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JUNE 2022

Developing the ecosystem

Critical Communications Today editor **Philip Mason** introduces this special, Critical Communications World-themed issue

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 issue of *CCT*, the premier resource for professionals working in the critical communications sector.

All being well, this issue should hit desks about two weeks prior to the start of Critical Communications World 2022, taking place later this month. Anticipation ahead of the event is reflected across the course of these pages, beginning with our 'big interview' (page 10), which features ETSI CTO – and CCW keynote presenter – Adrian Scrase.

It is a wide-ranging conversation, with Scrase – as might be expected – having many interesting things to say about the ongoing broadband standardisation effort. He also touches on other subjects, however, not least the way in which the sustainability piece is going to be increasingly important for the sector going forward.

Skip forward a couple of pages, meanwhile, and you will find a special article focusing on the development of 'future technology', the inclusion of which is intended to echo in advance similarly themed sessions taking place in Vienna. The piece features interviews with TCCA's Future Technologies working group, as well as a deep dive into two emerging solutions with the potential to have a profound impact on the future of the sector.

This issue's last feature, which can be found on page 24, focuses on BroadWay, a major project concerned with the development of 'pan-European' broadband for the continent's emergency services. With the technology now a long way to being proven, we find out what is next for the programme.

Finally, turn to the back of the issue for a preview of Critical Communications World 2022 itself. The special 12-page section will tell you all you need to know ahead of the show, from special features located across the exhibition floor to what to expect from the conference and Focus Forum sessions.

I would also like to draw readers' attention to the International Critical Communications Awards, which as has been the case in recent years, is co-located with CCW. I had the honour of being asked to get involved in this year's judging, and I have to say the standard of competition was extraordinarily high. It is going to be a great night, and a massive credit to the sector as ever.

Enjoy the issue.

Philip Mason, editor

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Who, what, where

ASIA

Push-to-Talk over Cellular helps secure election

Inrico has supplied its Push-to-Talk over Cellular communication and dispatching system to the Philippine National Police in Cavite City. The force oversaw security in polling precincts across the location, during the country's recent election, taking place at the beginning of March.

According to Inrico, it provided "a complete communication system, including PoC radios and accessories, PTT app and dispatch console". Its T529 PoC radios leveraged 3G/4G and Wi-Fi networks, "replacing traditional two-way radios".

Discussing the deployment, a spokesperson said: "[The technology] enabled officers to communicate instantly across substantially larger areas. All the PoC radios operated on Inrico's iConvNet convergent communication platform, a powerful system running Windows, Android, Linux, IOS and RTOS."

MIDDLE EAST

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TETRA at motorsport mega event

Airbus SLC has highlighted the use of several of its TETRA solutions by organisers of the recent Saudi Arabian Grand Prix.

According to a statement, the company supplied its TMR880i, THR880i, TH1N and TH9 radios, alongside the RCS9500 radio dispatch console. A spokesperson for the company said that these were "pivotal to safeguarding people and the venue, while guaranteeing seamless on-site race activities and operations".

Speaking of the roll-out, Airbus SLC head of Middle East, Africa and Asia Pacific, Selim Bouri, said: "Several mega events in the region have benefited from our solutions. It was our honour to provide support to the organisers of the Grand Prix." The Saudi Arabian Grand Prix took place at the Jeddah Corniche Circuit.

SOUTH AMERICA

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Private wireless network deployment at Chilean mine

Nokia has deployed private wireless network technology across the Minera Centinela copper mine for Chilean mining group Antofagasta Minerals.

The open pit mine – which is located north of Santiago – produces copper concentrate and cathodes, as well as molybdenum and gold.

Nokia's head of enterprise for Latin America, Marcelo Entreconti, claimed that the new private network marked "the first wave of Industry 4.0 projects in Latin America". He continued: "Deploying these networks lays the groundwork for an expansion beyond connectivity, where Nokia is already proposing solutions to the global mining community."

(For more on the deployment of broadband and TETRA in the mining space, see our feature on page 20).

EUROPE

© Michi Portmann

Motorola and Swisscom PTT collaboration

Motorola Solutions is providing Swiss telecommunications operator Swisscom with what it describes as "a next generation, 3GPP standards-compliant PTT solution".

According to a statement, the new service will use Swisscom's broadband network. Priority service will be given to "critical users in emergency situations", with one of the first customers being Switzerland's largest cable car company, Zermatt Bergbahnen AG.

Speaking of the deployment, a spokesperson said: "Staff will rely on the new PTT service to communicate and share information in support of daily operations, such as patrolling slopes, as well as to manage critical rescue efforts in emergency situations. The company operates across 200 kilometres in the Matterhorn mountain area."

Sepura appoints former ESN solutions architect

Sepura has appointed Rob Merrick as its business development manager for broadband products.

According to a statement, Merrick will be responsible for "continuing to grow Sepura's presence in the evolving LTE market space, supporting customers and partners in deploying its mission-critical broadband solutions". He previously worked as solutions architect at the UK Home Office, where he played a key role in the development of the Emergency Services Network.

Prior to the Home Office, Merrick worked for the Directorate for Emergency Communication in Norway as technical architect on Nodnett.

Speaking of the appointment, Merrick said: "There are significant opportunities in the market, where LTE solutions can answer customers' operational needs."

NORTH AMERICA

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PowerTrunk Canadian prison roll-out

The Ministry of the Solicitor General in Canada is rolling out TETRA at 31 correctional and youth facilities across the country. The technology is being provided by PowerTrunk, via Ontario-based partner Williams Communications Services.

According to a statement, the aim of the project is to replace "legacy infrastructure and radios with a more reliable, robust, and scalable solution, based on an open standard technology". PowerTrunk will provide 31 base station sites and 5,000 devices, as well as dispatch consoles based on its NG CeCoCo solution.

Speaking of the deployment, PowerTrunk CEO Jose Martin said: "We are delighted to be supporting Williams Communications on this contract. [It is] our first TETRA system for public safety in North America."

News round-up

Industry giants' 5G private networks deal

BT and Ericsson have announced a new joint partnership, with the intention of providing commercial 5G private networks for the UK market.

According to a statement, the agreement marks the first of its kind in the country. It will "enable BT to sell next generation mobile network technology products to businesses and organisations in sectors such as manufacturing, defence, education, retail, healthcare, transport and logistics."

The deal follows BT's recent announcement of its investment of almost £100 million in its 'Division X' unit, taking place over the next three years. This is to "accelerate the development of customer solutions which integrate emerging technologies like 5G, IoT, edge computing, cloud and AI."

Speaking of the 'private network' concept, a spokesperson said: "[They] are wireless solutions that provide secure indoor and outdoor 5G cellular coverage, making them suitable for a range of uses. [This is particularly the case] in environments such as factories, education campuses and other large sites where security and ultra-low latency connectivity are important.

"New innovative applications and IoT capabilities can be enabled through a private 5G network to improve productivity and optimise operations. It can drive cost savings [through] asset tracking, predictive maintenance, connected sensors, real-time data processing, automation and robotics."

The release also quotes a forecast from the Market Research website, which predicts the growth of 5G private networks at an average rate of 40 per cent a year, between 2021 and 2028. It is also predicted that at that point the market will be worth around $14 billion.

Discussing the deal with Ericsson, BT's managing director for Division X Enterprise, Marc Overton, said: "This UK-first we have signed with Ericsson is a huge milestone and will play a major role in enabling businesses' transformation, ushering in a new era of hyper-connected spaces.

"We have combined our skill and expertise

at building converged fixed and mobile networks, with Ericsson's leading, sustainable and secure 5G network equipment. This will offer a pioneering new proposition which will be attractive to many industries.

"Unlike a public network, a private 5G network can be configured to a specific business's needs, as well as by individual site or location. They also provide the foundation to overlay other innovative technologies such as IoT, AI, VR and AR, opening up a multitude of possibilities."

Katherine Ainley, CEO Ericsson UK & Ireland, said: "This ground-breaking agreement with BT means we are taking a leading role in ensuring 5G has a transformative impact for the UK.

"The high quality, fast and secure connectivity provided by Ericsson private 5G can help organisations make all-important efficiency gains. These can create safer, more productive, and sustainable business operations, and help the country build global leaders in the industries and technologies of the future."

The two companies have already worked together on a number of 5G-related projects, such as a private network rolled-out at Belfast Harbour in Northern Ireland. This was installed across 35 acres of operational port, in order to help drive "operational efficiencies and accelerate its digital transformation."

BWV to cover all of England's strategic roads

National Highways in the UK has announced plans to equip its traffic officers with body-worn video cameras.

According to a statement, officers will wear the cameras while conducting patrols across England's 4,300 miles of 'strategic roads'. The devices will be provided by Motorola Solutions.

Describing the work carried out by the traffic officers, a spokesperson for National Highways said that they are responsible for "keeping road users safe during more than four million journeys taking place across England's motorways and major roads each day".

Mel Clarke, customer service director for the organisation, said: "Our traffic officers patrol England's motorways and major roads 24 hours a day, seven days a week, and are at the frontline to keep people safe and help the network run smoothly.

"These body-worn cameras protect citizens and our traffic officers, and are now part of the officer's uniform. This investment forms part of our commitment to maintaining the safety of England's roads and providing greater operational visibility for our staff and the general public."

Motorola's UK and Ireland manager, Fergus Mayne, said: "The VB400 body-worn cameras are developed locally in the UK and will support the safety of millions of passengers who drive across England's major roads during the day and night.

"By deploying the cameras to all traffic officers, National Highways has committed to the highest levels of safety for everyone who travels and works on the roads."

The National Highways deployment is one of several recent roll-outs of Motorola body-worn video by UK public safety organisations including NHS England, Lancashire Constabulary and Police Scotland.

ETSI focuses on AI security


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Etsi has released a new report outlining the role of hardware in relation to artificial intelligence security.

According to the organisation, the document "gives an overview of the roles of general-purpose and specialised hardware, such as neural processors and neural networks, in enabling the security of AI". The report also identifies hardware vulnerabilities and common weaknesses in AI systems, while at the same time outlining available options to prevent attacks as well as illustrating general hardware requirements to support security.

Discussing the need for the report, a spokesperson for the organisation said: "AI hardware provides the platform that supports and accelerates AI-related operations.

"Aside from general security requirements, the hardware used in AI and machine learning [ML] features additional security requirements to protect hardware in AI/ML-specific use-cases. [That includes] those in which AI/ML is used to attack generic, or specific, computing, storage and communication hardware."

ETSI SAI Industry Specification Group rapporteur Alec Brusilovsky said: "AI is expected to revolutionise our wireless ecosystems, and the increased integration of AI throughout our technologies and solutions makes security all the more important.

"It's been suggested that the best way to safeguard AI is to constantly improve its security. The research featured throughout the ETSI GR SAI 006 report reveals that our coveted level of security depends on – and stems from – hardware security for AI."

As well as the AI security report, ETSI – via its 5th Generation Fixed Network group – has released the first specification for F5G network architecture. According to a statement, this architecture will deliver "a variety of services to residential and business customers over a single physical network, with guaranteed service-level agreements".

The new specification defines the F5G end-to-end network architecture, as well as related requirements for the network nodes, including 'customer premise network', 'access network' and 'aggregation network'. The architecture also explores new network features, such as "a seamless connection between optical transport network and access network".

TCCA News

TCCA has published an advisory guide focusing on the adoption of mission-critical broadband applications.

According to a statement, the white paper emphasises a standards-based approach, essential to "help ensure interoperability, a multi-vendor choice of products, and a thriving ecosystem that benefits all stakeholders". It looks at key considerations for development and deployment by mission-critical organisations, with a particular emphasis on the user experience.

Discussing the need for the document, a spokesperson for the organisation said: "The increasing use of broadband applications by first-responders to augment existing mission-critical voice and narrowband data services is catalysing a focus on the quality of 'mission critical' applications.

"Unlike consumer apps, mission-critical apps need to achieve end-to-end mission-critical quality of service [QoS] levels, in terms of priority, pre-emption, availability, security and resilience. This means that their successful deployment and management is a complex task."

The taskforce for this area of work in TCCA's Critical Communications Broadband Group was led by Motorola Solutions' Tim Clark. He said: "To be truly mission-critical, applications must rely on an end-to-end ecosystem that can support the necessary QoS to ensure user trust.

"From secure hosting environments for the application servers, through the transport and cellular networks to the devices and their associated operating systems, each needs to be mission-critical in its own right."

In more TCCA-related news, critical messaging specialist Secapp has announced its membership of the organisation.

The company, which is based in Finland, develops and manages the eponymous Secapp critical communications and alerting software-as-a-service platform. The solution is designed for use in emergency and disaster situations.

According to a statement, Secapp is designed for "improving safety, managing infrastructure and processes, and keeping people informed. It works by combining all commercial communications channels – apps, SMS, automated calls, email – and authority communication [TETRA] channels into one solution. This enables the broadcast of mass notifications, alerts to individuals and teams, as well as collection and sharing of critical data."

Head of partnerships at Secapp, Timo Harju, said: "We have designed Secapp with the emphasis on reliability and security, both essential foundations of critical communications. The rapid dissemination of information in a crisis situation is essential, and in joining TCCA, we look forward to becoming further integrated into the critical communications ecosystem that supports first-responders and critical users around the world."

Dream the impossible

ETSI CTO **Adrian Scrase** talks to **Philip Mason** about the 3GPP Release 18 work item selection process, and the key role played by the mission-critical sector in the ongoing development of broadband technology

The work items for Release 18 were signed off at the end of last year. Could you give me an overview of the process, and what was different this time around, compared to previous releases?

The process was different this time, for a number of reasons. The first of these was an increase in the numbers of stakeholders who wanted to be involved.

If we go back several years, the debate while working through each release would have been primarily between manufacturers and operators of mobile networks. That could be quite challenging in itself, and we had quite a lot of tension around what should be in the early releases.

Now, if you add this plethora of newcomers – from the power industry, the health industry and so on – it makes things even more complex. They're all coming in with their own needs, as well as different positions on certain issues. It took more time to understand what was being presented, and whether or not it was achievable, both practically and commercially.

What did that mean for the release, in real terms? Did a certain level of compromise have to be achieved?

For Release 18, the debate was long and hard. We had many more subjects put forward than we could ever capture, so we had to divide our capacity in a more equitable way. We're not just running with the main players this time around, we're making sure to take the whole community with us.

If you look at Release 18, there's an exhaustive list of normative work that makes it up. I think it's very well-balanced indeed. The release also anticipates the direction of travel going forward, with studies that, if they're successful, will go on to take place in Release 19.

You're essentially seeing the development of a narrative. There are pieces of work here that you can see appearing release after release, making increasing progress in getting to a stage of maturity.

What would you say are the headline items for mission critical in Release 18?

There's a whole package of work around relays and gateways, which is an inherent part of the Release package, at least as a study item. At the same time, UAV connectivity also plays a big part, with the role of drones in mission critical becoming more important all the time.

There's also a lot of content in relation to extended reality, AI and machine learning. Again, I think all three of those have quite an important role to play in mission critical going forward. You can imagine all sorts of scenarios involving the use of this technology, and the work is really building on what's already being carried out in the industry sections.

Could you go into a bit more detail about the drone-related content?

We're looking at how you can use a UAV as a broadcast mechanism. At the same time, the work also takes in how to authenticate a drone and disconnect it from your network if you think it's a rogue. That's an integral part of Release 18.

You mentioned that there were two major differences to the process this time. What was the other one?

The impact of COVID-19, particularly in relation to our ability to meet. Both ETSI and 3GPP are traditionally very meetings-based, with everyone getting together in working groups, then plenaries to approve documents and so on. All of a sudden during the pandemic, we couldn't do that.

We essentially had to learn to cope, with varying levels of success. ETSI put together a virtual meeting plan, and for the smaller groups that was relatively achievable. The problem came with the larger groups consisting of 500 people. Having a conference call with that many participants… you can imagine what that was like.

What would you say the impact of that was in real terms?

Frankly, work was inevitably delayed, as was the case with Release 17, for example.

Looking to the future, I don't think we'll go back to what we did before in terms of meetings. We can obviously now have face-to-face meetings, but that isn't necessarily straightforward either, because you can meet in some countries and not in others.

I think it's inevitable that we'll have to have mixed

ETSI CTO Adrian Scrase

scheduling going forward, for instance with a physical meeting followed by two virtual meetings. That may well carry on indefinitely.

How else do you anticipate the process is going to evolve, particularly in relation to the mission-critical side?

Honestly, change is a constant. The move to broadband is now reaching its 10th anniversary, and if we look back to 2012 when it started, the mobile world was looking at developing a fourth-generation system largely catering only to consumers. That's where we started, and we had to spend quite some time understanding the needs of the bespoke public safety community.

Their needs were very demanding, requiring that we change an established system in quite fundamental ways. At the time we weren't sure that we wanted to do it, but credit to them for sticking with it and making sure that their requirements are being met. The mission-critical community really needs to be commended for putting so much energy and effort into this work.

Going forward, things are going to look very different because of 5G. A lot of work is now going on to meet industrial rather than consumer needs, which are almost taken for granted. Again, the initial work with the mission-critical community was a real tipping point in relation to getting to where we are now.

What were the specific 'difficult' requirements of the mission-critical community 10 years ago?

Mission-critical voice, which in itself wasn't so shocking, of course. At the same time, there was also the requirement that devices needed to work between each other in the absence of any network connection.

That's completely against the way a mobile system works, and at the time it was presented as a prime requirement. If you're outside of coverage – say, up a mountain – you still need your radio to work.

What's the situation with device-to-device now?

If you come forward to Release 18, you see what might have been previously regarded as basic functionality being extended considerably, with mission-critical devices now acting as gateways.

That will enable both 3GPP-type and non-3GPP-type technology to access the network, with mission-critical clients on other devices.

The initial request was that a mission-critical device should talk to a mission-critical device, but it's more than that now. We're saying that those devices might not even be intended for connection to our system, for instance something like a Wi-Fi-enabled tablet.

Can you provide a general overview of the release process and how it works?

Releases are basically a snapshot of the progress that's being made within a given period. These days, that typically takes place across the course of about 18 months, but it can be as short as 15 and also up to 24.

At the beginning of any given release, we spend a lot of time trying to decide what features and functionalities should be included. We then set up a programme to complete the work by a given point.

The release itself is a kind of standalone set of standards that are designed to work together.

The way that it's changed in recent years, again in part driven by mission critical, is that the community now understands that not everything can be driven by commercial demand. Some of the functionality which is being included now may never make anyone any money, but it fulfils important societal needs.

With that in mind, how has the market changed in parallel with recent releases? Given the increasing interest in broadband for public safety, for instance, is there a sense that the functionality in question is becoming increasingly commercially viable?

The public safety market is still very small. At the same time, we're starting to see commonality between that particular vertical and other industry needs. This is exactly what has been demonstrated in the process around Release 18.

There are many industrial users now that need the deterministic capabilities also required by mission-critical


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users. That level of resilience and reliance. That's true for some of the more industrial applications.

In terms of mission critical itself, I would say that manufacturers are now starting to see it as a legitimate market. There isn't really a viable alternative, to be honest, particularly with end of life for TETRA predicted at around 2040. All of the users of those systems will move over to a broadband-based approach.

Changing the subject slightly, during your Critical Communications World 2021 presentation you mentioned that the discussion around sustainability is going to be increasingly important to the sector going forward. Could you expand on that?

Sustainability is going to be an absolutely key area going forward. Looking at it from the technology perspective, everything that 3GPP does is geared towards the development of an increasingly compelling offering with better performance. The overwhelming implication is if you're going to do that, you're going to need to use more energy.

At the same time, the world is changing and you've now got all these big vendors and operators setting themselves carbon-neutral target dates. They have to meet those or they'll end up getting pushback from their shareholders. It's not just a nice-to-have any more.

What work is actually being carried out in relation to the sustainability piece?

ETSI has already carried out a lot of the groundwork for establishing metrics and KPIs in relation to this. Clearly, if you want to know how efficient your network is, you have to have an agreed methodology in order to measure it, or you won't have anything to compare it to.

At the same time, in 3GPP, you have the designers looking at things like infrastructure and the network itself. Potential solutions could be as simple as turning down the power on base stations in unpopulated areas in the middle of the night. AI and machine learning will have a crucial part to play in that – putting them into sleep mode until traffic is detected.

> More industry verticals are becoming involved in the standardisation process

Many people are saying that 6G will have to be designed specifically with energy efficiency in mind, right from the outset. As a technology, 5G was built first, at which point we looked at how we could make it more efficient. For 6G, sustainability is going to be an imperative from the start from a design point of view.

What's the current progress on 6G, both from ETSI and 3GPP's perspective?

As far as 3GPP is concerned, 6G hasn't really been mentioned yet. It's not on the radar screen. From ETSI's point of view, it's very much in the conversation. A lot of the future building blocks will be started now as studies, which will then go on to mature. We'll get critical mass and support for them, and at a certain point, they'll be imported into 3GPP.

ETSI has already plotted the candidate technologies which could be important for 6G, and we're now looking to see what research activities need to be undertaken, working with different bodies.

What functionalities are potentially in play for 6G, particularly when it comes to something like sustainability?

One area which could potentially be in the conversation is energy efficiency around devices.

For instance, we could conceivably see a whole generation of phones that don't need to be recharged, with energy instead being harvested from other radiation sources. Imagine not having to plug your phone in for a week or a fortnight at a time.

Honestly, the rate of progress is increasing all the time and if I were a young engineer just graduating, this is exactly the area that I'd want to get into. Nowadays, you need to dream the impossible, because the impossible is exactly what's likely to happen.

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On the horizon

Philip Mason talks to TCCA's Future Technologies group about the need to stay on top of new developments, while also exploring two exciting emerging solutions in the fields of coverage and energy efficiency

The critical communications environment is becoming an increasingly complex place in which to operate and thrive.

There are several reasons for this, not least ongoing changes to the geopolitical landscape, symbolised – at least in Europe – by the UK's, seemingly counterintuitive, Brexit project, as well as the catastrophic war in Ukraine. At the same time, nobody needs reminding of the COVID-19 pandemic, which while currently 'under control' continues to have profound implications for how we work and travel.

Just as important as these broader changes, however, is the rate at which communications technology itself is developing, while at the same time becoming increasingly more advanced and sophisticated.

The most obvious example of this is the ongoing move from narrowband to broadband on the part of national public safety agencies across the world. This in turn has opened the critical communications conversation up to include the likes of drones and artificial intelligence, technology which 20 years ago would have been considered exotic or even downright space age.

That being the case, in this article, we are going to carry out what often gets referred to as 'horizon scanning', exploring a variety of emerging – mainly network level – solutions and concepts containing the potential to be just as impactful as those mentioned above. Before we get into specific detail, however, it is necessary to obtain some insight into the overall landscape, as well as a view of some of the likely trends going forward.

Into the future

Established in 2020, TCCA's Future Technologies Group describes its main function as "searching out the developments that could shape the future of critical communications". It is led by executive director of TCCA member Actica Consulting Robin Davis, alongside Hermitage Comms founder and partner Iain Ivory.

Going into greater detail about the aim of the group and its importance to TCCA, Davis says: "Horizon scanning is becoming increasingly important for the critical communications sector because of the rapid development of technology.

"If you're going to invest in technology as a user organisation, it's important to be ahead of the game. It takes time to bring new technology onboard, so the last thing you want is to be investing in solutions which are already out of date."

According to Davis, the core method through which the group carries out its horizon scanning activities is via the monitoring of a variety of pertinent information sources. These include mainstream news media, but also science publications, as well as content issued by the world of academia. The aim of the exercise, he says, is to identify trends in areas which are "complementary to either public safety or mission-critical communications".

Ivory illustrates the point further, this time, however, discussing what the group is not focused on. "We don't

generally look at 4G, 5G or 6G," he says. "The idea is to approach things from a much broader perspective, rather than 'this is what will be replacing TETRA' or 'this is what will be replacing 4G'. We're not saying 'this is happening so therefore it means XYZ'."

He continues: "Rather, we're simply highlighting research, picking up on what may be relevant going forward. Or, looking at a specific problem, such as how do we power devices in a more efficient way, to help them last across the course of a shift. The lens of the group is always whether something might be useful."

This last statement is borne out by the massive variety of subject areas highlighted in one of the group's regular newsletter updates.

These included everything from potential advances in security ('The quest for quantum proof encryption just made a leap forward') to AI and AR ('artificially altered material could accelerate neuromorphic device development'), and much more.

Indeed – according to Ivory – this range of potential 'trends' is so wide, it is impossible to narrow down the potentially most impactful to less than about four or five. Discussing this, he continues: "Honestly, there are multiple trends which we're picking up on. For instance, there's always a lot of stuff around body-worn sensors, and solutions to provide additional input [in terms of wearer biometrics].

"The provision of power is a consistent theme as well, which could include extracting excess energy from broadcast signals to harnessing user movement to the same end."

Davis elaborates further: "Another thing we are seeing is a big focus on artificial intelligence, which could either be on the edge of the network or relating to applications. Drones are a constantly evolving theme as well, for instance autonomous UAVs to detect gas leaks ahead of firefighters being deployed."

As is probably obvious at this point, the topic in question (ie, 'the future') is far too broad to try and cover in any comprehensive fashion, certainly over the course of just a few pages.

The best strategy is probably to drill down into areas which will likely be the most broadly applicable across the sector.

That means coverage, as well as – taking Ivory and Davis's comments as a guide – solutions to increase energy efficiency in relation to devices.

> **"The idea is to approach the issue from a broader perspective"**

Windows of opportunity

Going back to the recent Future Technologies Group newsletter, one of the most interesting stories was included under the heading of 'Beyond 5G, extending connectivity'. It concerned the launch of an ETSI industry specification group, dedicated to the ongoing development of reconfigurable intelligent surfaces, otherwise known as RIS.

Describing the technology in question, the newsletter stated: "RIS is a new type of system node, leveraging smart radio surfaces with thousands of small antennas or 'metamaterial' elements. [It does this to] dynamically shape and control radio signals in a goal-oriented manner."

Going deeper into the ongoing development of the technology, chair of the ETSI ISG RIS, Arman Shoejaeifard, said: "'Reconfigurable intelligent surfaces' is essentially an umbrella term for several different technologies, all of which use smart radio surfaces, allowing the nodes to be dynamically configurable."

He continues: "Obviously, there are already a number of legacy coverage solutions in the 4G and 5G space, all of which come with extensive costs in terms of hardware, operations and deployment. The attractiveness of RIS, for instance as a coverage solution, is essentially that it's far cheaper, as well as being far more flexible. It's also mostly passive and creates little need in terms of energy consumption."

For those who have never previously come across the concept – which is still very much in the R&D phase – Shoejaeifard describes the current RIS prototypes as "ultra-thin, 2D surfaces" deployable on almost any flat plane. This could include a window, a painting hanging on a wall, and more.

In ETSI's words: "RIS [could] be a planar surface consisting of multiple layers. [This could include] an outer layer with a very large number of small antennas or metamaterial elements, and a middle layer with a metallic/copper panel to prevent energy leakage. There [could also be] an inner layer with the necessary circuitry for turning the response of the RIS elements."

Discussing potential functionality in more detail, Shoejaeifard continues: "RIS is being considered as a key technology block, both in the evolution of 5G but also, importantly, 6G. Looking at coverage first of all, we know that with 5G, the massively increased frequency will also lead to more challenges when it comes to propagation and issues around line-of-sight communications.

"This can obviously be rectified by increasing the number of antennas at your radio nodes, but that isn't necessarily practicable if we are talking about coverage indoors. By contrast, RIS components can be easily and unobtrusively deployed in places with known coverage issues, where they can be used to reflect, refract and redirect the signal.

"Outdoor-to-indoor coverage has always been a challenge. Imagine if you have a window with one of these sheets embedded on it, which can then direct signals from outside. This is not something you can do with conventional solutions, and it's one of RIS's key performance indicators."

According to Shoejaeifard, the first RIS solutions to be produced and deployed will consist of purely 'passive' nodes whose purpose is ultimately to 'recycle' the signal from a given source. He describes this functionality primarily in relation to more 'conventional' KPIs, such as the improvement of data capacity and the achievement of "more favourable propagation conditions".

As the concept develops, however, ETSI also anticipates that RIS will become integral to entirely new wireless services and applications. One example of that is environmental sensing – for instance, within the social care or health environment – the mention of which leads us neatly onto the topic of real-world deployment. What are likely to be the benefits of the technology, particularly for mission-critical and public safety organisations?

"This has great potential for mission-critical type applications, at least on paper," he says. "As mentioned, one of the main use-cases is deployment within indoor environments, such as in a factory setting or a mine. RIS is also being looked at in relation to the use of drones, again in order to ensure that you've got adequate coverage to carry out those kinds of operations."

Going back to the 'environment monitoring' use-case, meanwhile, ▸

Shoejaeifard says the RIS will differentiate itself from current IoT sensor solutions through ease of deployment, energy efficiency and cost.

Asked to sum up the implications of the solution, he says: "Reconfigurable intelligent surfaces have the potential to bring a new kind of paradigm to critical communications, transforming the propagation environment from a passive actor to an 'as a service' proposition.

"In the history of wireless communications, we've always conceived of the air interface – the wireless channel between a transmitter and receiver – as something we can't control. Or to put it another way, a system where the network itself makes all the decisions within the cell.

"With RIS we have the potential to actually control how the propagation environment behaves, which in turn has huge implications to how you design and deploy wireless systems in the future. You go to a scenario where you can configure a channel to achieve a particular functionality, inducing certain behaviour on the signal."

Harvester of energy

As well as potential innovation around networking and coverage, another huge area of interest in terms of emerging technology are solutions related to energy efficiency. This could be in relation to the network itself or devices carried around by users, both of which – as pointed out earlier in this issue – are likely to become increasingly voracious in their use of power as users are offered increasing bandwidth.

One organisation carrying out work in this field is the Penn State University College of Engineering, which is currently developing technology through which 'ambient' radio waves can be harvested in order to power wearable health monitoring devices.

Giving an overview of the project and its origins, team leader Larry Cheng says: "The energy-harvesting project originated with our efforts to develop sensors and wearable devices, designed to capture essential information about patient health. We're trying to provide information in relation to diagnostics or the valuation of treatment from different perspectives, moving towards what I'd call precision medicine. The monitoring technology sits flat on the skin's surface, like a temporary tattoo."

He continues: "Integral to that is energy-harvesting technology, which will not only help us to develop the sensors at relatively low cost but also take away any concerns about battery replacement within the device itself. At the same time, if the wearable device can provide its own power, that facilitates the transportation of data through getting rid of the need for wires going to the unit."

Explaining the process further, Cheng says the ambient radio waves from the which energy is harvested emanate from sources including microwave ovens, as well as Wi-Fi. In the normal run of things – that is, without the harvesting technology – this energy would usually be left to go to waste.

According to him, while the energy level contained in the electro-magnetic waves is comparatively small (around one microwatt), this is still enough to contribute to the running of low-power devices. That being the case, the first iterations of the technology will be designed as a complement to traditional power sources, such as batteries and supercapacitors.

"The energy level in these electro-magnetic waves is so small that people don't even think about it," says Cheng. "But it can still be significant in certain contexts. One application we've been looking at is in relation to the treatment of foot ulcers. It's important to monitor these at an early stage, because if you wait too long for treatment, amputation becomes inevitable."

He continues: "Treatment of that kind of ulcer typically involves the patient wearing a cast on their foot, which obviously restricts access and information about whether the wound is healing or not. Therefore, frequent opening of the cast is needed, with a new one needing to be applied. And that's not convenient.

"By the same token, if we use sensors in the cast to monitor the ulcer, we also need to find a way of doing it without having to change the battery, because that also means opening up the cast."

According to Cheng, the energy-harvesting process takes place via what is known as a 'rectenna' (rectifying antenna), which a well-known virtual encyclopaedia describes as "a special type of receiving antenna that is used for converting electromagnetic energy into direct current (DC) energy".

These were developed – as per the same online resource – as far back as the 1960s by US-based electrical engineer William C Brown. Proposed use-cases up until this point have included using them as a receiving antenna for solar-power satellites, and as well as part of Brown's initial work, helping to power a model helicopter.

Adobe Stock/Monkey Business

The technology could eventually be used to power mobile phones

Asked why it has taken so long for the energy-harvesting technology to be developed in relation to the health sector, Cheng says: "While radiofrequency antennas and rectennas could enable wireless communication and RF energy harvesting in the far-field, their performance deteriorates because of frequency detuning from mechanical deformations. In addition, the on-body radiation efficiency of stretchable antennas severely degrades due to human tissues.

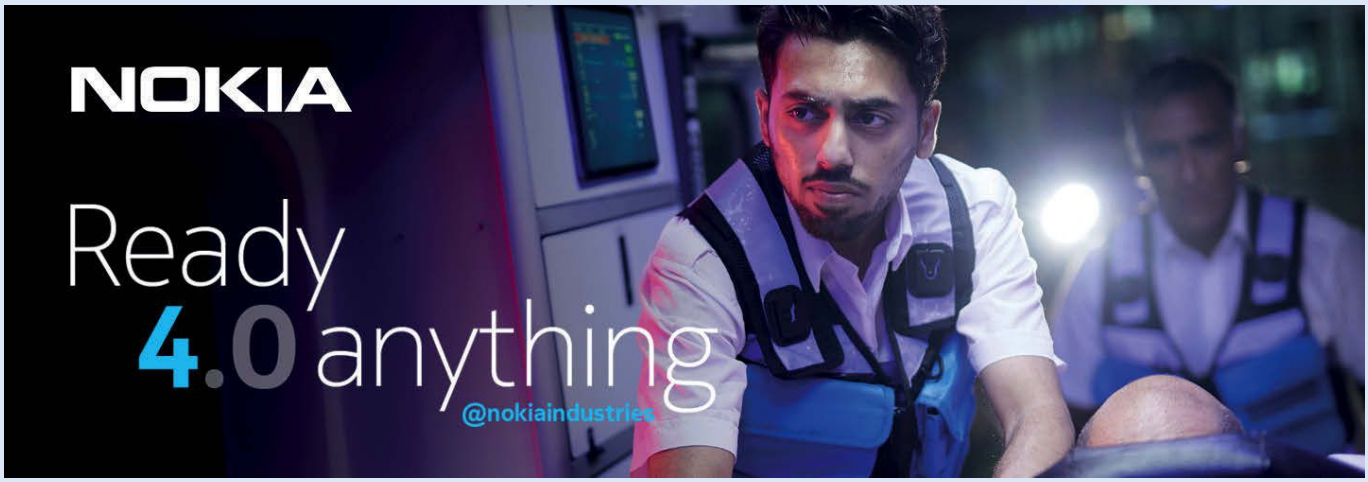
"Therefore, our recent work explores a hierarchically structured stretchable microstrip antenna with meshed patterns arranged in an arched shape. The almost unchanged resonance frequency during deformations enables robust on-body wireless communication and RF energy harvesting."

Going back to the use-case itself, it is clear that the technology as it is currently being developed, at least by Penn State, is comparatively limited when it comes to relevance to the mission-critical sector.

According to Cheng, however, there is potential for it to be leveraged to help power larger devices such as mobile phones through a charging pad or docking station. This is directly relevant to the mission-critical sector.

As we have seen throughout the course of human history, technology always tends to beget technology, with the rate of innovation speeding up with the implementation of each successful new idea. It is therefore vital that the mission-critical communications sector continues to scan the horizon for the sake of both users and manufacturers.

A Focus Forum on future technologies will be held at Critical Communications World on 23 June.



Deployable 5G and satellite backhaul set to boost public safety communications

Climate and weather-related disasters have surged fivefold over the last fifty years – a troubling trend that climate scientists forecast will continue. This means public safety agencies will need to prepare for a relentless increase of the number of catastrophic events in the future. Saving lives and property will increasingly demand communications solution that offers high availability and ubiquity for disaster response, with unique advantages in terms of coverage, increased reliability, extreme broadband, low-latency connectivity and speedy deployment.

Fortunately, such a solution is emerging. As part of a study for the European Space Agency (ESA), Nokia Bell Labs has been leading a consortium including SES, KPN, the Dutch Police and Defence on end-to-end (E2E) integrated terrestrial and satellite communications proof of concept (PoC), called Remote Services for Urgency Events (ReSCUE). Based on a 5G private wireless deployable system, it is poised to support essential public safety operations during periods when commercial or default public safety networks are not operational or do not provide sufficient coverage, capacity or reliability.

With field tests scheduled for 2022, this PoC addresses four specific use cases defined jointly with the Dutch Police and Defence: mission-critical push-to-talk (PTT) and push-to-video (PTV) services for one-to-many and one-to-one communications in half-duplex mode, including priority/overruling policies; streaming HD video and data via 5G from automated guided vehicles (AGV) – including robots, drones and boats; support for hyper-connected first responders carrying trackers, sensors and bodycams; and enhanced on-site situational awareness / augmented reality to assist first responders and supporting personnel in dangerous locations.

Innovative architecture

The beauty of this solution lies in its innovative architecture, which combines a 5G local deployable terrestrial private wireless network with a satellite link, providing connectivity between field operations and a centralized command-and-control (C&C) center. The local 5G system offers high bandwidth and low delay for local communication and applications, while the satellite link enables maximum flexibility to provide connectivity with the central C&C in case of rapid ad-hoc deployment in especially mission-critical situations triggered by flooding, earthquakes, fires and similar events.

To provide the network performance required by the defined use-cases, the end-to-end solution include following building blocks:

- A 5G wireless edge network based on Nokia Digital Automation Cloud (DAC). This provides a 5G RAN, a 5G core, local edge server and IP router where locally run applications can support critical operations such as a rescue mission, a remote ad-hoc hospital and other activities. In this scenario first responders deploy a complete 3GPP 5G Stand Alone (SA) system on the emergency area with 5G next-generation base stations and all 5G core network functions in the edge, comprising a fully operational 5G SA network. The edge is connected to the Nokia DAC for management of the private wireless network with secure cloud-based

functions, but can run on its own in case of loss of the satellite backhaul link. Peak bandwidths should range from 30/15 Mbps (DL/UL) per 5 MHz, for the 3.5-3.8 GHz TDD spectral band, resulting in aggregate speed (DL+UL) of close to 1 Gbps for a 100 MHz spectrum allocation. The target coverage area is realized with deployment of one or multiple cells, depending on the area size of the emergency event, the frequency used and the bandwidth required. The expected maximum network latency is 10 ms with 20 active user terminals per cell.

- A satellite link enabled by a VSAT or terminal embedded in a rapid response vehicle, providing L2 (MEF- E-Pipe) service. This crucial element connects the 5G wireless edge network at the response site with the public safety central C&C center. For this Nokia Bell Labs is considering a Ka band spectrum 26.5-40 GHz uplink / 18-20 GHz downlink with either the GEO (Geo-stationary Earth Orbit) or the O3B MEO (Middle Earth Orbit) satellite constellation from SES located at 8000 km, using two dedicated parabolic antennas or a single flat panel able to form two (or more) beams, with fast switching capability. The coverage radius is expected to be 2000 km (MEO) to 9000 km (GEO), with 99.9% availability at a minimum service rate of 10 Mbps, with potential latency of 30 ms per hop and capacity of 10 Mbps up/ 150 Mbps down.

- An Ethernet terrestrial link between the satellite provider gateway and the C&C center. The private wireless network path between the satellite PoP and C&C center would comply with a standard service level agreement (SLA). The service could be an E-line or P2P Ethernet virtual circuit as defined by the Metro Ethernet Forum (MEF), where the demarcation points are the user network interface (UNI) or the external network-network interface (ENNI) – the latter being relevant when multiple operators are involved in setting up the end-to-end path between the SatCom point of presence (PoP) and the C&C center. Latency and bandwidth for the overall E2E network is determined by the satellite link. A 99.9% availability, corresponding to a downtime of maximum 8.76 hours per year is a minimum requirement for this PoC, based on the combined trajectory of satellite and terrestrial links to the C&C center.

Security Considerations

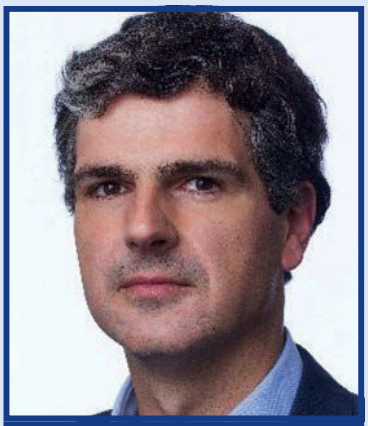
In this study special attention was dedicated to cyber-security. Specific communications paths envisioned in this PoC remain inside the private wireless network, cross the satellite link between the private wireless network and the C&C center, and occur between the operation, administration and management (OAM) layer and the Nokia DAC edge (in the private wireless network) and/or the Nokia DAC. They also exist in OAM layer messaging for Nokia DAC management at the C&C center and in the Nokia DAC regional cloud.

Customer traffic between a user equipment (UE) to the private wireless access points is protected by 5G radio security via encryption and mutual authentication on the N1 interface between the UE and the access and mobility function (AMF) hosted on the local Nokia DAC edge. To secure the traffic between the local private wireless network and a remote C&C center, the best practice is to utilize additional application-specific security measures like TLS (Transport Layer Security), which will also enable the security on the satellite link, and which has as additional benefit that it will not interfere with any performance enhancing proxy (PEP) that might be activated on the satellite terminal (VSAT) and satellite gateway specifically to enhance the TCP performance. Management communication between the private wireless network site and the cloud is secured with TLS as per industry best practice.

User access to the web portals hosted in the DAC is secured using HTTPs and role-based access control (RBAC). Firewall protection in the DAC restricts the network ports visibility to traffic. The router provides firewall filters and ACL rules to filters traffic towards external networks beside local switching, routing, and firewall. The best practice is to pool different switch physical ports into security zones with defined communications policies.

The future for enhanced public safety

This groundbreaking PoC is poised to provide a new level of communications capabilities for public safety agencies facing a future of stronger and more frequent natural disasters – including spectrum flexibility, plug and play efficiency, high bandwidth and low delay for local communications and applications, with a satellite link providing maximum flexibility for rapid ad-hoc deployment in mission-critical situations. Nokia Bell Labs and its partners now are ready to proceed with the actual demonstration phase in 2022. Stay tuned for results or attend Critical Communications World in Vienna, in June, to know more about this study!



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Digging the scene: mining's digital transformation

While two-way radio is still widely used for mission-critical voice services, mining companies are now deploying 4G and trialling 5G to support their operations. **James Atkinson** reports

The mining industry operates in an increasingly challenging environment where fluctuating demand and volatile prices can quickly impact profitability. The most accessible high-quality metals and ores are already being exploited, or are exhausted.

This is forcing mining companies to exploit lower-quality ores, often in more remote areas and in harsher environments, with attendant higher risks and costs. Mining companies are also subject to much more stringent regulatory oversight these days, including tougher environmental, sustainability and safety regimes.

To meet these challenges the industry has to dramatically increase efficiency, productivity, safety and sustainability, to deliver better profitability. This is impossible to achieve using traditional mining methods.

What is needed instead is a digital transformation of the industry, enabling it to support high levels of automation and intelligent use of IoT data and analytics to deliver system-wide efficiencies across the whole mining process.

Most mines operate with some form of mission-critical push-to-talk voice network, usually TETRA, P25 or DMR, along with Wi-Fi mesh networks to support data transmissions and short-range connectivity applications using Bluetooth. For the time being at least, two-way radio remains popular with new systems still being implemented, largely because mining is a very conservative industry, which prefers to use proven technology.

"Voice is still everything in mining," says Terence Ledger, global sales director at Sepura. "It's true that increasingly people are talking about data and what you can do with it, but without voice, it is not a mission-critical solution. The traditional selling points of TETRA, as in voice clarity, audio quality, coverage and robustness, is still what people are looking for."

Ledger points to one Australian mining customer which has upgraded its TETRA terminals from Sepura's STP8000 and STP9000 hand portables and SRG mobile terminals to its latest SC20 hand portables and SCG22 mobile radios. "Their transition choices have mostly been around audio quality, so each generation of radio with a better audio quality is better able to support their operations," he says.

"What they have also started to deploy with their new radios is over-the-air programming," adds Ledger. "They can cast a Wi-Fi net over their site and then carry out programming, like talk

group changes. They can implement dynamic operational changes much more quickly than they used to. That opens up the door for things like Sepura AutoMate."

Sepura's AutoMate application is designed to automatically execute routine and safety critical tasks more quickly to reduce user error and enhance the safety of personnel. All sorts of triggers can be deployed to enable automatic radio changes, including geofences, loss of trunked mode operation (TMO), a Bluetooth beacon, the speed of a vehicle, and so on.

For example, a Swedish customer has deployed the solution in a massive underground mine. "They have a Wi-Fi network, so they can carry data across smart devices or radios. They use AutoMate to automatically switch the radio over to Wi-Fi and TETRA DMO when they go underground and lose the TETRA TMO network, so they have constant communications," says Ledger.

AutoMate is based around location in its widest sense. "The benefit is that it is using the TETRA network to warn other people," says Ledger. "The initial use-case for it in Australia was centred around blast zones. You set up a geofence around the blast zone, so if anyone entered that zone it would set off a warning on their radio and those of the blast team. But you can tailor it to do what you want to suit your operations."

Another example illustrates how mining companies are introducing more automated processes into their operations. An open cast mine situated in a very dry and dusty environment uses watercarts to spray the road to keep the dust down. The company has deployed AutoMate in the cab radios to enable an automated system to activate and deactivate the water fill points. The watercart cab radios are programmed with a static geofence zone at each fill point location.

As the watercart enters the geofenced zone, it will automatically prompt the user to open the valve. Once in the correct position, the operator can activate the fill point by pressing the select button on the radio. When the tank reaches 95 per cent capacity, the radio automatically sends a deactivation message. "It has made a big improvement from an efficiency point of view," says Ledger.

The application is designed to execute routine and safety critical tasks


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Sepura's new SCU3 broadband vehicle device, meanwhile, demonstrates that the company is looking ahead to the broadband future. Future models will be dual-bearer units, enabling it to support both TETRA and LTE. "That will open up a lot more opportunity for transitioning to LTE solutions," observes Ledger.

"You might start using its TETRA voice capability, which is still the gold standard for what many organisations need to be working with. But having the data capability, you can start to use Google maps and data connectivity applications via the radio. It is something that a lot of organisations are looking at," he says.

Beyond narrowband

While many mining companies are still investing in, or wish to retain, their existing mission-critical two-way radio networks, a broadband solution is required to enable the massive operational transformation mining companies are seeking. Wi-Fi has been widely used to support broadband data, but it has its limitations.

"Digital transformation is great, but the network can make or break your transformation," says Marc Jadoul, strategic marketing director at Nokia. Wi-Fi, he points out, has a much more limited range than 4G and can support far fewer connected users or devices simultaneously. It is also more prone to interference, handover issues and so performance predictability and QoS is less reliable.

4G's greater coverage range also means that fewer base stations are required. Jadoul cites one, albeit extreme, example where a customer replaced 150 Wi-Fi trailer access points with just six 4G cells-on-wheels (CoWs), producing a saving of 10 million euros.

Unsurprisingly, Nokia advocates the use of 4G/5G. The company argues that it has the required bandwidth, latency and mobility to support automation, tele-remote operations, HD video streaming, MCPTT, MCVideo, and real-time tracking of people and equipment.

Nokia says it can also support 'smart PPE' (integrated ear muffs and helmets; heads-up displays and biometrics), as well as the collection of IoT sensor data using LTE-M and NB-IoT. This enables the monitoring of temperature, sound, vibration, chemicals and gases to provide near real-time situational awareness. More than that, 4G/5G can support all these applications on a single network.

Nokia has more than 35 mining customers operating private wireless networks in more than 60 mines around the world. "Around 85 per cent of our mining customers today are using 4.9G/LTE, and 85 per cent of the applications they need or are deploying can run on 4G," says Jadoul.

Safety, productivity, efficiency and profitability, and sustainability, are the main drivers for investment in private wireless networks, adds Jadoul. "Safety is always at the top of their list, but what is interesting is that these drivers are tied together. If there is a safety incident in a mine, you have to halt production. Immediately you lose tons of production and that will impact on efficiency and profitability."

"This is why automation is so important," he continues, "because that reduces the number of safety ▸

> **"4G/5G can support all these applications on a single network"**


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HD cameras are transmitting real-time video from the mine's crushing area

incidents, which increases productivity. Automation can also enable 24/7 operations. Conventional mines work in shifts, so you get productivity peaks. But if you introduce automation, you iron out the production peaks and troughs."

Jadoul says that the first productivity gains are coming from the automation of the drilling, blasting, loading, hauling and crushing processes. For example, if autonomous haulage trucks are kept at a steady speed and can avoid emergency stops, they will save fuel.

Also, integrated on-board vehicle controllers, high-precision global positioning and obstacle detection and avoidance systems deliver better operational performance throughout the load, haul and dump cycle. Vehicle performance telemetry monitoring of tyre pressure, temperature and so on enables more accurate predictive maintenance, which helps to reduce costly breakdowns on site.

Technology company Komatsu has been working with Nokia since 2019 on its autonomous haulage system (AHS) to replace Wi-Fi connectivity with 4G on trucks. Komatsu found that Wi-Fi was causing up to five or six errors per truck, per hour, which – according to it – equates to 15.13 per cent of time lost during a 24-hour period (or, up to 13 minutes per day). The introduction of 4G apparently reduced these kinds of network errors by 84.6 per cent, resulting in a productivity increase of 8.5 per cent, or 250,000 tons per year.

Jadoul says a mix of automation and tele-remote operations is currently being used. "Tele-remote operations means a guy in a control centre, which may be hundreds of kilometres away, is controlling three to five trucks or several automated drilling machines simultaneously. So, these kinds of operations are not fully autonomous, but assisted operations where staff intervene where necessary, based on IoT and video information," says Jadoul.

It is relatively easy to design the 4G network architecture for an open cast mine. "Often the network will be made up of a mix of bigger cells and a number of smaller ones, supplemented by a few CoWs, especially for the areas where there is more activity and you need to bring in more capacity," says Jadoul.

Underground mines are a far more difficult proposition as they can include spiral ramps, vertical shafts, horizontal adits, narrow corridors and large galleries with thick rock walls. In addition, the radio network has to cope with interference and reflections from machines blocking the corridors.

This makes network planning, design and deployment complex but absolutely essential as connectivity must be everywhere to support all the equipment, environmental monitoring and safety applications. Jadoul says a mix of radio technologies may be used, including small cells, micro remote radio heads, distributed antenna systems and leaky feeder cables. The network may also need to integrate legacy UHF/VHF two-way radio systems and IoT overlay networks.

A further key component is edge computing. "Edge computing is probably of bigger value than bandwidth, because it reduces the need for bandwidth, it speeds up the applications and it allows computing and processing closer to the mine, as opposed to having to transfer everything to the cloud," says Jadoul.

Further evolution

Another obvious advantage of 4G is that it provides a future-proof evolution to 5G. Jadoul says 5G will support ultra-HD video and sub-millisecond latency to enable applications such as real-time remote control of high-speed robots and drones. It will also enable tens of thousands of IoT sensors and industrial devices to be connected once 3GPP finishes Release 18 in 2023.

Nokia has been working with mining operators to trial 5G. For example, Codelco in Chile is running a 5G pilot at its Radomiro Tomic Division, where HD cameras are transmitting real-time video from the mine's crushing area to its new integrated operations centre in Santiago, 1,500km away. A 5G standalone network is being trialled at Sandvik's Test Mine facility in Tampere, Finland. This is to test new opportunities in robotics, remote and autonomous operations, full-fleet automation, analytics and enhanced safety.

Of course, private 4G/5G networks cannot exist without spectrum. Jadoul says that some countries such as Australia are providing ample private spectrum as mining is a very strategic industry. "In some other big mining countries like Chile, we are working with TSPs like Claro and Telefónica, as they are the ones providing our customers with spectrum."

A variety of models are emerging, whereby some MNOs just provide the spectrum, others provide spectrum and the RAN, while others provide spectrum and the core. Mining customers can then opt for a fully hosted and managed network model, or own and operate the private wireless infrastructure on their premises.

Mining may traditionally be a conservative industry when it comes to deploying new technology, but digitalisation is rapidly accelerating. IDC's Worldwide Mining Decision-Maker Survey 2021 reveals that 71 per cent of mining companies intend to invest in 5G connectivity in the next 18 months, with a further 16.9 per cent looking to deploy 4G.

Some may wish to retain tried-and-tested mission-critical two-way radio systems for voice. But the broadband era is definitely on its way.

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BroadWay: the next phase

With the BroadWay project about to come to an end, **Philip Mason** talks to three of its main players about the ongoing challenge of providing cross-border broadband to European emergency services

One of the key current developments in the realm of critical communications technology is the ongoing move from narrowband to broadband on the part of an increasing number of emergency services organisations across the globe.

This includes what you might refer to as 'early adopters' such as the UK (with its Emergency Services Network), the United States (FirstNet) and South Korea (SafeNet). We are also now seeing major progress in this realm from the French authorities, as well as Finland with its Virve 2.0 project.

While there is clearly massive potential value in the move to mission-critical broadband, so far the programmes in question have only really concerned themselves, perfectly understandably, with communication within the boundaries of their given nation state. What happens, however, when emergency services operations need to take place across national borders?

One project aiming to address this problem, at least in Europe, is BroadWay, which is attempting to facilitate the equivalent of broadband 'roaming' for public safety between a variety of countries within the EU. Or, in the words of the project's website, "BroadWay is procuring innovation activity for a pan-European broadband mobile system for PPDR, validated by sustainable test and evaluation capabilities".

Outlining the project's core business case, the website continues: "Disasters, crime and terrorism are not confined to geopolitical borders.

"Those who protect and rescue us should be able to talk, share and access information wherever they are and whenever they need to, enhancing European co-operation."

As those who have been following the project's progress will know, it has recently finished its 'technical validation' phase, during which two competing consortiums – led by Frequentis and Airbus – demonstrated their respective pilot solutions.

To quote more BroadWay publicity – this time in the form of a recent press release – "during these events, the Technical Validation Committee witnessed full functionality of mission-critical services (3GPP standardised MCPTT, MC-Video and MC-Data) and associated applications and devices".

Developing the concept

The project journey began over half a decade ago, following the European Commission's request for information regarding pan-European public safety communications requirements.

Out of this sprang an initial one-year project, which in turn became a fact-finding initiative known as BroadMap. This codified an exhaustive list of the aforementioned first-responder needs, derived from emergency services organisations across the continent.

Following BroadMap, BroadWay's task was to find a way to actually develop this pan-European communications solution, taking into account both the technology itself as well as operational protocols from

> **“The teams weren’t able to travel, so they sent out actual devices”**

the myriad of emergency services organisations mentioned above. The project has gone through numerous different phases, finally unveiling the three competing prototypes last year.

President of the Public Safety Communication Europe Forum, David Lund, picks up the story at this point. “The supply teams delivered their prototype demonstrations in spring of 2021, something which was inevitably impacted by COVID-19,” he says.

“Rather than the teams being able to travel for the demonstration, they had to send out actual devices to the practitioner organisations who were evaluating the technology. That worked out well, because the first-responders were then able to actually use them wherever they were located across Europe.”

According to Lund, the practitioners, who were situated across the continent, were able to access both push-to-talk voice and video calls via the prototype solutions (albeit – obviously – without mission-critical radio access at that stage). The evaluation took place via a pre-designated scenario, where different users were required to make calls at certain times.

Discussing this in greater detail, he says: “This wasn’t an operational exercise, but rather a technology trial. But it worked out so much better than just going into a lab and pushing buttons on phones all in the same place.”

He continues: “The trials proved-out MCPTT, and also gave us the confidence that mission-critical services are going to work. That obviously gave us real cause for excitement as we went on.

“At the same time, we expanded the stakeholder view, staging a few more events and bringing in other practitioner organisations, particularly special forces. That included a range of stakeholders from across the EU, including Europol and Frontex [the European Border and Coastguard Agency].”

Fast forward to this year and the technical validation trials. This saw the consortiums having to prove a variety of key functionalities beyond simply the ability to speak, as well as that the system could be used without the supplier’s intervention.

The trials proved-out MCPTT, and also gave us the confidence that MCS will work

360-degree solution

As mentioned, by the time of the BroadWay third, pilot, phase, the four consortiums originally involved in the project at the design phase had been whittled down to two. At that point, those led by two other companies had been taken out of the running, leaving teams led by Frequentis and Airbus.

Going into greater detail about the latter’s involvement in the project, and what it had been required to deliver by the time of the third phase, Airbus SLC head of sales and programme delivery, Eric Davalo, says: “The target of the consortiums at that stage was to address the various different layers which existed within the BroadWay project. At the top of that list was to address the mobile communication level – roaming between countries, in other words.

“At the same time, there are critical services provided by mobile networks, such as quality of service, priority and pre-emption. They are ultimately implemented by the MNO, which is where BroadWay really brings something new.”

He continues: “While it’s still a real challenge to get QPP [quality, priority and pre-emption] within an [individual] country, the project has managed to harmonise it across borders, something which has never been done before. Typically, when you roam from one country to another, you lose all of your priority settings, and the visited MNO will invariably put you at the standard or minimum quality level.”

Returning to the subject of harmonisation, Davalo says that another key challenge when it came to the MNOs was locking down what type of communications “parameters” existed as the user passed from one operator to another. Because, in his words, “3GPP doesn’t define all of that, only part of it”. The company’s partner in relation to the roaming piece was telecommunications company BICS.

The second layer of interoperability, meanwhile, related to the mission-critical services application itself. Or: “If you have MCX 1 and MCX 2, how do you make sure that there’s interoperability between them?” This required interface between MCXs is being defined by 3GPP, with input coming from BroadWay, phases one, two and three.

So what was it that Airbus and Frequentis actually have to deliver? What will emergency services practitioners have access to once BroadWay finally becomes operational?

Discussing this, Davalo says: “The idea is to provide a 360-degree solution, firstly implementing the interoperability which I mentioned previously. The first target was to design the concept, alongside looking at potential security and control issues for each organisation. It needs to take account not only of national first-responders, but also regional and private emergency services organisations.”

He continues: “The second thing the consortia needed to do was demonstrate harmonised quality assurance across borders, in relation to mission-critical QPP. Lastly, we also had to deliver the application itself and demonstrate that it can work. That meant the complete software solution, and the MCS application.

“From our point of view, the whole thing has been incredibly useful. If you look at previous projects to foster interoperability between TETRA and TETRAPOL countries, it was really an afterthought. By contrast, BroadWay has come at the broader process of ▸


Adobe Stock/Tatiana Belova

rolling out nationwide mission-critical broadband."

Going back to the key challenges of the project and what the consortiums were expected to deliver, Frequentis head of mission critical services, Charlotte Roesener, says: "The key challenge was not any individual goal, but facing 11 different goals together. [Some of those] might even contradict each other, but our ambition was to provide a solution that [would] score high in all dimensions."

Roesener continues that one of the biggest challenges was the comparatively limited timescale.

Elaborating on this, she says: "The actual project phases themselves are incredibly short, and solutions need to be built, tested and demonstrated across Europe within six to eight months. Only with expertise in the team and a mature product portfolio could we pull this off in such short time."

As mentioned, Airbus was able to test the networking and interoperability side via the involvement of BICS, which has experience in handling roaming between many network operators. The company also has a dedicated 4G LTE network in its manufacturing plant in Toulouse, which according to Davalo was also leveraged.

Discussing the Frequentis consortium, Roesener says: "Thanks to our consortium members, we were able to build dedicated networks, and use and roam to several European commercial mobile networks.

"We were able to show all different concepts and set-ups that will be necessary to shape a pan-European solution for operational mobility.

"BroadWay's goal is incredibly important. Severe natural disasters are [now] occurring due to extreme weather conditions, and the pandemic has also clearly shown that challenges do not stop at political borders.

"First-responders have always seen the need to co-operate across domains and regions, and this project is about providing communication systems that empower them."

Gaining political ground

Much of the work on the BroadWay project's key objectives has now been achieved, certainly from a technical perspective.

That being the case, you have to wonder where the project goes from here, both from an operational point of view, as well as, crucially, in terms of its existence as a political entity within the European space.

Discussing the first point, Lund says: "From a technical perspective, the ideal would be to see every commercial network across Europe go on to offer priority and pre-emption. We're not going to achieve that within BroadWay, but it's certainly in the discussion. The mobile network operator community is starting to wake up to the idea.

"In terms of user assurance going forward, we're not responsible for ensuring operational standards at a national level – plus, the programme finishes in September. That said, you can never really see the user assurance process coming to an end [among emergency services]. After BroadWay finishes, we also hope that our practitioner evaluation team will continue to advocate for this nationally."

Perhaps even more interesting than the operational side is the potential future direction of the pan-European broadband effort from a political perspective.

After all, according to Lund, there is now widespread support for the concept in a variety of European ministries of justice and interiors. Indeed, the work of the BroadWay project was explicitly cited by the European Council during a stakeholder event early last summer.

For him, the implications of the latter could be huge. "The commendation in June of last year indicates greater support for us going forward on the part of the European Commission.

"This has been translated into a new programme which we began in March, called BroadNet Preparation.

"That project has followed on from regular meetings about the deployment and management of technical solutions taking place across the governance structure.

"It's being taken forward as part of the European Commission's Internal Security Fund [ISF], in parallel with continuing to prove out the technical solution and the interconnect. That will be across the course of at least 18 months."

He concludes: "When it comes down to it, we have to understand what is the best model for this? Could we be seen as something like the European FirstNet? Personally I don't think so, because we don't have our own spectrum or a single operator.

"But I do think that we're looking at a similar model, where we have a single organisation that governs the operations. There are any number of questions still to be answered."

Providing interoperable mission-critical broadband across the whole of the European continent is an essential, extraordinarily complex, task. With the technical side well under way however, perhaps the real work is only getting started.

The project is being taken forward as part of the European Commission ISF

4G and 5G networks made for mission critical

ERICSSON

When it comes to mission-critical networks, reliability and response times are everything, and constant uptime is the bare minimum required. On top of these requirements comes an increasing need to harness the technology that can improve user responses, from the live video feeds of hard-to-reach places to ongoing analysis of constantly changing situations.

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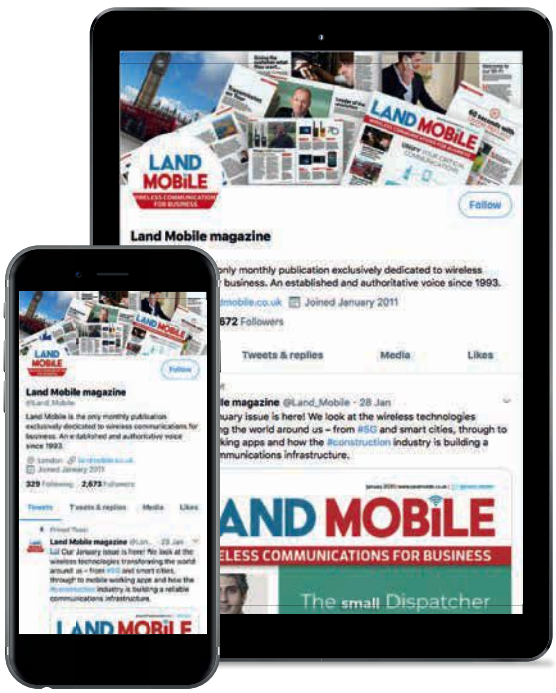

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INTERNATIONAL CRITICAL COMMUNICATIONS AWARDS 2022

BEST MC-X DEVICE OF THE YEAR

Sepura SCU3 LTE device, Sepura

CROSSCALL CORE-X5, Crosscall

Hytera PDM680, Hytera

RTP-800: the first MCX cab radio terminal for transport, Teltronic

BEST MC-X SOLUTION OF THE YEAR

Sepura SCU3 broadband vehicle device, Sepura

Tactilon Agnet 500 MCX solution, Airbus,

MCX interworking with Rohill TetraNode, Frequentis AG

CSP-MCX The broadband mission critical communication platform, Leonardo Spa

BEST TETRA DEVICE OF THE YEAR

Sepura SCG22 Mobile TETRA radio, Sepura

Hytera PTC680, Hytera

Motorola Solutions MXP600 mission-critical TETRA portable radio, Motorola Solutions UK

BEST USE OF ADVANCED TECHNOLOGY

Hytera AI-based noise cancellation for two-way radios, Hytera

Transportable 5G-SA autonomous bubble with dynamic federation capability for Israelian Fire Brigade, Athonet

Private 5G for search and rescue operation, Telenor ASA

Shortlist Announced

Celebrating excellence in critical communications

The ICCAs, presented by TCCA, are the most prestigious awards in critical communications. Celebrating excellence in the sector, the 2022 ICCAs will once again recognise the success of products, organisations and individuals across 15 categories that have pushed boundaries and capabilities within the field.

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BEST USE OF CRITICAL COMMUNICATIONS IN MINING, OIL & GAS

Aqura industrial wireless, Aqura Technologies

National wireless mining solution with Sepura SCG22 mobile radios and AutoMate application, Sepura

Network planning automation for Smart mining, ATDI

Boliden Kevista digital connected mine, Nokia

Motorola Solutions DIMETRA Express TETRA system, TETRA BTS and TETRA Radios, Commscope repeaters. Designed and managed by Motorola Solutions Germany and Motorola Solutions Austria GmbH, Motorola Solutions UK Limited

BEST USE OF CRITICAL COMMUNICATIONS IN PUBLIC SAFETY

Critical communications innovative usage during Dubai World Expo, Airbus

Modernisation of the Ciudad Juárez immediate response centre, Jomtel Telecomunicaciones

Public safety network, critical communications enhancement program, NSW Telco Authority

RESCAN, reliability and maximum coordination in the fight against the volcano, Teltronic

Motorola Solutions ADVISOR TPG2200 TETRA two-way pager for Bavarian emergency and rescue services, Motorola Solutions UK Limited

Motorola Solutions Airwave TETRA system supplied and managed by Airwave Solutions Ltd, United Kingdom for the G7 Summit, Cornwall UK, Motorola Solutions UK Limited

LTE mission critical coverage for international interforce shooting polygon, Athonet

BEST USE OF CRITICAL COMMUNICATIONS IN UTILITIES

Wien energie mission critical service transition to broadband, Frequentis

Edesur, towards new telemetry paradigm for electricity market thanks to TETRA, Teltronic

CHAMPION FOR EQUALITY, DIVERSITY AND INCLUSION

NSW Telco Authority

ATOS

Motorola Solutions UK Limited

BEST USE OF CRITICAL COMMUNICATIONS IN TRANSPORT

UK airport operations control centre, Ajar Technology

Sri Lanka railway radio telecommunications project, Hytera

Kazakhstan railway runs safely and efficiently with TETRA communications system, Hytera

Airport Integrations and control - Zurich Airport Brazil, Kofre Tecnologia

Motorola Solutions ST7000 small TETRA radio used by Nippon Airport Radio Services Co. (NAR) the public operator providing Mission Critical communications at the airports of Narita, Kansai, Naha and Chubu in Japan, Motorola Solutions UK Limited

CONTROL ROOM INNOVATION

UK airport operations control centre, Ajar Technology

Brokering of multiform mission critical communications via the 3020 LifeX platform, Frequentis AG

Bedfordshire Fire and Rescue (BFRS) – Replacement mobilising system - command central control System (CRS) cloud control system and emergency services network (ESN) connect for multi-disciplinary teams (MDTs) with Motorola Solutions Inc., Motorola Solutions UK Limited

ADVANCES IN SUSTAINABILITY

The winner will be announced on the night

EMERGING TECHNOLOGY, PRODUCT OR SOLUTION

Handsfree R5 MCX Fixed Vehicle Device, Handsfree Group

Mission-critical 5G deployable network solution, Ericsson and Verizon, Ericsson AB

Hytera PNC560 world's first 5G MCPTT device, Hytera

Vuzix Shield, Vuzix Corporation

Multinetwork gateway: Inter-network technology gateway between TETRA, VHF and LTE, ATOS

Mission critical comms with broadband & mobile edge computing, ATOS

GOVERNMENT AUTHORITY COLLABORATION

Securing interoperability of the three disaster networks and cooperation among government departments, KAPST (Korea Association for Public Safety Telecommunication)

PSBN Innovation Alliance (PIA), Peel Regional Police

OUTSTANDING CONTRIBUTION TO CRITICAL COMMUNICATIONS

Alan Seery, Aqura Technologies

Diana Ball, Sepura

Jim Bugel, AT&T FirstNet

PSBN Innovation Alliance, Halton Regional Police Service

TCCA YOUNG ENGINEER OF THE YEAR

The winner will be announced on the night

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21 June 2022 at the Kursalon Vienna

Book your tickets at www.critical-communications-world.com

Phil Kidner

Phil Kidner

Phil Kidner – known to many as PK – was chief executive of TCCA from 2006 until 2017. He died earlier this year after a short illness, aged just 68

Born in Somerset, UK, Phil excelled at academic subjects and sport at school, playing rugby for Somerset Schoolboys. In the first step of a working career that would lead him ultimately to TCCA, Phil left school at 16 to accept a place as a police cadet at Hendon Police College. Police life – then – did not appeal, however, and a succession of jobs followed, including window cleaning in Germany, working in Post Office Supplies, and as a wages clerk with Strand Hotels in London.

After meeting his wife-to-be Jane during a weekend visit back home, he decided to return to Somerset and worked at Hinkley Point during the construction of the original nuclear power station. Still courting Jane, he decided a proper career was needed, and applied to join Avon and Somerset Police. Passing out top of his intake, the following day, on 2 February 1974, he married Jane.

Stationed at Clevedon, Phil came top in his sergeant's exam, and signed up for a part-time law degree in Bristol. Coming top in the exams again, he was encouraged by his professors to apply for a full-time law degree at Bristol University, funded by Avon and Somerset Police. A long and distinguished career in the police followed, including working for the Home Office in London. Phil retired with the rank of Chief Inspector.

In 2006, Phil accepted the role as chief executive of what was then the TETRA Association, a membership organisation with the aim of protecting, enhancing and promoting the use of TETRA technology worldwide. Determined to drive the association forward, Phil became the catalyst for change.

> Phil was kind, loyal, generous, diplomatic and wise - a mentor to many

Using his knowledge of the law, he updated the legal framework of the association, enhancing the output and efficiency of board meetings with his many discussion papers. He transformed the annual TETRA World Congress from a relatively small European-centric event to the world-leading Critical Communications World conference and exhibition of today.

With the possibility of critical broadband only just emerging on the far horizon, Phil changed the focus of the association to include future technologies and influence their design. The TETRA and Critical Communications Association became the 3GPP Market Representation Partner for critical communications. TETRA remained an equal priority, and together with other determined stakeholders, Phil was instrumental in getting the TETRA standard accepted for use in North America.

Once met, Phil was never forgotten. A superb public speaker, he lit up a room with his presence and his air of authority. He was kind, loyal, generous, diplomatic and wise – a mentor to many.

The critical communications world owes a huge debt of gratitude to Phil for his passion for, and commitment to, taking every possible opportunity to drive constant improvement in technology and services. His legacy will resonate for many years to come.

Phil leaves his wife Jane, three children and six grandchildren. Our sincere condolences to all his family.

SHOW PREVIEW

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WELCOME FROM TCCA CHAIRMAN OF THE BOARD, MLADEN VRATONJIĆ

Welcome to this preview of Critical Communications World 2022. Taking place in the elegant Austrian capital city of Vienna, this year's CCW event is the result of a huge amount of effort from many, many people across our sector. With the pandemic still in disruption mode, planning and execution of events remains far from straightforward, and I would like to thank all our exhibitors, speakers, sponsors, organisers and of course visitors for their support and confidence.

The core theme for CCW this year is 'Evolving the Ecosystem,' and we will be looking at how technological developments and user requirements are driving change in mission critical communications around the world. TCCA, through its many Working Groups and taskforces, undertakes countless projects, catalysing and driving a wide range of initiatives to ensure the ecosystem does indeed evolve. All these activities have the common goal of ensuring that critical communications are of the highest quality across the world, for the benefit of everyone.

CCW is the premier showcase for the advances achieved, and also the place where we look to the future. We always consider what is needed next, and how we can enhance the standards and the technologies to enable our first responders and other critical users to carry out their vital work as safely and securely as possible. The CCW exhibition will be full of the technologies of today, giving valuable insight into the technologies of tomorrow. The conference programme likewise is brimming with information on best practice, experiences to be discussed, and visions to be examined, to ensure progress can be made.

New for 2022 are our Focus Forums, which are exclusive gatherings that we hope will generate in-depth debates on the key topics of the day. These are designed for experts in their field to come together and learn from others while sharing their own challenges. Above all, we encourage collaboration – the more expertise we pool, the greater will be our momentum.

CCW is also a time for celebration, with the International Critical Communications Awards winners being announced. Our congratulations to them all in advance, and our thanks to everyone who entered the Awards this year and took the opportunity to showcase their work to our panel of expert industry judges.

Please enjoy your time in Vienna in June. Visit as many exhibitors as possible, as there is so much to see. Catch as many conference sessions as you can, there is much to learn.

If you are a member of TCCA then our hospitality and meeting area is also available to you – come and say hello to our team! If you are not a member, come and meet us and find out more about the Association.

On behalf of TCCA, I wish you a successful and valuable time in Vienna and look forward to seeing you there.

Mladen Vratonjić,
Board Chair, TCCA

VISITOR INFORMATION

WHY ATTEND?

It is vital to stay on top of the latest technological developments that affect you and your organisation.

Whether exploring the exhibition hall, attending conference sessions or networking with government authorities, Critical Communications World provides the inside track on all the latest cutting-edge communications solutions and best practice.

CCW is a key pillar around which our sector can create mutually beneficial initiatives, promote technology advances, share experiences and ideas, and demonstrate the power of teamwork.

The event is inspired by innovation, risk, challenge, vision and a deep knowledge and investment in critical communications technology.

A core theme for CCW 2022 is how developments in technology, as well as user requirements, are driving change in mission critical communications around the world.

VENUE

Critical Communications World 2022 takes place on 21-23 June at the Messe Wien Exhibition and Congress Center in Vienna, Austria.

The Messe is an ideal location. It is centrally located, not far from the famous Vienna Prater, as well as in the vicinity of the new campus of the Vienna University of Economics and Business, and the Sigmund Freud Private University. It is also near the business and residential area of Viertel Zwei.

TRAVEL

Two Vienna U-Bahn/underground stations are located close to the venue's main entrances. These are U2: Messe-Prater and U2: Krieau.

Vienna International Airport is only 20 minutes away by taxi. The airport bus will also transport visitors to Messe Wien (Foyer D) in around 30 minutes.

There are more than 4,000 parking spaces available in the immediate vicinity, for those travelling by car.

OPENING TIMES

21st June:

Exhibition opening: 10:00
Exhibition closing: 17:30

22nd June:

Exhibition opening: 09:00
Exhibition closing: 17:30

23rd June:

Exhibition opening: 09:00
Exhibition closing: 15:00

VISITING

As organisers of CCW, we regard the health and safety of everyone participating in the show as of paramount importance.

As of 16th May 2022 Austria has lifted all Covid status checks for travellers, it is now possible to enter Austria from all countries without any restrictions. Face coverings are not essential when visiting CCW, but will continue to be recommended.

WHAT TO EXPECT AT CCW 2022

EXHIBITION

Stay at the forefront of critical communications by browsing products and services from a broad range of leading global companies. Visitors will meet established market leaders and suppliers, finding solutions to transform their organisations. Visitors will have the opportunity to connect with Platinum Sponsors Frequentis, Leonardo and Motorola Solutions, and Gold Sponsors Ericsson and Hytera, plus many more.

CONFERENCE SESSIONS

CCW 2022 will feature three days of in-depth conference sessions, delivered by critical communications thought leaders from across the globe. This year, the programme will focus on the evolution of all aspects of the critical communications ecosystem. This will take in subjects including standardisation, infrastructure, security, network development, as well as the changing requirements of mission critical operations. See pages 36 to 38 for more details.

FOCUS FORUMS

Focus Forums are Critical Communications World's new 'deep dive' sessions. Running alongside the main conference programme, they will provide comprehensive updates on specific areas, enabling specialists to come together to discuss new developments, and to share their own challenges, experiences, and skills. Each session will be chaired by a member of TCCA, alongside a host of expert panellists joining the discussion. Topics include international collaboration, the continual evolution of TETRA, interworking, mission critical broadband and future technology.

We recommend that participants should have some knowledge in each area of a given session, and that they are keen to actively contribute to the discussions. Booking is essential as spaces are limited, so make sure you register early to guarantee your place.

GOVERNMENT AUTHORITIES GLOBAL VILLAGE

Returning for CCW 2022 is the Government Authorities Global Village. With authorities from 18 countries currently confirmed to be in attendance, it will provide an exclusive forum for national critical communications operators from around the world to connect and collaborate.

At a time of great change for the industry, the Global Village provides the opportunity for partners and stakeholders to discuss achievements, issues and direction of travel in the continuing journey towards public safety broadband.

GUIDED TECH TOURS

New for CCW 2022, guided tech tours will take place at dedicated times during the event. They will provide demonstrations of new and innovative technologies across a variety of product categories, including narrowband/LTE devices, VR, robotics, and AI.

NETWORKING

Face-to-face connection, taking place in person, is as important as ever - you'll achieve more at one live event than you will in several weeks of online meetings. Visitors to CCW can make use of the Networking Lounge, as well as - if members of TCCA - the TCCA Member's Lounge. Both are purpose-built spaces, providing a perfect location for high-level networking.

THE INTERNATIONAL CRITICAL COMMUNICATIONS AWARDS

Presented by TCCA, the ICCAs are the most prestigious awards in critical communications. Celebrating excellence in the sector, they recognise the success of solutions, organisations and individuals that have pushed boundaries and capabilities within the field.

The ICCAs ceremony will take place on the evening of the first day of the show, 21st June 2022, at the Kursalon Vienna. Tickets are available for this gala dinner evening individually or as tables of 12 guests. The ticket price will include a drinks reception on arrival, three-course gala dinner including wine, and the chance to network with sector colleagues after dinner in a relaxed setting.

SPEAKER HIGHLIGHTS

FIDEL LIBERAL

COORDINATOR, MCS TAASTING; PROFESSOR, UNIVERSITY OF THE BASQUE COUNTRY

***EVERYTHING YOU NEED TO KNOW ABOUT MCX COMPLIANCE ASSESSMENT* JUNE 21ST, 12:30-13:00**

Fidel is a well-recognised expert in the mission critical communications environment. He currently works as a professor at the University of the Basque Country, where he leads several different mission critical communications and 5G-related research and development projects. These include the Mission Critical Open Platform (MCOP), as well as the MCS TaaSting project, aimed at pushing flexible testing as a service mechanism for mission critical solutions certification. He has also served as technical expert in NG112 and MCX Plugtests.

KIRSI KOKKO

HEAD, DIGITAL TRUST FINLAND, BUSINESS FINLAND

***HOW TO GET BROADBAND SERVICES UP AND RUNNING: FUNDING OPPORTUNITIES?* JUNE 21ST, 15:45-16:45**

Kirsi started her career in ICT and digitalisation at Nokia, where she held middle management positions in product and business development, for more than 15 years. She developed and launched several mobile data innovations while at Nokia, including multimedia smartphones and consumer services.

She has been working at the Finnish innovation-funding and internationalisation service provider, Business Finland, since 2015. Her vision is to create multi-billion business through the development of safe and cybersecure solutions.

ADRIAN SCRASE

CTO, ETSI & 3GPP

***HOW TO STANDARDISE 5G* JUNE 22ND, 10:30-11:00**

Since joining ETSI, Adrian has worked with many different technical committees. He has been Secretary of the former ETSI Technical Assembly, and more recently the ETSI Board. As Secretary to the Board, he was heavily involved in the discussions which led to the creation of the 3rd Generation Partnership Project (3GPP). He is currently the ETSI CTO, while also still holding the position of Head of the Mobile Competence Centre, which has the primary role of supporting 3GPP.

SARAH HUGHES

PRIZE CHALLENGE SPECIALIST, NIST PUBLIC SAFETY COMMUNICATIONS RESEARCH DIVISION

***NIST SUPPORT OF NEXT GEN COMMUNICATIONS TECHNOLOGY DEVELOPED WITH PUBLIC SAFETY* JUNE 22ND, 11:45-12:30**

Sarah joined the Public Safety Communications Research Division's Open Innovation team in April 2018, and currently serves as a Prize Competition and Challenge Specialist. In this role, she manages internal and external R&D, communications, legal, administrative, and procurement resources. This is in order to design and implement prize competitions and challenges to advance PSCR's mission. She is responsible for managing all aspects of the prize competitions and challenges assigned to her within the Open Innovation portfolio.

RENAUD MELLIES

HEAD OF INTERNATIONAL COOPERATION, STANDARDISATION AND INNOVATION, RRF PROGRAMME, FRENCH MINISTRY OF INTERIOR

***NON TERRESTRIAL NETWORKS FOR CRITICAL COMMUNICATION* JUNE 23RD, 10:45-11:45**

Renaud has been working in the telecommunications industry for 20 years before joining the RRF program led by the French Ministry of Interior in 2020. RRF, the future French PPDR Broadband Network, will guarantee a smooth transition from legacy heterogeneous narrowband networks and will respond to the ever-growing operational needs expressed by French PPDR users. Renaud has been heading standardisation and innovation efforts and was recently appointed as head of international cooperation.

LAURA KANKAALA

SENIOR SECURITY CONSULTANT, WITHSECURE

***SECURITY CHALLENGES WITH 5G* JUNE 23RD, 13:00-13:30**

Laura is widely recognised as an authority in the 'white hat' hacker community. She possesses a deep knowledge across the security landscape, including a highly developed understanding of cloud security, mobile, privacy and stalkerware. She gained a wider audience across Finland when she recently appeared with two fellow professional hackers in a TV documentary series called 'Team Whack – everything is hackable.' The aim of the program was to help consumers and businesses protect themselves from breaches and hacks.

CONFERENCE TIMETABLE

21st June 2022

08:30-10:00
REGISTRATION

10:00-10:30
OPENING CEREMONY

10:30-11:00
EXHIBITION

Theatre A
Transition to Broadband and 5G

11:00-11:30
TCCA WELCOME AND INTRODUCTION
Mladen Vratonjic, Board Chair & Director, TCCA
Kevin Graham, Chief Executive, TCCA
Tero Pesonen, Board Member and Director, TCCA

11:30-12:00
KEYNOTE ADDRESS 1: MISSION CRITICAL COMMUNICATION – A EUROPEAN PERSPECTIVE
Günter Graf, Vice President New Business Development, Frequentis AG

12:00-12:30
KEYNOTE ADDRESS 2: HARNESSING THE POTENTIAL OF THE INTERNET OF THINGS (IOT) FOR CRITICAL COMMUNICATIONS
Marie Hogan, Head of Mobile Broadband and IoT, Ericsson

12:45-13:15
INTERNATIONAL COLLABORATION FOR DRIVING CRITICAL COMMUNICATIONS FORWARD
Tero Pesonen, Board Member and Director, TCCA & Chair, CCBG, TCCA

13:30-14:00
SAUDI ARABIA ROADMAP FOR SPECIALISED NETWORK RADIO LICENCE IN THE 450 MHZ BAND
Eng. Saad Ibrahim Alaskar, Director of Field Operations, Communication and Information Technology Commission (CITC), Saudi Arabia
Eng. Abdullah Basher Almutari, Acting Director of Spectrum Planning and National Cooperation, Communication and Information Technology Commission (CITC), Saudi Arabia

14:15-14:45
SESSION SPONSORED BY ERICSSON
COMMUNICATIONS YOU CAN ALWAYS RELY ON
Antonio Fernandez Merino, Global Head of Sales Public Safety, Ericsson

15:00-15:30
MANAGING DEMAND AND CONTACT ON SOCIAL MEDIA TO THE SAME STANDARD AS TELEPHONY
David Bailey, Social and Digital Communications, Police Digital Service

15:45-16:30
PANEL DISCUSSION: NETWORK PLANNING FOR CRITICAL BROADBAND
Chair: Ildefonso de la Cruz Morales, Principal Analyst, Critical Communications, Omdia
Anthony Sutton, Chief Commercial Officer, Ranplan Wireless
Tom Cooper, Senior Sales Director, Avari Wireless
Francois Goudenove, Sales Officer, Syntony GNSS

Theatre B
Transition to Broadband and 5G

12:30-13:00
DEVELOPMENTS IN 3GPP STANDARDISATION FOR MISSION CRITICAL COMMUNICATIONS
Georg Mayer, Chair, 3GPP, SA

13:00-13:30
EVERYTHING YOU NEED TO KNOW ABOUT MCX COMPLIANCE ASSESSMENT
Fidel Liberal, Coordinator, MCS Taasting & Professor, University of the Basque Country

13:45-14:15
INTERWORKING OF MISSION CRITICAL BROADBAND AND CURRENT NARROWBAND SYSTEMS
Harald Ludwig, Chair, Technical Forum, TCCA

14:30-15:30
PANEL DISCUSSION: HOW TO GET BROADBAND SERVICES UP AND RUNNING: TESTING AND CERTIFICATION
Chair: Harald Ludwig, Chair, Technical Forum, TCCA
Brian Hobson, Senior Director, Roadmap Development Division, US Government First Responder Network Authority
Dereck Orr, Division Chief, NIST Public Safety Communications Research Division
Renaud Mellies, Head of International Cooperation, Standardisation and Innovation, RRF Programme, French Ministry of Interior
Kari Junttila, Development Manager, Erillisverkot
Peter Clemons, President, Quixoticity-EU & Vice President, Standards, EUWENA
Steven Wyckaert, Next Generation Communications Product Owner - Mobile Devices, ASTRID

15:45-16:15
FREQUENTIS SPONSORED SESSION
HOW CAN TETRA AND MISSION CRITICAL BROADBAND COMMUNICATION INTERACT IN FUTURE?
Charlotte Rösener, Head of Mission Critical Services, Frequentis AG
Bert Bouwers, Chief Technology Officer, Rohill BV

16:15-17:00
PANEL DISCUSSION: HOW TO GET BROADBAND SERVICES UP AND RUNNING: FUNDING OPPORTUNITIES
Chair: Peter Clemons, President Quixocity & Vice-President, Standards, EUWENA
Sarah Hughes, Prize Challenge Specialist, NIST Public Safety Communications Research Division
David Lund, Coordinator of Broadway/ GNSS, Public Safety Communications Europe (PSCE)
Kirsi Kokko, Head, Digital Trust Finland, Business Finland

Theatre C
Looking to the Future

12:45-13:15
TETRA TODAY AND INTO THE FUTURE
Francesco Pasquali, Chair, TETRA Industry Group, TCCA

13:30-14:00
USING AI AND CROWDSOURCED NETWORK INFORMATION TO IMPROVE RELIABILITY OF THE CRITICAL NETWORK
Jarno Taskinen, Head of Marketing, Mentura Group

14:15-15:00
PANEL DISCUSSION ON CLIMATE CHANGE
Chair: Katariina Salmisalo, Communications Director, Erillisverkot
John Winterbourne, Market Development Manager, Ballard Europe
Ricardo Gonzalez, MSSSI VP International Core Strategy, Motorola Solutions
Juergen Tusch, Senior Telecommunications Executive, Dr Tusch Consulting

15:15-15:45
SESSION SPONSORED BY CCF
BROADBAND FIELD OPERATION – FEEL THE REAL FUTURE BY SIMULATION
Elina Avela, CEO, Beaconsim

16:00-17:00
VISIONS OF 6G
Chair: Philip Mason, Editor, Critical Communications Today
Paolo Barracca, Research Engineer, Nokia
Harri Saarnisarri, University Researcher, University of Oulu
Mika Skarp, Senior Project Manager, Cumucore

Theatre D
Looking to the Future

12:45-13:15
INTRODUCTION TO ADVANCED AND FUTURE TECHNOLOGIES
Robin Davis, Chair, Future Technologies Group, TCCA
Iain Ivory, Co-Chair, Future Technologies Group, TCCA

13:30-14:15
PANEL DISCUSSION: HOW CAN WE INCORPORATE FUTURE TECHNOLOGIES INTO OUR OPERATIONS?
Chair: Robin Davis, Chair, Future Technologies Group, TCCA
Antti Kauppinen, Chief Technology Officer, Erillisverkot
Nina Myren, Deputy Head of Department, Norwegian Directorate for Civil Protection (DSB)
David Jackson, Director of Business Engagement, Police Digital Dervice
Chris Lucas, Senior User and Assurance Manager, NHS Ambulance Radio Programme

14:15-14:45
AI BASED ADAPTIVE NETWORK FOR SMART CITIES
Bhagvan Khommadi, CEO, Quantico, Computacao

15:00-15:30
INTELSAT SPONSORED SESSION
INTELSAT HIGH-THROUGHPUT SATELLITE CONNECTIVITY FOR CRITICAL COMMUNICATIONS
Joel Schroeder, Director, Land Mobile Products, Intelsat

15:30-16:15
PANEL DISCUSSION: HOW CAN PUBLIC SAFETY BENEFIT FROM INTERNET OF LIFE SAVING THINGS?
CHAIR: Barbara Held, Journalist, Behorden Spiegel
Jörg Wetterau Communication Consultant, Laboratory for Communication
Samuel Gustafsson, Head of Sales, Europe, Airbus
Gillian Smith, Vice President Marketing, NextNav

16:30-17:15
PANEL DISCUSSION: SECURE CLOUD BASED SOLUTIONS
Mika Nieminen, Product Manager, Erillisverkot
Mika Myllymäki, Solution Business Manager, Airbus
David Bailey, Digital Engagement Manager, Police Digital Service

SCAN HERE TO REGISTER

CONFERENCE TIMETABLE

22ND JUNE 2022

THEATRE A
INTERNATIONAL PERSPECTIVES AND COLLABORATION

09:45-10:00
WELCOME TO DAY TWO

10:00-10:30
KEYNOTE ADDRESS 1: WHAT WILL THE FUTURE LOOK LIKE IN 10-20 YEARS, AND WHAT SHOULD WE DO ABOUT IT NOW?
SPEAKER TO BE CONFIRMED

10:30-11:00
KEYNOTE ADDRESS 2: HOW TO STANDARDISE 5G
ADRIAN SCRASE, CTO, 3GPP & TCCA

11:15-11:45
THE FUTURE MISSION OF PUBLIC PROTECTION AND DISASTER RELIEF COMMUNICATIONS
PAUL STEINBERG, Senior Vice President of Technology, Motorola Solutions

12:00-12:30
ENHANCING MISSION-CRITICAL TETRA INTO THE FUTURE
MĂDĂLIN-VIRGIL MIHAI, Technical Deputy Director, Special Telecommunications Service, Romania

12:45-13:15
"WE ARE ONE ALREADY" – BENEFITS AND CHALLENGES OF CROSS-CONNECTED NETWORKS IN THE NORDICS MOVING TO BROADBAND
JARMO VINKVIST, COO & Virve Operator, Erillisverkot

13:30-14:00
SESSION SPONSORED BY HYTERA
CHRISTINE CANT, Head of Product Management Europe, Hytera Communications Europe

14:15-14:45
FOSTERING INNOVATION FOR MISSION CRITICAL BROADBAND
THOMAS SCHOLLE, Head of Directorate Strategy and Central Management, BDBOS

14:45-15:15
PROJEKT NEMO – A FACELIFT TO THE LARGEST TETRA NETWORK WORLDWIDE
THOMAS BRANDT, Project Manager, Network Modernisation & Head of Unit, Federal Agency for Public Safety Digital Radio (BDBOS)

15:30-17:30
GAGV: CRITICAL COMMUNICATIONS UPDATES FROM AROUND THE WORLD
Chair: BARBARA HELD, Journalist, Behoerden Spiegel
JO DEWAELE, Marketing Strategy Team Leader, ASTRID, Belgium
DONGCHAN KIM, VP, Korea Safe-Net Forum, Republic of Korea
CATE WALTON, Technical Lead, Emergency Services Mobile Communications Programme (ESMCP), Home Office, UK
LISA CASIAS, Deputy CEO, US Government First Responder Network Authority, USA
ARI TOIVONEN, Programme Director, Virve 2.0, Erillisverkot, Finland
RENAUD MELLIES, Head of International Cooperation, Standardisation and Innovation, RRF Programme, French Ministry of Interior, France
VIKTOR KOHÁRI, Head of Service Development, Pro-M, Hungary
PHIL CRNKO, Chair, Finance and Governance Committee, PSBN Innovation Alliance, Canada

THEATRE B
TRANSITION TO BROADBAND AND 5G

11:00-11:45
PANEL DISCUSSION: HOW CAN WE MOVE FROM 4G TO 5G OR 6G?
Chair: NINA MYREN, Head of Section, Department for Public Safety Communications, Norwegian Directorate for Civil Protection (DSB)
KASHIF MAHMOOD, Director, Next Generation Platform, Telenor
BRIAN HOBSON, Director, Roadmap Development Division, US Government First Responder Network Authority
JASON JOHUR, Strategy and Market Development Director, Ericsson & Vive-Chair, Broadband Industry Group, TCCA
THOMAS REHBERG, Head of Public Safety Market Segment, Nokia

12:00-13:00
PANEL DISCUSSION: HOW TO GET BROADBAND SERVICES UP AND RUNNING: WHAT ARE THE OBSTACLES AND CHALLENGES?
Chair: ILLDEFONSO DE LA CRUZ MORALES, Principal Analyst, Critical Communications Omdia
RICARDO GONZALEZ, MSSSI VP International Core Strategy, Motorola Solutions
THOMAS REHBERG, Head of Public Safety Market Segment, Nokia
RONNY HARPE, Head of Rakel, Swedish Civil Contingencies Agency, MSB
BRIAN HOBSON, Roadmap Development Division, US Government First Responder Network Authority
KARI JUNTTILA, Development Manager, Suomen Erillisverkot Group

13:15-13:45
CCF SPONSORED SESSION: HOW TO BUILD A TRUSTWORTHY 4G/5G NETWORK
SPEAKER TO BE CONFIRMED, Erillisverkot

14:00-15:00
PANEL DISCUSSION: CRITICAL COMMUNICATIONS FROM AN MNO PERSPECTIVE
Chairs: JARMO VINKVIST, COO & Virve Operator, Suomen Erillisverkot & BERIT ISAKSEN, Legal Department, Norwegian Directorate for Civil Protection (DSB)
EETU PRIEUR, Vice President, Cloud Initiatives, Elisa
RYAN BURCHNELL, Director, Market Strategy and Development, AT&T-FirstNet
RICHARD HARRAP, Managing Director, Emergency Services Network, EE

15:30-16:00
LEONARDO SPONSORED SESSION
PROFESSIONAL ECOSYSTEM FOR SMART INDUSTRY
ANGELO BENVENUTO, Head of Solution and Product Marketing, Leonardo Cyber Security Division

16:00-16:30
THE IMPACT OF LTE TOWARDS SAFE CITY IN ABU DHABI
DR.LT.COL. HAMAD KHALIFA AL NUAIMI, Head of Telecommunications division, Information Technology Center, Abu Dhabi Police General Head Quarter

THEATRE C
TRANSPORT, UTILITIES AND NON-PPDR

11:00-11:45
PANEL DISCUSSION: IMPACT OF DECARBONISATION ON THE MISSION CRITICAL COMMUNICATIONS NEEDS OF NON-PPDR SECTORS
NICK SMYE, SCADA Working Group, TCCA
ROBIN DAVIS, Chair, Future Technologies Group, TCCA
KHOUSTUV GHOSHAL, Vice President & Head of Utilities, Ericsson
JULIAN STAFFORD, Technical Director, European Utility Telecom Council
STUART PALMER, CEO of Radlink Communications Australia

12:00-12:30
THE EVOLVING NEEDS OF THE UTILITY SECTOR
ADRIAN GRILLI, Technical Manager, European Utilities Telecoms Council, EUTC

12:45-13:30
FOCUS ON RAILWAYS
THE FUTURE OF RAILWAY COMMUNICATIONS
ROBIN DAVIS, Chair, Future Technologies Group, TCCA
SONIA MIGUEL, Product Manager, Teltronic
VALERIO DI CLAUDIO, Cyber Security CTO, Leonardo
PETEVEIKKO LYLY, Expert, mobile networks, Finnish Transport Network Agency

13:45 - 14:15
PRIVATE LTE 450 MHZ FOR OIL & GAS REMOTE WELLS
ABDULLAH ALANAZI, IT Project Manager, Aramco
KUMEEL ALSMAIL, Energy Segment Lead, Nokia

14:30-15:00
AXION ENERGY: DEPLOYING A TETRA SOLUTION FOR A HIGH-RISK OPERATION
GASTÓN GUSTAVO HUGHES JENKINS, Manager and Founder, OMT SRL

15:00-15:30
NEW SINGAPORE METRO LINES: ENHANCED CYBER SECURITY SERVICES, ENCRYPTION AND INTEGRATION WITH TETRA FOR THE TRANSPORTATION MARKET
SILVIA FANIGLIULO, International Sales Manager, Leonardo

15:45-16:15
CCF SPONSORED SESSION: NEXT GENERATION GEAR FOR FIELD OPERATIVES: GIMMICK OR REAL
SPEAKER TO BE CONFIRMED

16:15-16:45
TETRA UPDATES FROM THE USA
KEITH AMMONS, Director, North America TETRA Association & VP Market Developent, PowerTrunk Inc

17:00-17:30
DEPLOYING A FUTURE-READY TETRA SOLUTION FOR ZURICH AIRPORT TO COVER ALL AIRPORT OPERATIONS
JENS-PETER NEUMANN, Senior Project Manager, ErvoComm

THEATRE D
PUBLIC SAFETY AND CONTROL ROOMS

11:00-11:30
TEST EQUIPMENT AND THE MISSION CRITICAL SERVICES ECOSYSTEM
FIDEL LIBERAL, Coordinator, MCS TaaSting & Professor, University of the Basque Country
DERECK ORR, Division Chief, NIST Public Safety Communications Research Division

11:45-12:30
NIST SUPPORT OF NEXT GEN COMMUNICATIONS TECHNOLOGY DEVELOPED WITH PUBLIC SAFETY
SARAH HUGHES, Prize Challenge Specialist, NIST Public Safety Communications Research Division
PATRICK HAGAN, Emergency Operations Technical Specialist, Houston Fire Department

12:45-13:15
EVOLVING PUBLIC SAFETY NEEDS WITHIN THE UNITED STATES
RYAN POLTERMANN, Wireless Communications Research Engineer, Pacific Northwest National Laboratory

13:15-13:45
CCF SPONSORED SESSION:
OPTIMISED ALARMING - SAVING LIVES BY SAVING SECONDS
SIMO RUOKO, CEO & Partner, Roger-GPS

14:00-14:30
BROADWAY AND BROADGNSS: REALISING PAN-EUROPEAN OPERATIONAL MOBILITY FOR PUBLIC SAFETY RESPONDERS
DAVID LUND, Coordinator of Broadway/GNSS, Public Safety Communication Europe (PSCE)

14:45-15:15
ROBUST, RESILIENT AND REDUNDANT BACKHAUL NETWORKS FOR PSAPS, CIVIL COMMAND AND CONTROL
DR HERMANN BUHLER, Vienna University of Technology & Managing and Engineering Consultant, Austria

16:00-16:30
A REVIEW OF THE STATE-OF-THE-ART IN FIRE AND RESCUE COMMAND AND CONTROL
KEN REHBEHN, Principal Analyst, CritComms Insights

16:30-17:30
PANEL DISCUSSION: THE FUTURE OF CONTROL ROOMS
Chair: PAUL BREMNER, Principal Analyst, Public Safety and Critical Communications, Omdia
TERRY BURNWORTH, President, Pyramid Architecture/Engineering & Pyramid Consulting
DAVID JACKSON, Director of Business Engagement, Police Digital Service
SALLA LEVONEN, Emergency Response Control Centre
ROB CLARK, Senior Director, Public Safety, NextNav

CONFERENCE TIMETABLE

23rd June 2022

Theatre A
International Perspectives and Collaboration

09:30-09:45
WELCOME TO DAY THREE
Tero Pesonen, Board Member and Director, TCCA
+ introduction to plans for CCW 2023
Katariina Salmisalo, Communications Director, Erillisverkot

09:45-10:15
KEYNOTE ADDRESS: CRITICAL INFRASTRUCTURE CYBER SECURITY: WHAT TO EXPECT?
Urmas Ruuto, Chief of Technology Branch, NATO Cooperative Cyber Defense Centre of Excellence (CCDCOE)

10:15-11:00
PANEL DISCUSSION
WHAT CAN WE DO TO BEST PROTECT OURSELVES FROM CYBERSECURITY THREATS?
Chair: Tero Pesonen, Board Member and Director, TCCA
Urmas Ruuto, Chief of Technology Branch, NATO Cooperative Cyber Defense Centre of Excellence (CCDCOE)
David Firth, National Cyber Security Centre, NCSC

11:15-11:45
TWO CONCEPTS – ONE MISSION: ERILLISVERKOT & NEDAA MISSION CRITICAL BROADBAND COMMONALITIES AND DIFFERENCES BASED ON EXPERIENCES
Ari Toivonen, Programme Director, Erillsverkot

12:00-14:00
GAGV: CRITICAL COMMUNICATIONS DEVELOPMENTS FROM AROUND THE WORLS
Chair: Ken Rehbehn, Principal Analyst, CritComms Insights
Kylie de Courteney, Managing Director, New South Wales Telco Authority (NSWTA), Australia
Luz Fernandez del Rosal, International Cooperation, Directorate Strategy and Central Management, Federal Agency for Public Safety Digital Radio (BDBOS), Germany
Dimitri Gilissen, Program Director, NOOVA , Ministry of Security and Justice, Netherlands
Eng. Saad Ibrahim ALAskar, Director of Field Operations Center, CITC, Saudi Arabia
Eline Paxal, Head, Department of Emergency Communications, The Norwegian Directorate for Civil Protection (DSB), Norway
Jane Stojanov, Head of Sector for Telecommunications in Public Safety, Ministry of Interior, North Macedonia
Jose Isidro Torreblanca, Operations Chief, Spanish Nationwide Pubic Safety and Disaster Relief Network (SIRDEE), Ministry of Interior, Spain

Theatre B
Non Terrestrial Networks

10:00-10:30
COMBINING 5G AND SATELLITE COMMUNICATION FOR DISASTER & RECOVERY OPERATIONS – ESA RESCUE STUDY
Herbert Mittermayr, Partner, Nokia Bells Lab Consulting Service

10:45-11:45
NON TERRESTRIAL NETWORKS FOR CRITICAL COMMUNICATIONS
Chair: Marc Balliet, Chair, Broadband Industry Group, TCCA
Ali Helenus, Head of Strategic Marketing and Technology, Airbus
Giampaolo Panariello, Chief Technology Officer, Nokia
Renaud Mellies, Head of International Cooperation, Standardisation and Innovation, RRF Programme, French Ministry of Interior

12:00-13:30
NON TERRESTRIAL NETWORKS: INTEGRATING NTNS WITH TERRESTRIAL NETWORKS
Chair: Barbara Held, Journalist, Behoerden Spiegel
Maik Bernickel, Business Development Manager, Gesat
Jens Specht, Business Development, Global Government, Inmarsat
Dylan Browne, President, Government Business Unit, OneWeb
Kieran Arnold, Chief Architect Future Communication Systems, Satellite Applications, Catapult
Marko Höyhtyä, New Space Co-Creation Manager and Associate Professor, VTT Technical Research Centre of Finland Ltd
Antti Kauppinen, Chief Technology Officer, Suomen Erillisverkot

Theatre C
TETRA Apps and Devices

10:15-11:00
PANEL DISCUSSION
TETRA APPS
Chair: Hannu Aronsson, Chair, Applications Working Group, TCCA
Peter Hudson, Chief Technology Officer, Sepura
Niklas Lagerblum, Product Business Manager, Airbus

11:15-12:00
OXFORD DEBATE: IS VOICE THE KILLER APP OR HAVE APPS KILLED THE VOICE?
Moderator: Mladen Vratonjic, Board Chair & Director, TCCA
App: Robin Davis, Chair, Future Technologies Group, TCCA & Tero Pesonen, Board Member & Director, TCCA
Voice: Peter Prater, Managing Director, Hexagon & Iain Ivory, Co-Chair, Future Technologies Group, TCCA

12:15-12:45
CCF SPONSORED SESSION
SECURITY UP TO APPLICATIONS AND BEYOND
Heikki Riippa, Chair, Signet Digital

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Theatre D
Cybersecurity

10:45-11:45
UPDATES FROM SFPG: SECURITY MEASURES IN CRITICAL COMMUNICATIONS
Chair: Trevor Evans, Chair, SFPG, TCCA
David Firth, Crypt Securiity Consultant, National Cyber Security Centre, NCSC
David Chater Lea, Fellow of the Technical Staff, Motorola Solutions
Mika Laitinen, Security and Cryptography Architect, Airbus
Brian Murgatroyd, Chair, ETSI TC TCCE

12:00-12:30
MOTOROLA SPONSORED SESSION
HOW TO IMPROVE SECURITY IN THE DIGITAL WORLD AGAINST CYBER THREATS
Sara Lasso de la Vega, Cybersecurity Sales Manager for Southern Europe, DACH, Nordics and Baltic regions
Marcus Wale, Senior Account Manager - Cybersecurity, Motorola Solutions

12:30-13:00
FIRESIDE CHAT: SECURITY CHALLENGES WITH 5G
Chair: Aleksander Gorkowienko, Senior Managing Consultant, Spirent
Laura Kankaala, Senior Security Consultant, WithSecure
Nils Ahrlich, Head of Security Consulting Practice, Nokia

13:00-13:30
SECURE SMARTPHONE WITH THE COMPLEMENTING ECOSYSTEM, AND INTEROPERABILITY WITH OTHER SYSTEMS IN CRISES ESCALATION
Anders Berghall, Sales Director, Nordics, Bittium

FOCUS FORUM AGENDAS

21ST-23RD JUNE 2022

Focus Forums are in-depth, deep-dive courses which will provide knowledge-sharing and comprehensive updates in each topic area. The focused sessions will comprise of multiple presentations, interactive discussions and roundtables, allowing specialists to come together to learn about developments, and to share their own challenges, experiences and skills. We recommend that participants should have some knowledge in each area, and are keen to actively contribute to the discussions.

REGISTRATION COSTS 145 EUR PER FOCUS FORUM, OR 175 EUR FOR MORE THAN ONE FOCUS FORUM. SPACES ARE LIMITED, SO MAKE SURE YOU REGISTER EARLY TO GUARANTEE YOUR PLACE.

DAY 1 - 21 JUNE

13:30-15:00

ROOM 1: INTERNATIONAL COLLABORATION FOCUS FORUM

Chair: *TERO PESONEN*, Chair, Critical Communications Broadband Group, TCCA

Nationwide developments or updates of their critical communications systems are at different stages around the world. However, it is imperative that challenges, obstacles and successes are shared across international borders, so that national authorities and operators can learn from each other.

This international cooperation will benefit organisations and citizens in each country and will help drive critical communications forward.

- Introduction and setting the scene
- Evolving value chain
- Challenges to be overcome only by cooperation

Speakers: *TERO PESONEN*, TCCA; *PETTERI VIITANEN*, Ericsson; *JARMO VINKVIST*, Erillisverkot; *EETU PRIEUR*, Elisa; *DR LT COL HAMAD KHALIFA AL NUAIMI*, Abu Dhabi Police; *KEN REHBEHN*, CritComms Insight; *KEVIN GRAHAM*, TCCA; *RICHARD HARRAP*, EE; *HERMAN VAN SPRAKELAAR*, Dutch National Police

15:15-17:30

TETRA: A TECHNOLOGY IN CONTINUOUS EVOLUTION FOCUS FORUM

Chair: *FRANCESCO PASQUALI*, Chair, TETRA Industry Group, TCCA

This session will focus on how TETRA technology is evolving to address the new challenges and demands posed by end users and the market in general.

The forum will represent a unique opportunity for all delegates wishing to understand why TETRA systems remain the optimal, unrivalled and future-proof choice for the critical communications needs of their organisations.

- Welcome and introduction
- TETRA and broadband
- TETRA and cybersecurity
- Panel Discussion: Future challenges with TETRA on broadband and cybersecurity
- TETRA improvements and optimisation
- TETRA data applications
- Panel Discussion: Latest improvements, optimisations and data application solutions

Speakers: *FRANCESCO PASQUALI*, Chair, TETRA Industry Group, TCCA; *TAPIO SAVUNEN*, Airbus; *ARI TOIVONEN*, Erillisverkot; *TIM CLARK*, Motorola Solutions; *PHIL WOODLEY*, Sepura; *HAUKE HOLM*, DAMM Cellular Systems; *HANNU ARONSSON*, Chair, TETRA Applications Working Group, TCCA; *PETER HUDSON*, Sepura

DAY 2 - 22 JUNE

12:30-14:00

ROOM 1: INTERWORKING FOCUS FORUM

Chair: *HARALD LUDWIG*, Chair, Technical Forum, TCCA

This in-depth session will discuss the technical, organisational and operational challenges with connecting networks, with a focus on interworking with the currently used network.

Attendees will learn and exhange their views about the current status of the various standardisation activities to connect 3GPP and non-3GPP systems and how these standards will be put into reality across the mission critical broadband ecosystem.

- Welcome and introduction
- Setting the scene: What is interworking and why is it important?
- Interactive Discussion: What is needed and when is it needed?
- Identification of interworking solutions

Speakers: *HARALD LUDWIG*, Chair, Technical Forum, TCCA; *BERT BOUWERS*, Rohill; *CHARLOTTE ROESENER*, Frequentis; *STEVEN WYCKAERT*, ASTRID

13:30-17:30

ROOM 2: MISSION CRITICAL BROADBAND FOCUS FORUM

Chair: *MARC BALLIET*, Chair, Broadband Industry Group, TCCA

This in-depth focus forum will address the challenges and possible solutions for moving to mission critical broadband.

It will enable participants to learn and exchange their own experiences and ideas.

- Introduction to mission critical broadband
- Mission critical applications
- 5G for mission critical
- Devices for mission critical broadband

Speakers: *MARC BALLIET*, TCCA; *TERO PESONEN*, TCCA; *SHEN MINJUN*, Huawei; *NOEL KIRKALDY*, Nokia; *JASON JOHUR*, Ericsson; *SANDOR SIPOS*, Airbus; *TIM CLARK*, Motorola Solutions; *STEVEN WYCKAERT*, ASTRID; *FILIPPO GAGGIOLI*, Nokia; *SANNE STIJVE*, Ericsson; *PETER HUDSON*, Sepura; *TOPIAS UOTILA*, Goodmill Systems

DAY 3 - 23 JUNE

12:30-14:00

ROOM 1: FUTURE TECHNOLOGIES FOCUS FORUM

Chair: *ROBIN DAVIS*, Chair, Future Technologies Industry Group, TCCA

This Focus Forum course will include presentations from members of the TCCA Future Technologies Group and will cover the up and coming developments in adjacent technologies that are likely to have relevance or impact on critical communications.

This includes technologies that are connected to and relevant with mission critical users and that may utilise mission critical communications as a bearer.

Join this session to learn as well as to exchange your own experiences and views on the technology that will be important in driving the future of critical communications.

- Introduction to the Futures Group
- Future tech horizon scanning
- Panel Discussion

Speakers: *ROBIN DAVIS*, TCCA; *IAIN IVORY*, Hermitage Comms; *ARI TOIVONEN*, Erillsverkot; *RICARDO GONZALEZ*, Motorola Solutions; *MLADEN VRATONJIC*, TCCA

SPONSORS

PLATINUM SPONSOR & ICCA SPONSOR

Frequentis www.frequentis.com

Stand G70

Frequentis' safety-critical communication and information solutions leverage more than 70 years of experience, showcasing true leadership in the market. The company has driven innovation throughout its history with many 'industry firsts'. This will continue, with a focus on user-centric design that considers the controller in all that the technology does.

PLATINUM SPONSOR & ICCA SPONSOR

Leonardo www.leonardocompany.com

Stand D90

Leonardo is a global technology player in aerospace, defence and security. With over 45.000 employees, and revenues of 11.5 billion, it has a strong industrial footprint in Italy, the UK, the US, Poland, and a wide presence internationally. With experience in information technology, communications, automation, physical and digital security, Leonardo generates synergies by joining its expertise to support public safety, security and emergency organisations/civil protection agencies. Leonardo's offer includes solutions for the security and protection of critical infrastructures and transport infrastructures, as well as major events and stadia. It also includes solutions for cyber security, integrated networks systems and secure communications, all of which enables reliable and efficient information management.

PLATINUM SPONSOR & ICCA SPONSOR

Motorola Solutions www.motorolasolutions.com

Stand C120

Motorola Solutions is a global leader in public safety and enterprise security. Its solutions in mission critical LMR, video security/access control, and command centre software create the most integrated technology ecosystem, making communities safer and helping businesses stay productive and secure. All its products are bolstered by managed and support services.

GOLD SPONSOR

Ericsson www.ericsson.com/en

Stand F99

Built on Ericsson's leading 3GPP 4G and 5G technology, its mission critical communications and applications deliver next generation, high performing, resilient and secure mission critical mobile broadband communication services. Together with service providers, end user organisations/partners, the company empowers digital transformation for public safety, and critical infrastructure industries.

GOLD SPONSOR

Hytera www.hytera.co.uk

Stand D120

Hytera is a leading global provider of innovative professional mobile radio communications solutions that improve organisational efficiency and make the world safer. Established in 1993 in Shenzhen, China, Hytera is the second largest PMR provider in the world, as well as the world's fastest-growing PMR solution provider. The company has around 8,000 personnel serving customers in 120 countries and regions, in sectors including government, public security, utilities, transportation, oil and gas, and more. Around 40 per cent of Hytera's personnel are engaged in engineering, R&D, and product design across eight research and development centres.

SPONSOR

Vienna Convention Bureau www.vienna.convention.at/de

The Vienna Convention Bureau was established in 1969 as a department of the Vienna Tourist Board. It was established with the help of the city of Vienna and the Vienna Chamber of Commerce and has been supported by them ever since.

Bureau activities include the staging of national and international association congresses and corporate events, as well as providing facilities for meeting planners.

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