lasts for four years – was signed with Motorola's reseller, Centrul Pentru Servicii de Radiocomunicatii SRL. It will provide devices to the Romanian police, border control, gendarmerie, as well as other emergency services organisations. Devices include the company's MTP3550 portable radio and its MTM5400 mobile radio.

Motorola regional vice-president of Europe, Michael Kaae, said: "State-of-the art mission-critical solutions enable frontline public safety officers to communicate efficiently. TETRA radios and body-worn video solutions are key components of Motorola Solutions' mission-critical technology ecosystem."

Airbus wins major Saudi oil producer contract

The largest oil and gas company in Saudi Arabia has chosen Airbus to update its critical communications network. The latter will be deploying its Tactilon Agnet 800 solution, as well as TETRA-based technology.

Speaking of the roll-out, Airbus's head of sales for the region, Walid Lahoud, said: "Airbus technology is capable of supporting [this] company's diverse communication and collaboration requirements.

"The upgrade is aligned with its strategy, in order to reinforce facilities and maximise the use of the latest smart solutions. Airbus technology helps boost productivity, safety and operational efficiency."

The Tactilon Agnet 800 application allows smartphone users to communicate with TETRA radios.

NORTH AMERICA

Cradlepoint acquired by European technology giant

Ericsson has completed its acquisition of Cradlepoint, which provides wireless WAN edge 4G/5G solutions for the enterprise market. According to a statement released by Ericsson, the investment is key to its "ongoing strategy of capturing market share in the rapidly expanding 5G enterprise space".

Ericsson senior vice-president Åsa Tamsons said: "I am very excited to welcome Cradlepoint to the Ericsson family. With its market-leading solutions, we are strengthening our enterprise offering and taking an important step to lead the next wave of enterprise network transformation."

Ericsson acquired Cradlepoint for around the sum of one billion US dollars. The latter company will continue to operate as a standalone subsidiary.

Credit/Municipal Government, Juárez Town Council

Teltronic provides Mexican city narrowband

Teltronic has rolled out a new TETRA network in the northern Mexican city of Ciudad Juárez, in collaboration with systems integrator Jomtel Telecomunicaciones.

The company has provided its NEBULA infrastructure, with the system including a switching control node, devices, as well as fixed base stations to provide coverage for the city's entire metropolitan area. It has also provided its 'next generation' control centre solution, CeCoCo NG.

Teltronic describes Ciudad Juárez as one of the largest cities in the country, with a "strategic location" resulting in increased levels of industrial activity.

"At the same time," the company says, "it is one of the Mexican cities with the highest levels of insecurity and crime."

EAST ASIA

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Hong Kong Airport replaces legacy systems

Hong Kong International Airport is rolling out a new, high-bandwidth IP/MPLS system, provided by Nokia.

According to the company, Nokia will also support and manage the migration of legacy, non-IP, aviation applications to the new network.

It will furthermore supply what it calls "a range of operational, aviation-specific, professional services for network design, architecture, integration and deployment."

Speaking of the brief, Nokia head of air traffic management, Mervyn Harris, said: "This is a robust next-generation network. [Through it, we will] complete a flexible, seamless migration of legacy applications, as well as delivering wide-ranging benefits such as increased passenger capacity."

Hytera

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Critical Communications Week helps sector engage online

November witnessed the first iteration of Critical Communications Week, a new online event enabling the sector to engage 'virtually' during the COVID-19 crisis.

Taking place across the course of five days, CCWeek included a virtual exhibition, as well as a range of conference content, aimed at filling the void following the rescheduling of Critical Communications World to later this year. In the words of the organisers, the conference featured "numerous expert speakers, covering a wide range of topics including TETRA, 5G, AI, drones, and more".

Conference presenters included Ericsson's global head of mission-critical networks, Manuel Ruiz, Nokia public safety business consultant Marc Balliet, Motorola senior vice-president of technology Paul Steinberg, and many more.

Ruiz focused on 'the journey to mission-critical 4G and 5G', highlighting in particular the importance of consulting with users, as well as discussing MNOs' increasing willingness to become involved in the public safety sector. "The market momentum is very interesting now," he said.

Taking place on the same day as Ruiz's presentation, meanwhile, chair of TCCA Technical Forum Harald Ludwig co-led a session discussing the recent progress of the ETSI MCX Plugtests programme. According to him, the fifth Plugtest, which took place remotely last year, consisted of 1,300 test cases executed across more than 170 sessions. There was a 95 per cent success rate.

As well as the main conference programme, the event also featured a whole day dedicated to sponsor organisation Critical Communications Finland. This included presentations centred around the ongoing roll-out of Virve 2.0, the country's burgeoning mission-critical broadband network. Topics ranged from the network infrastructure itself to the procurement of devices (for more on this, see page 24 of this issue, and our interview with Erillisverkot development manager Ari Toivonen).

Discussing 'the road to Virve 2.0' in his presentation of the same name, Erillisverkot head of department Antti Kauppinen said: "We've been tasked by the Ministry of Finance to move over to [the new system] by the end of 2025. We begin with a TETRA system [Virve] and end up with public safety over commercial technology."

He continued: "We only want to buy 3GPP-standardised solutions. That will help us gain a bigger ecosystem in the world and in Europe, so that we all do things in the same way. That is also to make sure that we have interoperability with other IT systems, and other nations."

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CCWeek was also used as the platform for the first virtual edition of the annual International Critical Communications Awards (ICCAs).

Following the event, CCWeek organisers announced that all the conference presentations were being made available online. Discussing this, a spokesperson for MA Exhibitions said: "This was a landmark event for the critical communications sector, and we're excited to be able to share every session from across its five days.

"Those wishing to access content can do so via the online programme. Simply click on the sessions you wish to see to gain hours of insight into the latest developments within the critical communications sector."

According to the organisation, CCWeek conference content will remain available for several months.

CCW rescheduled to November

TCCA has announced that Critical Communications World (CCW) has been postponed to November of this year due to concerns over COVID-19.

Speaking of the decision, a spokesperson for the organisation said: "With international travel restrictions certain to impact into the spring, Critical Communications World 2021 has been rescheduled to 3 – 5 November of this year. The event will still take place at the Feria de Madrid – otherwise known as the IFEMA – in Madrid, Spain."

Elaborating further, TCCA chief executive Tony Gray said: "Everyone involved in Critical Communications World must be able to prepare for the event with full confidence. They must be reassured that plans will not have to change, travel costs will not be wasted, and – crucially – that they will be safe.

"CCW is the largest and most important show in its sector. It will continue to bring the entire industry ecosystem together, setting the agenda for the future of critical communications.

"This is clearly a difficult time, and we are grateful to everyone for their continued patience and support as we reorganise. We have huge expectations for CCW 2021, and fully expect it to be one of the most successful - and enjoyable - shows in the history of the event."

According to the organisers, CCW 2021 will feature numerous masterclasses and conference presentations, led by industry experts from around the world. The conference will be free to attend for the first time.

New 5G specification schedule released

Several major developments have taken place in the realm of standardisation in recent months.

First, December saw 3GPP announcing a timeline for Release 17, following the recent plenary meeting of its Technical Specification Groups (TSG).

According to the organisation, the schedule will see the R17 stage two 'functional freeze' taking place this June.

The stage three protocol freeze will be in March 2022, meanwhile, with the protocol coding freeze following three months later in June. The timeline is based on the assumption that 3GPP will be able to conduct physical meetings in the second half of 2021.

Speaking of the plan, a spokesperson for the organisation said: "With remote working now confirmed as the norm [in early 2021], the [organisation] took the view that delegates need more time to be able to comfortably and accurately consolidate the results of their work. This guidance takes into account the fact that in the busiest groups, the stream of contributions can peak at over 1,000 emails a day.

"Only the timeline for the work has changed. The content of Release 17 remains as approved during the December 2019 TSG#86 meetings."

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In late October, meanwhile, ETSI launched a new set of DECT-2020 New Radio standards, known as the ETSI TS 103 636 series. According to the organisation, the new standard was developed to support "ultra-reliable, low latency" wireless IoT applications in the realm of voice and industry.

Discussing the standard, a spokesperson for the organisation said that it "defines an advanced radio interface applying modern radio technologies. It is designed to provide a slim but powerful technology foundation for wireless applications deployed in various use-cases and markets.

"The standard supports massive machine-type communication, in use-cases including logistics and asset tracking, building automation and condition monitoring. It is targeted for local area wireless applications, deployable anywhere by anyone in no time."

Speaking of the new standard, vice-chair of ETSI's DECT technical committee, Jussi Numminen, said: "The new standard brings mMTC and URLLC performance to a whole new level. This provides great flexibility to address large-scale and high-density applications in logistics and building automation, and low-latency applications in industry automation."

TCCA news

TCCA CEO Tony Gray has announced his intention to retire in June of this year, with the organisation subsequently beginning the search for his successor.

Discussing requirements for the role, chair of TCCA's board, Mladen Vratonjić, said: "The new CEO needs an in-depth knowledge of critical communications. [They need this] in order to properly represent the interests of all our members from around the world, to collaborate with our partners, oversee our programmes and maintain and enhance our public profile.

"We have achieved a great deal under Tony's leadership, and we look forward to the new CEO building on this, and further strengthening the association and the sector, to the benefit of all our members."

On the organisation itself, a spokesperson said: "TCCA is the catalyst for global, open standards [in] critical communications development. It has celebrated its 25th year with an increasing membership, new and ongoing involvement in many key projects across the sector, and the hugely successful global virtual event, Critical Communications Week.

"TCCA acts in the interests of its members to strengthen and enhance the critical communications ecosystem. This work is overseen by Tony Gray."

In other TCCA-related news, the organisation has collaborated with German critical communications organisation PMeV Netzwerk Sichere Kommunikation on guidelines to help control rooms connect to mission-critical services in 4G/5G. According to a statement, a number of international control centre operators are also participating in the project.

Gray said: "There is a vital need for guidance in the application of 3GPP standards to the connection of control rooms to critical broadband services and networks. This co-operation will develop an 'Implementation Guide for Control Rooms', agreed by the 65 participants in TCCA's control room workshop in 2020.

"The core thesis of this document is that only an internationally agreed solution based on global standards is economically attractive, future-oriented and permits interoperability."

Chairman of the PMeV board of management, Bernhard Klinger, said: "The connection of control centres is highly important for mission/safety-critical broadband applications, in order to meet the increasing demand for broadband services in mission-critical 4G/5G networks. PMeV represents the German interest in mission-critical communication standardisation, and will contribute to the international developments in this area."

Turn to page 28 to read an interview with TCCA CEO Tony Gray.

"We need to be meticulous..."

The first pre-verification of a mission-critical push-to-talk conformance test case has been achieved. **Philip Mason** talks to MCS-TaaSting project co-ordinator **Dr Fidel Liberal** about the implications for the sector

In the statement announcing the pre-verification, it mentions that the project involved "nine months of joint effort". Who else has been involved?

We developed as a consortium, consisting of a variety of organisations. On the academic side, that included Texas A&M University in the US, as well as the University of the Basque Country, which is leading the project. The latter is providing expertise on mission-critical protocols, while the former offers hands-on training for first-responders.

On the technology side, we have GridGears and Enensys, two companies developing the platform which allows testing to be carried out in the cloud, as well as eMBMS-capable RF equipment. Nemergent Solutions is providing the MCS client used to carry out the test. SONIM – the UE manufacturer – is providing LTE handsets-related expertise.

These organisations were joined by TCCA and the Public Safety Technology Alliance (PSTA), whose interest is in the certification process itself. We have also been collaborating with 3GPP RAN 5 working group and TF160.

MCS-TaaSting was initially funded by the US National Institute of Standards and Technology [NIST], who we approached as a consortium.

Could you go into detail about the 'pre-verification' process – what was the test case?

The test case related to the whole process from switching the terminal on to being ready for making a call. There are something like 45 steps, all of which have to be checked one at a time.

It is called 'pre-verification' because the testing took place over IP – using the so-called IP model – rather than LTE. However, the signalling is exactly the same as would be taking place in a real LTE network.

We have also completed an additional nine test cases, and are now working towards the so-called IPCAN mode. By the end of the first quarter of 2021, we're hoping to have the resulting tester ready for formal approval. This will enable real, binding, verification processes.

Why is it an important accomplishment?

It's important because stakeholders – purchasers, clients – currently have no globally certified means of testing whether what is being supplied matches the standard. This includes all current critical-communications-over-broadband roll-outs, such as the Emergency Services Network in the UK, and FirstNet in the United States.

The foundations for certification have been laid by the 3GPP RAN Working Group 5 (RAN5), which is obviously great. But as of this moment, there's no actual MCX certification programme in place because there's no conformance test tool available.

This is in contrast to the broader commercial telco industry where, since 2G, there's a global consensus to follow 3GPP specifications, as well as the availability of test tools to check it. Whatever the technology is within the commercial context, there's a set of technical specifications that define, to the bit level, how systems should behave.

The critical communication sector needs to have access to similar testing and conformance standards, in order to start building confidence within our community.

There's a general feeling currently that any certification programme would be several years away. This is why I think what we're doing will ultimately prove extremely valuable, enabling certification programmes to be in place much earlier.

What does the pre-verification/verification process involve? Could you provide a simplified description of the testing tool?

In essence, the tool provides a way of codifying the literal description of the test case – equipment A sends a particular message to equipment B. These definitions are set out in comprehensive tables defined by RAN5. However, for them to be useful they need to be transformed into a 'neutral' test automation language, called TTCN-3.

This can in turn be compiled into an automation engine. It can then be rolled out in the form of running code which generates every single message, and checks the format of the responses. To put it crudely, the tool acts as a kind of philosopher's stone for the testing of communications technology.

Why are the literal – 'prose' – definitions not adequate by themselves?

The central flaw with the natural language definition is that

MCS-TaaSting project co-ordinator Dr Fidel Liberal

there still may be room for interpretation. This is in regard to the level of detail when coding it into messages, as well as checking the results. The testing needs to be 'standardised' in the same fashion as the technology, and the TTCN-3 suite is how this is typically accomplished in the telco world.

If all the testers have is the 'prose', there is the opportunity for different behaviours, which is exactly what we don't want. For example, if easier-to-pass tests existed, it stands to reason that manufacturers will gravitate towards them, just for the sake of ease.

It's like taxes, which obviously people will avoid paying if there's a legal way to do it. That's why the use of TTCN-3 is now so widely accepted as a requirement to make sure that the certification process is correct.

With no uniform standardisation, you risk some vendors simply imposing the size of their market share in order to make slightly different, and finally incompatible, versions of the standards. We are running fast to prevent this from happening. This means developing the tools needed for conformance certification programmes, following the well-defined 3GPP procedure.

What are the key differences between the critical communications and commercial markets that make your project necessary? Standardised testing is crucial, so why was the only option to form a consortium and pursue funding?

The simple answer to that is the size of the critical communications market and, again, what's currently happening on the consumer side.

To address the first point, we are incredibly niche as an industry, which in terms of devices means that we only buy in the order of millions of units worldwide on an annual basis. You then compare that to the global consumer market, which sees more than 1.5 billion being sold every year. Those being the conditions, test equipment manufacturers are clearly going to address the commercial market first because there's less risk.

At the same time, this is all happening at the same time as 5G certification, which is where the real money is. Test equipment manufacturers – quite understandably – have lately invested all their resources in that area.

I would refer to the situation as a perfect storm, not dissimilar to the slow development which we're seeing around ProSe [proximity services]. It's pretty much the worst timing ever.

What implications does the current lack of conformance testing have for national mission-critical broadband networks which are already being rolled out? What is the real-world impact?

The implication is that, quite simply, there's no impartial, trusted party who can verify the technology. There are organisations like the Global Certification Forum (GCF) that already have mission-critical working items, but they're in a dormant state because there's no testing equipment.

There are also consulting companies in the field, as well as the operators themselves, who will likely carry out manual testing of what the supplier is deploying in the build-out of their network. But again, the current situation around testing means that there could be errors in the definition at some level.

When operators ask suppliers for assurance that they'll be clinging to the standards, meanwhile, the most they can typically give are statements showing internal commitment, and attendance of the ETSI MCX Plugtests. This enables them to claim that they have already interconnected with another vendor, or tested most of the defined test cases.

Obviously, this is incredibly important in itself, but the certificate issued afterwards is merely one of attendance. The Plugtests are all about interoperability not conformance certification. This is very important to understand.

The initial pre-verification test case was in relation to MCPTT. Are you focusing on mission-critical data and video as well?

As you say, at this stage, we have only MCPTT. The rest will follow as a waterfall, however, with a timescale of around two years. These are complicated processes and functionalities, and we need to be meticulous.

Ultimately, the work we're carrying out will provide value for everyone, whether they're involved on the supply side, or are an operator or a user. When the TTCN-3 coded test cases are verified, any testing tools manufacturer can make it run on their equipment. This is the only way to go about the process of building safe, effective, critical communications technology.

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Trusted ways, new thinking

Richard Martin gives an overview of the critical communications technology – both new and mature – becoming increasingly integral to the oil and gas sector

This is a story with three parts. First, narrowband technologies such as TETRA, P25 and DMR are still being deployed across the oil and gas industry, offering secure and reliable voice and data services. At the same time, we are also seeing the emergence of broadband networks such as private LTE, with their ability to provide rich data.

As wireless technologies enable machine-to-machine connection, meanwhile, the possibilities offered by automation – and eventually AI – will likely improve safety and reduce costs. The question is, what key factors are in play to determine which solution will suit a particular user's needs?

Emerging trends

As with many industries operating in the current global climate, oil and gas is being confronted by a range of challenges around revenues, as well as – according to industry specialist Futurelink – skills shortages. It therefore needs to employ radical thinking to help secure profitability going forward.

As mentioned, key to this are emerging critical communications technologies, such as AI and data analysis. With that in mind, Alexandre Giarola, director of commercial markets accounts at Motorola Solutions in Brazil, highlights the increasing role of video within the industry, coupled with analytical tools. "You have to remember that in this sector there are two dominant concerns: safety and security," he says.

"If you look back at the early days of video, it was mainly used to monitor entrances and key locations, [while at the same time] needing a human to watch screens and video walls. With high-resolution cameras, it is now possible to closely monitor processes and equipment, as well as human movements around major installations and at remote sites. This can be done by either a controller, or video analytics."

Giarola continues: "This new functionality could be used, for example, to see how a repair is progressing, or whether tools have been left behind, which may be a hazard. Video coupled with analytics tools will also determine whether intruders or vehicles are moving around within facilities. Video analytics are increasingly able to provide a dashboard approach, eliminating the need to watch multiple screens, while also quickly alerting controllers to any issues. [In the future], video may even replace other technologies such as RFID or other location systems."

Asked where wireless communications will fit into all this, Giarola responds: "Wireless eliminates the need to run cabling to cameras. We will see broadband technologies such as private 4G and 5G contribute in this area, once spectrum becomes available. Wi-Fi works up to a point, but lacks the reliability and security demanded in the industry."

Bullet-proof option

As promising as the new technologies discussed above are, Giarola also notes that the industry can be quite cautious when it comes to the introduction of new methods. One tried-and-tested solution, of course, is narrowband.

Discussing this, Giarola continues: "The oil and gas industry has the funds to experiment, but adoption [generally only] takes place once a technology is proven and secure. In the case of [Brazilian national oil and gas supplier] Petrobras, Motorola Solutions has rolled out P25.

"The P25 technology was selected by them to provide the necessary coverage, as well as easing the migration by working alongside legacy analogue radios. The roll-out is a good example of how narrowband still works well, in order to meet the needs not only in relation to secure voice, but also low-speed data over a wide area. The data from pipelines and pumps [is easily carried] over such radio networks."

Another country also still heavily dependent on the use of narrowband technology in the oil and gas space is Australia. One example of this includes the Barrow Island-based Gorgon LNG project, which uses a large TETRA network across its several gas fields.

Located off the coast of Western Australia, its communications also integrate personal location AVL/APL, automated vehicles, Zetron dispatch consoles, IP telephony and alarm monitoring. The Ichthys offshore LNG project – likewise situated in Western Australia – also uses TETRA for voice and data, alongside intrinsic safe terminals.

Moving on to the USA, meanwhile, Rick Nielson of Wisconsin-based Bay Networks describes the installation of TETRA at the massive Flint Hills Resources Pine Bend refinery in Minnesota.

> **Remember, in this sector, there are two dominant concerns – safety and security**

Both narrowband and broadband technology are being used in the oil and gas sector

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He says: "TETRA was selected, with the operation needing a 'bulletproof' solution. Bay installed two Powertrunk base stations, one in the north and one in the south [of the site], with directional antennas. Following network measurements showing 95 per cent coverage, a further site was added in the centre, with omni-directional antennas. In-building coverage has been provided by a fibre VBA network."

Nielson continues: "Sepura ATEX-standard 8X intrinsically safe radios are used. An initial 400 of those were supplied, with a total of 1,500 ultimately being needed.

"The challenges presented by the site include large amounts of metal, for instance in steel blast shelters. Also, the proximity to the city of Minneapolis made it necessary to carefully select frequencies in the 450-470MHz band, in part 90 and part 22. The latter of these had to be purchased."

Staying on the subject of Sepura, the company also produces a variety of other TETRA applications which it says are suitable for the oil and gas environment. These include AutoMate, which is a location application linked to RFID and GPS radio beacons, used to alert employees if they are entering a dangerous area.

Its SmartView TETRA product, meanwhile, provides control room staff with information on the location of workers, as well as their skills.

The developing broadband story

Ken Rehbehn is the senior principal analyst, critical communications, at OMDIA. Alongside many other areas of expertise, he also has a keen interest in the roll-out of LTE networks in the oil and gas environment.

According to him, one of the most interesting areas of work currently taking place is on oil rigs situated in the Gulf of Mexico, as well as the North Sea. Both are using LTE-based voice and data. "SCADA is still widely used, as it is well proven and secure," he says. "But, ultimately, LTE should offer a more capable and future-proof solution."

Elaborating on this, Rehbehn outlines the situation in the USA, where spectrum for private LTE is available in the 3.5GHz band. This in particular is being used in oil and gas, as well as other industrial cases.

This falls under the auspices of the CBRS (Citizens Broadband Radio Service) arrangement, whereby spectrum is shared with military communications, under the control of a spectrum administration architecture. This system is known as OnGo, and consideration is now also being given to extending it into the 3.7 to 4.2GHz bands.

As of 2017, there were 60 companies in the CBRS alliance – including the likes of Cisco, Ericsson and Nokia – and vendors now offer off-the-shelf solutions in this CBRS band. Indeed, Motorola has introduced its own CBRS solution called Nitro, which is a platform comprising management, data and voice, and an OnGo personal radio.

With that in mind, there are currently no direct equivalents to CBRS outside of the USA. The European Union 5G Observatory, for instance, reports that Germany, France, the UK, the Netherlands and Sweden are all allocating spectrum for 5G type and private networks in various frequencies.

Australia, meanwhile, is expecting to make it possible for new entrants to offer networks for public or private use. It may be possible to use US-originated ▸

CBRS solutions for oil and gas networks under these local arrangements. It has also been noted that network slicing in 5G should facilitate industrial users in such networks.

Going back to the subject of Brazil, there is currently no private broadband spectrum allocated, although there is some consideration being given to 3.5 or 3.7-3.8GHz bands. Speaking of this, Motorola Solutions' Giarola says: "Public LTE in Brazil may not be an option, as refineries and pipelines are usually at a distance from cities and towns. That said, spectrum may become available for private networks in the future."

Reno Moccia is Redline Communications' executive vice-president of sales and marketing. He gives a comprehensive overview of how the company services the oil and gas market, specifically in relation to mission-critical wireless broadband communications.

"Redline has been active in providing industrial broadband solutions for 21 years," he says. "We propriertised WiMax with software-based technology and have also developed a global offer under our Virtual Fiber brand. Our technology has been deployed in locations such as North Banks in Alaska, as well as in Baffin Islands, Canada."

He continues: "A few years ago, we acquired PureWave, which is a specialised LTE provider. We adapted its technology in order to offer our industrial private LTE solution, meeting the same environmental standards.

"To be honest, I would say that working on smaller LTE systems from the start gave us some advantages. For example, our 20W LTE eNodeB only consumes 75W, and can be solar-powered, which is hugely beneficial in remote locations.

"This type of industrial customer is not the primary interest for the major suppliers, but we can cost-effectively scale right down, providing a system for just 25 users if necessary."

Asked for his opinion on the availability of multiple frequencies, Moccia says: "Our technology is based on open standards, and we support the 3GPP LTE bands. In the USA, we leverage CBRS band 48, as well as other spectrums, such as Anterix 900Mhz. We're currently working on multiple systems for under-served areas on the East Coast.

"We also do business in Japan, where we have great traction with band 41, and in Chile with band 40. Interestingly, Canada is dragging its feet, with the incumbent telcos hanging on to frequencies."

Linking back to this article's earlier discussion of 'new' technologies, and in particular how LTE will be a key facilitator of these, he says: "Automation is a major driver for the adoption of broadband communications. With that comes increased plant safety, as well as efficiency.

"Another example of an incredibly interesting use-case is the ability to remotely monitor oil wells. This will allow companies to monitor temperature, flow, leaks and emissions, while keeping the workforce out of harm's way and maximising extraction."

Continuing this discussion, Redline also points to the 'enhanced oil recovery' techniques (such as injecting CO2 or water), which are now being used by operators to extend the life of wells, as well as extracting 'heavy' (that is, incredibly high-density) and 'extra heavy' oils. In this case, communications networks will need to extend central applications to workers in the field, as well as bringing data from the field back, in order to closely control multiple wells in real time.

Regarding the last use-case, Redline points to its Intelligent Digital Oilfield solution. A critical element of this is a 'virtual fibre' transport system, which started as a derivation of WiMax but more recently is 4G-based. These provide gigabit data streams between different facilities. According to the company, high speeds of around 160Mbps are achievable over short distances using the technology. Lower speeds over 40km are also available.

Finally, *CCT* asks Moccia about the future use of broadband, specifically whether 5G will become part of the Redline offering. He is unequivocal: "Yes, but 4G is currently meeting the needs of this industry both in terms of bandwidth and capacity, as well as coverage. I would see 5G as an enabler for IoT when the density of devices exceeds 4G capacities."

Other companies active in this space include Airbus, with its MCx solution, linking narrowband and broadband networks. The company sees a place for both 4G and 5G within oil and gas, conceiving both as genuinely transformative in terms of safety and enhancing processes.

During evolution and transition, however, Airbus stresses that the continued operation of narrowband should be ensured.

The choice

In the choice between narrowband and broadband, the decision may ultimately lay with the type of facility involved. For instance, larger, more dispersed facilities may still be good candidates for narrowband, where the need is for voice and low-speed data.

Regarding LTE, meanwhile, it is clear that the use of private networks is on the rise. There are ongoing issues, however, not least around the availability of spectrum.

For the ever-cautious oil and gas industry, there are plenty of proven narrowband and broadband systems which can be matched to its specific needs. Mix in the possibilities of automation and AI, and we will undoubtedly be watching the sector with keen interest for years to come.

Article written with invaluable input from Kevin Graham and Anton Abrahams.

Photo credit/André Ribeiro

The oil and gas sector presents a variety of challenging environments

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Maintaining positive energy

Philip Mason explores the use of cutting-edge critical communications in the distribution of electricity, focusing in particular on an ICCA-winning project in Poland

Critical Communications Week – which took place in November last year – was a first for the industry in many ways. Naturally, there was the 'virtual' conference and exhibition, staged in order for the sector to meet and interact at the height of the COVID-19 crisis. At the same time, however, the event was also the setting for the first-ever online iteration of the International Critical Communications Awards.

While last year's awards were by necessity much smaller in scale than would usually be the case, the four categories that were included still represented a very decent cross-section of best practice across the sector. They also, for the first time, focused exclusively on specific roll-outs, again spread across a variety of different verticals.

With that in mind, over the next few issues we are going to focus on some of the winners of last year's awards, starting with the category of Best Use of Critical Communications in Utilities. This was won by Motorola Solutions, in recognition of its work with Polish energy distributor Energa-Operator, rolling out a new TETRA system.

The second part of the article will drill down even further into the distribution piece, meanwhile, featuring an interview with the Wi-SUN Alliance. The organisation describes itself as delivering "field area network certification to accelerate IoT end device interoperability", with a huge part of its work taking place in the realm of smart meters.

Continual monitoring

According to figures quoted by Motorola Solutions, Energa-Operator's electricity distribution network covers almost a quarter of Poland. It provides power to nearly three million private customers, as well as 200,000 businesses.

The operator's new TETRA system – again, according to Motorola – provides voice communication (naturally enough), while at the same time helping to monitor the distribution network for faults, as part of an integrated SCADA system. To quote a press release regarding the project: "The independent communications network based on the TETRA standard enables Energa-Operator to operate efficiently day-to-day, and even in extreme crisis situations where the continuity of supply is essential."

Magdalena Potejko-Malicka, director of sales Poland for Motorola Solutions, was at the centre of the roll-out of the Energa system. Discussing the origins of the deployment, and what problems the technology is intended to solve, she says: "The core need on their part was the ability to manage the network in the event of a failure of power.

"They needed to be able to quickly locate and isolate areas of the network where things had potentially gone wrong, in order to be able to attend to the problem immediately. They previously relied on GSM, which while by no means a bad solution was not ideal for the situation in question because it, likewise, would have been affected by the power outage.

"Before the TETRA system was in place, in some circumstances, they would have needed to employ some kind of manual override procedure. Someone would have literally travelled to the affected location, before coming back to the dispatcher to confirm verbally that it needs to be switched off. The disconnection needs to be double- and triple-checked before any of their repair units can be sent out."

According to Potejko-Malicka, the roll-out consisted of a number of base stations, alongside TETRA modems, connecting to the SCADA switches. At the same time, the new technology also needed to connect with the incumbent dispatcher system, as previously developed with Energa-Operator by a third party.

Needless to say, this all had to be done with absolutely no disruption to business-as-usual operations, in order to avoid – ironically enough – any issues when it came to maintaining a constant supply of energy. As Potejko-Malicka tells it, this essentially meant that delivery had to take place across multiple sites at once, rather than by sub-region.

Going into greater detail about the operation of the technology, she says: "The job of the SCADA system is essentially to provide continual monitoring, with information being sent back and forth via the use of the narrowband short data service [SDS].

"This is now the method through which the regional dispatcher is informed that there might be a problem. At the same time, the dispatcher can also send messages back, again via SDS. This constant status confirmation is crucial to let everyone involved know that, yes, the network is shut down at the appropriate points."

She continues: "There is obviously also a voice element to the system. Again, they were previously using a mixture of analogue and GSM. In reality, the company was using whatever they could – when they had coverage, the field operatives used cell phones."

As mentioned, the Energa-Operator roll-out received this year's ICCA for the best use of critical communications in a utilities environment. That being the case, you can't help but wonder what raised the deployment above the other candidates. Was this not, after all, just a relatively straight-forward adoption of an already-known-to-be incredibly reliable technology?

One answer to this is likely to have been the scale of the project, as well as the speed at which it was carried out. It probably doesn't need repeating, but it can't hurt – the Energa-Operator network covers just under 25 per cent of Poland, a figure which equates to somewhere in the region of 78,000 square kilometres.

The other reason – at least according to Potejko-Malicka – meanwhile, is the scale of innovation which the project brought to the customer itself. And, more to the point, Motorola Solutions' focus while working with that customer.

Discussing this, she says: "The implementation of the new TETRA system was a huge innovation for Energa-Operator, literally going from analogue to digital. It wasn't simply an upgrade – it's enabled an entirely new way of working from their point of view.

"One of the questions I was asked by the jury was the value which we brought to the customer. Energa as a company knows the benefits of TETRA, and they knew exactly what they had before. At the same time, they also know exactly how they want to use it to further improve their operations."

Two phases

Broadly speaking, there are two phases when it comes to the distribution of electricity. The first involves the infrastructure which we have just been discussing, otherwise known as the 'transmission grid'. This is the environment through which power is transported from a generating site (ie, power stations, renewables, etc) to a substation, primarily via the use of overhead wires and underground cables.

> **"The second phase is known as 'electric power distribution', which delivers the product to the customer"**

The second phase, meanwhile, is known as 'electric power distribution', which ultimately delivers the product to the consumer. Without wanting to simplify the process to the point of absurdity, this involves the use of what are known as 'distribution transformers', whose job it is to lower the voltage to the point where the electricity can be harnessed in a private or business setting. The final link in the chain are the electronic user devices themselves, alongside the meters through which the aforesaid usage is measured.

Remaining on the latter devices, metering is also a field that is seeing major changes when it comes to the use of technology. Whereas the distribution companies are continuing to fully embrace TETRA, however, use-measurement is becoming increasingly broadband-focused.

One organisation at the heart of this is the Wi-SUN Alliance, which was formed in 2011 to – according to its website – "drive the adoption of interoperable smart utility networks, as described by IEEE [Institute of Electrical and Electronics Engineers] 802.15.4g". Promoting and certifying wireless field area network technology, its members include the likes of Cisco, Itron, Landis+Gyr and Toshiba.

Discussing the benefits of smart metering compared with its electromechanical equivalent, Wi-SUN Alliance president/CEO Phil Beecher says: "In terms of benefits, the main advantage – to both the consumer and the power companies – is automation. Whereas previous iterations of the technology had to be 'read' manually, smart meters provide a ▸

The Tokyo Electric Power Company has a rolling programme of around 30 million smart meters

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constant flow of usage and other measurement information taking place in real time.

"From the point of view of the providers in particular, that means increased efficiency and accuracy when it comes to things like outage management, voltage adjustment, monitoring energy theft and so on. They also make it easier to manage power from renewables, which can cause problems when it comes to grid stability. If the wind drops, suddenly you've potentially lost a gigawatt of power."

Going back to the subject of voltage adjustment in particular, Beecher elaborates by discussing the basics of the process of supplying power, something which has traditionally involved a certain amount of 'losses'.

"A large amount of loss has always taken place on the distribution network," he says, "due to there being a minimum voltage required at the customer premises. To achieve this, the distribution networks tend to run 'over' voltage, so that by the time it's gone through all the losses, the amount required by the user is still guaranteed. That extra voltage accounts for quite a significant energy loss.

"If you can measure the voltage at every meter coming from a substation, you can deliver just the right amount of voltage and reduce your losses. This is one of the things which smart metering enables us to do."

As discussed, as an organisation, Wi-SUN Alliance is primarily focused on questions of standardisation. At the time of writing, it boasts a membership of 250 companies, and has certified more than 200 products ranging from network nodes to IP network bridges.

According to Beecher, this is important for any number of reasons, many of which won't exactly be unfamiliar to regular readers of *Critical Communications Today*. These include the need to ensure interoperability, while at the same time avoiding the kind of vendor lock-in which not only stifles innovation but also the marketplace itself.

On the current situation around the world and the influence of the Wi-SUN certification programme, Beecher says: "There's a huge drive in South America now, as well as across Asia, as evidenced by the work of the Tokyo Electric Power Company [TEPCO]. They have a rolling programme of something like 30 million smart meters now, about 95 per cent of which are on a Wi-SUN capable wireless mesh network [rather than consumer broadband].

"There's also some fantastic work going on in the US. The initial drive for Wi-SUN was actually in relation to Pacific Gas and Electric, and Florida Power and Light, both of whom were convinced by the technology at an early stage. They'd already invested in wireless mesh from a Silicon Valley start-up, but were concerned that they were going to get stuck if the company disappeared or stopped producing."

This last point leads very neatly to the subject of vendor lock-in, something which Beecher claims has bedevilled the industry in the past. He illustrates this once again by bringing in the example of Japan which, prior to the Fukushima nuclear disaster in 2011, saw the major utilities companies apparently using preferred suppliers, offering proprietary technology.

On this, he says: "After Fukushima, the Japanese government began to insist that power companies needed to introduce energy conservation programmes, using equipment based on open standards, while at the same time putting out open tenders.

"What we're seeing now is these companies starting to deploy a mixture of different technologies. This has in turn seen a positive reaction from the likes of [meter and software manufacturers] Itron, and Landis+Gyr, which have started their own partner programmes."

The efficient – uninterrupted – distribution of energy is crucial for the continued functioning of society at all levels. Communications technology is playing an increasingly integral part in the process at every point.

Renewable sources of energy can introduce instability into the grid

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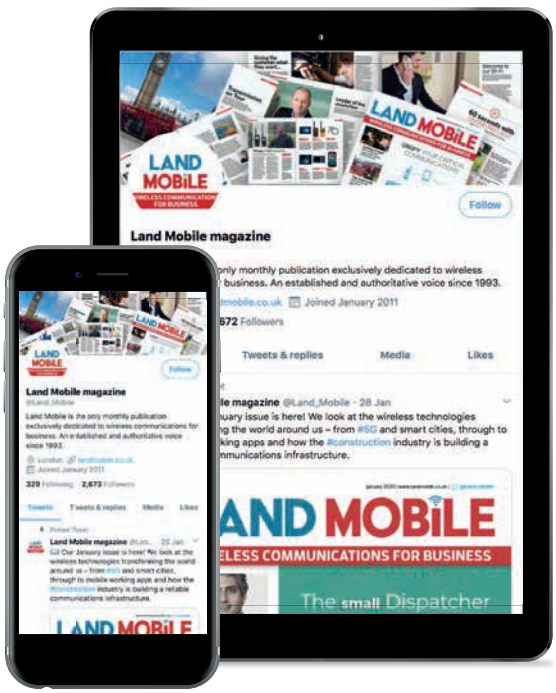

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Learning from the past

Philip Mason talks to Avon Fire and Rescue Service in the UK about the brigade's ongoing effort to digitalise its incident command in collaboration with Airbus

The Grenfell Tower fire, which took the lives of 72 people in 2017, was one of the most serious and deadly incidents dealt with by London Fire Brigade (LFB) since the Second World War.

As well as being an appalling day for the people of London, however, it also marked a low for the brigade itself, which at the time drew criticism for aspects of its response. This revolved around what an official inquiry referred to as "systemic" failures, despite the "extraordinary courage and selfless devotion to duty" of firefighters.

As difficult as it was to hear at the time, this criticism will likely prove invaluable from a learning perspective going forward. This is something which has already been tacitly acknowledged by the brigade itself, specifically in its comprehensive response to the recommendations made in the aforementioned inquiry. Actions prompted by that document include the drafting of new guidance on tackling high-rise fires, the promise of drones to aid future response, and more.

At the same time, the brigade is also looking at aspects of its critical communications strategy, for instance around how it manages information. The most obvious example of this – and work which is already well under way – is upgrading the servers on its command units. According to a subsequent paper published by the Mayor of London, this will enable it to "enhance the connectivity and usability of the Command Support System software".

As much of a learning experience as Grenfell has been for LFB, however, there is clearly plenty that other UK brigades have been able to take from that appalling day. This is apparent in recent procurements by organisations such as Avon Fire and Rescue Service, which has worked with Airbus to roll out new incident command software.

The main purpose of this technology is to achieve a more comprehensive operational picture in relation to resources deployed on the fireground. At the same time, it also provides – according to the service – an end-to-end audit trail regarding decisions made throughout the course of an incident.

Work in progress

As special projects station manager for Avon Fire and Rescue Service, Ben Thompson has responsibility for the deployment of the new system. Discussing the origins of the Airbus collaboration, he says: "We've been using the company's technology for a long time, including its ScCapture, ScCourier and Mobile Data Gateway products. We've now rolled out SAFEcommand, which will improve management of the incident ground."

Increased situational awareness is essential on the fireground

He continues: "We started thinking about this around 2018, before finally putting pen to paper and going to work on the project at the beginning of 2019. The roll-out coincides with our new command unit vehicle, as well as – of course – some of the learning which came out of the Grenfell fire."

Airbus describes its incident command software as a "mobile information system" delivering "frontline crews direct access to command and control information and risk data from the incident, using tablets, smartphones and in-vehicle PCs". At the same time, it also collates information for the benefit of commanders, allowing them to track the deployment of assets on the fireground.

It does this via the use of the aforementioned mobile gateway, which facilitates communication between

> **"The lay-out of very large premises often makes it difficult to keep track of resources on the ground"**

appliance mobile data terminals (MDTs) and a centralised location (represented in the case of Avon FRS by the control room, as kitted-out by Capita). 'Message types' include radio and GPS data, as well as status updates, SMS and more.

Discussing the specific problems which the software is intended to solve, Thompson says: "At its core, the technology enables us to get a handle on the multiple, simultaneous flows of information which we have coming into incident command at any one time.

"If you think of a standard incident, we've got information coming in from control, from our officers and appliances on the ground, as well as external agencies such as other emergency services. Examples of that could include GPS data from our appliances and situational updates via the control room, the latter of which would have been traditionally passed on through [UK TETRA network] Airwave. That all has the potential to be quite chaotic.

"The new software provides us with a range of functionality such as organisational charts, mapping, as well as a timeline of events. What that means in essence is that I can capture and collate all the information in one place in real time, which makes things much easier to process."

Returning to the subject of radio communication, he continues: "While it would be inaccurate to say that we're trying to engineer out the use of voice altogether, we're certainly trying to rein it in, at least to a degree. Depending on the situation, there are quicker – less labour-intensive – ways of passing on critical information."

Going deeper into the 'organisational chart' aspect of the solution, Thompson outlines a hypothetical scenario involving a number of appliances in attendance at a local DIY superstore.

According to him, the lay-out of this kind of premises has traditionally made it difficult to keep track of resources on the ground, simply because it tends to provide so many places to park around the building. With the SAFEcommand software, this is apparently no longer an issue, with the attendance information being presented via a single visual interface, as communicated by GPS.

"At the same time," he continues, "the technology can also help us to keep track of firefighters themselves. If we have a fire in a multi-storey building – which will generally have limited vehicle access – crews will tend to disappear into side alleys as well as different parts of the building. At that point the GPS on the fire appliances isn't really any use.

> **"We used to write up incidents by hand. That's ok, but what if it's blowing a gale at two in the morning?"**

"What the electronic organisation chart does in that situation is help us keep up to date with the specific sectors across the fireground. We can't electronically track individual firefighters as yet, but we can make sure that we're always aware of where people are meant to be during a given incident."

Another function of this aspect of the software is the ability to capture the details of personnel from across other organisations. This could include other emergency services, as well as representatives – for instance – from the power or water supplier.

Speaking of this, Thompson says: "We've always logged that other emergency services are in attendance, usually over Airwave. What's far more useful is to know how many police officers and paramedics in total are on scene, as well as their names and contact details."

Timeline functionality

Avon FRS clearly believes that its new command software will make an impact when it comes to real-time incident management. At the same time, however, the solution also enables the brigade to provide a comprehensive audit trail, in terms of both decisions taken, and resources deployed, at the scene. This takes place via what Thompson calls its 'timeline' functionality.

Discussing why this is so important, he says: "Another reason for adopting the technology has been the criticism levied at the service nationally, saying that decisions are not always documented as thoroughly as they could be. Again, this is something that we have to make sure we do better.

"The environments which we operate in are often massively dynamic, with the potential to change from one moment to the next. The decisions we take within those environments, meanwhile, will likely have an enormous impact, both on the surrounding community and the direction of the incident itself. If we decide to close Bristol Temple Meads railway station or the M32 motorway, we need to make sure there's a clear audit trail letting people know why.

"In terms of the software, this is achieved via the timeline, on which key decisions are logged as the incident progresses. Years ago, we used to write up incidents using our pocket notebooks. That's great, but what if it's pouring with rain and blowing a gale at two o'clock in the morning?"

As is probably obvious by now, Avon Fire and Rescue Service is in the process of updating its critical communications capacity across the board, something which will inevitably also influence its wider processes. This is apparent in its new incident software, as well as the mobile command unit mentioned at the beginning of the article.

According to Thompson, though, the service is also planning to add another layer of agility by enabling crews to remove mobile data terminals from the appliance. "We've just had sign-off to buy four Panasonic Toughpads," he says, "which we intend to keep completely free from the fire engine.

"We're purchasing those as part of a trial, with the intention of deploying them to forward sectors or bridgeheads. That then gives us a way to connect to the vehicle remotely – via the Airbus software – giving firefighters access to information where it will likely be most useful to them."

He continues: "Connected to that is the ability to share risk information, which is something that we're also currently looking at. We're in the process of upgrading all of our high-rise floorplans, information which, again, we're planning to make available to firefighters on the frontline. It's fine having that information available in the vehicle, but it's even better having it on the eighth floor."

The Grenfell fire has had a profound impact on the UK fire and rescue service, with the changes currently being made by LFB also resonating across the rest of the country.

In turn, these changes are being hastened by increasingly sophisticated communications technology.

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Looking for answers

Following the recent Virve 2.0 device RFI, **Philip Mason** talks to Finnish operator Erillisverkot, as well as Samsung, about functionality, user requirements and obsolescence

There are currently three countries already well under way with the roll-out of mission-critical broadband to their emergency services, including the UK, the US and South Korea. All three nations are in the advanced stages of infrastructure build-out, something which in turn has led to users being able to take advantage of a variety of functionalities.

As important as these trailblazers are, however, it is possible that it is only with the imminent second wave – as represented by the likes of Norway, Finland and France – that the process may start to become more refined.

After all, these latter programmes will have had the chance to absorb whatever learning has come out of the experience of FirstNet, SafeNet and the Emergency Services Network. Likewise, the technology itself will also have had a greater chance to mature and develop, with the twin holy grails of MCPTT and ProSe (proximity services) now starting to move towards full viability.

One of the furthest-advanced of these latter projects is Finland, which has taken any number of steps forward over the past 12 months, not least in the decision to bring Elisa and Ericsson on board to help construct the new network (aka Virve 2.0). In typically proactive fashion, meanwhile, Finnish operator Erillisverkot also recently put out a request for information (RFI) around devices.

According to a statement published at the time, the RFI went out in order to gather information about "the types of devices that users want or expect to use, and the type of devices that manufacturers intend to provide". Naturally enough, those questioned included both users as well as the market itself.

Nationwide emergency services broadband is well underway in the UK, the US, and South Korea

Discussing engagement with the emergency services – as well as elaborating on the reasons for carrying out the RFI in the first place – Erillisverkot development manager Ari Toivonen says: "The rationale for putting out the RFI was simply to get a decent overview of what was available when it came to the market.

"Other programmes have obviously gone with different models, which is fair enough. But we came from the point of view that we didn't want to miss anything, so we opted for a public RFI instead of discussions with some limited set of suppliers only.

"At the same time, we also needed to get a decent idea of the needs of our public safety agencies at a comparatively early stage. Users are often extremely demanding in terms of what they want from a device, and we needed a comprehensive view of their expectations."

He continues: "In terms of the results from the RFI, we wanted to be incredibly open about what we found, and share the information with anyone who could potentially find it useful. That feeds into the other reason for putting out the RFI, which was to make users and manufacturers more aware of one another; to illustrate the existence of a potentially thriving market."

Going back to the user consultation in particular, Toivonen says the core aim was to develop a clear understanding of everyday usage, focusing on a variety of different operational areas.

This information was gathered using service design

methods, including – for instance – a series of workshops, with each containing between 10 and half a dozen participants.

According to him, key themes to come out of this work included the need for ruggedised equipment ("because things break"), as well as the importance of simplicity when operating the device in the field. Another important requirement clarified by the process was the overwhelming user desire to carry as few devices as possible.

Elaborating on this, Toivonen says: "The holy grail is ultimately just to have one device, but as with everything else, it's a matter of figuring out whether this could actually work. According to the IT departments we spoke to, at the moment, some users carry a couple of radios as well as multiple smartphones. We've heard about people carrying something like eight devices.

"We're obviously at an early stage, but one potential model we're looking at is the use of a single smart device as a kind of hub inside a vehicle, with others linked via Wi-Fi or Bluetooth."

As difficult as it clearly is to decide upon a device for what might be termed general usage, perhaps even more challenging are those destined to be rolled out within specific – often unique – operational contexts. Regarding Finland in particular, it probably won't be a surprise to learn these often involve extreme cold, as well as vast, often deserted, areas of remote terrain.

Outlining the specific requirements of those charged with patrolling the country's wilderness and border areas during the harsh winter months, Toivonen says: "Emergency services personnel operating in these more remote places may have to travel using a type of snow mobile, known also as a ski-doo. During the colder parts of the winter, temperatures in the northern parts of Finland can drop down to minus 30, or even lower.

"These users obviously have a very specific set of requirements when it comes to communications equipment. For instance, the devices clearly have to be able to survive extreme drops in temperature. At the same time, they also need to be operable while on the move, and while the rider still has their gloves on."

He continues: "Another potential issue – again – is the number of different devices that might be needed in the field. This could include a fixed radio on the ski-doo, but also a personal one for when you jump off the vehicle. We then need to figure out a way to keep the control room informed of exactly what you're doing and where you are.

"This is a perfect illustration of why it's so important to facilitate contact between users and manufacturers. We had a session where one of our users asked about temperature range, and the response was, yes, the device works all the way down to zero degrees. That's great, but what about the Finnish winter? If it doesn't work in or below freezer temperatures, we can't sell it to anyone."

The other big question to ask users, of course, is how they actually feel about losing the incumbent Virve system. Do they have any misgivings about replacing something as ultra-reliable as TETRA with a broadband network, potentially based on a commercial offering? How is Erillisverkot working to reassure them?

"While not part of the RFI, user assurance is of course something that we've had to address," says Toivonen, "and, to be fair, there has been a certain amount of trepidation."

> **A big focus is on budgeting and the lifespan of the technology**

He continues: "Users want to know the details around the technology, which includes devices, applications and so on. That's perfectly understandable, of course, but at this moment in time, it really has to be understood as a work in progress.

"At the same time, there's also discussions around budgeting, a big focus of which is the lifespan of the technology. Again, the users want to know what they need to put in their budgets now in order to buy devices, perhaps a year or more later. However, there's a fair chance that any device we can name now will be obsolete, either by the time you buy it or soon afterwards. None of this is easy."

Commercial potential

As discussed above, a big part of the Finnish RFI has involved in-depth consultation with a range of emergency services users. At the same time, however, Erillisverkot has also invited the manufacturers themselves into the conversation, in order – at least in part – to facilitate dialogue with potential customers.

According to Toivonen, though, there was another reason for getting technology companies involved, with the operator also seeing the request for information as an opportunity to shine a light upon the commercial potential of the sector.

One company which is already heavily involved in the critical communications sector, however, is Samsung, which in 2017 won the contract to provide devices and accessories to the UK's Emergency Services Network. According to its UK head of public safety, Nick Ross, meanwhile, it also ▸

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> **We've already seen how useful broadband communication can be when deployed in the public safety sector**

already provides a vast number of – non-mission-critical – smart devices to UK police forces.

Discussing the current market conditions, as well as the reasons why Samsung has been so enthusiastic when it comes to engaging with the sector, Ross says: "Critical communications is indeed a niche industry, but it is also a vitally important one. ESN is obviously very high-profile in terms of the contract, but we've also been involved in SafeNet in South Korea, as well as FirstNet in the US."

He continues: "I've often been asked why Samsung are in the space, because, obviously, we're not known as a player when it comes to digital radios. The first reason is the experience we have with national procurement, both with the projects I mentioned and via Samsung divisions such as Techwin, which supplies major defence contracts.

"The other factor is that we've already seen how useful broadband communication can be when deployed within the public safety sector. For us, that began with the South Korean Sewol ferry disaster in 2014, after which we were called upon to build a device for use by the Korean emergency services."

According to Ross, the latter experience illustrated not only how useful the technology could be when deployed on the frontline, but also that the critical comms sector was viable as a business proposition. This was likewise previously borne out in the UK, when the company got involved with the – now ubiquitous – police mobile working app Pronto, in collaboration with original developer Kelvin Connect.

Speaking of this, he says: "I first joined the business around 2012, at which point we were just starting to discover the potential opportunities around mobile devices for business applications. Kelvin Connect – who were really a start-up from Glasgow University – started working with some early adopters, and I saw the opportunity there.

"Eight years down the line, and the 'workflow' business case is now well and truly exploited. By the time we'd won the contract for the Emergency Services Network, I'd estimate that around 80 per cent of police officers in the UK were already using a Samsung device as part of their daily operations."

As Ross tells it, it is apparent that two fundamental things are required for broadband device manufacturers to make a go of it in a sector such as emergency services communications.

The first of these is the capacity – not to mention the will – to deliver at scale, despite a potentially limited customer base (at least compared with the literally billions of devices sold to the general public every year). Just as important, however, is the desire to actually invest in the development of the technology itself, for instance in relation to specific functionalities such as mission-critical push-to-talk and ProSe.

For Ross, this is illustrated by the company's ESN offering, which is based on the company's premium rugged series of consumer devices. Elaborating on this, he says:

"Under the hood, they're essentially our highest grade of consumer devices. The chipsets and architecture are taken from our premium range, which are much more powerful than any bespoke radio equipment that you could find on the market.

"In terms of specific use by the emergency services, they're obviously ruggedised, with bespoke casing, removeable battery and so on. The Galaxy XCover FieldPro – which is the official title for our emergency services device – will obviously also support MCPTT and ProSe, functionality which is continuing to develop as we speak."

He continues: "The advantage I would say that we have over other manufacturers is our ability to build everything in-house, including the architecture of the devices themselves. This is why we've been able to advance to this point, with perhaps less dialogue with [global chipset manufacturer] Qualcomm than other vendors might have to engage in.

"It really is a question of scale for the industry at this point. Even with ESN and FirstNet well on the way to being rolled out, it's still very challenging for national governments to really exert pressure on [other] suppliers to take mission-critical broadband seriously as a viable market."

Lingering questions

As indicated by the above, Samsung would appear to have an advantage within the critical comms industry, by virtue

Photo courtesy of Erillisverkot (photographer: Olavi Airaksinen)

Winter in Finland tends to mean extreme cold

of the apparent scale and diversity of its manufacturing and development operation.

That being the case, however, you can't help but wonder what the real-world situation might be for emergency services users on the ground when it comes to the market as a whole.

How close are public safety users to being considered a truly 'influential' voice, for instance, despite the disparity with the consumer market? How exactly will something such as obsolescence be addressed, particularly at a time when public safety organisations are already massively short of cash?

For Toivonen, the solution to the latter question still remains to be found. He does admit, though, that it would be helpful if the industry were able to commit to individual devices for longer periods of time. This would not only mitigate any potential extra cost, but also insulate individual IT departments from the possibility of continual change.

For Ross, meanwhile, the answer lies in the fact that emergency services are rolling out smart devices already, pretty much across the board.

Speaking of this, he says: "It's true that a broadband device is going to be a much more expensive piece of glass than a TETRA radio. It's also true that the former is going to be impossible to keep current in the same way, due to updates coming from Google Android rather than device manufacturers themselves. Functionality is the name of the game, and with Android there is often a hard cut-off point for security reasons.

"With that in mind, we need to make sure that we're supporting the new devices for as long as possible, which is something which is already happening with ESN. And we are also working with Google themselves and the AER [Android Enterprise Recommended] programme."

He continues: "Going back to the question of cost, we believe that the capabilities of these devices will balance out the money which is being spent. We're taking users on a journey far beyond what they can currently do with Airwave.

"The key point from our work with Pronto is that the business case allows the devices ultimately to pay for themselves. We already know that police are willing to spend, say, £900 – including the device, accessories and management tools – every three years just to do applications, so programmes like the Emergency Services Network are really just an extension of that. The onus is ultimately on the user to exploit the technology to its full potential."

The coming year will likely see huge developments in the ongoing roll-out of mission-critical broadband across nation states. Keep reading *Critical Communications Today* for all the latest updates.

Start of a new era

Ahead of his planned retirement in June, TCCA chief executive Tony Gray discusses his hopes for the sector, as well as predictions for the organisation

What's been the most important change to the critical communications landscape during your time as chief executive?

I think the most fundamental change I've seen is in the drive towards enhancement of what were previously considered to be strictly commercial and consumer standards, such as 3GPP LTE and 5G for mission-critical use.

Throughout the course of my career, it was always considered that use of necessarily niche standards such as ETSI TETRA was the only way to ensure delivery of the levels of functionality, security, reliability and resilience that are essential for critical use.

However, in the past several years it's become clear that, in fact, despite its relatively small size, our sector can wield enough heft in global standardisation forums like 3GPP to have its particular needs and requirements taken into account. This has taken place through continual effort and engagement.

Why do you believe that change to be important?

It has been recognised throughout the journey towards adoption of enhanced mass market standards and technologies that economies of scale could be achieved if critical users became a segment of a much wider global ecosystem.

I believe we're beginning to see the fruits of our labours in this regard. The groundwork has been laid for even-more-functional and better-value broadband solutions, for the future of critical communications.

What will be the impact of 4G and 5G, not just operationally but in terms of the market?

Again, with some critical users and applications gradually migrating to substantially mass-market solutions for both infrastructure and devices, I believe we'll see not only greater bandwidth – and hence functionality – but also the economic benefits of scale.

In my opinion there will also be a natural tendency towards convergence of different market segments having similar or complementary requirements.

A variety of verticals, such as the automotive, rail and industrial automation sectors, could end up having a substantially similar – and louder – voice in driving requirements.

Not including broadband, what are likely to be the most impactful technologies going into the future and why? Where will innovations such as artificial intelligence fit in?

On the back of the data revolution enabled by higher available bandwidths, I believe the future will be all about applications. That means the 'apps' we're all so used to on our smartphones, but also the range and types of usage that can be made of critical communications bearers.

New technologies are continually emerging and developing, such as artificial intelligence, augmented reality, robotics and so on. All of these rely on having reliable and ubiquitous access to volumes of data.

Future critical users are undoubtedly going to find many and varied innovative ways to apply these and other new technologies to their work and daily lives.

Where will the TETRA standard be in five or 10 years' time?

TETRA has been, and remains, the gold standard for critical voice and short data functionality and security. Everything I see from the market, and specifically in the work of the ETSI Technical Committee TCCE, tells me that this will continue.

TETRA will be a significant candidate as a premium quality standard and technology choice for at least the next two decades.

How do you expect TCCA to evolve? What would you like to see?

I'm incredibly gratified that during my tenure as CEO we are greatly extending and enhancing TCCA's mandate, reach, as well as its influence.

The organisation is now truly representative of the critical communications sector as a whole and across the entire space. This is regardless of which standard, and whether public, private or hybrid operators, and in all parts of the world.

This has been achieved in great part through partnerships with the likes of 3GPP and ETSI, as well as other like-minded organisations including GCF, 450 Alliance and EENA. I hope that TCCA can maintain the momentum and build on these foundations by continuing to expand and grow its messaging and influencing abilities.

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A message from BAPCO president John Anthony

Welcome to the preview for BAPCO: The Online Event, which this year replaces our annual March Conference & Exhibition, now taking place in October. While we are disappointed that we've had to reschedule our Coventry event, we know that this fantastic virtual experience will provide massive benefit to the sector, all from the comfort of visitors' own homes.

The exhibition and conference profession has learnt much over the course of the past year, having had to adapt to the drastically changed environment occasioned by COVID-19. As the voice of the public safety communications sector, BAPCO cannot afford to stand still either.

With that in mind, BAPCO: The Online Event will bring together the key companies from across the industry to do business at our innovative virtual exhibition. At the same time, conference attendees will hear about the latest ideas and innovations from a range of presenters, including users, operators as well as manufacturers themselves.

"Book early for the conference sessions that interest you, not only to listen but to engage with experts from across the industry"

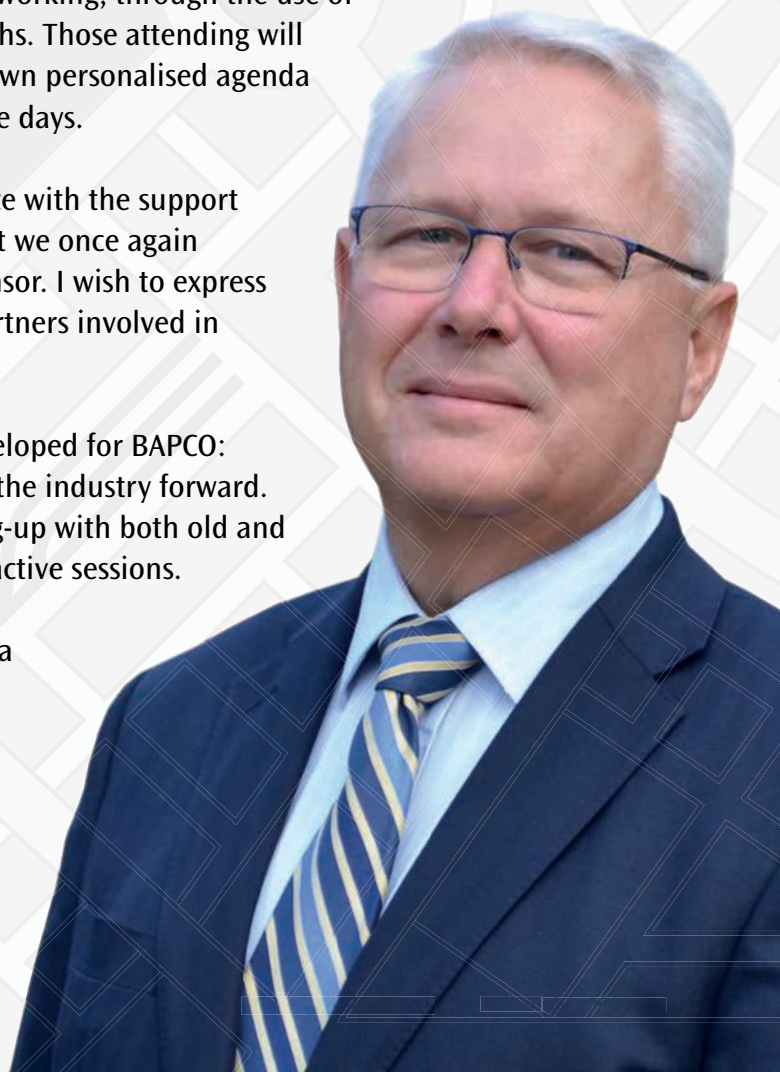
I would recommend that you book early for the conference sessions that interest you, not only to listen, but to engage with experts, as well as other colleagues from across the industry. As ever, we've pushed incredibly hard to ensure that we bring you the very best in critical communications technology, as well as operational best practice.

This new virtual experience offers the ability for visitors to engage in all-important networking, through the use of the exhibition's virtual booths. Those attending will also be able to tailor their own personalised agenda across the course of all three days.

As with all our events, BAPCO Online can only take place with the support of those within the industry, and I am very pleased that we once again have Motorola Solutions onboard as our Platinum Sponsor. I wish to express my personal gratitude to them, and to all our other partners involved in the show.

I know that the fantastic programme that we have developed for BAPCO: The Online Event will help bring us together and drive the industry forward. Myself and my fellow directors look forward to meeting-up with both old and new friends at the virtual booths, and during the interactive sessions.

I hope that you all - exhibitors and visitors alike - have a fantastic show, and a safe and prosperous 2021.



John Anthony, MBE
President, British APCO

What to expect at the new virtual show for the UK public safety communications sector

Conference sessions

Running across the course of the event's three days, the BAPCO Online conference will offer a range of cutting-edge presentations, delivered by some of the most respected thought leaders in UK public safety communications. Topics will include mission critical broadband, the UK's current Airwave TETRA network, 'future' technology, and much more.

There will be a variety of different sessions including keynote and plenary lectures, panel discussions, roundtables and one-on-one interviews.

During the show, viewers can browse the online conference programme using the BAPCO platform's advanced filters, bookmarking sessions that they wish to attend. There is also a 'live chat' function, enabling you to meet other attendees and submit questions directly to conference speakers during the livestream.

Turn to preview page 34 for the full conference programme.

Networking opportunities

Take the conference sessions further by meeting new contacts through the live discussions. Discuss the important topics covered in the sessions, in order to gain – and provide – fresh perspectives.

Another way for visitors to take advantage of the BAPCO Online platform meanwhile is through its 'people you should meet' function, which provides a bespoke list of suggested contacts as recommended by cutting-edge AI. This can be used to send connection requests to speakers and suppliers of interest, in order to make valuable and lasting contacts.

Visitors can also contact suppliers via direct message, while booking meetings for video chats, again via the online platform.

The exhibition & product marketplace

Browse the virtual exhibition to visit a range of leading global public safety communications companies. Visitors can also use it to download company-specific resources, finding out more about what vendors have to offer.

Exhibitors can be contacted through the use of the direct message function. Face-to-face meetings are also available, with the BAPCO Online platform also offering video conferencing functionality.

Alongside the exhibition, the 'product marketplace' allows visitors to quickly and easily compare resources, in order to find the most suitable products and services for them. Use the platform's advanced filters to search by product category, exhibitor, as well as whether a product is on special offer.

Emergency Services Network update

John Black, ESN Programme Director, ESMCP

John has over 30 years of experience in IT, and has led major projects in both the applications and infrastructure domains. Most of his career has been spent with IBM, where he trained as an IT architect. He joined the Home Office in July of last year as Chief Technology Officer for ESMCP. He was appointed Programme Director in August.

ESN: a big picture update
2nd March, 12:10-12:30 GMT

ESN vs FirstNet: Compare and contrast progress, key features and learnings
4th March, 17:20-17:50 GMT

Changes to the UK telecoms network

Huw Saunders, Director of Network Infrastructure and Resilience, Ofcom

Huw has been in the telecommunications industry for over 35 years. In that time, he has worked for equipment vendors, telco/service providers, as well as in consulting roles.

He is currently Director of Network Infrastructure at Ofcom, a role in which he focusses on network security and infrastructure development. He has widespread experience in all aspects of telecoms services, with an emphasis on policy, strategy, business development, and service deployment.

2nd March, 14:50-15:10 GMT

COVID-19's effect on emergency services in the UK and USA: will 999/9-1-1 ever be the same?

Brandon Abley, Director of Technology, NENA: The 9-1-1 Association

Brandon works with a number of experts in the development of NENA technical standards.

He advises, educates and advocates on technical issues for the emergency calling community.

He represents the United States, public safety and 911 in a variety of standards development and advocacy bodies, including ATIS, ETSI, IETF and EENA.

2nd March, 17:50-18:20 GMT

Deployment of ESN

Becca Jones, ESN Director of Deployment and User Insight, ESMCP

As Director of Deployment and User Insight, Becca is responsible for engaging with the broad ESN user community, in planning and supporting their transition from Airwave to ESN. She started her career in the NHS as a clinical biochemist, following which she spent 14 years at the Forensic Science Service in operational and programme management roles. She joined the ESN programme in 2013.

3rd March, 12:10-12:30 GMT

Public safety network and private use: case study following Brussels terrorist attacks

Frederic Jans-Cooremans, Project and Radio Spectrum Manager, STIB

STIB is the Brussels Intermunicipal Transport Company. Bringing years of radio experience to the organisation, Frederic wrote the tender for a driverless metro system, based on radio interchange.

For STIB, he is currently involved in rolling-out the biggest private TETRA network in Belgium.

4th March, 14:50-15:10 GMT

Mapping for emergencies: using mapping and data to respond to COVID-19

Dominic Cuthbert, National Security and Resilience Sector Manager, Ordnance Survey

Dominic has been with Ordnance Survey for over 18 years, and has a wealth of experience across a range of government sectors.

Based in Scotland, he works closely with the Scottish government, and has recently been appointed as GB lead for National Security and Resilience for OS.

4th March, 16:20-16:40 GMT

Fergus Mayne, UK Country Manager and Head of Sales, Motorola Solutions

Motorola Solutions has sponsored three conference sessions.

What are the biggest current issues for the sector?
Undeniably, the impact of COVID-19 can be seen across all sectors and public safety is no exception. From the onset of lockdown last year, one of the most critical demands of technology was - and continues to be - helping those on the frontline to work more safely, as they continue to protect and keep the public safe with new challenges arising from the pandemic.

These challenges have ranged from overnight adaption to remote working, social distancing measures, changing guidelines, and increased demand and pressure on the frontline, to name a few. The pandemic has, however, also offered opportunities for new ways of working to be adopted, a greater focus and interest in scalable, flexible cloud as well as video technologies.

What will be the most transformative public safety technology over the next five years and why?
I would say artificial intelligence, specifically within public safety workflows. AI has the potential to improve resource efficiency by accelerating workflows, increasing the speed of decision making, and improving the safety of frontline responders and the community.

For example, studies have shown that multi-tasking by a human, such as when monitoring multiple video feeds, can result in a 40 per cent drop in productivity. AI can actively monitor cameras for unusual situations, such as the appearance of smoke, or individuals matching the description of missing or abducted persons. This allows video analysts to verify potential items of interest instead of scanning endless video feeds.

Another benefit we are seeing with AI is in accelerating post-incident workflows in policing. Our studies indicate that 30 per cent of an officer's time is spent on administrative tasks, with 400,000 incident reports created annually in a large city. Here, AI can transcribe a spoken narrative recorded by the officer, rather than the officer typing up a report in their vehicle or back at the station. It can also automatically populate it in the incident record, where the original audio file is kept as evidence.

Darryl Keen, Hertfordshire County Council Director of Community Protection and Chief Fire Officer

What is the most important message you would like people to take away from your presentation?
That there is currently a significant focus on end-to-end integration of emergency response. That is, from the point at which the caller reports an emergency, through to the point at which responders arrive on scene.

What are the biggest current opportunities for the public safety communications sector when it comes to technology?
The biggest opportunity is the Emergency Services Network. It will provide a once in a lifetime chance to transform communications for the emergency services, and to deal with the ever-present criticism of 'communications,' which is raised in too many reviews of major incidents.

What will be the most transformative technology over the next five years, and why?
MAIT [Multi-Agency Incident Transfer] will connect all emergency control rooms. This will make information sharing more efficient, and ensure that emergency response can be as effective as possible.

What changes would you like to see in the world of public safety communications and technology?
Emergency services are very much focussed on their response capabilities. I would like to see every service applying a similar level of focus to their control room and communications capabilities.

MAIT case studies: before and after

3rd March, 13:40 to 14:10

Steve McLinden, Transformation 2020 Programme Lead, Mid and West Wales FRS

What is the most important message you would like people to take away from your presentation?
That the integration of digital technology within legacy processes in the first responder operational environment is now achievable and should be embraced. This should be through the adoption of a collaborative, non-proprietary, approach, to fully exploit IoT.
First responder digital capabilities are now where smart phones were ten years ago. People are becoming aware of them, but are not sure what the impact will be. In ten years, they'll wonder how they ever survived without them.

What are the current biggest challenges and opportunities for the public safety communications sector?
Finding the balance between maintaining existing services and embracing innovation through working differently. Also, taking the risks required to implement change linked to innovation.

What will be the most transformative technology over the next five years and why?
From a Fire and Rescue Service perspective it will be the adoption of digital technology in the operational environment. That also means providing access - via IoT -, to enhance situational awareness through technologies such as live video streaming, drones and tracking within buildings.

What changes would you like to see in the world of public safety communications and technology?
A positive move towards making new digital solutions more open source. This will ensure organisations don't get 'locked in' or 'locked out' in an area of innovation likely to develop massively over the next three to five years.

Creating an instantly deployable 'digital eco-system' to enhance first responder situational awareness and safety

3rd March, 15:20 to 15:40

Tuesday 2 March

12:00-12:05 Opening video

12:05-12:10 Welcome to BAPCO Online Event: introduction to platform and sessions
John Anthony, President, British APCO, **Andy Rooke,** Vice-President, British APCO, **Chris Lucas,** Vice-President, British APCO

12:10-12:30 Keynote Address: ESN: A big picture update
John Black, ESN Programme Director, Emergency Services Mobile Communications Programme

12:40-13:00 Overview of FirstNet: reinvestment and expansion
Ed Parkinson, Chief Executive Officer, FirstNet Authority, **Jeffrey Bratcher**, Chief Network and Authority Officer, FirstNet Authority

13:10-13:30 Unchaining the control room through the cloud to provide operational resilience and flexibility
Session sponsored by Motorola Solutions
Mark Swift, Solution Manager, CommandCentral CRS, Motorola Solutions

13:40-14:10 Panel Discussion: Moving call taking/control room functions to home based working
Chair: John Anthony, President, British APCO, **Peter Arnold,** Head of Operations, Yorkshire and Humber Scientific Support Services, West Yorkshire Police, **Paul Clements,** Chief Superintendent, Greater Manchester Police, **Paula van Beurden,** Compliance Manager, HSBC

14:20-14:40 Building secure and safer communities
Session sponsored by Motorola Solutions
Kelly Harrison, Solution Manager, CommandCentral CRS, Motorola Solutions

14:50-15:10 Changes to the UK telecoms network
Huw Saunders, Director of Networks Infrastructure and Resilience, Ofcom

15:20-15:40 Uses of UAVs in public safety services
Ian Jenner, Head of Business Development, Evolve Dynamics

15:50-16:10 Digital transformation: the role of control room voice
Session sponsored by Red Box
Paul Long, Solutions Consultant, Red Box, **John Taggart,** Key Account Manager, Red Box

16:20-16:40 Cybersecurity: how can public safety organisations protect their networks
Representative from National Cyber Security Centre

16:50-17:10 MCA: use of new technologies
Matthew Leat, Head of Infrastructure, Maritime and Coastguard Agency

17:20-17:50 Networking Break

17:50-18:20 COVID-19's effect on emergency services in the UK and USA: will 999/9-1-1 ever be the same?
Brandon Abley, Director of Technology, NENA: The 9-1-1 Association & **April Heinze**, 9-1-1 and PSAP Operations Director, NENA & **Luke Nebbett,** Operating Unit Manager, South East Coast Ambulance Service NHS Foundation Trust

18:20-18:40 Interview with John Black
ESN Programme Director, Emergency Services Mobile Communications Programme

18:40-19:20 New Technology Showcase

Wednesday 3 March

12:05-12:10 Introduction to day
Chris Lucas, Vice-President, British APCO

12:10-12:30 Keynote Address: Deployment of ESN
Becca Jones, ESN Director of Deployment and User Insight, Emergency Services Mobile Communications Programme, **Colin Searle,** Chief Supeintendent, Dorset Police, **Mark Jones,** Community Fire Prevention Officer, Merseyside Fire and Rescue Service

12:40-13:00 Artificial intelligence and robotic automation in the emergency services: the art of the possible
Paul Perry, Robotics and AI Consultant, NICE

13:10-13:30 Keeping the frontline safe through mobility
Session sponsored by Motorola Solutions
Ian Williams, Software Consultant for Europe, Motorola Solutions

13:40-14:10 Panel Discussion: MAIT case studies: before and after
Chair: Chris Lucas, Vice-President, British APCO, **Darryl Keen,** Chief Fire Officer, Hertfordshire Fire and Rescue & Chair, 999 Liaison Committee, **David Jackson,** Chief Superintendent & Head of Contact, Command and Control, Metropolitan Police, **Tony Bracey,** Head of Programmes, Welsh Government

14:00-15:00 Roundtable: The end of the control room: how technologies are redefining the future mission-critical workflow
Session sponsored by Motorola Solutions

14:20-14:40 Reliable comms at the extended fireground
Session sponsored by Tait Communications
Richard Russell, Incident Ground Solution Architect, Tait Communications

14:50-15:10 Virve 2.0: on the path to broadband, the Finnish way
Ari Toivonen, Development Manager, Suomen Erillisverkot

15:20-15:40 Creating an instantly deployable 'digital ecosystem' to enhance first responder situational awareness and safety
Steven McLinden, Transformation 2020 Programme Lead, Mid and West Wales Fire and Rescue Service

15:40-16:20 Networking Break

16:20-16:40 AI: what are the dangers of falling behind the public in terms of use of the technology?
Jerome Paris, Managing Director, EENA (The European Emergency Number Association)

16:50-17:10 The UK analogue to digital switchover
John Livermore, Industry Engagement Manager, Openreach

17:10-17:50 Networking Break

17:50-18:20 Panel Discussion: Mental health in public safety communications: effective coping skills for control room teams and first responders
Chair: Andy Rooke, Vice-President, British APCO, **April Heinze,** 9-1-1 and PSAP Operations Director, NENA: The 9-1-1 Association, **Heleena Chauhan,** Resilience Officer, LLR Resilience Partnership

18:20-18:40 Interview with Chief Supt David Jackson
Head of Contact, Command and Control, Metropolitan Police

18:40-19:20 Virtual drinks

Thursday 4 March

12:05-12:10 Introduction to day
Chris Lucas, Vice-President, British APCO

12:10-12:30 Keynote Address: Putting digital and data before technology. How we need to move from technology delivery to business change and support
Wayne Parkes, Director, National Enabling Programmes, National Police Technology Council, **Ian Bell,** CEO, Police ICT Company

12:40-13:00 Broadway to BroadNet: enabling operational mobility
David Lund, Coordinator of BroadWay & President, Public Safety Communications Europe

13:00-13:40 Networking Break

13:40-14:10 Panel Discussion: National Enabling Programmes: how can they be adopted across the public safety sector?
Chair: Chris Lucas, Vice-President, British APCO, **Wayne Parkes,** Director, National Enabling Programmes, National Police Technology Council, **Bethan Page-Jones**, Head of the National Police Capabilities Unit, UK Home Office

14:10-14:50 Networking Break

14:50-15:10 Public safety network and private use: case study following terrorist attack in Brussels
Frederic Jans Cooremans, Project and Radio Spectrum Manager, STIB – Public Transport Operator in Brussels

15:20-15:40 Uses of UAVs in public safety services
Ian Jenner, Head of Business Development, Evolve Dynamics

15:40-16:20 Networking Break

16:20-16:40 Mapping for emergencies: using mapping and data to respond to COVID-19
Dom Cuthbert, National Security and Resilience Sector Manager, Ordnance Survey, **Rick Crowhurst,** Senior Public Sector Manager, Landmark Information

16:40-17:20 Networking Break

17:20-17:50 Panel Discussion: ESN vs FirstNet: Compare and contrast key features and learnings
Chair: John Anthony, President, British APCO, **John Black,** ESN Programme Director, Emergency Services Mobile Communications Programme, **Ed Parkinson,** Chief Executive Officer, FirstNet Authority, **Jeffrey Bratcher,** Chief Network and Authority Officer, FirstNet Authority, **Jeffrey Lane**, Fire Chief, USA

17:50-18:10 Interview with Joanna Davinson
Chief Digital Data and Technology Officer, UK Home Office

18:10-18:30 BAPCO Online Event: Highlights, key learning points and virtual drinks
John Anthony, President, British APCO, **Andy Rooke,** Vice-President, British APCO, **Chris Lucas,** Vice-President, British APCO

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Motorola Solutions has created the first and only mission-critical ecosystem built for public safety. It enables organisations to share knowledge across their entire operation, as well as facilitating powerful collaboration, streamlined workflows and improved performance.

The mission critical ecosystem unifies voice, data, video and analytics into one secure, connected, network. It is transforming the way public safety agencies and first responders protect themselves and their communities in the moments that matter.

Motorola Solutions conference sessions:

Unchaining the control room through the cloud to provide operational resilience and flexibility
2nd March, 13:10-13:30

Building secure and safer communities
2nd March, 14:20-14:40

Keeping the frontline safe through mobility
3rd March, 13:10-13:30

Red Box

Silver Sponsor

Red Box is already supporting the transition to the Emergency Services Network. At this important juncture, it's imperative that organisations have the necessary tools to enable the transformation journey into DCS, ESN and beyond. Red Box is trusted by over 70 per cent of UK police forces, and possesses a 32-year history of working with other critical public safety services. Its secure and reliable voice capture technology underpins this, turning organisations' rich data into powerful insights that meet compliance requirements, improve operational efficiencies and promote smarter working with real-time decision making.

With Red Box's open API architecture, organisations can also extend the value of voice, with access to a wide range of AI applications and tools. They can also benefit from integration with critical communications platforms, including computer-aided dispatch, CRM, DEMS and communication control systems.

Red Box conference session:

Digital transformation: the role of control room voice
2nd March,15:50-16:10

Tait Communications

Silver Sponsor

Tait Communications is a BAPCO: The Online Event Silver Sponsor. Although not able to meet the public safety community face-to-face this time around, it will take every opportunity to connect and catch up virtually with visitors to the show.

Tait Communications conference session:

Tait fire and rescue expert Richard Russell will share the company's concept of in-vehicle critical communications as a component of the Tait Unified Fire Solution.
3rd March, 14:20-14:40

FourNet

Roundtable Sponsor

As a BAPCO Gold Member and Online Event Roundtable Sponsor, FourNet will be hosting a roundtable discussion, sharing its experience of delivering critical services to UK fire, police and ambulance. The discussion will focus on bringing the back office and control room together.

FourNet combines the resilience and reliability of Avaya's control room and communications, with the world-class collaboration capabilities of Microsoft Teams. FourNet has set the standard and created the blueprint for how public safety services can collaborate and work together.

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