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CRITICAL COMMUNICATIONS TODAY

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FEBRUARY 2023

Lessons learned from tragedy

Editor **Philip Mason** discusses some potential areas of learning for the sector, following the recent appalling earthquake in Syria and Turkey

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 work to stimulate and focus debates on the topics that matter most and provide our readers with a means to raise their concerns.

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Welcome to the latest edition of *Critical Communications Today*, the leading resource for those working in the mission-critical comms sector across the world.

Before we get under way with the issue, I want to acknowledge the appalling suffering currently taking place in Turkey and Syria, following the earthquake which took place at the beginning of February. At time of writing, over 35,000 people have lost their lives in the tragedy, with thousands more known to have been injured.

For me, there are two initial pieces of learning which the sector can take from this terrible situation. The first, quite simply, is just how vital the provision of properly developed and integrated mission-critical technology continues to be when it comes to public safety and disaster management. If you are reading this, the chances are you are involved in critical, possibly even life-saving, work, either as a manufacturer or a user. This is always something worth reminding ourselves of as a community.

The second, possibly less apparent, lesson from the Turkey-Syria earthquake is the importance of collaboration and communication in and of itself. As people will remember, alongside the terrible suffering on the part of those caught up in the earthquake, the big story in the initial stages of the incident was the rescue and relief effort taking place.

Without wanting to create too spurious a parallel with our sector, if nothing else, this has to remind us what can be achieved when those involved collaborate within community. Whether we are talking about the standardisation piece, interoperability, cross-border co-operation and so on, we have always done better together.

This piece is being written just prior to two major events for the industry, taking place across February and March. The first of these is the annual BAPCO Conference & Exhibition in Coventry, which as readers will likely be well aware focuses on the use of communications technology by the UK public safety sector. The week before this, meanwhile, is Mobile World Congress, which will see the world's biggest manufacturers coming together for a week in Barcelona.

Both events are crucial when it comes to the evolution of mission-critical technology, albeit in different ways. BAPCO contributes to the sector by – among other things – showcasing examples of best practice within an operational context.

MWC, meanwhile, tends to demonstrate the state of the art when it comes to broadband technology, something which is becoming increasingly integral to the mission-critical sector. *Critical Communications Today* is happy to be a media partner for both events.

Enjoy the issue.

Philip Mason, editor

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SSS PUBLIC SAFETY

Who, what, where

ASIA

Ericsson claims public safety 5G licence plate first

Taiwan-based comms provider Far EasTone Telecom has developed the world's first 5G smart police patrol car solution, according to its partner, Ericsson.

The company has done this by leveraging the latter's "end-to-end 5G network slicing technology, including 5G Core and RAN slicing, utilising dynamic radio resource partitioning in a live 5G standalone network". Ericsson believes that the development proves advanced 5G's capability to enable "mission-critical applications for the public sector".

A spokesperson said: "It is an application created for the Kaohsiung City Police Department, to support licence plate recognition. Patrol cars equipped with high-resolution photography devices use AI image analysis to identify vehicles that have been reported stolen."

Adobe Stock/Vladimir

Hytera collaborates on next gen railway comms

Hytera Communications is collaborating with Kazakhstan's national railway company Temir Zholy, alongside BT Signal, to co-develop broadband railway communication systems designed for use "with 5G and beyond".

According to Hytera, the group will develop a 'core competence' centre, with the aim of "accelerating future-proof railway communication systems for KTZ". The latter plans to use the centre to develop a research project relating to new standards of railway radio comms in the Asia-Pacific region.

Country manager of Hytera Kazakhstan, Ivan Wang, said the competence centre will act as "a key driver to accelerate the digitalisation of KTZ". It will also provide a platform for railway communication specialists to exchange technical expertise.

EUROPE

Adobe Stock/Sergio Delle Vedove

Industry giant opens new Central European office

Airbus has established a subsidiary in the Slovakian capital of Bratislava, with the aim of supporting Ministry of Interior projects and "related activities".

The company currently provides TETRAPOL technology for SITNO, which is the national network used by Slovakian security personnel. According to a statement, it is also supporting the modernisation of the critical communications network via the introduction of its Tactilon Agnet platform.

Speaking about the new office, Airbus head of sales for the Slovak Republic, Philippe Devos, said: "This is part of a growth strategy which brings us closer to our customers. They will now be able to receive dedicated support and talk to Airbus employees who are at hand and speak the local language."

Motorola provides BWV to enable border force

Motorola Solutions has provided 2,500 of its VB400 body-worn cameras to the Lithuanian National Police and Border Guard Service. According to a statement, the devices will be used by frontline teams to "help increase transparency in policing and border protection".

The service is responsible for protecting the Lithuanian border, which is more than 1,000km long. Its duties include the management of border crossings.

Discussing the rollout, Axel Kukuk, Motorola head of sales for Baltics, Nordics and Central Europe, said: "Body-worn cameras are a vital tool for enhancing transparency and accountability. Increasing numbers of public safety agencies across the region are seeking high-quality video security solutions that are easy to deploy and integrate seamlessly into officers' workflows."

Adobe Stock/Mapics

Munich public transport chooses TETRA

Munich's underground railway has deployed around 1,800 TETRA radios, supplied by Sepura.

According to a statement released by the company, the rollout – which involves its SC20 model – has taken place as part of operator Stadwerke München's "major project" to renew its radio system.

The deployment has taken place in collaboration with Sepura's regional partner, Selectric. Speaking of the rollout, the company's managing director, Hendrik Pieper, said: "Sepura products are known around the world as tough and reliable.

"We have achieved success in the world's largest TETRA market by combining [these] with outstanding customer service to users in organisations throughout the country."

SOUTH AMERICA

Adobe Stock/Kalyakan

First industrial-grade LTE private network in a port terminal

Nokia has announced the deployment of what it claims to be the first industrial-grade LTE private network in a port terminal, situated at San Antonio Terminal Internacional, Chile.

According to a statement, the new network will be based on Nokia's Digital Automation Cloud platform, which the company claimed will use "4.9G LTE to deliver pervasive high-bandwidth, low-latency connectivity, and improved network predictability in piers and yards".

San Antonio Terminal Internacional (STI) is the main port terminal in Chile, as well as one of the most important in South America. It is based 110km from the Chilean capital city of Santiago.

Marcelo Entreconti, Nokia's head of enterprise for Latin America, said: "With this project, STI takes an important step in its digitalisation journey."

News round-up

Sepura receives fine from Ofcom

Ofcom has fined device manufacturer Sepura £1.5m for what the organisation refers to as "a breach of competition law". According to a statement by the UK communications regulator, this followed an investigation into the company "exchanging commercially sensitive information with competitor Motorola about pricing intentions during a procurement process".

According to the aforementioned statement, the focus of the investigation was a text message exchange which took place between senior employees of Motorola and Sepura in 2018. This exchange related to a tender process for devices and related services used by the emergency services' communications network.

To quote the Ofcom statement in full: "The emergency services in Great Britain use a private mobile radio network called Airwave to securely communicate in the field. The Airwave network uses 'terrestrial trunked radio' [TETRA] technology to provide secure and reliable two-way communications.

"In 2014, the Home Office launched a tender to replace the Airwave network with a new 4G commercial mobile network, called the Emergency Services Network. Due to the rollout of this new network being delayed, it became apparent that TETRA devices and the Airwave network would be needed for longer than anticipated."

The statement continued: "In 2018, the Police ICT Company – now known as the Police Digital Service – ran a procurement process to address a potential shortfall in TETRA devices, accessories and services. This is a highly concentrated market, where Sepura and Motorola are effectively the only two competitors.

"In June 2019, Ofcom opened an investigation after Motorola came forward to the Competition and Markets Authority (CMA) with information about its contact with Sepura during this process.

"The CMA handed the matter over to Ofcom, as the regulator for communications services and concurrent regulator under the Competition Act 1998."

Following a period of evidence-gathering, Ofcom found that the aforementioned senior employees contacted each other on 5 September 2018. The exchange – again according to the statement quoted above – covered a range of matters "relevant to an upcoming tender process for devices and related services used by the emergency services' communications network". This included Sepura's pricing strategy and likely pricing levels.

Speaking about the situation and its aftermath, an Ofcom spokesperson said: "We have concluded that this exchange of messages had the object of restricting or distorting competition in the supply of TETRA devices, accessories and related services for use on the Airwave network in Great Britain, and affected trade within the UK.

"In light of the seriousness of the infringement, Ofcom has decided to fine Sepura £1,500,000 for breaking competition law."

Concluding by discussing Motorola's role in the above, the spokesperson said: "Under the CMA's leniency policy, the first company involved in certain types of anti-competitive agreement to come forward about it may receive immunity from fines, so long as the conduct is not already being investigated. Motorola has been granted immunity under this policy, which means it will not be fined."

Responding to the verdict, a spokesperson for Sepura said: "Throughout the period of the investigation, Sepura has co-operated fully with Ofcom and is pleased to have reached a conclusion.

"In the three and a half years since the investigation commenced, Sepura has seen a change of ownership, improvements in governance across the business, and additional rigorous training implemented for all staff. Sepura remains recognised as a global leader in the development and supply of radio terminals, accessories and applications for mission-critical and business-critical communications."

Qualcomm claims mmWave milestone

Qualcomm Technologies has announced the achievement of what it calls "groundbreaking" 5G standalone (SA) mmWave performance during recent tests. The organisation anticipates that the results of the tests will lay the groundwork for expanded deployments of commercial mmWave.

During the testing process, devices powered by the Snapdragon X65 were connected to network infrastructure equipment provided by a variety of industry players. These included ZTE, Nokia Shanghai Bell and CICT Mobile.

According to Qualcomm, the companies achieved over 7.1Gbps download peak rate – using DDDSU frame structure – and over 2.1Gbps upload peak rate, utilising DSUUU frame structure. All the tests were completed – again, according to the global technology company – under the guidance of China Academy of Information and Communications Technology, alongside China's IMT-2020 (5G) Promotion Group.

The tests took in core performance metrics such as single-user throughput, user plane/control plane latency, beam switching and cell handover. They also demonstrated that "mmWave achieves higher speeds and lower latency than sub-6GHz, using 5G mmWave-only [FR2-only] deployments, without an anchor on LTE or sub-6GHz spectrum, allowing greater flexibility to deploy 5G and to meet higher-capacity demand".

mmWave as a term refers to very short wavelength radio frequency spectrum, sitting between 30 and 300GHz. The spectrum – which Qualcomm refers to as "abundant" – can, according to the provider, offer extreme capacity, ultra-high throughput and ultra-low latency.

2023 ICCAs launched

TCCA has announced that the 2023 International Critical Communications Awards are open for entry. The winners will be announced during Critical Communications World in Helsinki in May.

Discussing the awards, a spokesperson for the organiser said: "Presented by TCCA, the ICCAs are the most prestigious awards in the critical communications sector, celebrating excellence and recognising products, organisations and individuals who have pushed boundaries in the field. The entries will be evaluated by an expert panel of independent judges, looking to reward innovation in terms of both the technology itself as well as how it is being used on the frontline." This year will also see the establishment of the Phil Kidner Award for Outstanding Contribution to Critical Communications. The award is named in honour of the former TCCA CEO, who sadly passed away at the beginning of 2022.

Chair of the judges, Robin Davis, said: "We've seen the quality of ICCA entries improve year on year, and we anticipate that 2023 will be no different. Our panel of independent judges are hopefully looking at a difficult task to select the top submissions and recognise innovative and impactful products, services and contributions."

The ICCA ceremony will take place on the evening of Tuesday, 23 May in Helsinki, with the event co-located with this year's Critical Communications World.

Categories this year include:

- Emerging technology, product or solutions
- Best use of critical communications in public safety
- Best use of advanced technology
- Best use of critical communications in transport
- Best use of critical communications in utilities
- Best use of critical communications in mining, oil and gas
- Best control room innovation
- Best TETRA product or solution of the year
- Best MCX product or solution of the year
- TCCA young engineer of the year
- Government authority collaboration
- Champion for equality, diversity and inclusion
- Advances in sustainability (not open for entry – chosen by the judges)

TCCA News

Owner and operator of the world's largest offshore telecommunications network, Tampnet, has joined TCCA.

According to a statement released by the latter organisation, Tampnet is responsible for 4500km of subsea fibre infrastructure in the North Sea and Gulf of Mexico. This provides: "High-speed connectivity to shore for more than 350 offshore windfarms and offshore oil and gas production platforms."

The statement continues: "With its direct and critical fibre routes between Scandinavia, UK and continental Europe, the network is increasingly utilised for international data and internet traffic. This ties in with the growing needs of the Scandinavian data centre industry and establishment of the large international cloud providers in the region."

Discussing its decision to join TCCA, Tampnet CEO Elie Hanna said: "[We] hope to bring awareness to the capabilities of our offshore network, and support governments, offshore operators, safety system technology manufacturers and other stakeholders to design and implement secure and responsive systems for their critical operations.

"We look forward to sharing knowledge and collaborating with all stakeholders across these industries. [We aim to] further develop improved, responsive systems and harness the power of telecommunications."

TCCA CEO Kevin Graham said: "We are extremely pleased to welcome Tampnet to our membership. They clearly bring a wealth of practical experience as an operator of resilient networks, and a deep understanding of user requirements, in particular the energy, oil and gas and maritime sectors. We look forward to the valuable knowledge they can exchange across our global critical communications industry community."

Another new TCCA member meanwhile is specialist telecoms training academy Wray Castle. In a statement released by the organisation last year, the latter is described as delivering "training courses across a range of technologies, with a focus on professional mobile radio covering mission-critical broadband, TETRA and DMR."

The statement continued: "These courses help critical communications professionals to stay current with the latest telecoms technologies, and to make informed decisions on how to develop critical communications services and networks including the adoption of LTE and 5G cellular network technologies."

Wray Castle CEO Andrew White said: "We are delighted to have joined TCCA and are eager to serve its members with a wide range of highly relevant learning and development programmes, ranging from individual courses to fully structured learning pathways. We are pleased to share TCCA's passion for life-long learning through the provision of industry best-in-class training."

ICCA

INTERNATIONAL CRITICAL COMMUNICATIONS AWARDS 2023

An opportunity to shine

The International Critical Communications Awards is one of the most important annual events taking place within the crit comms sector, celebrating innovative solutions and roll outs on a global scale.

While the awards are crucial for the critical communications industry as a whole however, they are also massively beneficial for those individual companies who enter and win. This is in terms of a company's overall reputation and how they are viewed within the sector of course, but also the ongoing visibility of any successful products and roll outs entered in the competition.

Last year's ICCA winners were of an unbelievably high standard, pushing the boundaries both from a technological and customer service perspective. In this article, we're going to focus on some of the winners from last year's awards in Vienna and remind readers why they were successful.

AIRBUS

Airbus won two awards on the night. These consisted of 'Best use of critical communications in public safety' (for innovative usage during the Dubai Expo), and 'Best MC-X solutions of the year' for its Tactilon Agnet 500 product.

Describing the latter in a press released published after the awards, the company said: "Tactilon Agnet is a collaboration engine, a strong push-to-x service combined with an ecosystem of apps, accessories, devices and possibilities of integration. Due to the fact that it can bridge together communications and workflow management, it can also support business processes in a new way."

Speaking at the time, the company's head of Middle East, Africa and Asia Pacific, Selim Bouri, said: "We are so thrilled to win! It is an ultimate compliment. Tactilon Agnet is such a versatile solution. It delivers instant group communications over broadband – push-to-talk, data, video – and it does this easily and securely."

ALDB

ALDB-CSR won in the category of 'Advances in sustainability.'

ERICSSON

Ericsson won in the 'Emerging technology' for its mission critical 5G deployable network solution.

Discussing the product, the company said: "Ericsson and Verizon jointly conceived the idea [for the product]

Taking place on the 23rd May 2023, in the heart of Helsinki, the International Critical Communications Awards are great way to raise awareness of your company's work across the sector.

and partnered together in every step of building the 5G deployable network solution. This is one example of the way Ericsson co-creates new 5G applications with customers, identifying real problems that we can jointly address in the society and taking concerted action to solve the issues."

FREQUENTIS AG

The crucially important 'Control room innovation' award was won by Frequentis AG for its 3020 LifeX solution.

The company, which originated in Austria, where the 2022 awards took place, initially established its reputation in the field of control rooms for aviation. It has since branched out into other mission critical verticals, including public safety.

The 3020 LifeX solution is described by the company as a "future-orientated public safety and collaboration platform," designed with the "next generation," "multimedia" control room in mind.

Describing the solution in a statement, Frequentis said: "Thanks to its sophisticated, modular architecture, 3020 LifeX can integrate a variety of systems using different protocols and can flexibly exchange or upgrade them without compromising ongoing operations."

HYTERA

The 'Best use of critical communications in transport' award was won by Hytera, for its Sri Lanka railway telecommunications project. The award was in recognition of the roll-out of its HyTalk MC solution.

Discussing the solution after the award was announced, a spokesperson for the company said: "The integrated HyTalk MC solution enables train drivers, dispatching controllers and station masters to easily communicate with each other, thereby ensuring the smooth running of daily operations on trains, in stations, depot areas and control centres.

"SLR can interconnect its sites and provide railway personnel with real-time access to critical data, allowing them to better serve passengers and ensure smooth operation for train drivers."

LEONARDO

Another winner in the category of 'Best MC-X solutions of the year' was Leonardo Spa, with its CSP-MCX platform.

The company describes the product thus: "The industry standard based MCX platform enables immediate and secure communication services, compliant with 3GPP Mission Critical Services Standards Release 15. It offers PTT communication, enhanced with voice, video, multimedia chat and a set of APIs for third party application development.

"CSP-MCX is a cloud native platform, designed to support the modern software architectures based on containers and micro services. It provides benefits in terms of scalability, resiliency, efficient usage of system resources and security."

MOTOROLA SOLUTIONS

Motorola Solutions was recognised for its mission critical portable radio, the MXP600, which won the 'Best TETRA device of the year.'

Describing the product, Motorola said: "Built for frontline workers, the MXP600 is a rugged, lightweight, yet fully capable TETRA portable radio that is easy to carry and easy to use.

"It has innovative audio technology to hear and be heard, best-in-class coverage, class 3 transmission power, and long battery life. Bluetooth 5.0 and NFC enable rich collaboration, providing a leading-edge user experience today and ready for mission-critical communications tomorrow."

SEPURA

Another big winner in Vienna last year was UK-based device manufacturer Sepura. The company won 'Best use of critical communications in mining oil and gas' for its SCG2/AutoMate application, as well as 'Best MC-X device of the year' for its SCU3 solution. (Sepura's Diana Ball also won the 'Outstanding contribution to critical communications' award, meanwhile).

Describing AutoMate in a recent edition of Land Mobile magazine, the company's sales director, Terence Ledger, said: "AutoMate originated as a concept as something for use in the Australian mines. In that environment, you've got very large vehicles, big holes in the ground and lots of people moving around. It's very dangerous.

"They wanted something that would enable them to geofence certain areas, so that if a radio user was there, the control room would know automatically. You could then alert the user via their TETRA device, automatically place them within a certain talk group, and so on."

TELENOR

Telenor ASA won in the 'Best use of advanced technology' for its private 5G search and rescue solution.

Telenor describes itself as: "An international company with a history that spans over 165 years, yet with a purpose that has never changed. Empowering societies by telegraph or 5G, we strive to advance, include and safeguard people. Our brand and services are deeply rooted in many nations, where we are connecting people to what matters most."

TELTRONIC

Our next winner is Teltronic, who picked up the award for the 'Best use of critical communications in utilities,' in relation to its work with Argentinian power distribution company Edesur.

The TETRA-based project developed for EDESUR enables the latter company to detect any incident or outage in the distribution network in "practically real time." Whereas previously monitoring 8,000-plus remote terminal units would – according to Teltronic – taken more than two hours, the new TETRA infrastructure "allows this operation to take just ten seconds."

This in turn "establishes a new operating model for electricity production and distribution."

Non-technical awards

As well as recognition for the solutions and roll outs discussed above, the 2022 ICCAs also included several of what might be regarded as 'non-technical' awards.

The first of these went to the Canadian Public Safety Broadband Network Innovation Alliance, for its work in the field of government authority collaboration. Awards also went to New South Wales Telco Authority as equality, diversity and inclusion champion, as well as Tero Pesonen in recognition of his outstanding services to TCCA.

The TCCA young engineer of the year, meanwhile, was awarded to Shaunak Patel of NSW Telco Authority. Speaking in a recent edition of Critical Communications Today magazine, he said: "I feel recognition is extremely important on all levels, particularly for younger employees as it helps build confidence in their work. It also celebrates their contribution and empowers them in knowing they are making a difference."

Deadline for entries: Monday 13th March 2023

Visit www.critical-communications-world.com/iccas today to submit your entry

Making connections

Airbus SLC CEO **Olivier Koczan** discusses the company's work with the French authorities, and its successful bid to provide core services to the Réseau Radio du Futur project

Can you tell me a little about your professional background and your current role?

My background is as an engineer, but that was many years ago. In terms of my professional career, I joined Airbus Group after several years at the French DGA [Direction Générale de l'Armement], which is the French military technology and procurement agency. That was in 1994.

Six years later, in 2000, I joined the mobile communication unit, as head of business in France. I was in charge of delivering the ACROPOL project for the French Ministry of Interior which later became INPT [Infrastructure Nationale Partageable des Transmissions], a shared capability used by several security forces in France.

I have been in various roles during my time in this business unit, including being in charge of [business in] France, and later on, the rest of the globe. For two years, I also operated as head of sales for what used to be known as CIS, now Connected Intelligence, which is all about satellite services, intelligence, cybersecurity and so on.

I took over as the head of Secure Land Communications in 2015, and I'm still in that position after seven years.

What would you say are the biggest current opportunities and challenges facing the mission-critical communications sector? How do you anticipate those challenges being addressed?

I look at this more as an opportunity, but the biggest thing is the current migration to a more data-centric mode of operation on behalf of emergency services and security organisations. In our view, this is being enabled by the maturity of the technology alongside the availability of the 3GPP standard for broadband services.

In terms of challenges, I would say that a major one is on the operational side. The move towards broadband looks straightforward – simply enabling access to more capacity – but the end-user community will need to think carefully about how their working methods will change going forward.

This is something that we're helping our customers to address, so they can take as much benefit from the technology as possible. We want to support them on their journey towards transition and evolution, and it's something which we are currently focusing on incredibly heavily.

To what degree does the whole culture of user organisations need to change to accommodate the new technology? How exactly are you addressing that as a business?

As a business, we are creating teams of people who are responsible for really sitting, observing and discussing with the end-user, almost on a daily basis. Again, we want them to understand what the solution in question can bring in terms of their operation, and how it could add value. At the same time, we want to understand what they need.

An example of that is the recent rollout of our mission-critical push to X (MCX) solution in a large administration in France. That turned out to be quite a long journey, because they also had to discover the implications of the technology which they had procured. It has been a joint and fruitful journey.

To be honest, beyond the provision of the application itself – push to talk, MCX and so on – there are other important challenges to handle. These include the accessories to be used, for instance. Personally, I would say that you can't really consider them accessories any more, because without that aspect, users can't take advantage of the new ecosystem of collaboration [as enabled by broadband].

You've recently been awarded the contract by the French government to provide a core component of its planned Réseau Radio du Futur (RRF) emergency services broadband project. Could you go into greater detail about your responsibilities as a company?

From a procurement perspective, the French organised the tender in three different lots. Lot one was about coverage. This had been pointing towards a mobile network operator and they have indeed selected two of them, Bouygues Telecom and Orange. The third lot is in relation to the BSS [business support solution]; the information and management system for the RRF, for which they selected ATOS.

Our involvement is in relation to the second lot, in a consortium alongside Capgemini. To some extent it's the main one in that it's about the core network capability, data centres, the LTE software, and the provision of 5G at a later date. This is the lot where the MCX application, devices and

> **Public safety organisations don't trust paper and they don't trust PowerPoint. They trust what they can touch**

Airbus SLC CEO ***Olivier Koczan***

the accessories are provided. At the same time, the second lot includes responsibility for system integration. We have the responsibility to make sure the RRF as a system works, including lots one, two and three. Our partner, Capgemini, is focusing on the data centre creation and the provision of the core network application, while the MCX application, the devices and the accessories are provided by Airbus.

Why do you think you won the contract? How do you believe that Airbus differentiated itself?

I suppose the simple answer is just that we sent in the best offer. Looking a little bit further below the surface though, I do believe that, first of all, it was the very deep knowledge that we have of the customer. This is in terms of what they require, but also their constraints.

We have been working with the security forces in France for decades, so we know them well and we also know their business. On top of offering what we believe to be a very powerful solution from a technological perspective, that means we have been able to understand their actual needs.

Again, that's vital from the manufacturer side, and we've been able to tailor the technical proposal to fit very well. When you already know your customer, they understand what you're doing.

Is there any sense of how the users feel about the move from narrowband to broadband? Thinking back a few years, when the ESN contracts were first awarded in the UK, there was a certain amount of trepidation on the part of users when it came to the new technology…

First of all, it's necessary to acknowledge how reliable [the current French narrowband solution] TETRAPOL is, as well as TETRA-based networks elsewhere. It works very well and does exactly what it has been designed to do. There is absolutely no ambiguity when it comes to that.

That being said, narrowband technology is not capable of delivering high-speed data services, which is now what the end-user organisations want, and what they're moving towards. Public safety organisations want to evolve in their mode of operation, moving away from mainly voice and short messaging to a much more data-centric mode. That doesn't mean that they're not happy with what they have today.

> In order to create the needed high level of confidence, the users need to feel comfortable

But how do you create reassurance in relation to the new technology?

Public safety organisations don't trust paper and they don't trust PowerPoint. They trust what they see and touch.

So, in order to create the needed high level of confidence they need to feel comfortable, you have to be together with them in the field. It took us quite a long time, and quite a significant amount of effort, to create that level of confidence.

Going back to public safety broadband specifically, one of the pain points for users tends to be anticipated worries around coverage. What level of reassurance can be delivered in that regard?

It's a fact that in some geographical areas, the broadband coverage might not be perfect for emergency services' needs during a given incident.

For instance, take the case of the forest fires in France last year. [If they were to happen again] there's no way to be sure that there would be commercial coverage, so solutions would need to be provided to fill the gap. That's something that we've proposed to the French Ministry of Interior.

One of the key deadlines for the rollout of the new French network is the Olympics in Paris in 2024. That's not far away…

It's not, but as per the contract, there are several versions of the system to be delivered, the first one being early 2024. Whether that's going to be a version which gets used at the Olympic Games, I can't say, although I do believe they will make use of it.

If they do use it, it's difficult to know to what extent. It takes time for a user organisation to get familiar with a new solution. But fundamentally, that's a decision for the MOI and the users themselves.

Whenever the network is rolled out, we're extremely proud of our success when it comes to the French procurement. That will now hopefully pave the way for other similar projects and opportunities in Europe.

Critical comms at a crossroads

At the beginning of a crucial year for the sector, the president of Quixoticity-EU, **Peter Clemons**, anticipates the big issues for 2023 and explains why it is time to 'press the accelerator' regarding mission-critical broadband

Thirty years have now passed since the completion of the first set of TETRA standards by ETSI. It is important to remember that TETRA brought the critical communications world into a new 'digital age' at almost the same time as our perhaps more famous, commercial, mass-market ETSI sibling, GSM.

NATO's important decision to give European public safety organisations access to up to 2 x 5MHz in the key 380-400MHz UHF band, meanwhile, provided further fuel and momentum to efforts to develop a unified communications solution for first-responders.

Other key developments during the mid-1990s included the creation of TETRA MoU – still thriving today as TCCA – in late 1994 by the main drivers of the emerging standard. And also strong competition from a French FDMA alternative (TETRA uses the TDMA channel access method), the publicly available specification Tetrapol, which is still in use today in countries such as France, Spain and Switzerland.

The first public safety networks based on the TETRA standard started their rollout at the very end of the last millennium. This led to several major nationwide public safety networks such as VIRVE (Finland), ASTRID (Belgium) and Airwave (United Kingdom) being fully operational by the mid-2000s.

Meanwhile, a major, pan-European public access mobile radio (PAMR) network, operated by Dolphin Telecom, failed in its mission to extend TETRA's reach to public networks. However, multiple non-public safety sectors did start embracing TETRA, which became the dominant digital LMR solution across the Middle East region and parts of Latin America and Asia-Pacific, where the appropriate spectrum was made available. For diverse reasons, public safety entities in North America, Australia, New Zealand and some parts of Asia preferred APCO and TIA's Project 25 (P25) alternative standard for digital LMR systems.

5G's more advanced features, such as network slicing, are still in their infancy

Meteoric rise of the smartphone

Moving briskly forward to the early 2010s, we observe the meteoric rise of the smartphone within the much larger, global commercial market. This inevitably generated a widespread concern among a growing number of public safety agencies about the lack of a serious data capability within their existing TETRA/P25 networks.

The inability to transmit high-resolution images and video from major, or even routine, incidents meant that hundreds of millions of consumers – and perhaps more importantly, almost every criminal gang – now had access to more advanced communications features than first-responders.

2012 was an important year in our journey to broadband. The US government set up the First Responder Network Authority (FirstNet) with dedicated spectrum in 700MHz and several billion dollars earmarked from future spectrum auctions. Also, TCCA set up its broadband group (CCBG) to start engaging with global standards bodies and the wider community.

Early public safety LTE programmes such as the UK's Emergency Services Network, and then Korea's SafeNet (in the wake of the 2014 ferry disaster), were also created. The importance and urgency of public safety's needs were recognised by 3GPP, which set up an entirely new group, SA6, to accelerate the first release of mission-critical push-to-talk standards during Release 13, published in 2016.

Mission-critical data and video standards followed in

Release 14, completing the basic set of features considered necessary to launch mission-critical services during the 2010s. However, with the exception of the UK's ambitious ESN programme – which later had to backtrack on its original plans – no other agency was considering switching off their existing TETRA/P25 network until the next-generation network was fully up, running and offering all possible services to users' satisfaction.

Critical communications enters the 2020s

The first three years of the current decade have been eventful, to say the least. With the first year barely weeks old, COVID-19 started sweeping the world, killing millions of people and confining a significant proportion of the global population to their homes while government health programmes scurried to find reliable vaccines to allow the return to some kind of normality.

Fake news and endless conspiracy theories started spreading across social media; global supply chains were disrupted and relationships between different nations, cultures, religions and social groups became strained.

Then, just as we started emerging from COVID, in February 2022, Russia invaded Ukraine, kickstarting a war on European soil. Record temperatures across the Northern Hemisphere during summer 2022, along with countless natural disasters, also reminded us that human-induced climate change is a reality.

In the wider communications space, meanwhile, new platforms have emerged, allowing us to communicate with each other remotely, opening up new opportunities for the global workforce. 5G has reached its first one billion users, without yet fulfilling its promise of revolutionising industry and commerce.

5G's more advanced features such as network slicing, ultra-reliable, low-latency and massive machine-type communications are still in their infancy. Mobile operators and new system integrators are struggling to apply new business models – such as private and hybrid networks – that guarantee availability, reliability and privacy to vanguard enterprises pushing ahead with digital transformation programmes.

In the critical communications space, the public safety sector is continuing to struggle to complete the much-heralded transition from legacy narrowband technology to the next generation of broadband LTE/5G-based solutions that were expected to dominate the market by the early 2020s.

> **These nationwide networks were replacing a myriad of incompatible local systems**

Other sectors such as automotive, railways, utilities, 'factories of the future', ports, airports and so on have joined the 3GPP party. They are now being awarded private spectrum to build their own private networks, but are still lacking the economies of scale and full range of devices and applications required to complete the transition.

With that in mind, what is stopping us making the full transition to critical broadband?

Back around 2012, when FirstNet and CCBG came into being and the UK government started looking at LTE as a credible replacement for its maturing Airwave network, emergency services and other critical users could have expected a full solution to have been ready by the end of that decade. It is therefore important to understand why this did not happen anywhere at scale, and what the prospects are for a successful migration in the short to medium term, most definitely before the end of this decade.

Successful deployment

Firstly, when we look back at the successful deployment of TETRA across Europe during the 2000s, we must remember that these nationwide networks were replacing a myriad of incompatible local and regional systems. We must also remember that TETRA was specifically designed with mission-critical services in mind.

Perhaps the most successful public safety LTE deployment so far, in South Korea, came as the result of a national tragedy in 2014 and that this new network was replacing a myriad of incompatible local and regional LMR networks. In the US, FirstNet has completed its nationwide deployment and has over four million users, but has not yet attempted to replace existing critical voice networks, thereby avoiding UK ESN's ongoing trials and tribulations.

Designing, building and operating large-scale mission-critical mobile broadband networks in the early 2020s is not for the faint-hearted. Just for starters, either entirely new networks need to be built across a wide geographical area, or existing commercial networks need to be extended and enhanced to provide sufficient coverage and capacity for critical users with the necessary levels of availability and reliability. Then, this new network needs to be rigorously tested in real time over extended periods to verify full compliance. The right mix of devices with the right form factors and functionality – including the full range of mission-critical services – also need to be available and running smoothly and seamlessly over the critical communications network in order to launch services for end-users.

Even when network, devices and services are in place, meanwhile, a significant number of challenges remain before existing networks can be switched off and first-responders can rely on the new solutions for all their communications needs. These include interworking, device-to-device, multicast, full redundancy and fully open interfaces, among others.

Most public safety agencies have expressed a wish to

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> **A growing number of mission critical users are making the move to standards-based mobile broadband**

keep the transition period from TETRA to LTE as short as possible. However, due to the complexity of the migration process, it has become clear that there will be a significant period when both solutions will be operating together, requiring interworking.

Following completion of Stage 3 work within 3GPP on the so-called IWF (interworking function) during Release 16, the LMR standards bodies, ETSI and ATIS, have been completing work on their side. Technology company Etherstack has already announced agreements with major suppliers, so solutions should become available soon that will then need to be proven at scale.

Another question is device-to-device (D2D) communications – Direct Mode/DMO in the TETRA standard. This provides the ultimate level of resilience and redundancy for first-responders when networks go down, are saturated or users find themselves out of network coverage or prefer not to rely on the network for specific operations.

This functionality is a given in the TETRA and P25 worlds but previously unheard of in commercial networks, which make their money from charging customers to use their networks! 3GPP developed ProSe (Proximity Services), which was never really implemented because of the lower power – and therefore shorter range – of mobile devices.

Higher power is available for vehicle-mounted devices, but higher-class devices come with their own challenges. More recently within 3GPP, public safety agencies and other verticals have been collaborating with the automotive industry on V2X (vehicle-to-everything) services which include a sidelink that provides D2D capabilities. It is likely in the short term that additional frequencies and accessories will be required to provide D2D services until an acceptable alternative is developed.

LMR's traditional operating model has also been based on half-duplex (PTT), one-to-many group calls, where potentially hundreds of first-responders in a local area can communicate with each other during a major incident.

Mobile telephony has always been based on one-to-one communications, with a separate channel required as the number of users increases (unicast mode). In order to allow the efficient, synchronised delivery of mission-critical voice, data and video, so-called multicast/broadcast standards have been developed within 3GPP as eMBMS (evolved multimedia broadcast multicast services).

eMBMS becomes increasingly essential for the successful operation of mission-critical LTE networks as the number of users increases. The 5G equivalent – 5MBS – is currently being standardised within 3GPP Releases 17/18.

3GPP standards continue to evolve with 5G Advanced and beyond, offering more flexible architectures. It also offers open platforms and interfaces; greater integration between terrestrial and non-terrestrial networks, public and private networks; 3GPP and non-3GPP networks; and much more. All this will benefit public safety and other critical users in the future, once the transition has been made.

With all this in mind, it is therefore clear that existing legacy solutions are likely to be required for longer than anticipated; however, there is also a clear consensus about the path to be taken. A growing number of public safety agencies and other critical users are now making the move to standards-based mobile broadband, and these agencies are talking to each other much more and sharing experiences. The European Commission-funded BroadWay programme has now been completed and is moving towards an implementation phase as BroadNet. We are most definitely on the right track, and now it is time to press the accelerator.

The road ahead – pressing the accelerator

So, here we are in early 2023, at a crossroads. There can be no going back to the ways of the past. And yet there is almost certainly no final goal in this new reality of continuous improvement where more open, flexible, software-defined networks allow upgrades to take place in an instant without the need to replace expensive hardware.

Over the next three to five years, we will see many more public safety agencies and other critical users make the successful move to mobile broadband solutions. This will involve using a combination of their own and mobile operator spectrum; a combination of fixed and mobile; connecting people, places, things, vehicles, sensors, robots, with increasingly orchestrated and automated processes.

Solutions such as TETRA will probably remain as a fallback for some time to come, although some agencies will bravely switch them off and fully embrace the future.

More mistakes will inevitably be made, but there will also be important breakthroughs, new initiatives, exciting new products and services. Then, sometime around 2030, we will look back again and realise we have entered a very different critical communications world, with its own unique set of opportunities and challenges.

We will be led by a new generation of thought leaders and decision-makers – human or otherwise – building upon the modest successes of the previous generation to accelerate our path towards the smarter, safer, greener, fairer world that lies just over the horizon.

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Going further in critical communications

Building new constellations

Traditional GEO satellites currently provide PPDR organisations with comms in areas of poor terrestrial coverage. New LEO constellations, and in particular future native 3GPP 5G NTN satellites, offer the prospect of more resilient, seamless and cost-effective solutions, as **James Atkinson** reports

Public protection and disaster recovery (PPDR) organisations have been using satellite communications for many years. Traditional GEO satcoms are used by mobile field teams to provide communications, or to backhaul other radio technologies in areas of limited or no terrestrial coverage.

"Satellite is an important tool in closing the gaps in rural areas," points out Ken Rehbehn, principal analyst, CritComm Insights. "It can potentially be a vital tool during natural disasters where the infrastructure has been wiped away and needs to be augmented. And it is not necessarily the case that you need all the bells and whistles of broadband. Just fairly simple data exchanges like text messages, emails and basic maps are extraordinarily helpful."

PPDR organisations can choose from a range of fixed, portable, vehicle mounted (on the pause, and on the move) satellite platforms, such as those offered by UK-based Excelerate Technology. "Our solutions are being used daily by first-responders and emergency services," says David Savage, CEO and founder of Excelerate. "We also work closely with policing and security services for public safety at major pre-planned events such as NATO and G7 Summits and, for instance, government organisations and the Environment Agency for PPDR."

Excelerate provides satcom services based on an enhanced resilience Ku-band satellite network, but it also offers GEO satellite networks using Ku and Ka frequencies to enable applications that "require alternatives where there might be a trade-off between cost and service guarantees or security", explains Savage. "In addition, we are happy to support the new low Earth orbit (LEO) services coming on stream from Starlink and OneWeb."

> To be truly useful, devices need to connect to a stable, secure network

Savage says satcoms tend to be part of an overall comms solution designed to provide an "insurance plan" to back up existing applications. But he thinks satellite comms are now becoming a prerequisite. Video streaming from CCTV surveillance vehicles, drone teams or body-worn devices is a key driver here. "To be truly useful, they need to connect to a stable, secure network that has enough bandwidth to support the requirement," he says.

The need for reliable, cost-effective 'comms on the move' solutions using satellite, hybrid edge and bonded connectivity applications combining LMR, 4G, 5G and satellite is increasing. "We see a significant potential for these services on entire fleets of vehicles and not just an incident command vehicle," asserts Savage.

Distinguished engineer

The recent development of mission-critical 4G broadband systems for public safety means satellites are now being integrated into mobile phone networks as well. For example, Andy Sutton, BT distinguished engineer and principal network architect, EE ESN, says EE is using satellites to address several use-cases on the UK's Emergency Services Network (ESN).

"The most obvious is to provide mobile backhaul connectivity for 4G LTE cell sites in extremely rural areas – those which aren't currently served by terrestrial connectivity, be this fibre or microwave radio," says Sutton. "The second use-case, the most common in terms of volumes of terminals deployed, is to provide a resilient connection as a back-up to a terrestrial backhaul transmission circuit.

"A configuration like this ensures that the overall ESN service availability is protected, even in the event of a


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> **Coverage is immediately there: two-way connectivity, text, voice, data and even location tracking**

fibre break or microwave radio failure. Additionally, we use satellite communications for backhaul on our fleet of rapid-response vehicles and other temporary base station installations," says Sutton.

The UK's latitude means GEO satellites can provide ESN coverage wherever it is required and be sure of achieving backhaul connectivity. However, Sutton says that as "GEO satellites are located 35,786km above the equator, the latency is high enough to cause implementation issues, which require specific workarounds to optimise the service layer".

Rehbehn argues that even with GEO satellites there is tremendous value in having that backstop of connectivity, but notes that there are at present few low-end, cost-effective, consumer connections to satellite systems. "That will change as LEO constellations fill in. One of the great opportunities of the LEO constellations is universal back-up on every fire appliance, police car and ambulance.

"If you have LEO constellations that are operational for consumers, then that drives economies of scale and brings price points down to very affordable levels. The economic business case for public safety agencies may be compelling as a back-up," says Rehbehn.

Finland's Erillisverkot Group, which operates the country's Virve TETRA public safety network and replacement Virve 2 broadband network, trialled OneWeb's LEO services in October 2002 in conjunction with Airbus and the Finnish Defence Forces.

Antti Kauppinen, chief technology officer at Erillisverkot, says: "How we are using satellites at the moment is that we have some tactical solutions, so we have some mobile capacity that uses satellites for the backhaul connection. But that is a GEO satellite at the moment."

Erillisverkot was keen to see how LEO satellites might complement and augment the terrestrial network, especially in the sparsely populated far north. Kauppinen says they wanted to see how well OneWeb worked in terms of the service delay and capacity.

"It worked okay," he reports. "It is not 100 per cent good yet, but it gave us a positive view of OneWeb. We know when it is truly available and what sort of activities we can plan on top of that."

Looking ahead, Kauppinen says: "I am sure we will utilise satellite services in the future one way or another. But we don't have a decision yet and also we have to have a wider discussion with the government and end-users to see which direction they want to proceed with satellite services."

Combination of networks

SpaceX's Starlink has certainly impressed observers following its use in Ukraine. It is the most advanced LEO constellation, with 3,271 satellites in orbit. SpaceX is now seeking FCC approval to deploy 29,988 of its larger Gen2 Starlink satellites. The FCC gave approval for 7,500 in December 2022 but has deferred decisions on the rest.

OneWeb now has 502 LEO satellites, or almost 80 per cent of its planned 648 constellation. It deploys larger satellites at a higher orbit than Starlink, hence it requires fewer craft to provide coverage. However, both operators use dedicated satellite spectrum, meaning users need bespoke dishes or devices to receive the services.

Waiting in the wings are rival LEO operators with a very different business model: satellite-direct-to-cell-phone using spectrum provided by terrestrial MNO partners. Consumers will be able to use their off-the-shelf smartphone without the need for any proprietary solutions.

The two most advanced are Lynk Global and AST SpaceMobile. Where the two differ is in their architectures. Lynk aims to deploy around 5,000 small satellites, while AST plans 168 much larger satellites. However, these LEO constellations are at a very early stage and need to raise funds to keep going.

In September 2022, the FCC granted Lynk the first commercial licence for satellite-direct-to-cell-phone services, but only for 10 test satellites, of which just three are in orbit. Lynk hopes to have 1,000 satellites deployed by 2025, providing some broadband services.

AST SpaceMobile has just two test satellites in orbit, but it hopes to launch five more later this year, which would support commercial operations. In the meantime, it will test its services with MNO partners, including AT&T, which operates the FirstNet broadband network.

In a video posted by AST in late December 2022, Chris Sambar, president, AT&T Network, commented: "The reality is it's impossible to cover every square inch of America with any single technology. But we believe we can come really, really close with the combination of terrestrial networks and direct-to-cell satellite networks. And we think that this relationship with AST is going to give us the ability to do that."

AT&T has been working with AST since 2018 to understand a variety of different things. These include the architecture, the link budget, how to compensate for the Doppler effect, how to compensate for a vehicle in space that's travelling at 17,000mph, and how to ensure they don't interfere with ground stations.

When it comes to terrestrial network outages,

Sambar says: "What would mean a lot to us is if we could turn on that connectivity immediately. And the space-based mobile network that AST is building, just imagine the possibility.

"When they [first-responders] need coverage, it's immediately there – two-way connectivity, text, voice, data and even location tracking. What a terrific opportunity to be able to provide that to first-responders as an augment to the FirstNet programme."

These LEO satellite constellations will offer public safety new connectivity solutions. But something even more potentially useful is coming down the line in the shape of 3GPP 5G NTN (non-terrestrial networks), which will provide native 5G satellite solutions within the 3GPP ecosystem.

Nicolas Chuberre, 5G/6G solution line manager at Thales Alenia Space, is well positioned to explain the benefits of 5G NTN. He is the lead representative of Thales in 3GPP TSG RAN, where he is the rapporteur of the work item on the integration of NTN (satellite and HAPS) in the 5G system. He also chairs the Satellite Communication and Navigation working group at ETSI.

He points out that the satcom industry has developed proprietary, standalone networks designed to address specific user terminals, or a specific satellite network deployment scenario. "This has resulted in disjointed markets between satellite and mobile networks," Chuberre says.

Interworking solutions have been developed, but as the two technologies rely on different mechanisms and terminals, this prevents the ability to leverage the full added value of both technologies.

What 3GPP is doing is defining an access technology to address the specifics of 5G NTN deployment in terms of Doppler, latency, cell size and so on, to provide a continuous technology framework across both satellite and terrestrial networks. "All the mechanisms defined by 3GPP over the last 20 years are just offered natively over NTN," says Chuberre.

"This helps to resolve issues like how to best handle the QoS end-to-end and how to best address the security issues end-to-end. [It also resolves the issue of] how to best balance the radio resources allocated on both the satellite network and the local terrestrial access network to match and support the traffic."

The intent is to enable mass-market smartphones to be enhanced with satellite capabilities so they can roam seamlessly between terrestrial mobile and satellite networks, thereby achieving service continuity at a global level. This would represent a potential market of billions of terminals; far greater than the very limited market addressed by the bespoke dual-capable 2G/3G and satellite devices available today.

Satellite is an important tool in closing the communication gaps in rural areas


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Chuberre continues: "But the major advantage of adopting a standard is that it can support multi-vendor interoperability, so that a terminal vendor can invest in R&D to design appropriate terminals with the perspective of a market opportunity that is much larger, and not limited to the one of a given network vendor."

Being part of the wider 3GPP ecosystem will also provide much greater economies of scale for satellite operators. "You also have the possibility of combining better satellite network components with terrestrial mobile network components, in order to provide global service continuity, or for increased reliability if you are using multi-connectivity schemes," points out Chuberre.

He says research shows that adding satellite connectivity to smartphones will have little impact on materials costs. This will be welcome news to budget-squeezed public safety agencies.

Renaud Mellies, head of international co-operation, standardisation and innovation, RRF Programme at the French Ministry of the Interior, says: "While connectivity is the main thing for us, what we want is a handset for every PPDR person, so in France that is about 400,000 people. So, the cost is very important for us and we also want the same handset for everyday use."

He adds that they also want assurance on mobility issues when roaming between different terrestrial and satellite networks, and also when PPDR teams roam across national borders.

"At the moment it is very difficult for us to have roaming with mission-critical QoS with priority and pre-emption. QoS is very important with voice, and voice is a must," says Mellies. "We come from narrowband technology and we want to have at least the same QoS when using 3GPP standardised solutions."

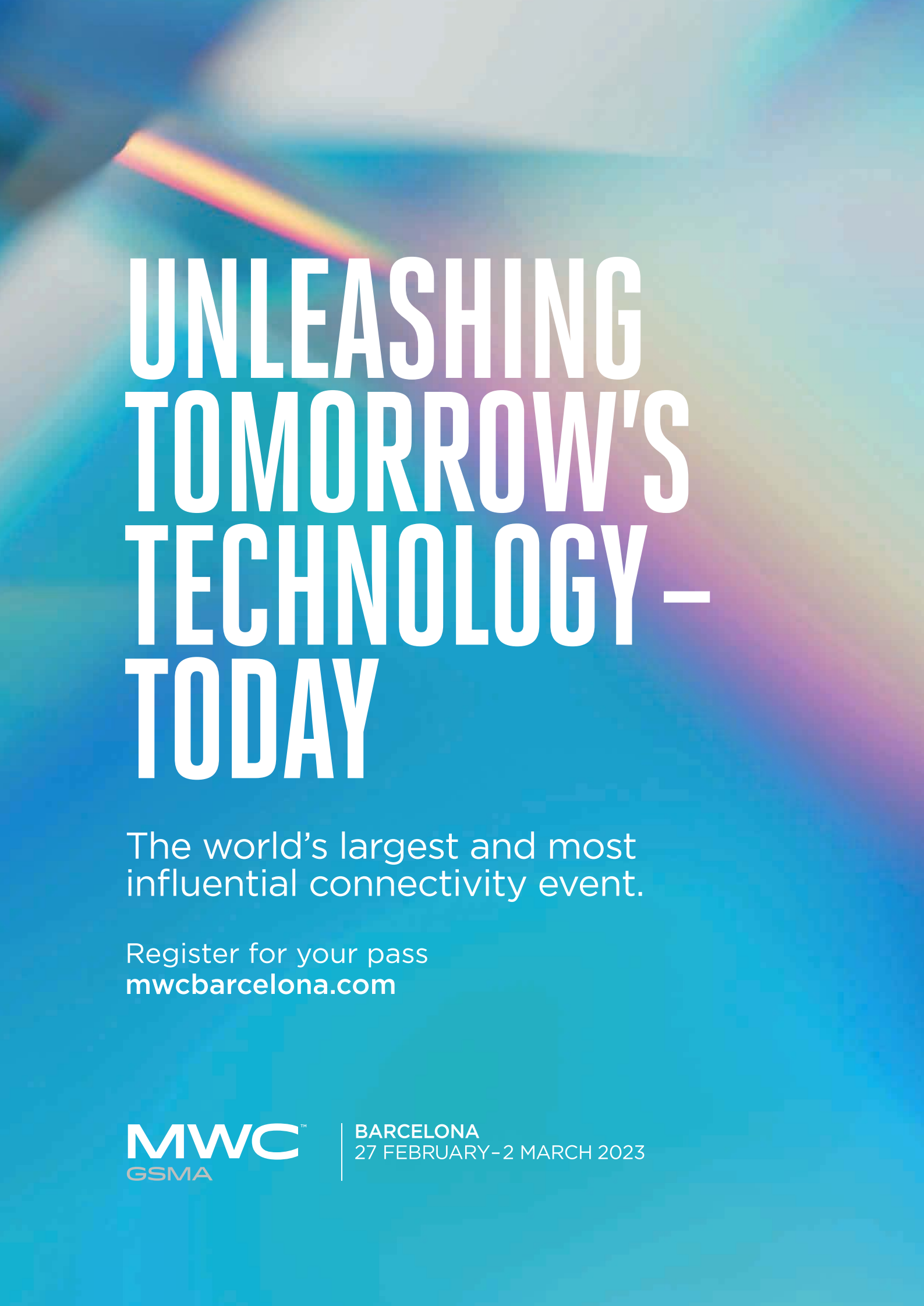
EE ESN's Andy Sutton notes that it is still early days for 3GPP NTN and its performance characteristics are as yet unknown, although "it's reasonable to assume that capacity will be quite limited".

But in addition to phone comms from satellite-based NTN, he anticipates "significant evolution in backhaul capabilities", as well as support for other NTN elements such as HAPS and drones, "both of which have great potential to support an evolved ESN in the future".

Erillisverkot's Kauppinen adds: "For complementing and ensuring the connectivity of public safety, NTNs are by far the most interesting solution, as everyone has in their pocket a device to connect to the secondary system. That would be like a dream come true for public safety, as it would mean the service is very secure."

The satellite market is on the cusp of some exciting new developments that offer public safety some intriguing possibilities. For Europeans, there is the possibility that the EU IRIS² (Infrastructure for Resilience, Interconnectivity and Security by Satellite) LEO programme announced in November 2022 might adopt 3GPP 5G NTN for the access technology.

As Chuberre points out, all current and in-development satellite constellations are based on proprietary technology, so the first 5G/6G NTN-based satellite constellation could be quite a market disruptor. If the price points are right, it could also prove to be a very attractive proposition for public safety organisations.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The big picture

Critical Communications Today talks to a major developer of control room technology about the evolution of AI for public safety

As with so many other things when it comes to public safety communications technology, the control room/command environment is currently undergoing a process of evolution.

On the dispatch side, for instance, we are seeing various advances, for example the integration of consumer technology such as Google Maps with the likes of NEC's recently developed mapping solution, Maps. On the incident management side, 360-degree, data-centric solutions such as Unblur's IRIS suite, meanwhile, are having a profound impact on the operational environment.

Perhaps the most profound change to the control room environment, however, is the way in which incident information itself is gathered and then acted upon. The most obvious example of this is the numerous channels through which members of the public are now able to contact the emergency services, something which falls under the broad umbrella term of 'Next generation 911/112/999'.

These methods of contact could include traditional telephony, but also social media, emergency contact apps, and so on. Public safety operatives also have increasing potential access to 'visual' information, such as video footage submitted by the public as well as CCTV.

While the potential benefits of the latter are clearly enormous from a situational awareness perspective, they also raise serious questions around how this new glut of information should be sifted and actioned.

It is fine having all this data, after all, but before it can be considered useful, it somehow needs to be contextualised and ultimately rendered meaningful. And what of control room staff's mental health, with the 'visual' element adding another layer of potential trauma to what was already an extremely stressful job?

One potential solution to these problems is the use of artificial intelligence, something which has been a hot topic within the sector for several years. One of the most interesting companies in this field is Hexagon, whose HxGN OnCall Dispatch Smart Advisor solution is the subject of this article.

Emergency services AI

As described on the company's website, Smart Advisor enables users to: "Leverage assistive AI to fill operational blind spots in complex, unfolding emergencies. [It] supports continual autonomous assessment, and gives users richer, actionable insights that would otherwise go unseen."

Going into more detail about the product – and the company's conception of 'emergency services AI' more generally – Hexagon's sales director of public safety and utilities and communication - Germany-Austria, Norbert Habermann, says: "A very good way to think about it is as a second pair of eyes in the command and control centre.

"Artificial intelligence is something which has been discussed and researched by academia for a long time. [But academia's questions] are not the same ones which are relevant to emergency services command and control. In the latter environment, AI is there purely to assist, in real time."

He continues: "Smart Advisor is incorporated into our HxGN On Call portfolio, which I believe is one of the most modern systems on the market. We developed the technology from scratch, which has given us the opportunity to use different models and new functionality when it comes to the incorporation of machine learning. We've been researching this area for years."

Asked to describe how Smart Advisor actually works in practice, Habermann discusses what he refers to as "agents", which are essentially in-built analytical tools, responsible for finding connections between disparate pieces of information provided to the control centre. This information could come from members of the public itself, as well as data harvested from previous calls and incidents.

Going into greater detail about this, he says: "We have numerous assistive 'agents' running in the background of the system. For instance, there are agents which look for keywords, which in turn feeds into the pattern agent, which analyses those keywords and looks for potential meaning.

"The repetition agent looks at how often a particular keyword appears in the system, while the location agent correlates data about where calls are being made from. There is also the similarity agent, the statistic agent, rule agent, weather agent and so on."

He continues: "The agents run simultaneously in the background, but they are separate from each other. The intelligence in the system is how we connect them up.

"When the dispatcher is handling emergency calls, they will invariably have to make a decision in seconds. Therefore, they need the information immediately, which is one of the most important points for us. We only concentrate on the information which is dispatch-relevant."

Giving a relatively simple example of a situation where this might be useful to a dispatcher, Habermann discusses a hypothetical caller suffering from symptoms which they think may be evidence of COVID-19. Via the agents running in the background, the system will also identify other similar calls taking place within a particular location/timeframe, correlating the information and carrying out an almost predictive function.

"If the agent sees that people with these symptoms have developed COVID-19, they can link them up," says Habermann. "This in turn may give them the ability to mitigate a potential outbreak or make them aware that within the next few days, a lot of similar calls could be arriving. This gives them the opportunity to prepare, both in the control room and on the ground.

"Alongside the technology that we have already discussed, Hexagon has developed another solution through which we are able to look at social media messages. This is information which, again, can be analysed by Smart Advisor in order to develop insight about potential incidents in real time."

The human element

Alongside the workings of the technology itself, the other key discussion around emergency services AI is where its use ultimately leaves the dispatcher. Are we ever likely to see a situation where the 'human element' has been made completely redundant, for instance, with operational decisions being taken solely by 'the machine'?

The other key discussion around AI is where it leaves the dispatcher

As readers may or may not recall, this is something we addressed this time last year during an interview with another major industry player, who was adamant that the final operational decision must only ever be made by the human expert. This is a sentiment echoed by Habermann, who likewise believes that primacy must remain with the dispatcher.

"In our view, the role of the dispatcher doesn't change," he says. "They decide what needs to be done, in exactly the same way as they did in the past. We do have modules for automatic dispatch, but that is not a thing for now. The human being will continue to decide in the public safety world, as lives depend on it.

"Again, humans are limited in terms of their capacity to analyse information, which in the control room environment is increasing all the time. What Smart Advisor is designed to do is compress this huge amount of information in order to make it useful, bringing different strands together to alert the dispatcher that something meaningful might be happening."

According to Habermann, AI is currently still in the early stages of emergency services organisations incorporating it as an integral part of their day-to-day operations.

As might be expected, however, he absolutely believes that "the value is there".

For the technology to truly take off, he also believes that manufacturers must remain centred on the user. "Everyone's talking about AI," he says, "but it can mean both everything and nothing.

"The most important thing is that we have a customer who wants to use 999/112. The industry has to provide an AI product in relation to that, not a philosophy or a discussion.

"We have to give them something useful."

Adobe Stock/Rawpixel.com

The global village

The Government Authorities Global Village is an increasingly integral part of Critical Communications World

For the third year in a row, the Critical Communications World exhibition will have at its centre the Government Authorities Global Village (GAGV).

Intended to enable networking and best practice sharing between government organisations from across the world, the village is described by organisers of the event as "a dedicated space for representatives of national critical communications projects to come together to discuss ideas, challenges and best practice".

The spokesperson continued: "The Government Authorities Global Village brings governments and operators together, enabling them to meet with each other, fostering a spirit of collaboration across international borders.

"It facilitates knowledge sharing and benchmarking, while at the same time enabling organisations to shout about the great work that they have carried out so far."

As might be expected, many of last year's attendees included countries regarded as 'trailblazers' when it comes to the rollout of mission-critical broadband to their respective countries' emergency services. This included the United States with its FirstNet project, the UK with its innovative Emergency Services Network, and the Republic of Korea (SafeNet).

While all at different stages, each of these projects is in a continual – fascinating – state of evolution, which visitors were able to gain a profound understanding of in Vienna.

SafeNet and FirstNet in particular, for instance, are quite far forward when it comes to provision of the new technology to users. The UK's ESN, meanwhile, is in the process of overcoming various obstacles in the run-up to its eventual switch-off of the UK's legacy emergency services TETRA system. As mentioned, the opportunities for learning from these projects was immense.

Alongside these trailblazers, last year's GAGV also featured several countries who have started to pursue an interest in mission-critical broadband relatively recently. Some of these have already confirmed that they will be in attendance again this year.

Many of these are also at different stages of their respective projects, with the likes of France having only just awarded the contract to supply core network services, while Finnish operator Erillisverkot is far enough forward to be exploring the use of satellite technology to provide resilience and redundancy.

The GAGV facilitates knowledge sharing

Staying on the subject of the Northern European countries, CCW 2023 co-host nation Finland will also be joined by Denmark, Norway and Sweden at this year's GAGV. All of these countries face similar challenges (and worries, not least the looming presence of Russia to the north and east), and all will be coming together in Helsinki to celebrate the spirit of 'Success in Cooperation'.

Finally, the GAGV will also welcome countries that have perhaps received less publicity than the above, certainly in the European press.

One of the most interesting of these is Canada, which, led by an Ontario-based user group, is in the process of one of the most interesting mission-critical comms rollouts taking place across the globe. Established in 2019, the idea behind the project, according to the Canadian Public Safety Broadband Network Innovation Alliance's executive director, is to: "Establish public/private partnerships across all levels of government, critical infrastructure providers, innovation hubs, and private organisations, both in and out of the tech space."

Also present will be Australia, which also boasts one of the most forward-looking user groups in the world, as exemplified by the New South Wales Telco Authority. As visitors to Critical Communications World in Vienna last year will remember, one of the highlight presentations was delivered by NSW Telco's MD, Kylie de Courteney, who discussed not only public safety comms strategy in that part of the world, but also presented nothing less than a vision for the whole sector.

Discussing the importance of the GAGV and its place in the CCW ecosystem, TCCA CEO Kevin Graham said: "As with last year, the GAGV will be a crucial part of the 2023 iteration of Critical Communications World. We know from talking to attendees that a lot of new and strong relationships were forged last time, and we don't expect Helsinki to be any different.

"It is a truly pivotal time for the industry, particularly in relation to ongoing discussions relating to the rollout of mission-critical broadband. The GAGV is there to circulate best practice around the world, thereby helping to drive the discussion – and the sector – into the future. Fostering such collaboration and co-operation is crucial in sustaining innovation and aggregating scale globally to meet critical industry needs."

At time of writing, attendee organisations include Canada, Denmark, France, Germany, Hungary, the UK, Norway, Spain, Sweden, Australia and Finland.

Critical Communications World 2023 takes place on 23-25 May in Helsinki.

> **As with last year, the GAGV will be a crucial part of CCW 2023**

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ACCELERATING TECHNOLOGY EVOLUTION

‘Success in Cooperation’

Tero Pesonen, TCCA Board vice-chair and chair of TCCA’s Critical Communications Broadband Group, looks at the origin of CCW 2023’s key theme

The theme of Critical Communications World 2023 in Helsinki is ‘Success in Cooperation’. It is a tribute to the Finnish critical communications ecosystem, which has been using it as its slogan for years. But what does it mean and where does it come from?

‘Success in Cooperation’ is an attitude for all interactions, at all levels. It applies equally to the organisation’s internal way of working, across organisational borders and national borders, extending even to competing companies.

‘Success in Cooperation’ in critical communications is, first and foremost, recognition of – and at times also an acceptance – that one cannot cope alone (or at least for a long time alone). At the same time, it is very much a decision to trust the other parties and willingness to take an extra step to help out.

One might think that mutual trust and ‘Success in Cooperation’ in Finland would be a natural automatic outcome of the Nordic – ‘happiest nation in the world’ – society. However, that is not the case. It has been learnt. Therefore, it can be universal, if the will is there.

The history goes back to the late 1980s, to a point in time when every public safety agency in Finland had its dedicated analogue network. Each of them required renewal, but the nation was in a severe recession.

All requests for agency-specific separate networks were rejected, and the message was that there were resources for one public safety network only. The concept of a shared public safety network was established. Nevertheless, this was a hard cookie to bite for the agencies. There were many fears of joint service, and a lack of trust in the technology capabilities as well as towards the other operatives.

To build trust, it was decided that each organisation in the digital TETRA network was equally important, but had to operationally own a private virtual radio network (PVRN). To overcome the regional boundaries from the past, seamless nationwide mobility and the capability to send messages to anyone in the network were enabled.

To serve situations requiring multi-agency operation, designated common co-operation talk groups were established. The capacity, security, privacy and continuously improving coverage increased trust in the technology, as well as co-operation, initiating a continuous cycle of increased trust for deeper working together.

This enabled the renewing and rationalising of the 112 (999/911) emergency response centre (ERC) structure by consolidating hundreds of separate call centres into a single specific agency, using one national system in just a handful of physical locations. The ERC takes care of call-taking and dispatching for all incidents and all agencies in the entire country.

It is an attitude for all interactions at all levels

In parallel, the Finnish model of field command required better situational awareness and mobile tools. This model is where the leader/commander is leading remotely from in front, on the road instead of from a control centre.

This resulted in police taking GPS-based AVL (automatic vehicle location) into use, together with a computerised field command solution. As the solution turned out to be very efficient, the police made it available to other public safety agencies for free. With only minor user-group-specific modifications, the agencies were dispatching and task handling with a common situational picture nationwide.

In parallel, a process of adjusting laws and regulations took place, fostering co-operation enabled by trust. An illustration of this is the act of providing police, border guards and customs equal interchangeable rights, allowing the nearest unit to be assigned to a task. This makes a positive difference in resource efficiency, particularly in rural areas.

Now, public safety was co-operating. The next step was to invite utilities to participate in the common network. After all, public safety is dependent on electricity, and utilities need reliable critical communication, when a storm or disaster has impacted the power grid.

This step evolved further to include also commercial mobile network operators in a joint system, as well as a process to share the status information of all networks, and to agree on preparedness and distribution of work to restore services as quickly as possible in case of any interruptions.

Since then, national railways have joined the same shared network, which originally was thought to be impossible. The Finnish network has also been connected with Norway and Sweden, enabling far more efficient cross-border support than before. This includes jointly agreed rules for operational procedures, access rights, language and so on.

Over the years, ‘Success in Cooperation’ also represents itself in the co-ordination of common goals for the development of operational ways of working in the field, to the extent that industry is part of the cycle. Open communication with the industry and transparent procurement enable trust and joint international advancement of the entire sector. Commitment to driving standards is key for co-operation on a larger scale down the road.

How about ‘Success in Cooperation’ on a global scale for the benefit and safety of all in critical communications?

Tero’s work for TCCA is sponsored by Erillisverkot.

> **In parallel, a process of adjusting laws and regulations took place**

The return to business as usual

CCT reports from PMR Expo 2022, which took place in Cologne last November

PMR Expo 2022 possessed a much different – frankly much busier – atmosphere than its previous iteration, which took place 12 months before. There were two key reasons for this, both of which were connected to the other.

The first of these was that unlike November of 2021, Germany has not been struggling through social contact restrictions on anywhere near the scale of winter of the year before. As those who were in attendance will recall, 2021, with its masks and wide aisles, felt as if lockdown was apt to be declared at any minute.

The other reason for the livelier feel was the return of several Chinese companies, whose presence had been missing from the 2021 iteration of the show.

As will surprise no-one who has attended the PMR Expo conference before, a large majority of content across the course of the three days was situated around developments taking place within Germany itself. At the same time, much of what was spoken about – again unsurprisingly, given the direction of the sector – focused on the ongoing impact of broadband technology on mission-critical users and manufacturers. Beginning with day one, proceedings kicked off with an overview of different aspects of the latter topic, with presentations on the journey from 5G to 6G, digital transformation in industry, cybersecurity, the use of public networks for critical applications, and more. Speakers included Bernhard Klinger (board chair, Federal Association of Professional Mobil Radio), professor Slawomir Stanczak from the Fraunhofer Heinrich-Hertz Institute, and Siemens' Markus Weinlander.

The PMR Expo summit continued on day two with Thomas Scholle, head of strategy and management at BDBOS. Picking up on the themes of the previous sessions, he discussed the German strategy in relation to mission-critical broadband, as well as the business case for rolling it out.

Going on to discuss the rationale for providing mission-critical broadband for public safety, he said that they wanted to offer "internet connection" along with radio. Discussing the rollout of off-the-shelf devices in relation to this, he said: "We're going to need to set the criteria for it, so that end devices can have the proper level of security and all the necessary criteria."

"You need frequencies, investment and political interest"

He continued by reiterating the variety of potential use-cases in relation to mission-critical broadband for the emergency services. These include transmission of video, photos and data, instant access to online databases, biometrics and so on.

Moving onto the implementation of a broadband network, he said that the German federal government, as well as the individual states, "want to get things moving. The creation of a high-performance broadband network is long overdue," he said.

Looping back to the beginning of his presentation, he reiterated the importance of security, as well as the availability of spectrum and standardised technology.

Touching on the anticipated rollout phases, Scholle foresaw an initial framework contract managed by BDBOS and a preference for an 'own operated' network. In order to do that, he said, you need frequencies, investment and to "resuscitate political interest" following the massive change of context post-2019.

Following on from Scholle, the conference continued with TCCA CEO Kevin Graham discussing government strategies around the world, in relation to the rollout of critical broadband.

Beginning by discussing the continuing role of networks such as TETRA, he said: "Across enterprise, industry and public safety government, we're seeing users continuing with their narrowband networks. In fact, many are insisting that we support those networks for a number of years while they work through their programmes for adoption of critical broadband."

Graham continued by discussing what he referred to as "pathfinder" public safety broadband projects taking place around the world, as well as the "very good lessons" which are coming out of these early adopters. "We can learn from some of the successful aspects of their projects," he said. "We can also learn from some of the potholes that they've found."

Graham continued his presentation by discussing the availability of spectrum, which for him is a key differentiating factor in the different mission-critical broadband models being adopted around the world.

He said: "Access to spectrum is really important, because that can dictate what options are available to you in terms of providing a service to your end-users. [Different potential service models include] dedicated network, multi-operator carrier, mobile virtual network operator, and fully outsourced."

Another important factor, he said, is the process of augmentation/transition from the existing narrowband networks already serving users. (For instance, the nationwide TETRA network as provided by BDBOS in Germany).

"Some of the decisions on transition are around support [for] the existing legacy networks, and whether that adoption is a voluntary or mandatory decision."

Graham also mentioned the issue of "cut-off date", which was – and continues to be – a major pain point in relation to projects such as the UK government's burgeoning Emergency Services Network (ESN) programme.

Speaking of ESN in particular, he said: "It is probably one of the most ambitious programmes, [with the UK government's decision] to operate through a commercial mobile network operator, and three years later have all of their users transition fully to broadband. And be in the position that they could then turn off the Airwave TETRA network."

"We can learn from some of the potholes they've found along the way"

A welcome return

One of the most notable differences between last year's PMR Expo and the 2021 iteration was the increased number of exhibitors due to the changing global COVID situation. This included several Chinese companies, whose presence was extremely welcome.

Discussing the importance of European shows – and the European market as a whole – radio manufacturer Caltta's sales director of Europe and Turkey, Steve Shen, said: "It is really important. For the past two years, we couldn't attend. It's OK communicating online, but we need to see people – our customers – face to face. [In this environment], people can come to see all the products at one time."

Discussing the company's offer and what it had brought to Cologne in 2022, Shen continued: "Caltta stands for 'converge all to talk'. Our company is not only for DMR – we have DMR, 2G, 4G LTE and 5G. We also have a PoC [Push-to-talk over Cellular] solution, as well as unified communications. We sell multiple products, with a total solution."

Because of the nature of the show, Caltta only brought DMR and PoC devices to Cologne. Discussing the former in particular, Shen mentioned the company's DH5 series of radios, which at the top end features Bluetooth, location functionality, enhanced security, a man-down feature, as well as an IP68 rating. The device in question comes in two colours – green, which is more mission-critical-oriented, while the blue version is generally for enterprise or commercial use.

Discussing the international nature of the company's operations, he said: "We have very good business in the UK, the Netherlands, Italy, Spain, Hungary, Turkey and the Nordics. We're also trying to explore Eastern Europe, like the Czech Republic, Poland, Moldova and Romania."

Another important Chinese company in attendance was Kirisun. Echoing the sentiments of Caltta – particularly around the importance of the European market – its vice-president, Terry Lin, said: "The biggest increase in business for us is from the European market. We do a lot of business in England, as well as Sweden, France and more."

One of the products which Kirisun was most keen to show *CCT* was its ATEX radio DP810/DP815. As might be expected, these are intended for use in environments such as those within the oil and gas industry.

Discussing interest in the ATEX technology in particular, Lin said: "This is our first event since the Expo in 2019 – we didn't come last year. And the thing which has really surprised me is that most of the people we've seen have been interested in our ATEX radio offering, which is why we put it on such prominent display on the stand.

"Our aim is to become one of the top players in the sector. That means that we have to provide innovative technology in the high tier. We're focusing primarily on DMR and PoC business, and we want to be the most cost-effective."

The final company we spoke to was Abell, which was also demonstrating its DMR offering, including radios and repeater systems. Discussing the company's single-frequency DMR repeater R50(20), the company's general manager, Dai Bin, said: "There's no need to change the duplexer, because it's only one frequency. The dimension is just a little bigger than the mobile radio, [and it's] light weight. The idea of this is that it's far more simple to use and set-up."

The company also demonstrated a single-frequency repeater R50(10), incorporated into a backpack.

Critical testing in Spain

CCT reports on the latest ETSI MCX Plugtests, which took place at the end of last year in Malaga

Image ©ETSI

The capabilities of mission-critical push-to-talk (MCPTT), mission-critical data (MCData) and mission-critical video (MCVideo) – collectively, 'MCX services' – were tested during the seventh ETSI MCX Plugtests. They took place in November last year at the University of Malaga (UMA) in Spain.

The MCX Plugtests series is the first independent testing of public safety and other mission-critical services over LTE and 5G networks.

Using 4G and 5G test networks, more than 1,200 tests – based on 3GPP Release-17 – were executed by more than 150 delegates from different vendors. The full report shows a success rate of 96 per cent interoperability of the 3GPP mission-critical services tests.

The test cases have been amended with additional test scenarios, which will be included in a future version of the ETSI specification (ETSI TS 103 564, following ETSI committee TCCE approval). A total of more than 330 test cases are now available for the MCX Plugtests.

Besides the MCPTT, MCData and MCVideo application servers and clients, the testing also included devices, railways-oriented features and interworking with TETRA. It furthermore included IMS (IP multimedia subsystem), eMBMS (evolved multimedia broadcast multicast services) components, server-to-server and inter-MCX communication. A test stream was dedicated to 3GPP RAN5 conformance testing.

The testing during the 7th MCX Plugtests was complemented by an observer programme, with presentations, roundtable discussions and demonstrations for the observers. The observations from the Plugtests events provide valuable feedback to 3GPP working groups, as work continues in mission-critical communication specifications.

Essential events

The Plugtests are essential to ensure seamless access to mission-critical services over 4G and 5G networks across different vendors' products and implementations. They are key for all industry and public safety stakeholders, giving vendors a unique opportunity to test their implementations with other implementations.

This helps to identify issues early and thus can save a lot of cost later on. At the same time, user and operator members can see first-hand the state of the development and products.

This Plugtests event had a live 5G network available for the first time. This is very important for FRMCS, for instance, as it will use 5G right from the start. Also, for the first time there were live TETRA networks available, which allowed testing of the TETRA interworking function (IWF).

This event was organised by ETSI with the support of the European Commission, EFTA, TCCA, 5G-EPICENTRE project and UIC. Preparations started in June 2022 with the registrations of vendors and observers.

The tests, test specification and organisational issues were agreed between the participants during bi-weekly conference calls, taking place from June to November 2022. Before the main event, the vendors conducted integration with test networks and remote pre-testing of their implementations, via VPN tunnels which connected their labs to a central exchange hub.

Speaking of the event, chair of TCCA's Technical Forum, Harald Ludwig, said: "Having these Plugtests back as a face-to-face event makes a big difference. Only in-person events allow testing via real LTE/5G networks as devices have to be close to the base stations. Also, the fact that the test engineers could sit next to each other allows more efficient testing and troubleshooting.

"The social element – for instance, having coffee, lunch and dinner together – is not to be underestimated in these events. It also helps afterwards when vendors contact each other to solve issues."

Ludwig continued: "Interoperability is important in any context where products or systems from different vendors come together and should work across their implementations. The narrowband/broadband interoperability is important for the transition phase from narrowband networks to broadband networks.

"Only interoperable and standards-based solutions allow connection of implementations from different vendors and avoid vendor lock-in."

The next FRMCS and MCX Plugtests events are planned for the second and fourth quarters of this year. Details will be published on www.etsi.org.

> **"Standards-based solutions allow the connection of implementations from different vendors"**

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CONTENTS

Following on from last year's incredibly successful show, the BAPCO Annual Event is back with a vengeance this March.

As ever, visitors to the event will have the chance to increase their knowledge by attending the sector's most informative and useful educational conference programme. Through numerous live product demonstrations plus exclusive new launches, visitors will be able to experience first-hand the latest technology and equipment available. New for 2023, the Vehicle Demonstration Zone will allow visitors to explore and interact with the vehicles that are currently in use by the public safety sector.

Visitors will also be given the chance to join the themed, guided "Tech Tours", another exciting new addition to this years event. The tours will enable visitors to see some of the most cutting-edge kit the industry has to offer being demonstrated up-close.

We can't wait to welcome you to Coventry in March.

INSIDE THIS YEAR'S PREVIEW...

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BAPCO PRESIDENT, JOHN ANTHONY MBE

It gives me great pleasure to welcome you to this 2023 BAPCO Annual Event show preview.

BAPCO continues to be the premier event in the public safety technology sector, providing the forum for professionals in the field to exchange ideas and experiences, and to keep up to date with the latest developments. With that in mind we hope that you use this preview to help plan your visit and get the most from the two days.

My particular thanks, as always, must go to our sponsors and exhibitors, without whom we would not be able to deliver such successful events. In addition, our thanks go to the many contributors to our conference sessions, who make them both informative and interactive.

I am pleased to say that we are continuing to grow from our successful event last year. The exhibition floor this year is larger, featuring many returning exhibitors as well as a number of companies and organisations joining us for the first time. We are also seeing the number of international visitors continue to increase, and I thank them for taking the time to travel to be with us.

All of these organisations will be waiting on the exhibition floor, ready to discuss and demonstrate their products to you. In addition, there will also be our Public Safety User Hub, aimed at giving the opportunity to industry newcomers to take advantage of the exposure that attending the BAPCO Annual Event brings.

The conference sessions – which are spread across three streams - will once again feature a diverse range of speakers from home and abroad. This will allow visitors to hear first-hand about the global trends in public safety technology and collaboration. Be sure to use the programme guide in this preview to plan the sessions that you wish to attend. I know from experience that it is easy to miss a session as you get involved in other discussions with colleagues.

We will, of course, also be hosting our networking dinner, which was such a success last year. This will allow us to network with colleagues and acquaintances in a relaxed and informal atmosphere, whilst hearing from our charity partner, the British Heart Foundation and an after dinner speech from the exceptional Rachel Murphy, public speaker, health tech advisor and Tech Woman of the Year.

"I am pleased to say that we are continuing to grow from our successful event last year"

In addition, this year, we will be giving a number of awards, the principal one being the inaugural Ian Thompson Bursary. This will be awarded to one or more individuals, allowing them to broaden their knowledge of the industry from an international perspective.

Our team has continued to work hard to once again bring you a superb event in 2023.

Our mission, as always, is to continue to meet your requirements and benefit the public safety communications sector, at no cost to end users. Have a great event, and I look forward to meeting you in Coventry.

Exhibition

BAPCO 2023 will bring together the entire UK public safety communications sector to experience the latest equipment and systems, develop important business relationships and generate new opportunities. Get hands-on with new equipment and speak to experts on how to transform your organisation and reach your goals.

Visitors will have the opportunity to network with our sponsors Motorola Solutions, Hytera, Saab and Cradlepoint. We also have an exciting line-up of new exhibitors including Amphenol-Procom, CMI Corporation EMEA, 3S Group and CloudRF.

With over 80 companies in one place and thousands of innovative products and solutions to choose from, BAPCO is the best place to explore the latest public safety communications technology.

Tech Tours

NEW FOR 2023

Individually themed, these tailored, interactive experiences will provide the perfect opportunity to explore the new and innovative products offered by our exhibitors.

Escorted by a member of the event team, each themed tour will visit a selection of companies working within different product spaces (ranging from AI and robotics to cybersecurity and the transition to broadband and ESN). The tours are intended to help visitors experience the best products and solutions to suit their business needs.

Educational Conference

Expand your knowledge through free-to-attend conference sessions, offering a huge range of cutting-edge presentations, delivered by some of the most respected thought leaders in UK public safety comms. The programme will consist of three streams taking place across two days, and will be packed with keynote addresses, best practice discussions, technology updates, panels and debates.

The conference will cover all the big issues facing the UK public safety communications technology sector, from the evolution and continued exploitation of current solutions to the potential role of 'future technology' such as AI. BAPCO 2023 will also include vitally important updates on the ongoing Emergency Services Network roll-out.

To celebrate International Women's Day on Wednesday 8 March, we will be featuring a vitally important panel discussion on 'A time for change in the emergency services culture'. This discussion will cover why now is the time to act to deliver better outcomes to change inequalities. This is a session not to be missed.

Vehicle Demonstration Zone

NEW FOR 2023

New for 2023, this is a dedicated area where visitors can witness first-hand some of the vehicles which are currently in use by UK public safety agencies.

This interactive zone is intended to facilitate discussion around in-vehicle connectivity, while at the same time demonstrating a range of cutting edge solutions.

Networking Lounge

2023 will see the return of the Networking Lounge. This is a purpose-built space at the centre of the exhibition, enabling attendees to take time out and catch up with valued colleagues, old and new over a coffee and snack.

Public Safety User Hub (PSUH)

NEW FOR 2023

The PSUH is a dedicated space that will bring key public safety agencies together, enabling them to meet with each other to facilitate knowledge-sharing and benchmarking, and to share news about great work that they have been carrying out.

The BAPCO Annual Dinner

The BAPCO Annual Dinner is one of the most important events in the UK public safety calendar. As ever, it will be attended by a veritable who's who of influencers, thought leaders and personalities from across the sector.

Guests will enjoy an evening of entertainment and great food whilst networking and catching up with colleagues and friends, old and new. The BAPCO Annual Dinner will take place following the conclusion of the exhibition and conference's first day.

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SPEAKER HIGHLIGHTS

Michael Street, Head of Innovation and Data Science, NATO

Michael leads the exploiting data science & AI team within the NATO Communications and Information Agency's Chief Technology Office. This team applies innovative approaches and data science technology to extract value and insight from information.

Cool technology for hot situations. AI and big data for a safer world

Tuesday 7th March, 09:45 to 10:15, Theatre A

Holly Barkwell, Canadian Regional Director, NENA

Holly is an experienced public safety professional with over 27 years of technical and operational experience in 911 emergency communications and dispatch. She has experience in public safety policy, governance, technology, operations and change management and standards, and best practices.

Canadian NG 911 experience and best practices

Tuesday 7th March, 11:30 to 12:00, Theatre B

John Black, Programme Director, ESMCP

John joined the Home Office in July 2020 to work as Chief Technology Officer for the Emergency Services Mobile Communications Programme. He was appointed Programme Director for ESMCP in August 2020.

ESMCP update

Tuesday 7th March, 12:30 to 13:15, Theatre A

Eyra Abraham, Founder, Lisnen

Eyra is a founder of Lisnen, a start-up changing the landscape of adaptive technologies for people with hearing loss, using AI. The company develops an app that helps with situational awareness of critical sounds in the environment, such as fire alarms or sirens.

AI - helping to make technology accessible for all

Wednesday 8th March, 11:45 to 12:15, Theatre A

Ken Rehbehn, Principal Analyst, CritComm Insights

As a wireless technology analyst, Ken delivers industry analysis in order to address the international landscape of systems, networks, professional services, devices, and applications that provide a thriving public safety/industrial communications innovation ecosystem.

Embracing a digital fireground: the incident command revolution

Wednesday 8th March, 12:30 to 13:00, Theatre A

Jonathan Dunkerley, Police Superintendent, OCIP

Superintendent Jon Dunkerley is the National Police Airwave User Coordinator, a role he has occupied since 2019. Working as part of the national OCiP policing team, he manages Airwave operational risk for policing reporting to the national police ESN Coordinator, Gary Cann.

Keeping Airwave delivering to the max

Wednesday 8th March, 15:00 to 15:30, Theatre A

FOR THE FULL SPEAKER LIST, VISIT BAPCO-SHOW.CO.UK

The advance of critical communications interworking and development of critical broadband networks

Tuesday 7th March, 14:30 to 16:30, Theatre A

Mladen Vratonjic, Board Chair and Director, TCCA

Can you describe what you will be talking about during your presentation at the BAPCO 2023 Annual Event.

We will provide an overview of developments and progress in broadband critical telecommunications around the world, with a special focus on forerunners such as the US, Finland and, soon, France, which hopes to have part of the system ready for the upcoming Paris Olympics.

What do you see as being the big issues and challenges for the sector over the next five years?

As we move to critical broadband, the challenge will be ensuring that our voice is heard, and the unique and specific requirements of critical users taken into account. We are a very small sector compared to the huge consumer broadband market, but we are still critical to the safety and security of all those consumers in their daily lives.

What opportunities do you see for the sector in the current environment? What big changes would you like to see in the world of UK public safety communications?

The progress of ESN has been - and will continue to be -, well-documented and followed with intense interest by other countries looking to move to critical broadband. The UK Home Office is a pioneer, and their work is a huge opportunity for others to assimilate the positives, and the negatives, as ESN takes shape.

Leading digital transformation

Wednesday, 8th March, 09:45 to 10:15, Theatre A

"Conversational AI could really transform things"

Rachel Murphy, entrepreneur, health tech advisor, and non-executive director

Can you describe what you will be talking about during your presentation at the BAPCO Annual Event.

I will be talking about transformation of public services using the NHS as an example. In particular, the NHS APP as the 'front door' to consuming services across the system.

What do you see as being the big issues and challenges for the sector over the next five years?

Remote working and retaining staff will be key challenges, as will increased demands, and likely under-funding.

What will be the most transformative development over the next five years in terms of the technology?

The advent of things like conversational AI could really transform services in this sector. Big data and using the information you have in more of a preventative fashion will be key, while sharing data across departments will also be key to the user experience.

What key messages or take-home points would you like people to get from your session?

That we are all using digital technology day in day out. The use cases in your sector are plentiful but a lot of the time, basics need to be fixed before we start to get out the shiny new toys. Iterative improvements rather than big bang is the way forward.

THEATRE A: KEYNOTES, INITIATIVES AND BEST PRACTICE UPDATES

DAY ONE: Tuesday, March 7

09:30
CONFERENCE OPENING AND INTRODUCTION
John Anthony, President, British APCO, **Chris Lucas,** Vice President, British APCO, **Duncan Swan,** COO, British APCO

09:45
KEYNOTE ADDRESS: Cool technology for hot situations! AI and big data for a safer world
CHAIR: **Duncan Swan,** COO, British APCO
Michael Street, Head, Innovation and Data Science, NATO NCI Agency

10:15
KEYNOTE PANEL DISCUSSION: Enhancing operations with new technologies: a view from the top
CHAIRS: **Robin Davis,** Chair & **Iain Ivory,** Co-Chair, Future Technologies Group, TCCA
David Bailey, Digital Engagement Manager, Police Digital Service
Ian Taylor, Senior User and Business Change Lead (Fire) for the National Fire Chiefs Council (NFCC)
Tim Bishop, Executive Director of IM&T, South Western Ambulance Service NHS Foundation Trust
Matt Leat, Assistant Chief Coastguard, HM Coastguard Operations

12:00
Tech trends: shaping the future of emergency services
CHAIR: **Andy Rooke,** Vice President, British APCO
William Moore, CEO, Airbox Systems

12:30
KEYNOTE ADDRESS: ESMCP updates
CHAIR: **Darryl Keen,** Retired Chief Fire Officer, Hertfordshire Fire and Rescue
John Black, Programme Director, ESMCP, Home Office

14:00
A vision for the future: integrating terrestrial and space-based communications
CHAIR: **Ellie Rice,** Security Lead, DASA
Professor Andy Sutton, Distinguished Engineer & Principal Network Architect, BT

14:30
The development of critical broadband networks around the world
Chairs: **Mladen Vratonjic,** Chairman & Board Director, TCCA
Tero Pesonen, Vice Chair, TCCA

- **Broadband updates from around the world**
  Mladen Vratonjic, Chairman & Board Director, TCCA
  Tero Pesonen, Vice Chair, TCCA
- **Virve 2 updates from Finland**
  Ari Toivonen, Development Manager, Erillisverkot, Finland
- **FirstNet authority innovations: lessons learned and the common challenges public safety broadband faces**
  Travis Hull, User Experience Domain Lead, First Responder Network Authority
- **RRF Programme in France**
  Renaud Mellies, Ministry of Interior, France
- **Belgium updates**
  Christophe Gregoire, Director Technology & Operations, Astrid, Belgium

DAY TWO: Wednesday, March 8

09:30
CHAIR'S INTRODUCTION
Chris Lucas, Vice President, British APCO

09:45
Leading digital transformation
CHAIR: **Chris Lucas,** Vice President, British APCO
Rachel Murphy, Entrepreneur, Health Tech Advisor & Executive Director, RachelMurphy.com

10:15
SESSION SPONSORED BY MOTOROLA SOLUTIONS
The emergency services culture: a time for change
Jagtar Singh OBE, National Officer AFSA & Chair, Coventry and Warwickshire Mental Health NHS Trust
Suzette Davenport, Ex Chief Constable, Gloucester
Dee Collins, Ex Chief Constable, West Yorkshire
Alison Kibblewhite, Assistant Chief Fire Officer, Bedfordshire Fire and Rescue Service
Karen Gowreesunker, Assistant Chief Fire Officer & Strategic Enabler Enabling Services, WMFS

11:15
Leading digital transformation within public safety
Marcio Oliveira, VP Business Development, Intrado Life and Safety

11:45
AI - helping to make technology accessible for all
Eyra Abraham, Founder of Lisnen, Lisnen

12:30
Embracing a digital fireground: the incident command revolution
CHAIR: **Ian Taylor**
Ken Rehbehn, Principal Analyst, CritComms Insights

13:00
The challenge of high rise building and other mass evacuation scenarios
CHAIR: **Ian Taylor**
Darrell Shaw, Solution Architect, Telent & Representative from Merseyside FRS

13:30
Converged 3GPP MCPTT Communications for 21st Century fire rescue services: connecting the control room to firefighters
CHAIR: **Ian Taylor**
Richard Russell, Senior Business Development Manager, Tait Communications

15:00
KEYNOTE PANEL DISCUSSION: Keeping Airwave delivering to the max
CHAIR: **Chris Lucas,** Vice-President, British APCO
John Dunkerley, Police Superintendent, OCiP
Jonathan Kalisch, Head of Live Services, ESMCP, Home Office

THEATRE B: INITIATIVES AND BEST PRACTICE UPDATES

DAY ONE: Tuesday, March 7

11:00

The control room of the future: keeping the mission on course with voice-AI and analytics

Paul Long, Solutions Consultant, Red Box (now part of Uniphore)
Nadine Edmonson, Director of Product and Marketing Operations, Red Box (now part of Uniphore)

11:30

Canadian NG9-1-1 experience and best practices

CHAIR: **John Anthony,** President, British APCO
Holly Barkwell, President and CEO, BH Group
Ron Williscroft, Director 9-1-1, City of Winnipeg Communications Fire Paramedic Service

12:00

East of England Ambulance Service NHS Trust update on Hybrid Connex project

CHAIR: **Monica France,** Programme Manager, NHS Arden & GEM CSU
Stephen Bromhall, Chief Digital Officer, East of England Ambulance Service NHS Trust

13:30

PANEL DISCUSSION: MCX solutions for front line responders

CHAIR: **Andy Rooke,** Vice President, British APCO
Marja van der Kruk, Key Account Manager, Airbus
Chris Cant, System Sales Engineer, Hytera
Charlotte Roesener, Chair of the Industry Committee, Public Safety Communication Europe (PSCE) Forum & Frequentis

14:30

PANEL DISCUSSION: The next generation of control rooms: priorities and challenges

CHAIR: **Les Watson,** Managing Consultant, Mason Advisory
Dave King, Head of Sales, Frequentis
Matthew Palmer, Product Director, SSS Public Safety
Nadine Edmondson, Director of Product and Marketing Operations, Red Box
Yann Marston, Specialist Software Sales Leader, Motorola Solutions

15:15

PANEL DISCUSSION: Multi-agency coordination of an incident: ECHO, MAIT and SCG

CHAIR: **Ellie Rice,** Secuirity Lead, DASA
Paul Miller, Managing Director, AVR Group
Alan Thomas, Director, CAVT

16:00

The future of police contact: building a strong connection with the public

Jake Rigby, Research and Development Lead, BMT Global
Christian Ellis, Government and Security Business Unit Lead, BMT Global

DAY TWO: Wednesday, March 8

10:15

Development of a cloud based system for site specific, home safety visit and business protection risk information

Speakers to be announced, East Sussex Fire and Rescue Service
Speaker to be announced, Telent

10:45

A collaborative approach to delivering real time situational awareness

Steve McLinden, Account Executive UK, Unblur
Paul Dunnell, Station Commander Binley Fire Station, West Midlands Fire Service

11:30

The end of the line for UK telephony networks: will you get cut off?

John Livermore, ALL IP Industry Engagement Manager, Openreach

12:00

Case Study: use of digital technology within the Swaledale Mountain Rescue Team

Graham Worsley, R&D Advisor, Safenetics
Graham Brown, Swaledale Mountain Rescue
David Rutter, Swaledale Mountain Rescue

12:30

5G rural networks in Dorset: a case study

Simon Hill, Chief Technical Officer, Excelerate
Gary Littledyke, Project Manager, Dorset Council

13:15

Providing accurate indoor localisation and mapping for emergency services translates to higher emergency service efficiencies and more lives saved

Steve Ledbetter, President and COO, Eli Technology

THEATRE C: TECHNOLOGY DEMONSTRATIONS AND PRACTICAL EXAMPLES

DAY ONE: Tuesday, March 7

11:00
Technology is thriving, prevention is striving: the precipice of red-taped tech
Jonathan Sinclair, Technical Engineering Leader, Inclutech

11:30
The rise of IT and communications technologies to improve decision support in emergency and disaster management
Stephen Foreman, Account Executive, Noggin

12:00
SESSION SPONSORED BY MOTOROLA SOLUTIONS
Using biometrics to enhance frontline operations
Ian Williams, Software Consultant for Europe, Motorola Solutions

13:15
SPONSORED SESSION BY CONTENT GURU
Contact management for blue light: connecting the citizen journey to enhance public interaction
Shub Naha, Head of CNI and Utilities, Content Guru

13:45
Practical applications of AI in modern policing
Robert Hogg, CEO, Black Marble

14:15
SPONSORED SESSION BY CRADLEPOINT

15:00
Fleet audits: Driving operational efficiency
Dawn Griffiths, Business Development Manager, Sepura

DAY TWO: Wednesday, March 8

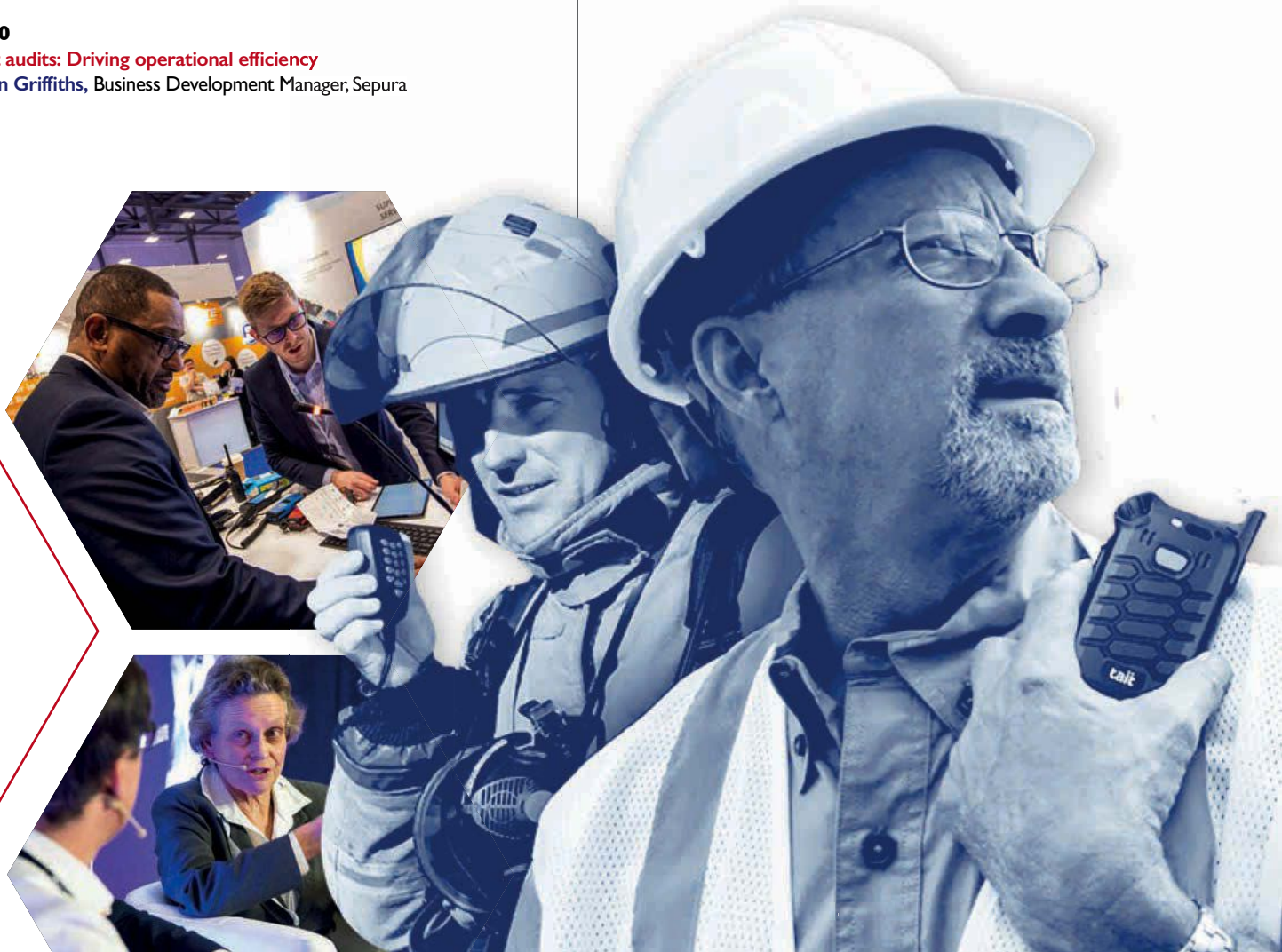
10:15
Resilience through collaboration: Hexagon's solution for smart and safe cities
Luzius Ammann, Lead, Business Development Efforts, Hexagon

11:00
Unlocking additional life saving data from the Internet of Things: what, why & how?
Ed Parkinson, President, Public Sector, Rapid SOS

11:45
Emergency service applications for 5G private networking
Andrew Carter, Group Technical Specialist - Wireless Technologies, Telent

12:30
Edge computing in public safety: the benefits of maximising the performance of your connected vehicle
Simon Ingram, Business Development, Emerging Edge IOT, TE Connectivity

13:15
Real time information of airborne plume risk and its distribution
Mike Brettle, Chartered Meteorologist, Plumecast Ltd



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