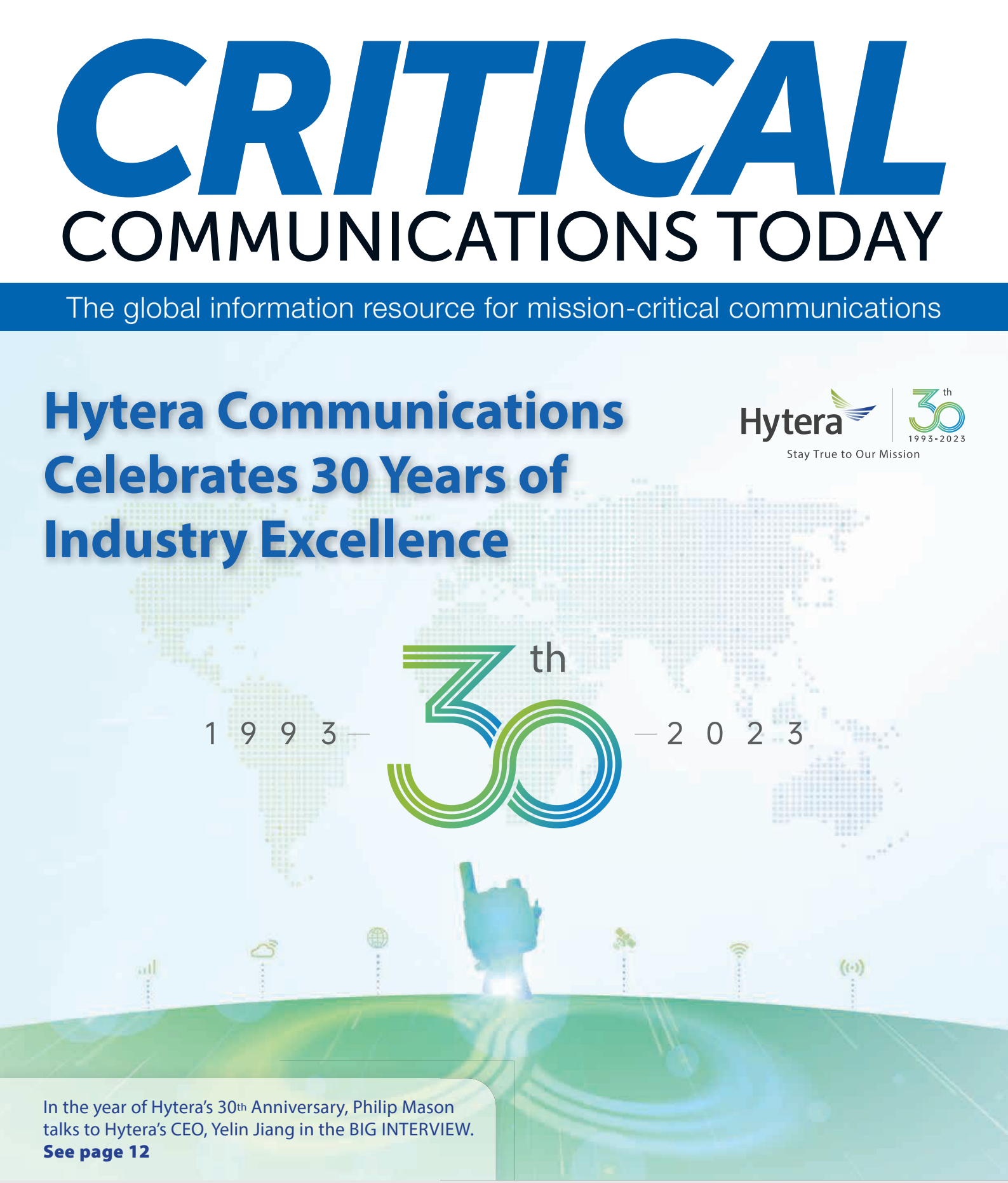
CRITICAL COMMUNICATIONS TODAY

The global information resource for mission-critical communications

Hytera Communications Celebrates 30 Years of Industry Excellence

Hytera
Stay True to Our Mission
30th 1993-2023



In the year of Hytera's 30th Anniversary, Philip Mason talks to Hytera's CEO, Yelin Jiang in the BIG INTERVIEW.
See page 12

May 2023
www.criticalcomms.com
@CritCommsToday

SUPPORTED BY TCCA

PUBLIC SAFETY ◉ TRANSPORT ◉ INDUSTRY

Maintain a critical satellite communications lifeline with personnel & assets

Critical Communications World *Stand E87*

Globalstar

globalstar.com/CCT

CRITICAL COMMUNICATIONS TODAY

Editor: Philip Mason
philip.mason@markallengroup.com
Product manager: Jessica Szuts-Naranjo
jessica.naranjo@markallengroup.com
Sales executive: Freddie Slendebroek
freddie.slendebroek@markallengroup.com
Graphic designer: Jamie Hodgskin
jamie.hodgskin@markallengroup.com

Circulation manager: Paul Creber
Sub-editor: Chris Young
Production director: Richard Hamshere
Managing director: Tim Willoughby
Event director: Anna Campagnoli
Chief executive officer: Ben Allen

Reader enquiry and subscription services:
Tel +44 1722 716997
(in the UK, 0800 137201)

MA Exhibitions
Part of Mark Allen

www.markallengroup.com

Critical Communications Today is published by:
MA Exhibitions Ltd, St Jude's Church, Dulwich Road, London, SE24 0PB, United Kingdom
Tel. +44 0207 738 5454
Online edition:
www.criticalcomms.com

Twitter: @CritCommsToday

(Print) ISSN 2517-2719
(Online) ISSN 2045-8673

UK Personal subscription rates

Quarterly Direct Debit	£13.50
Annual Direct Debit	£55
Annual Credit Card	£58
2yr Annual Credit Card	£99
3yr Annual Credit Card	£139.50

Subscribe online:
www.magsubscriptions.com
Subscribe by phone: +44 (0) 1722 716997
Printed by: Pensord Press Ltd

The paper used within this publication has been sourced from Chain-of-Custody certified manufacturers, operating within international environmental standards, to ensure sustainable sourcing of the raw materials, sustainable production and to minimise our carbon footprint.

recycle
When you have finished with this magazine please recycle it.

Cover credit: Adobe Stock/dimazel

MAY 2023

Heading north

CCT editor **Philip Mason** looks forward to Critical Communications World, taking place in Helsinki later this month

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.

GET IN TOUCH

@CritCommsToday

criticalcomms.com

philip.mason@markallengroup.com

READ MORE ONLINE

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

This editor's letter is being written at the beginning of May, just a few weeks prior to Critical Communications World, which this year will be taking place in the Finnish capital of Helsinki.

CCT is once again a headline media partner for the event, something of which we are immensely proud.

As you might expect, the event and its themes are reflected throughout the current issue, not least in our focus on the work being carried out by the five 'host' operators, beginning on page 14.

Across the course of the pages in question, readers will learn about the critical comms efforts taking place in Denmark, Estonia, Sweden, Norway and Finland, as well as each country's timetable to eventually move from TETRA to mission-critical broadband. Finland is furthest forward in this, but its regional partners – and particularly its immediate neighbours to the west – are also well under way when it comes to taking their own plans forward.

As well as the communications technology piece, also fascinating is the geo/political situation in that part of the world, with three out of the five countries sharing a border with Russia.

Needless to say, the abiding presence of the latter country haunts the above article like a spectre, with our Estonian interviewee in particular pulling no punches in his assessment of its current ambitions.

The war in Ukraine takes centre stage, meanwhile, with our interview with chief technology officer of the country's largest mobile network operator, Kyivstar. While not 'critical' comms in the strictest sense, the company's efforts over the past 15-or-so months provide an object lesson in how to keep a network functioning under the harshest conditions. This can be found on page 24.

Finally, head to the back of the issue for a 12-page Critical Communications World show preview, offering information on everything from exhibition features to the three-day conference programme. It promises to be another great show, following up on last year in Vienna.

One final word on CCW, which is once again co-located with the International Critical Communications Awards, taking place after the first day. Regarding the latter, this is the second year I have been honoured to help with the judging, and the standard of entries really has been incredibly high. I can't wait to attend the ceremony.

Enjoy the issue.

Philip Mason, editor

KATIM

GAME-CHANGING SECURE SOLUTIONS FOR MISSION-CRITICAL COMMUNICATION

KATIM is a global provider of mission-critical communication solutions that deliver the highest level of security, reliability, and interoperability that standard commercial solutions are simply not designed to deliver. Adopting advanced custom cryptography and a Zero Trust approach, KATIM ensures your data privacy and security through ultra-secure smartphones and quantum-safe network encryption devices.

Leveraging our expertise in ultra-secure and ruggedised smartphones, we address the specific needs of public safety operators through highly customisable phones trusted in any mission-critical situation. Attachable modules offers features such as push-to-talk, land mobile radio, satellite communications, body-worn cameras, and seamless integration with other systems, making them ideal for demanding field conditions.

Designed and manufactured in Finland to combat quantum computing risks, KATIM Gateway network encryptors protect against cyber threats, eavesdropping, and unauthorised access during information transit. KATIM Gateway devices also ensure authentication and authorisation control, allowing only approved users to access sensitive data.

As part of the prestigious EDGE Group, KATIM offers trust in a high risk, vulnerable world. With a global presence, including headquarters in Abu Dhabi and offices in the UAE and Finland, KATIM empowers organisations worldwide with the unwavering assurance that their mission-critical information and communications remain private and secure, no matter the circumstance.

Find KATIM at stand P21 at Critical Communications World 2023 being held at the Helsinki Expo and Convention Centre, Finland, from 23 to 25 May 2023.

katim.com

Who, what, where

NORTH AMERICA

New chair of FirstNet Authority appointed in US

Chief Richard Carrizzo has been appointed as chair of the First Responder Network Authority (aka FirstNet Authority) board. The announcement was made by US secretary of commerce Gina Raimondo in April.

According to a statement released by the organisation, chief Carrizzo has been in the fire and emergency service for nearly 40 years. He is currently the fire chief for the Southern Platte Fire Protection District in Missouri. He has served as FirstNet Authority board vice chair since 2020.

Discussing the appointment, chief Carrizzo said: "As a first-responder, I have been so proud to see what the FirstNet Authority has accomplished for our nation's public safety community.

"[The authority] has brought the nation's only public safety broadband network to life in just a few years. I am excited to step into this role."

Adobe Stock/KanawatTH

Cradlepoint expands its cybersecurity portfolio

Cradlepoint has acquired Ericom Software, which has developed what the company calls an "advanced cloud-based security platform".

According to a statement, the acquisition is a "strategic step towards solidifying Cradlepoint's SASE, zero trust and cloud-based security offerings for hybrid 5G and wireline environments".

The integration of Ericom's zero trust and cloud-based security solutions – says the statement – will be the foundation for Cradlepoint's new NetCloud 'Threat Defense' cloud service. Ericom provides integrated security controls.

Speaking of the move, CEO of Ericom, David Canellos, said: "[It] will create a powerful capability to meet the increasing demand for cloud-based secure network solutions."

EUROPE

Ambulance crews' cutting-edge connectivity

East of England Ambulance Service NHS Trust in the UK is piloting new technology, providing what it describes as "robust connectivity" from any area.

The organisation will be the first of its kind in the UK to pilot the new Hybrid Connex solution.

According to a statement, the 'Hybrid Connex digital ambulance of the future' project is attempting to provide the National Health Service with a "resilient" solution combining 4G, 5G and satellite connectivity. 5G will be the primary connection, falling back to 4G and finally satellite in "deep rural locations and areas with no coverage at all".

The project is being co-funded by the European Space Agency and the UK Space Agency.

Motorola connected vehicle embarks on European tour

Motorola Solutions has announced that it is taking its new 'connected vehicle' on a tour of Europe, on its way to Critical Communications World in Helsinki. According to the company, it will be travelling through Denmark, Norway, Sweden and Finland, and back through Belgium, Germany and Luxembourg.

A spokesperson for Motorola Solutions described the vehicle as being: "Equipped with in-car video solutions and analytics, software integrated with Apple CarPlay and voice commands for safer driving.

"[It] enables frontline teams to observe and analyze what is happening inside and outside the vehicle, send immediate threat alerts and capture footage automatically, allowing reports and statements to be processed, shared and saved at any time."

MIDDLE EAST

Adobe Stock/jamesteohart

Industry giant deploys motorsport comms

Airbus rolled out several new mission-critical technologies – including its TH9 TETRA radio – at the recent Formula One Saudi Arabian Grand Prix.

The second race of the 2023 F1 season saw the company deploy its TMR880i, THR880i, TH1N and TH9 radios across the Jeddah Corniche Circuit. It also deployed its RCS9500 radio dispatch console.

According to a statement, Airbus works as the "official secure communication technology provider for Formula One races in the region, providing secure collaboration and connectivity between organisers and security teams".

Airbus vice-president Selim Bouri said: "Clear, concise and secure communication is an important success factor. Airbus has the expertise and capabilities to effectively address this need."

AUSTRALASIA

Sepura Australian management changes

Sepura has appointed Ronan Rafferty as its country manager for the Australian critical communications market.

Rafferty will be taking over from Doug Bowden, who is retiring later this year. He joined Sepura having previously worked for JVCKenwood Australia, where he managed the communications and professional divisions, primarily selling radio terminals and solutions to mission-critical organisations.

Discussing the appointment, a spokesperson said: "[Ronan] has the opportunity to build on Sepura's considerable success in Australia, where over 120,000 TETRA radio terminals have now been deployed. He joins at an exciting time for us as we deploy the first VHF TETRA terminals to the market and continue to develop opportunities for broadband solutions."

News round-up

CMA imposes Airwave price cap

The Competition & Markets Authority has made the decision to restrict the amount Motorola Solutions can charge emergency services for use of the UK's Airwave network.

This follows an investigation into the provision of the TETRA-based system, the provisional findings of which were published at the end of last year. Motorola has stated that it will appeal the decision.

Discussing the situation in a statement, a CMA spokesperson said: "A market investigation by the Competition & Markets Authority, conducted by an independent group of experts, has found that the market is not working well, and the emergency services have no choice but to carry on using the Airwave Network.

"As a result, Motorola, which owns the company that operates the network, can charge the Home Office (which negotiates the contracts on behalf of the emergency services) prices well above competitive levels, resulting in higher costs which are ultimately paid by taxpayers."

The CMA has subsequently imposed the aforementioned price cap, using its powers under the Enterprise Act 2002. The CMA spokesperson continued that following imposition of the cap, "Motorola can charge to a level that would apply in a well-functioning, competitive market, putting an end to the estimated £200m per year of over-charging."

According to the CMA, the price limit will have the effect of lowering the cost of Airwave by almost £200m a year. It will apply until the end of 2029, with a review in 2026.

The organisation is also making a formal recommendation to the Home Office to develop a plan "so that when the charge control ends, the price of emergency communications network services is set competitively".

According to the statement quoted above, this is to "encourage competition in the longer term".

The initial CMA investigation into Motorola's provision of Airwave took place in light of the company's simultaneous involvement in delivery of the system's planned replacement, the Emergency Services Network. Motorola was the original Lot 2 contractor providing 'user services', but has since removed itself from the project.

Adobe Stock/Ascannio

Chair of the CMA's independent inquiry group, Martin Coleman, said: "Our emergency services have to use the Airwave Network to protect the public and themselves. When the original contract period for the Airwave Network came to an end, there was no alternative provider, so Motorola held all the cards when it came to pricing.

"As a result, the emergency services are locked in with a monopoly provider with no option but to pay a much higher price than they would if the market was working well."

Coleman continued: "We are generally reluctant to impose price controls, but the particular circumstances of this case mean that a price cap is the only effective way of ensuring the emergency services, and the taxpayers who fund them, aren't paying considerably over the odds.

"The cap will end the supernormal profits that Motorola has been making while allowing it to make a fair return."

Responding to the CMA decision in its own statement, a spokesperson for Motorola Solutions said: "Motorola Solutions strongly disagrees with the CMA's final decision and believes it cannot be justified on competitive, economic or legal grounds. We will appeal the decision.

"In 2016, the Home Office negotiated and agreed to the fixed price Airwave contracts, which were also provided to the CMA as part of the CMA's approval of Motorola Solutions' acquisition of Airwave.

"Despite the CMA finding no shortcomings in Airwave's exceptional service, the CMA intends to forcibly reduce the contractually agreed pricing going forward. We believe this unprecedented overreach will have a chilling effect on long-term investment and contracting with the UK government.

"Motorola Solutions is committed to vigorously protecting its contractual position in delivering the Airwave network, an essential service that operates at the highest levels and is relied upon by the 300,000 emergency services professionals who protect communities across the UK every day."

ETSI updates emergency contact specs

Adobe Stock/Gorodenkoff

ETSI has released a revised version of its TS 103 479 specification, defining next-generation core services for public communication with the emergency services.

New services covered in the specification include 'multimedia' emergency communication, including voice, photos, video and text. According to the organisation, the specification has been developed by its EMTEL technical committee.

Discussing the need for specification, a spokesperson for the organisation said: "Depending on different countries, there may be one or more emergency control centre[s], or public safety answering point[s].

"In cases where there are several control centres, [these] are networked via packet switched infrastructure or – in standard terms – an emergency services IP network [ESInet]. This will help to improve decision-making and response times during emergencies."

The spokesperson continued: "This revision also provides a technical basis for national packet switched infrastructure, giving access to emergency services communications to all citizens.

"It includes the requirement to support 'total conversation' [ie, voice, video and real-time text, combined in a single conversation] and 'real-time text' which can, for instance, help hearing-impaired people."

Specification rapporteur, Wolfgang Kampichler, said: "This recent publication is an essential foundation for European standardisation of emergency communication.

"It addresses the technical challenges of multimedia conversations coming from different networks, and is thus an important contribution to offer access to emergency services for all."

Another key technical addition in TS 103 479 includes a mechanism to update location data directly from the terminal, even during an 'active' emergency communication. According to ETSI, this allows for routing to the correct emergency control centre based on the location information, as well as making it possible to "manage roaming situations".

TCCA News

TCCA has announced the International Critical Communications Awards shortlist.

The winners will be announced during TCCA's Critical Communications World event, taking place in Helsinki in May. The complete list of finalists and their respective categories can found on the CCW website.

Discussing the awards, a TCCA spokesperson said: "The ICCAs are the most prestigious awards in the critical communications sector, celebrating the best in products, services, innovation and achievements as determined by a panel of independent expert judges.

"The ICCAs also recognise individuals who have pushed boundaries throughout their career, invigorating the sector. These 'individual achievement' categories include TCCA Young Engineer of the Year; Champion for Equality, Diversity and Inclusion; and the inaugural Phil Kidner Award for Outstanding Contribution to Critical Communications."

Chair of the judges, Robin Davis, said: "The quality of entries for the 2023 ICCAs was truly extraordinary. Entrants gave our panel of independent judges a tremendously difficult task, and those who have made it through to the shortlist should be immensely proud of themselves. On behalf of TCCA, I would like to extend my sincere thanks to our judges for their time in evaluating all the entries."

In other TCCA-related news, BYNE has become the latest member of the organisation, having joined in April. The company is described as "specialists in working with users to make critical operation environments less complicated".

BYNE, which is based in Brazil, has offices in Florianópolis, São Paulo and Rio de Janeiro. According to a statement from TCCA, its client base encompasses "the financial, oil and gas, energy, transportation and public safety sectors".

The statement continues: "For public safety, BYNE's expertise helps to integrate 4G/LTE cellular network infrastructure with PTT communication in urban areas. [This takes place] via satellite, third-party systems, and dispatch software, with the goal of improving dispatcher performance and productivity through streamlined interfaces, and streamlined workflows."

TCCA CEO Kevin Graham said: "BYNE's knowledge of critical industry communications and system integration experience will bring fresh expertise into our international community. We look forward with BYNE's assistance to extend information exchange in Brazil and more broadly across Latin America."

Finally, TCCA has also announced a forthcoming 'Critical Updates' TETRA security webinar taking place in the middle of June.

Details and the link to register for the event are available via the events section of the TCCA website.

ICCA

INTERNATIONAL CRITICAL COMMUNICATIONS AWARDS 2023

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 2023 ICCAs will once again recognise the success of products, organisations and individuals across 15 categories that have pushed boundaries and capabilities within the field.

BEST USE OF CRITICAL COMMUNICATIONS IN PUBLIC SAFETY

G7 Summit 2022 in Elmau (Bavaria, Germany), BDBOS, ALDB GmbH and Bavarian Authorized Agency

112 Suomi mobile application, Finnish Emergency Response Centre Agency

Thailand DOPA MOI Nationwide TETRA Project, Hytera

Eugowra/Forbes Flood Response, New South Wales Telco Authority

NextNav Pinnacle, NextNav

Queensland GWN & New South Wales PSN Interstate Roaming Service, Queensland Government Wireless Network & New South Wales Public Safety Network (Australia)

Korea's Safe-Net, world's 1st nationwide LTE mission critical network, Samsung Networks

Surf Life Saving New Zealand National Mission Critical Ecosystem, Surf Life Saving New Zealand

BEST USE OF CRITICAL COMMUNICATIONS IN MINING, OIL & GAS

5G Underground Experience, Aqura Technologies

Wanhua Chemical's Scalable PDT Communications System, Hytera

Motorola Solutions - Petronas Asia's First for Multi-Site, Multi-Technology, Multi-System Critical Connect Solution, Petronas and Motorola Solutions

Sierra Gorda, broadband connectivity to improve productivity and safety, Teltronic

CHAMPION FOR EQUALITY, DIVERSITY AND INCLUSION

Nokia

Debbie Powell, UK Home Office - Emergency Services Mobile Communications Programme (ESMCP)

CONTROL ROOM INNOVATION

X-2030, Leonardo

MCX solution over CeCoCo command & control., Teltronic

Tuesday 23rd May 2023 at the Scandic Park Hotel, Helsinki

BEST USE OF CRITICAL COMMUNICATIONS IN TRANSPORT

SPrivate networks enable Antartica Exploration, Athonet

Innovative antenna systems for FRMCS - field trial at 1.9 GHz, Ericsson AB in cooperation with Deutsche Bahn AG

Kazakhstan Railway's Convergent TETRA & LTE Communication System, Hytera

Delhi-Ghaziabad-Meerut corridor, communication over 3GPP MCX technology ready for FRMCS, Teltronic

Cobalt Cube, VNC Automotive

BEST USE OF CRITICAL COMMUNICATIONS IN UTILITIES

BYNE streamlines communication at COPEL-DIS Operation Centre, BYNE

CENIBRA Mission Critical Communication, Celulose Nipo-Brasileira S.A. (CENIBRA)

CSL Router provides Critical IoT Connectivity for Utilities across Europe, CSL

Private LTE Network & Communications System for Energy Industry, Edzcom/Cellnex

LECO Electricity MCPTT Project, Hytera

BEST USE OF ADVANCED TECHNOLOGY (AI, UAVS, SA ETC)

Hytera Digital WANET Repeater E-pack200, Hytera

CAPE Drone Software A Motorola Solutions Product, Motorola Solutions

Automated UAV network measurements with Nokia Drone Networks and QualiPoc, Nokia

Governmental site surveillance for highly sensible perimeters that are of national interest - with Nokia Drone Networks, Nokia

TCCA YOUNG ENGINEER OF THE YEAR

Zeineb Makni, Ericsson

Vaibhav Kakkar, New South Wales Telco Authority

Aaron Page, Actica Consulting

BEST TETRA PRODUCT OR SOLUTION OF THE YEAR

Portable Direct Communication Hub, Athonet

B-LiFE fast deployable TETRA+LTE solution, B-LiFE | Rohill

DTA-Node radio base station, Leonardo

MXP7000 MISSION-CRITICAL CONVERGED TETRA AND LTE PORTABLE DEVICE, Motorola Solutions

Sepura VHF Portfolio, Sepura

ADVANCES IN SUSTAINABILITY

RFHAWKEYE TETRA, Dac system

CAPE Drone Software A Motorola Solutions Product, Motorola Solutions

Automated UAV network measurements with Nokia Drone Networks and QualiPoc, Nokia

SCU3 Hybrid TETRA+LTE Vehicle Device, Sepura

EMERGING TECHNOLOGY, PRODUCT OR SOLUTIONS (IN DEVELOPMENT BUT NOT BEING USED YET)

Agnet Tacteam, Airbus Secure Land Communications

Barrett Communications (Motorola Solutions) 4075-5kW 5kW HF Linear Amplifier, Barrett Communications (Motorola Solutions)

MRFP MONITOR SYSTEM, Dac system

Patching of different network technologies on a unified radio backbone, Frequentis AG

Hytera PT590 New Generation TETRA Portable Radio, Hytera

Nokia Drone Networks for governmental site surveillance for highly sensitive perimeters that are of national interest, Nokia

GOVERNMENT AUTHORITY COLLABORATION

National Critical Communications Co-operation Based Eco-system, Finland

Queensland GWN & New South Wales PSN Interstate Roaming Service, Queensland Government Wireless Network & New South Wales Public Safety Network (Australia)

Safe-Net Forum for successful operation of national integrated Public Safety Networks in Korea, Safe-Net Forum

BEST MC-X PRODUCT OR SOLUTION OF THE YEAR

Standards based IWF using TETRA by Rohill with MCX AS by Nemergent, Frequentis AG, Nemergent SA, Rohill

Hytera PDM680 Rugged MCS Radio, Hytera

MCPTX - Mission-critical push-to-everything, Samsung

BEEHD MCX Framework, Softil

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

THE PHIL KIDNER AWARD FOR OUTSTANDING CONTRIBUTION TO CRITICAL COMMUNICATIONS

British APCO

NIST Public Safety Communications Research Program

Tor Helge Lyngstøl, Nødnett, the Norwegian TETRA-network

IN RECOGNITION OF OUTSTANDING SERVICES TO TCCA

The winner will be announced on the night

BOOK YOUR PLACE NOW

Places are available individually or as tables of 10 and the programme includes: drinks reception, three-course dinner, awards ceremony and a chance to network in a relaxed setting.

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

The journey and the destination

In the year of Hytera's 30th anniversary, **Philip Mason** talks to its CEO, **Yelin Jiang**, about the company's evolution and the complexities of the global critical communications market

It's Hytera's 30th anniversary. Can you give me an overview of the company's history?

Hytera was founded in 1993 by our chairman. We started off with five people working at the company, and at the beginning we were just dealing in analogue radio. It was essentially a box-moving business.

After 10 years of being in operation – around 2003 – we realised that there was going to be a shift from analogue to digital. There was a debate at the time between dPMR [digital private mobile radio] and DMR, with TETRA also starting to emerge as a key technology. Then we decided to move forward with DMR and TETRA.

By 2011, we were listed on the Chinese stock market. We also subsequently acquired a TETRA infrastructure company in Germany, HMF, which is located in Hanover. We embarked on a journey to transform from box-moving to becoming a system and solution provider.

How has Hytera's market position changed?

After the move from analogue to digital, we became increasingly strong in the market. Then, around 2015, we decided that we should make our next move, focusing on broadband. We started to develop dual-mode terminals, POC and MCS, smartphones, multimedia command and control and so on. Starting as a device provider, Hytera is now recognised in the market as a one-stop solution provider. We offer a portfolio of different technologies and protocols.

After 30 years, we've always focused on high-quality products, as well as on innovative solutions. Hytera's origin is China, and now operates globally. We sell into every part of the world, including Latin America, Southeast Asia, Europe and Africa. We're expanding our sales network all the time.

Given the company's background in narrowband, how are you finding the move towards broadband? From a traditional DMR/TETRA industry perspective, what are the key issues?

We firmly believe that broadband will be the future, both for public telecom and for the private PMR industry. The big questions are how and when – this is the most difficult part.

Based on our belief, we have invested a lot in the technology over the course of the past six or seven years. Today, we spend more than 60 per cent [of our R&D budget] on broadband in relation to terminals, infrastructure, base stations, applications and so on.

The broadband technology we've focused on are things such as dual-mode terminals, smartphones – our PNC 560, 460 – POC radio, bodyworn cameras, broadband base stations, and control room applications.

Regarding key issues in the market, I would say that there are a lot of difficulties. For instance, when we talk to customers, everyone says that they need broadband. But, if you go one layer deeper, no-one knows exactly what they need and how to get the most out of the new technologies yet. That's a major question for us.

At the same time, different customers in different industries will have a range of requirements. Then there are different layers of customers within those industries. That includes high-level managers, mid-level managers, and obviously the real users themselves, all of whom will have different opinions. That's very much the case within the mission-critical sector.

Each industry will also have its own set of requirements…

Yes – it's different from vertical to vertical. It's not like DMR or TETRA where in utilities and public safety the technology is leveraged for more or less the same purpose [ie, primarily voice]. There are more potential use-cases with broadband.

Broadband brings a lot of possibilities for the users and promises great potential. At the same time, there are currently no standards, guiding either vendors or customers. Plus, the giant commercial telecom vendors who have started to jump into these small vertical markets bring noise with them.

What kind of noise?

As PMR industrial vendors, we know very well what customers need. The same is true for other major players in the PMR business… they understand the customer very well also. But the giant telecoms vendors who are newcomers, they're not necessarily as aware of what is really needed by industrial PMR users. They arrive with a lot of fancy technologies, and I believe that this confuses customers about what their next move should be.

It also sows potential doubts in their minds about us. They

> **On one hand, customers want the most up-to-date technology, on the other they want a very slow replacement process**

Hytera CEO ***Yelin Jiang***

think that maybe the reason we say a particular thing or give certain advice is that we're late to broadband and don't have the same technology as the big commercial players. That is something we've heard.

Thinking particularly about China, there has been a learning curve. The trend now is that customers are realising that we have the experience, because the industry is so small and specialised. A niche market requires more focus.

What are the challenges of broadband from a technological perspective?

Questions continue to arise around chipsets, which are required to support a lot of the broadband standards and frequencies. The mission-critical chipset options are much more limited than that of consumer smartphones. The lifecycle of broadband chipsets are shorter and the evolution of the technology is very quick.

Normally in the PMR industry, evolution is about five to 10 years from one generation of device. But in public telecom, it's about two years, at maximum. Users need to upgrade their chipset, their camera and so on.

However, our mission-critical customers will insist on buying one device across the course of maybe five or six years. That's what they were used to, and that's what they want to continue to do.

So, on the one hand, they want the most up-to-date technology, but on the other hand, they want a very slow replacement process. This is something else which makes things difficult for the market to mature and be successful.

How do you get over that?

I can't say we've been very successful in this domain, but we've accumulated lots of experience, which is important for our ongoing improvement.

First of all, we need to try and grow with the customers. If they're moving to a broadband-based technology, it's our job to help them understand that the time period during which a replacement would be required is getting shorter.

At the same time, we've become very cautious in terms of the technology we're choosing for the products themselves. We are choosing chipsets and technology which we believe can survive for a long period of time, and have negotiated with chipset vendors in relation to exactly that. At the beginning, the customer didn't necessarily understand these things. But after you start to explain everything, they do.

> "We believe that broadband is something which will be used on top of DMR and TETRA"

How have you started to engage with the market in relation to this? How are you explaining it?

We are essentially engaging customer by customer. When the customer really wants to move to a different technology, our strategy is to establish close communication with them, share with them our insights, set up some common objectives, and start some pilot projects.

Given the importance of broadband now, how important is DMR/TETRA likely to be in future?

Our view of broadband is that it's a new market, rather than a replacement for DMR and TETRA. Maybe for some it's a replacement, but I'd say that's a maximum of 20 per cent of customers. We believe that broadband is something which will be used on top of DMR and TETRA.

We have no doubts that TETRA and DMR will exist for another 10 or maybe 20 years, which is why we've continued to invest in both. We have been introducing and implementing new technologies and features into our new generation of devices. For instance, we're now including AI for voice recognition in TETRA terminals.

We can't say that this market will grow, but it will continue to exist. No doubt.

You're opening another European office, in Germany. Did Brexit influence that decision?

Brexit was a factor, certainly. Before, we had no issue with where our warehouse was located, because Europe was all one union. Following Brexit, there's a lot of complexity.

It created a lot of additional document efforts. And even with much care, we can make a mistake and get a penalty.

Our 30th anniversary milestone year is a good time to be opening the new office. We've gone through so many changes, from the technology itself to the expansion of our business, and our brand image.

Our success is something we need to communicate with everyone, both inside and outside of the company.

Northern stars

Ahead of Critical Communications World in Helsinki, **Philip Mason** talks to the five host operator nations about the challenges facing the region, and imminent (and not so imminent) moves to mission-critical broadband

As *CCT* readers undoubtedly already know by now, this year's Critical Communications World is taking place in Helsinki.

While the event is officially situated in the capital of Finland, however, there is a palpable sense that the event is, at least in a way, being hosted by the entire region.

There are several reasons for this, not least Northern European culture itself, which seems to place an extremely high value on co-operation. You can read about this in the previous issue of *Critical Communications Today*, which featured TCCA's Tero Pesonen discussing 'Success in Cooperation', which also happens to be the theme of this year's event.

Looking specifically at the critical communications piece itself, meanwhile, readers will also likely be aware of the cross-border co-operation which has been taking place between Finland, Norway and Sweden for years. Naturally, this requires seamless interoperability between their respective public safety radio networks in order to facilitate mutual aid between all three countries' emergency services.

That being the case, in this article, we are going to attempt to provide a region-wide survey of this part of the world, focusing in particular (and in no particular order) on Sweden, Estonia, Denmark, Norway and Finland.

We shall look at current networks and working practices, discussing them in light of the broader political structure of each country. We will also touch on future plans, with each of the nation states in question looking at an eventual move towards mission-critical broadband.

The state of Denmark

Located on the northern tip of central Europe just west of Sweden, Denmark boasts a population of around six million people, distributed across a just-over 40,000 square kilometre landmass. It is, like many of its northern European neighbours, relatively well off, with the average wage (according to Scandification.com) sitting at the rough equivalent of US$6,400 a month.

Despite its high standard of living, however, it still faces a myriad of challenges, both domestically and from a global perspective. These include an ageing population, the ongoing climate crisis and, of course, the impact, indirect or otherwise, of a bellicose Russia on the wider continent.

Its current nationwide emergency services radio system is SINE, which was introduced into the country in 2010. Based on the TETRA standard, SINE – according to the Danish Centre of Emergency Communications (CFB) – was introduced "in order to give [public safety] the best conditions of


Adobe Stock/Leonid Andronov

efficient communication when helping and protecting its citizens".

Going into more detail about the development and roll-out of SINE, CFB technical manager Troels Schmidt Jensen says: "Our TETRA system has been up and running from the end of 2010. Discussions were started about it in 2004, following a major fire in Jutland, which resulted in multiple injuries and the death of a firefighter.

"That took place in a fireworks factory in a town called Seest. During that incident, there was a problem with co-ordination between firefighters and the police."

He continues: "The Danish state put out the tender for the network in 2007, and we started rolling out from 2008. It stretches across the whole country, and is used by all of the emergency services on a mandatory basis.

"Before TETRA, the emergency services were using many different analogue systems in a completely decentralised fashion. Each police region had a system, the fire department had its own systems. You could probably compare it to the United States, but completely analogue."

> **"Our studies show that almost every emergency service is using different kinds of tools to handle data"**

As well as being mandatory, SINE also shares another key characteristic with many other European narrowband networks in that it is centrally funded. It is provided meanwhile by a subsidiary of Motorola Solutions called DBK.

As discussed, Denmark finished the roll-out of SINE in 2010. In the meantime, it has become – as TETRA networks tend to – heavily relied upon, and more to the point, trusted, by its user community.

At the same time, progress marches on, something which is becoming increasingly apparent in the mission-critical communications sector via its continued interest in broadband technology.

Needless to say the Danish authorities also have an interest in broadband. If the CFB is to be believed, however, that process, at least at this stage, is far more tentative than that of some of the country's Nordic neighbours.

Discussing the potential evolution of Danish mission-critical comms, CFB project manager Jesper Rasmussen says: "Mission-critical standards have always been at the centre of the discussion for us. What's happening now, however, is that we're now discussing the application of those standards from a much broader perspective.

"That of course includes the technology itself, which has developed very strongly in the past few years. We are moving towards a stronger dependency on other kinds of [broadband-enabled] tools, rather than just voice."

He continues: "Denmark is a heavily digitalised country, certainly one of the most digitalised in Europe. This naturally affects the way that our emergency services currently deal with incidents today.

"Our studies show that almost every emergency service is using different kinds of tools to handle data. These are commercial 'best efforts' though, rather than mission-critical solutions."

While expressing a clear, and perfectly logical, interest in broadband as a national public safety technology, however, Rasmussen was less forthcoming about what Danish plans might actually be in this regard.

Continuing, he says: "We don't have any plans approved currently when it comes to rolling out emergency services broadband, but hope to have some in place later in the year."

What he could tell me about, however, was Danish plans to prolong use of the current narrowband network, or indeed pursue an entirely new contract when it comes to the provision of voice.

"We currently have a tender on our [narrowband] voice solution," he says. "And we expect to have a new contract handled during the fall of this year. We will also be looking at initiatives around broadband at that time.

"The voice tender is open and technology-neutral, although TETRA manufacturers have shown the most interest. We're looking at how we can supplement our very strong voice solution with broadband. The latter will, for now, be purely an add-on."


Photo credit: Olavi Airaksinen

On the border

Heading east and slightly north from Denmark (and hopping over the southern half of Sweden), our next stop is Estonia. This is a country of just over 1.3 million people, with an approximately 45,000 square kilometre landmass.

Asked what his country's major challenges are, CEO of the Estonian State Infocommunication Foundation, Sven Heil, is unequivocal: its Russian neighbour, directly across the border to the east. "The biggest security threat ▸

to Estonia is the Russian Federation," he says.

"Its goal is to destroy and reshape the European security architecture and the rules-based world order and restore the policy of spheres of influence."

According to him, other pain points include, but are no means limited to, cyber, energy and food security, climate change and terrorism. To this end, he says, defence spending in the country has reached three per cent of its GDP, with domestic security and emergency services also receiving considerable funding.

Needless to say, integral to the latter is mission-critical communications functioning at a high level. This currently takes the form of a TETRA-based nationwide system (known as ESTER) originally rolled out in 2007, the key drivers for which – according to Heil – included "secure connection, reliable devices, group calls and messages, good voice quality and coverage, and device-to-device connection".

He continues: "Today there are over 10,000 users [of the system], including blue-light and yellow-light services, and coverage is 98 per cent of the country. Users are very satisfied with voice and message services, [which] have worked even when commercial services have not, such as during power outages."

Given its situation as a comparatively tiny nation sharing a border with Russia, meanwhile, it is probably no surprise that Estonia has also recently launched an SMS-based public alerting solution. This was established in January of this year, following a collaboration between the Emergency Response Centre itself, alongside multiple telecom operators and technology provider Everbridge.

Discussing this – frankly rather ominously – he says: "Discussions are currently taking place today on how to further develop the public warning service, and integrate it with sirens, the 'Be ready' app, and other communication channels."

Staying on the subject of new technology, Estonia also has its own plans to introduce mission-critical broadband, albeit in around a decade's time. Discussing this, Heil says: "The plan is to introduce the broadband around 2030. The roadmap [will be according to] best practice, with a phased launch and migration [from the previous system].

Photo credit: Olavi Airaksinen

"There are lots of challenges, such as user needs, legislation, technological architecture and integration with other state communication solutions. We also need to look at funding and co-operation with partners and mobile network providers.

"The vision is for the state to manage the core network and buy in the radio network. We start with the management model convention."

Moving on to the role Estonia plays in the wider region, he mentions "bilateral agreements" with Latvia, Lithuania, Sweden and Finland, which sits to its north, across the Gulf of Finland. "Estonia is also involved in different co-operation formats with Nordic countries and pan-European associations, EU Commission and EU expert groups," he says.

"We meet our neighbours regularly, sharing information and learning from each other's experiences. In the field of critical communication, we actively participate in the Broadnet project, the Airbus Operators Forum, the Global Public Safety Operators Conference and in TCCA events."

> **"The vision in Estonia is for the state to manage the core network and buy in the radio network"**

> "We meet our neighbours regularly, sharing information and learning from each other's experiences"

Cross-border co-operation

The two CCW host nations that we have covered so far are integral to the identity of the region. That having been said, they are still geographically quite disparate, with one located in central Europe and the other right at the far east of the continent.

By contrast, our next three countries sit right next to one another, with two

of them also sharing a border with Russia. They are Sweden, Norway and Finland.

As well as geography, however, these three nation states also share one other notable thing in common (at least for the purposes of this discussion), in that they are all reasonably advanced when it comes to the roll-out of mission-critical broadband.

Finland in particular is now widely regarded as a trailblazer in the 'second wave' of countries moving from narrowband to LTE, with its Virve 2 project having been central to the discussion for several years.

Before discussing the future, however, it is necessary to provide some context by focusing on the present, and in particular the systems currently in operation across all three nations.

Discussing legacy technology, head of the current Swedish mission network, Ronny Harpe, says: "The name of the Swedish TETRA network is RAKEL, which was built out around 2005.

"When we originally rolled it out, I think there were around 200 types of radio systems being used by the police and ambulance across the country. Those were [rendered obsolete] by the adoption of one national radio system. Suddenly the tools were there, and we had RAKEL to communicate with each other."

Norway's system, meanwhile, also TETRA-based, is known as Nødnett. This was deployed over a nine-year period beginning in 2007, again with the purpose of replacing the large amount of disparate analogue radio systems previously being used by Norwegian emergency services. It was initially delivered by Nokia Siemens Networks, with Motorola Solutions taking over the project in 2012.

Finally, in Finland, there is Virve, the construction of which began in 1998, with the network becoming nationwide in 2002. It too is based on TETRA, with technology provided by Airbus.

As mentioned, Norway, Sweden and Finland exist in close proximity to each other, situated across the Baltic Sea in the most northerly part of the European continent. They are all also uncomfortably close to Russia, with Finland sharing a 1,340km border with its much larger neighbour.

It is this geographical proximity which has famously led all three to facilitate cross-border interoperability in relation to the three systems mentioned above. This in turn enables seamless co-operation between agencies, for instance when mutual aid is required.

Discussing the original rationale behind this, and how it has been working since the original implementation over a decade ago, Harpe says: "When RAKEL was finalised, it was required that we also connect Nødnett and Virve, thereby implementing cross-border communication between different agencies."

He continues: "This is used on a daily basis, right up until the present day. For instance, if an accident occurs in the northern part of Norway, and a Swedish ambulance is closest, the ambulance will go over and help. It's the same with the police and other public safety agencies. I'd say that the ability to do this is saving lives, several times a week.


Photo credit: Olavi Airaksinen

Finland is a trailblazer when it comes to public safety broadband


Photo credit: Olavi Airaksinen

"As far as I know, we are the only three countries in the world which are interconnected like this with our systems. It is also one of the main drivers for our future systems, both for us and for our neighbours."

Future systems

Moving on to the topic of future systems, Harpe says that his country has a "quite extensive" timetable when it comes to the deployment of mission-critical broadband.

This timetable was requested by the Swedish Civil Contingencies Agency (MSB) in February of this year, with the aim of starting to migrate users between 2027 and 2029. By 2030, Harpe says, they aim to have no emergency services users on TETRA at all.

"We're looking forward to hearing from the government in the autumn, so we can start doing the work for real by

1 January next year."

He continues: "We're aiming for dedicated frequencies in the 700MHz band, which will be allocated to us by the government. We need to have the infrastructure to be able to apply for the frequencies.

"Our goal is to have state-owned and controlled radio network as a foundation. At the same time, we're also suggesting a hybrid model, whereby we collaborate with one or several commercial operators."

For Harpe, the advantages of the latter would be immediate comprehensive coverage, as well as increased redundancy. "They also have frequency, so we can leverage that," he says. "Plus, they can solve issues with indoor coverage."

Moving onto the situation in Norway, director of the Department for Emergency Communication (DSB), Eline Palm Paxal, says: "DSB and the Norwegian telecom regulator have conducted a concept study for a future Nødnett, and QA [quality assurance] is also finalised.

"These reports are – for now – exempted from public disclosure, but the next step in the process is a pre-project to prepare for procurement. DSB is waiting for a governmental decision on the concept."

According to Palm Paxal, while waiting for the decision, DSB has started working together with user organisations to prepare for transition from current Nødnett to its next iteration. The "target scenario" for roll-out of public safety broadband, meanwhile, is something that she says she will talk more about at Critical Communications World.

> **"The DSB has started working together with user organisations to prepare for transition to broadband"**

While unable to discuss details around the planned roll-out itself, Palm Paxal was able to touch on timeframe, particularly as it relates to the country's relationship with its Nordic neighbours. According to her, all three countries are committed to maintaining cross-border services "during the whole period of transition" from narrowband to broadband, and beyond. This is despite the countries moving at different paces.

She says: "The end state will be a solution based upon interoperability between standardised MCX services. For the migration period we need to find bilateral solutions. There is no one solution fits all, but it can be solved.

"Which solution depends on national choices and strategies. Securing cross-border service continuity requires therefore close co-ordination and collaboration, from the beginning of the broadband projects. We have established a common working group who are looking into different options. Working with users will be crucial."

As mentioned, the Nordic nation which is furthest forward in its move from narrowband to mission-critical broadband is Finland. Primary suppliers for Virve 2 were finalised in 2020, with Ericsson winning the right to provide the dedicated 4G/5G network contract and Elisa handling radio access.

During the migration period, meanwhile, Airbus's Agnet service will be used to provide what operator Erillisverkot describes as "group PTT service and seamless connectivity between Virve and Virve 2".

Going into more detail in a joint statement, Virve COO Jarmo Vinkvist, and Virve 2 programme director Ari Toivonen, say: "Virve 2 runs the MOCN [multi-operator core network] model.

"Erillisverkot is the responsible service operator managing all the subscription and end-user services, whereas a commercial mobile network operator provides the 4G/5G radio access service."

They continue: "[In terms of progress] the Virve 2 end-to-end service has passed security audit, enabling it to be operationally offered. A prioritised data subscription was launched last year and voice services including group call will follow during this year.

"Currently, the service covers over 99 per cent of the population, but there is still some work to be done. Elisa is extending the coverage in very rural areas to reach the target of 97 per cent geographical coverage – including national sea areas – by the end of 2024.

"Field testing is in progress to finetune radio access network parametrisation, and also to gain experience in various situations. Plenty of work still needs to be done in terms of device management and logistics to optimise the related processes."

Discussing the challenges which the project has had to face so far, Vinkvist and Toivonen specifically mention the variety of legal and regulatory changes required before procurement could even begin. This took several years.

The procurement itself, meanwhile, was also "not easy and again required time", while the two of them refer to the technology piece – in a masterstroke of understatement – as "complex".

"To date we have had to update our original plan a couple of times," they say, "typically due to underestimation of workload and complexity." This is particularly in relation to ensuring service continuation of applications, and integration with TETRA.

This is a fascinating region, both in terms of mission-critical comms and the wider geopolitical situation. With CCW around the corner, it will be interesting to see what the sector will learn in Helsinki.

Adobe Stock/Monkey Business

The evolution of mission-critical IoT

The advent of broadband networks has opened up the possibility for PPDR organisations to take advantage of wireless IoT applications. However, they are also expanding the range of IoT use-cases with the arrival of 5G-enabled time-critical comms, as **James Atkinson** reports

What is meant by the term 'mission-critical Internet of Things' (MC IoT) for public protection and disaster relief (PPDR) agencies and other critical communications users? Does it just mean some 'best effort' IoT functionality for mission-critical users, which might be useful, but won't pose a problem if the data fails to get through?

Or does it refer to the performance criteria of the IoT application and bearer technology itself, where the information being sent is highly time-sensitive and requires precise positioning, ultra-high reliability and ultra-low latency? Where the application must work without fail.

Then again, while the air interface may meet the required MC performance criteria, does the full end-to-end system also meet that stringent criteria? And is the network itself physically hardened and equipped with back-up power systems and other redundancy elements to ensure it is always available?

Another way of looking at the question is to consider whether the failure of any element in the IoT service would endanger the life of a first-responder or a member of the public. The conundrum here is that critical comms users will have different definitions of what is 'mission critical' to them if they are a police force, a utility, a mining company, a railway operator or an industrial manufacturer.

Thomas Rehberg, head of public safety segment at Nokia, favours the latter interpretation. "We say mission critical is for anything regarding life-saving issues, law enforcement and first-responders. These are typical users who need mission-critical certified networks. So, it comes from the use-case."

"M2M comms have existed for many years"

IoT involves the use of devices with embedded sensors, software and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet, without the need for human intervention. Forms of machine-to-machine (M2M) communications have existed for many years using wired technology to support SCADA solutions for utilities, for example.

The advent of cellular mobile networks saw 2G being deployed to provide wireless M2M connectivity. This was soon challenged by the development of low-cost, low-power wide-area (LPWA) wireless technologies with long device battery life (up to 10 years), such as Sigfox, LoRa and others, using unlicensed spectrum. All of these solutions are designed to deliver small amounts of data on a non-time-critical

basis. LTE is good for transmitting high-bandwidth applications such as video, but is far too expensive, power-hungry and spectrally inefficient to compete with the non-cellular LPWA technologies for low-data-rate IoT applications. In response to these challengers, 3GPP developed the cellular Narrowband IoT (NB-IoT/Cat-M2) and LTE-M (Cat-M1/Cat-M) standards in Release 13.

Roughly speaking, LTE-M focuses on mobile IoT applications and can transmit more data than NB-IoT, so it is good for tracking vehicles and goods on the move. NB-IoT is a lower-cost, lower-power-consuming technology, which is better suited to battery-operated devices and fixed-indoor-coverage applications. The two are the only cellular technologies to support LPWA use-cases and they are designed to coexist with 5G networks.

Governments around the world are beginning to transition their emergency services communications networks away from traditional narrowband two-way radio to 3GPP cellular broadband networks. The early adopters in the UK, USA, South Korea, Finland and France have all opted to make use of existing public mobile networks.

Expanding the use-case

Manuel Ruiz, head of mission-critical at Ericsson, observes: "What we see in this transition is that the first use-cases public safety typically requires over LTE is the same push-to-talk voice communications they have today on narrowband, but also other use-cases related to data, such as accessing their databases from the field."

Broadband networks enable police officers to access police national databases and check vehicle licence plates, fill in digital forms, record interviews and issue fines and summonses on the street. The data collected on mobile devices can then be sent directly to police databases from the field. This saves time and makes the police more efficient, as it allows officers to stay on the street for longer without constantly having to return to the station.

All of which is good news in terms of increasing efficiency and productivity, but these broadband applications, while useful, can hardly be described as mission-critical. Video is a different matter. "When you think about IoT for the public safety community, it's not just about those little sensors that send a piece of information once a day," says Arnaud Legrand, head of marketing for public sector at Nokia.

He argues that we need to widen our definition of IoT beyond large numbers of devices sending small amounts of data. "Think about cameras," he says. "Cameras are among the first sensors that will be deployed. Yes, it's a broadband device that does not rely at all on NB-IoT or LTE-M, but I think IoT is much broader than those technologies."

Rehberg concurs: "The thinking is already expanding to the point where a robot is also thought of as an IoT service controlled by a broadband network. It's all about supplying emergency services personnel with relevant information and also the command centre, so they can take better decisions. All of this is coming and we consider all this as IoT."

Ericsson also believes the definition of IoT needs to be widened. It refers to four categories of 5G IoT: Massive IoT; Broadband IoT; Critical IoT; and Industrial Automation IoT. Massive IoT uses NB-IoT and LTE-M to support large numbers of low-cost, narrow-bandwidth devices that send or receive small volumes of data at infrequent intervals.

Broadband IoT supports applications requiring much higher data rates and lower latencies. 4G can provide this, but 5G brings additional capabilities for IoT, such as extended device battery life, extended coverage, enhanced uplink data rates and enhanced device positioning precision. Video is the obvious key application here and one that is available to PPDR organisations now, at least as a 'best effort' service on commercial 4G mobile networks.

Video analytics and AI algorithms can also be considered a form of IoT, as the 'machines' are programmed to do the heavy lifting instead of humans by automatically searching for anomalous behaviours and triggering alerts. AI analytics can be used to search hours of footage for a known suspect using facial-recognition technology or to identify – let's say – red cars in a particular location within a certain time period.

Being able to access CCTV footage and live video streams from bodyworn video (BWV) and drone video footage in real time gives control rooms and emergency services personnel on the way to, or at, an incident greater situational awareness. This can be potentially life-saving and, therefore, truly mission-critical in that sense.

Legrand says that it is also possible to remotely turn on BWV or the cameras on LTE devices remotely from the control room to give commanders a better understanding of the situation. Many BWV and LTE devices will also automatically start recording when the emergency button is pressed.

"You can also put a sensor on the police officer's gun holster, so as soon as they take out their gun, that automatically activates the camera on the device," says Legrand. Rehberg adds that a typical use-case in the past was to mount PTZ (pan/tilt/zoom) cameras on top of emergency services vehicles.

"But it never worked for a simple reason," he explains. "The driver was supposed to operate the camera, but too often he had no time. Instead, he jumps out of the vehicle to help his colleagues fight the fire or whatever. He doesn't sit in the car as a video operator. It's unreal to think like this. Now it works because this camera is under control of the command centre and they can do what they want with it." ▸

SCADA technology is used by the utilities industry

> **"Broadband IoT supports applications requiring higher data rates"**


Adobe Stock/SKfoto

The use of drones

The use of drones with HD video cameras and thermal imaging equipment is on the rise. Drones can provide greater situational awareness for police and firefighters at incidents, and their usefulness for search and rescue operations is immense.

Legrand cites a trial Nokia conducted with the Japanese city of Sendai a few years ago to see how drones could help after an earthquake or tsunami. "Interestingly, they used drones in couples. The drones were equipped with both HD and thermal cameras in order to detect survivors. But the second drone was equipped with a loudspeaker, so rescuers could provide some guidance to them," he says.

Nokia trialled another use-case in Dubai a couple of years ago when it equipped an ambulance carrying 360-degree cameras, which streamed live video back to a doctor in a hospital along with the patient's vital signs. The doctor wore AR goggles, which enabled them to be 'virtually' immersed in the ambulance. They could talk to the paramedics, make a diagnosis and suggest possible treatments as the ambulance journeyed to the hospital.

5G will bring many more use-cases, in particular those relying on ultra-reliable low-latency communications (URLLC) for time-critical IoT applications. Ericsson unveiled its 5G Time-Critical Communication solution in 2021, and as Jacob Possne, head of 5G services and ecosystem at Ericsson, explains, this requires an end-to-end approach including RAN, transport, 5G core, management and orchestration, BSS and support services to guarantee consistent low latency/high reliability.

"The aim is to increase guaranteed levels of reliability from 99 per cent to 99.999 per cent and reduce the latency from 50ms down to 1ms," says Possne. "In order to do that, we're relying on various functionality that will enhance both the robustness and also improve the low-latency properties.

"For example, making sure you have a periodic enablement of the uplink resources for specific classes of users, because some mission-critical use-cases might require a high consistent uplink throughput, such as video streamed from the scene of a disaster."

Of course, in 'best effort' commercial mobile networks, it is harder to guarantee the requisite levels of reliability and low latency, so Ericsson is offering two variants: Critical IoT for Public RAN, and Critical IoT for Private 5G. The former offers services with "moderate bounded latency (~50ms-20ms) and service availability requirements".

The latter deploys dedicated 5G infrastructure "for use-cases with extremely high requirements or service availability and/or bounded latency (~20ms-1ms)". This can be either an isolated network or an extension to an existing public network, perhaps via network slicing. It is suited to ports, mines or along a rail track, or for use in a factory for Industrial Automation IoT applications, including precise control of machinery and mobile robots.

As already alluded to, there are many other things that need to be done to ensure this level of network reliability.

> The aim is to have 99.999 per cent reliability

Ruiz says: "You do not want single points of failure, you need to have redundancies, site hardening, batteries for backup generators and so on." In addition, the operator needs to manage priority if the network gets congested following a major incident, for example.

Typical 5G URLLC use-cases, according to Ericsson, include: "AR/VR, autonomous vehicles, mobile robots, real-time human machine collaboration, cloud robotics, haptic feedback, real-time fault prevention, and co-ordination and control of machines and processes."

Possne says: "AR/VR use-cases will need bounded (URLLC) 5G for image stabilisation to be perfect. Other use-cases are things like drones for manoeuvring and real-time uplink connectivity." The Future Railway Mobile Communication System (FRMCS) will also require 5G URLLC for rail control systems, automatic braking and so on, where very low latency/very high reliability are musts.

In a PPDR context, the ability of police, firefighters or rescue workers to send a video-equipped robot into a potentially dangerous building or space, or to examine and potentially remotely disarm an improvised explosive device (IED), keeps humans out of harm's way. Precise indoor as well as outdoor positioning is also required.

Ruiz adds that in this kind of instance, video can be live-streamed to an expert many miles away, viewing the situation through AR goggles and providing advice to those on the ground. "The functionality can be controlled in real time without risking the expert. You also need very low latency that is predictable and reliable."

Nokia's Rehberg observes that the emergency services are at a point where 4G broadband technology is only just being introduced and the first wave of services and IoT applications are mostly replicating the key narrowband features they are used to. "Then they will learn about the possibilities of 5G technology, but this is definitely for the second wave. So, it will take a while, but we definitely see this coming. I'm absolutely convinced," he says.

The technological leap that 4G and 5G offer over narrowband technologies means PPDR organisations will be able to make use of many more features, including mission-critical IoT. The exact definition of MC IoT remains uncertain, but it is clear we need to expand it to include a far wider range of applications.

CRITICAL COMMUNICATIONS TODAY

The global information resource for mission-critical communications

Critical Communications Today *is the only publication serving all aspects of the mission-critical wireless comms community.*

Our reach is massive, with over

20,000

digital and printed copies.

Engage with industry professionals in more than

105

different countries.

Contact Jessica at ***jessica.naranjo@markallengroup.com*** *if you want to take advantage of the exposure that we provide.*

REGISTER FOR YOUR ***FREE*** COPY TODAY

www.criticalcomms.com

Photo credit: Kyivstar

State of emergency

CCT talks to the chief technology officer of Ukraine MNO Kyivstar, **Volodymyr Lutchenko**, about the measures required to keep the network going during wartime

Critical Communications Today's usual area of interest generally centres around the use of 'critical' comms technology, invariably within what might be regarded as 'high impact' environments.

That obviously could include within an emergency services/public safety context, which is something that we cover quite frequently. It could also mean within the oil and gas sectors, utilities, transport and so on.

What we don't generally tend to focus on, however, is the use of 'consumer' comms, which in general don't possess the requisite criteria for use in real-time, high-pressure, mission-critical situations.

This is beginning to change, of course (for instance, emergency services' increased use of data). But for the most part, if commercial offerings are part of the conversation, it will mostly be around the role played by MNOs in initiatives such as the Emergency Services Network in the UK.

That being the case, in this issue we are going to do something a bit different by looking at the provision of a purely commercial offering, being leveraged within an extraordinarily 'high impact' situation. That is, the LTE network provided by Ukraine's largest MNO, Kyivstar, which the latter has continued to maintain across the course of the country's war with Russia.

Infrastructure damage

The Russian invasion of Ukraine began in February of last year, with initial fighting taking place in Luhansk Oblast on the border between the two countries. This action was met with resistance from both Ukraine military forces and its population, something which has continued over the course of the past 15-or-so months.

A key part of the Russian strategy – certainly in the recent stages of the conflict, during the European winter – has been an attempt to disable Ukrainian critical national infrastructure.

This has manifested itself primarily in attacks on power facilities across the country, with the effect of causing multiple blackouts. As well as seriously affecting the population's ability to heat itself, however, these attacks have also impacted its ability to communicate.

Based in Kyiv, Kyivstar is the largest mobile network operator in Ukraine. Its offering covers all cities across the country, taking in around 26 million mobile device customers.

The company's chief technology officer is Volodymyr Lutchenko. Discussing the impact which the Russian attacks have had on Kyivstar's ability to provide connectivity, he says: "Since October, the biggest challenge for us has been blackouts. The most recent attack [the current interview took place in March] consisted of

around 90 rockets.

"This caused us some problems, mainly on the east of Ukraine, including Kyiv. It has been difficult to deal with, but frankly we're doing the same that anyone would have in our place. That includes increasing power back-up, with stationary as well as mobile generators."

He continues: "In these situations, we're mobilising all our resources. That means not only field engineers but all employees helping in support of these generators.

"That could mean the distribution of fuel, or – with special permission – working with the equipment itself. In conditions such as these, there comes a point where you have to involve everyone, including our subcontractors."

As well as the damage done to the Ukrainian energy grid on which Kyivstar's offering depends, Russian attacks have also had the obvious potential to damage the broadband infrastructure itself. According to Lutchenko, this damage has depended in large part on where the constituent parts of the network are situated.

In areas not under control of Russian forces, for instance, around 90 per cent of any damaged infrastructure has apparently been restored. Statistics released by the company to illustrate this effort include 144,000 "emergency and restoration works" carried out over the course of the war, the "vast majority" of which took place between October and December 2022.

Other numbers published by Kyivstar include the reconstruction and repair of 600 damaged sites, alongside the reconnection of 815 "human settlements".

When asked about damage to the comms infrastructure in particular, Lutchenko reiterates that actually "the biggest issue has been the energy infrastructure, but we're doing a great job with that". Regarding the latter, Kyivstar has provided generators to over 1,500 sites while also providing the aforementioned "constant maintenance".

As eye-catching as the above statistics are, however, they of course only tell half the story. The work, after all, actually had to be carried out by human beings, putting themselves in danger. The repairs had to take place – in the middle of a war zone.

"When the area is liberated, you can't just enter," says Lutchenko. "It could be heavily mined or destroyed altogether. It could be very dangerous, and there are special procedures we need to be applying with military authorities to provide us with supervision."

> "It's been difficult, but we're doing the same that anyone would have done in our place"

These procedures include checking sites for "hidden surprises". They also include protecting engineers from Russian aggression.

Discussing this, he continues: "To give a recent example in Kherson, there is still one area where it has been very difficult to restore all sites. Every time we tried, artillery begins. We don't know whether this area is under permanent monitoring from the enemy side, or there is something else.

"There are such cases very often. We've had people go missing, and we still don't know where they are now."

Be prepared

The invasion of Ukraine has forced the European community of nations to ask a series of fundamental questions around its own continued security. Needless to say, this also includes questions around Russia's long-term aims, as well as what could possibly happen next following months of military activity.

As unclear as the future seems at this point, however, with the benefit of hindsight the past seems relatively easy to understand. Or, to put it another way, it could be argued that the current situation wasn't necessarily all that difficult to anticipate.

From the Ukrainian perspective the ongoing difficulties with its neighbour go back years, with the current phase of antipathy between the two nations stretching back to Russia's annexation of Crimea in 2014. Indeed, it was something – according to Lutchenko – that the Ukraine telecommunications industry had been preparing for since at least 2021.

Discussing this, he says: "We started the preparation earlier than the war, although obviously, you can't plan for everything in advance. Honestly, that's the biggest part of our success when it comes to keeping the network resilient.

"I can't go into too much detail, but we were making preparations in relation to core network redundancy and transport network redundancy, maintaining radio access capacity."

He continues: "For example, in Kherson, we have a really good, really resilient network. The city was connected to the core network via the use of four independent backbone lines, and we connected three more.

"After we'd completed this work – when the city was occupied – we were surviving with only one 'limb'. Six limbs were broken and we couldn't repair them, but we had one limb left."

Another move carried out with the aim of increasing resilience was a movement of operations away from "on prem" and into the cloud, with Kyivstar also apparently considering building extra core nodes abroad. As Lutchenko says: "If your core site is down, it doesn't matter how many kilometres of fibre-optics you have, or how many physical radio sites. That's why we carried out extra activities to make the core network more resilient in every respect."

One other crucial area in terms of maintaining communications across the country is the likely unprecedented level of collaboration and co-operation between mobile network operators themselves.

Indeed, if Lutchenko is to be believed, the rules of competition have essentially been suspended in the face of national crisis.

He says: "There's been a huge level of co-operation between operators. In Ukraine, all telcos have different infrastructures, so we were making fast exchanges of frequency, capacity and transport routes.

"From the beginning of the war, I haven't been thinking about competition. We are very close with other mobile operators, exchanging information on a daily basis and supporting each other."

From the user side, this co-operation is perhaps most apparent in the ongoing provision of 'national roaming'. This, for those who don't know, allows an individual SIM card to connect to more than one operator network, for instance during times of national emergency.

With the interview coming to an end, *CCT* asks how Lutchenko is bearing up under the current conditions.

He says: "Our psychology has changed a lot because of this situation, but really, you don't notice it. Everyone is doing what they need to, without the fear of 'punishment' or any additional motivation.

"They just want to do their job as well as possible."

BAPCO 2023: interesting times

Critical Communications Today reports on two of the most important sessions from this year's annual British APCO Conference & Exhibition, taking place in Coventry

As always, one of the most well-attended conference sessions at this year's BAPCO Coventry show was the annual Emergency Services Network update. This was delivered, as in previous years, by programme director John Black.

For those who don't know, the context for the presentation in question was somewhat unusual, taking place as it did after key contractor Motorola Solutions' recent decision to end its involvement with ESN early. The company was responsible for Lot 2, in other words the provision of 'user services' such as the device interface, and systems/service integration.

Motorola left the programme – according to a statement issued by the National Audit Office in March – to "remove the risk that the CMA would force it to sell Airwave". (You can read more about Motorola's recent issues with the Competition & Markets Authority in the news section of this edition of *Critical Communications Today*).

As ever in Coventry, Black found himself in front of an audience which at this point it would be fair to say was typified by a curious mixture of mild exhaustion and inexhaustible optimism.

The exhaustion comes from the years of difficulties encountered by the programme in question up until this point. The optimism, meanwhile, relates to the sector's ongoing faith in the broadband technology itself, as well as the way in which the ESMCP has evolved over the years to increasingly take account of the user point of view.

This evolution is probably best symbolised by Black himself, who began his presentation by making a point of stating that he was not only looking forward to "getting this project done" but also "being a lot more open about what's going on".

Discussing the situation following Motorola's withdrawal from the project, he continued: "Lot 2 sits at the core of the system and holds it all together, [consisting of] specific technical components.

"[Having said that], we're making really good progress through the work required to build ESN, and the loss of the Lot 2 supplier certainly doesn't invalidate all that work."

"A lot of those contracts continue to make good progress"

Regarding the latter statement, Black mentioned the coverage piece (as delivered by EE), which continues apace, as well as the broader "ecosystem" consisting of the air-to-ground network, control room integration and so on. "A lot of those contracts," he said, "continue to make very good progress."

He continued on the same theme, stating that a full programme reset would not be necessary following recent events with Motorola, and that the key thing at this point is simply to "keep the momentum going".

While this is clearly necessary, however, there remains the thorny question of who now is going to provide the crucial Lot 2 services. This is something Black said we wouldn't know until some time in 2024, with the re-procurement process taking place over the course of this year.

What he was able to clarify, however, was that the structure of the programme would remain the same moving forward, with various options for change having been looked at and rejected. There will be no stopping or pausing of the programme, for instance; no prime contractor or alternative lot structure.

Rather: "The last option we looked

at was a one-for-one replacement. We're losing a user services supplier, [so] we'll put in a new supplier, sitting alongside those existing six-year-old contracts.

"We looked at [this question] very carefully through a financial lens, delivery lens and a strategy lens. We need to get the plan to get this job done as fast as we reasonably can, of course balancing officer safety."

He continued: "We're not going to take shortcuts or become data-driven. But equally, we also don't favour options that put in several more years delay and incur more time than is absolutely necessary to get the job done.

"We knew that the structure we had in place actually works and that the architecture is feasible. And we're confident that whatever reason we terminated the relationship with Motorola, it wasn't because [the technology] didn't work."

He finished this portion of his presentation with an analogy, stating that ESN is like a 60-piece jigsaw puzzle. Just because one of the major pieces has gone, he said, that doesn't mean they are going to "throw the whole jigsaw back in the box".

The procurement process for a new Lot 2 vendor began last October when the programme issued a prior information notice, once Motorola's decision about its ESN future became apparent.

Going into more detail about the Lot 2 procurement going forward, Black said the programme had a list of organisations it would like to "come to the table, and they're all pretty much there". One other thing of potential interest, meanwhile, was his belief that "there isn't one single organisation which can do this by themselves".

The programme, therefore, is relying on the market forming into what he called consortiums. This is "in order to create that competition that we want to get the best solution".

Organisational change

Another important presentation was the keynote given by digital transformation expert Rachel Murphy. She talked about leading change in the public sector, focusing specifically on the role she played in the recent 'digitisation' of the UK National Health Service (NHS).

Murphy began by discussing the situation prior to her arrival. She said: "I landed at the NHS as the lead of a digital transformation project. I walked into an office that was covered with old school gap charts, and was asked 'Can you do this?'. I said, I can – but we're going to have to look at this a different way."

> "We can do this, but we will have to work a completely different way"

Continuing her presentation, she described the procurement of technology by the NHS prior to her arrival as very "waterfall". In other words, "incredibly slow, incredibly painful… there was no way we were going to deliver this transformation in that way".

Describing the replacement process, which she oversaw, she said: "We built out something called a visual proposition, which was about how we galvanised the troops. It was a buy-in tool to get people excited and to get them [on board] with the fact that we were going to do something different."

She moved on to discuss a subsequent, major NHS programme called 'Empower the Person', which was intended to use digital technology to try to reduce "physical footfall" into accident and emergency departments. According to her, the initiative was also intended to provide those digital services in a more cost-effective and speedier way. "The drive was, what can you consume online?"

Discussing the nuts and bolts of the project from a service provision perspective, she continued: "What we did was make available for the first time the ability to book an appointment online; access your medical record; get a repeat prescription.

"All of these things seem quite basic, but the reality was, in healthcare at that time, we didn't have them available to us. So, there was a real concerted effort to put data in the hands of patients and end-users."

Regarding procurement of the technology in question, Murphy said the organisation during this period became far more agile (and certainly less bureaucratic), while at the same time seconding people into the procurement side in order to benefit from their expertise.

Discussing this, she said: "We had to bring in additional skills that we didn't already have within the NHS, including user researchers and service designers.

"The reason we did this is that we wanted it to be 'sticky'. We didn't want to just put in another service that was just going to be replaced in due course."

Murphy's presentation is relevant to *CCT* for several reasons, not least that it hints at potential strategies for embedding technological change within often quite risk-averse public sector organisations. The emergency services are, of course, a prime example of organisations which are sometimes known to operate in this way.

It was also important, however, because of the way the presentation illustrates the NHS's changing attitude to technology itself, with chosen software solutions going from proprietary to open source over the course of Murphy's involvement in the project. This illustrates the importance of standardisation and interoperability, and the benefits they bring.

Murphy said: "The open-source bit is particularly key to this. When I arrived, NHS Choices was running on proprietary software that was costing probably £3m a year in way of licence cost. Plus, it wasn't flexible and it didn't allow for the staff within the team to make changes, even to the content.

"So we moved to an open-source content management system – a piece of software called Wagtail – which really allowed to drive changes in a way that we just couldn't have done with the proprietary software."

Murphy finished her presentation by discussing broader learning from the process. This included the importance of "buy in" on the part of the organisation itself.

She also commented: "I would say energy is absolutely necessary. There was a lot of red tape and a lot of governance. There was an awful lot of 'We've tried this before and it didn't work then'."

At the same time, she said: "There were also pockets of people who were absolutely up for it. They were the ones who we [engaged], got the buy-in from and drove it forward.

"What I would say is that change is possible. But we had a lot of rocks thrown at us – not literally – as we went through this process. So, a note of caution.

"Be prepared for a bit of a rumble along the way, because we weren't met with open arms absolutely everywhere."

"Dawn of a new era"

Critical Communications Today reports from the recent European Emergency Number Association (EENA) conference

EENA 2023 took place in the Slovenian capital city of Ljubljana towards the end of April.

Scheduled across the course of three days, the event included far too many sessions to cover across multiple pages, let alone just one. With that in mind, we are going to limit our coverage – at least in the magazine – to the plenary session at the beginning of the first day.

The session was important, laying out key issues facing the European emergency contact community, particularly progress in relation to NG 112/999 as well as the public alerting piece, which is becoming increasingly relevant across the continent. It was delivered by EENA's technical director Cristina Lumbreras, public affairs director Benoit Vivier and director of digital communications policy Freddie McBride.

Beginning the session, Lumbreras said: "We are here to talk about the future of the emergency services, and [the technology] to help them work better. The title of this presentation is 'Towards a new era in emergency communications and response'."

Continuing, Vivier said: "The [emergency contact] technology is changing, but there's much more to it than that. We are also seeing that expectations from the citizens are getting bigger, in terms of reaching out to the emergency services, but also in terms of expectation when it comes to data.

"There are many things which are affecting emergency communications nowadays. I think that we're really at the dawn of a new era, and I think it's good to have time to reflect together on these changes."

Picking up the presentation, McBride began to take the audience through the drivers facilitating this current paradigm shift. He said: "Digital transformation of society pervades everything we do now. Every corner of the economy and society – and, of course, [all this] is underpinned by electronic communications networks and services."

As well as demand on the part of the public, he also identified other drivers. These included the green agenda and the need to reduce "telecoms emissions", alongside the need to use radio spectrum more efficiently, as well as to "reduce the cost of legacy support".

"Taking all of that into account," he continued, "PSAPs and the emergency services need to respond to these changes. They need to be able to receive and process emergency communications, and all the data that comes with them.

"This is a migration process. This is about the progressive replacement of legacy, but not just technologies. If you really want to maximise the development of technology, you have to look at your operational processes and procedures too."

Focusing on user demand when it comes to emergency contact, Lumbreras continued by discussing the diminishing role played by voice across the whole of society. Going forward, she said, the public will expect to be able to contact the emergency services using, for instance, video calling.

Cristina Lumbreras, Freddie McBride and Benoit Vivier

She continued by saying that it was also crucial to understand the importance of user experience. She said: "We expect that when we contact the emergency services, [they will have access to] some data, for instance our location.

"Callers also expect to not have to speak with many people during the same call, and that they get feedback [in real time]. When is the ambulance coming? Can I do anything while I'm waiting for it to arrive?"

Other key areas mentioned during the presentation included potential changes in legislation as well as call-taker access to contextual data. One particular area of legislation now impacting the sector, continued Vivier, is emergency warnings issued by public authorities. Europe has likewise also mandated the use of eCall across the continent.

Discussing the need for what he called "operational excellence" as another key driver, McBride said: "If we think about the realities that we have today, emergency contacts continue to rise, and the amount of channels that we have into the emergency services also continues to rise.

"This increased activity puts pressure on our current operations, and there's also a need to consolidate those operations. And, of course, we operate in an environment where there are often budgetary restraints.

"And at an operational level, the recruitment and retention of staff at PSAPs and emergency services has never been more challenging."

This year's EENA conference was a crucial event for anyone involved in the emergency contact sector. Look out for more coverage on the *CCT* website, as well as on our sister platform, Critical Communications Network.

The future is now

Vice chair of TCCA's Critical Communications Broadband Group, **Luz Fernández del Rosal**, makes the case for the shared use of 470-694MHz spectrum to benefit public safety

Luz Fernández del Rosal

We depend on first-responders when disaster hits. The question is, what will their work look like 10 years from now? Will there be autonomous drones delivering real-time high-definition video streams of the affected area, with infrared cameras to locate people in need? Or police officers equipped with body-worn cameras that control rooms can control remotely?

All these communication solutions will be critical for their missions. Therefore, they must be available, reliable and secure anywhere and at any time they are needed, even during severe flooding and when commercial communication infrastructure has been wiped out. This will only be possible if spectrum is available.

The future is now. First-responders already use those technologies every day. Nevertheless, commercial off-the-shelf mobile data and video services do not meet the high reliability and security requirements of mission-critical users.

Critical communication users from public safety, utilities and transport need resilient mobile broadband networks and services for their everyday work already, today. Mobile broadband communication is critical for all of them.

The introduction of mission-critical mobile broadband requires available frequency spectrum. Moreover, this is the case irrespective of the chosen network deployment model. The access to spectrum empowers mission-critical network operators to make the best choices to meet the high requirements of their customers.

This might be obvious in the case of a dedicated infrastructure as deployed in South Korea for SafeNet. However, no matter who deploys the network, mission-critical users will benefit from spectrum.

FirstNet in the US is a successful example of how public safety spectrum can be traded to obtain mission-critical class services from a commercial carrier. Even in the case of complete reliance on commercial carriers' resources and infrastructure, those carriers will need to have access to adequate mission-critical spectrum too.

If broadband is a highway that allows high-speed driving, spectrum is the vehicle that leverages the speed. Every mission-critical network operator will need a vehicle to drive that road, independently of whether it is your own car, a rental or a combination of both.

Additional spectrum will help save lives by enabling PPDR agencies to respond more effectively and efficiently to the increasing incidence of disasters and emergencies, driven by climate change, as well as socio-economic and geopolitical challenges. This additional spectrum will enable millions of professional users to greatly increase overall situational awareness in times of acute operational need.

At national level, studies have shown that PPDR spectrum needs range between 20 and 60MHz for broadband communications. In recognition of those requirements, TCCA has published a joint position on the World Radio Conference 2023 Agenda Item 1.5 (details on www.tcca.info).

TCCA advocates for a co-primary allocation of the spectrum band 470-694MHz to mobile service, to meet the additional spectrum needs of mission-critical users, especially PPDR organisations, globally, and in particular in Europe, Africa and the Middle East.

Although this spectrum range is currently allocated to broadcast service until 2030, clear trends in media usage behaviour show that frequency requirements for broadcasting are declining. This is especially due to changing media usage behaviour, as well as new methods for intelligent utilisation of the frequency band and new transmission technologies.

Therefore, the frequency spectrum in the 470-694MHz range can be shared and used co-operatively, taking into account the needs of both critical comms and broadcasting.

Critical comms continue to need harmonised spectrum, including exclusively licensed spectrum below 1GHz and standardised technologies to incentivise the development of economically viable, competitive and self-sustaining ecosystems that will facilitate cross-border mobility and wider geographical coverage.

The spectrum in 470-694MHz is the opportunity for critical communications to meet all these requirements and enable the deployment of mission-critical mobile broadband by 2030.

Therefore, TCCA strongly encourages mission-critical users and network operators to actively participate in the discussion with their national regulators, and to advocate for a co-primary allocation of the band 470-694MHz to mobile service at the World Radio Conference 2023.

Imagine a disaster 10 years from now. A co-primary allocation to mobile service could turn those future, well-equipped and reliably connected first-responders into reality and help make all our lives safer.

TCCA Critical Communications World 2023

150+
GLOBAL BRANDS

160+
LEADING SPEAKERS

21
GOVERNMENT AUTHORITIES

4
CAPTIVATING CONFERENCE THEATRES

SHOW PREVIEW

23 - 25 MAY 2023

Messukeskus, Helsinki Expo and Convention Centre, Finland

WWW.CRITICAL-COMMUNICATIONS-WORLD.COM

JOIN THE CONVERSTATION #CCW23 @CritCommsSeries TCCA Critical Communications Series

PLATINUM SPONSOR
MOTOROLA SOLUTIONS

GOLD SPONSORS
ERICSSON
LEONARDO

SILVER SPONSOR
SAVOX

PRESENTED BY
TCCA

CONTENTS

VISITOR INFORMATION

MESSUKESKUS, HELSINKI EXPO AND CONVENTION CENTRE

Tuesday 23rd May	**10:00 - 17:30**
Wednesday 24th May	**9:00 - 17:30**
Thursday 25th May	**9:00 - 15:30**

Messukeskus is situated next to Pasila train station and can also be reached by bus or tram. I and P trains run direct from Helsinki-Vantaa airport. Messukeskus has 24-hour parking facilities with room for 4,600 vehicles.

REGISTER NOW

SO MANY REASONS TO VISIT CCW 2023

Critical Communications World unites mission-critical and business-critical end-users with manufacturers and suppliers for three days of inspiration, knowledge and making connections. It has served the sector for more than 20 years.

At its heart CCW is a global networking hub, allowing visitors to view the latest technology and forge new business relationships with partners from across the world.

With an exhibition of leading international brands, a conference programme led by renowned crit comms thought leaders, in-depth focus forums, and government authorities fostering collaboration across international borders, CCW is the global event of the year.

For the first time, this CCW also brings together multiple host operators, from Finland, Denmark, Norway, Sweden and Estonia.

It promises to be a truly unique event.

WELCOME FROM MLADEN VRATONJIĆ

TCCA chair Mladen Vratonjić outlines the many reasons for attending Critical Communications World 2023

> *THE THEME OF CCW '23 IS SUCCESS IN COOPERATION, AND THIS IS FIRMLY EMBEDDED THROUGHOUT THE SHOW*

REGISTER NOW

With a record number of exhibitors, more conference sessions than ever before – and with the highest level of entries in the International Critical Communications Awards – we are looking forward to seeing a record attendance at this year's show!

The theme of CCW '23 is Success in Cooperation, and this is firmly embedded throughout the show. For the first time, we have host operators from five countries coming together to support the event – from Finland, Denmark, Sweden, Norway and Estonia. We would like to thank all these organisations and extend a special thank you to Finnish operator Erillisverkot whose teams have been a tremendous help in shaping CCW 2023.

Cooperation shines through in the Government Authorities Global Village. We are delighted to welcome 21 government operators from around the world, from America to Australia, who have come together to discuss the issues and challenges surrounding the delivery of critical communications services to their first responders.

Cooperation is clearly visible on the exhibition floor as well, with the Finnish pavilion and Swedish pavilion bringing together complementary companies in a shared space. All around the exhibition you will be able to find examples of organisations working together to ensure the highest quality products and services for the critical communications sector.

Please do sign up for one of the formal Tech Tours, and take the time to visit as many exhibitors as you can to experience just how wide ranging and diverse technologies and capabilities are becoming.

Cooperation is best reflected in the field of development and application of standards. We are proud that the organisations responsible for the most important world telecommunications standards - 3GPP, ETSI, and NIST - will also take an active part in this event.

Our conference is, as always, absolutely packed with terrific content from international expert speakers and panellists. With four theatres and a range of Focus Forums, you will be spoilt for choice.

The advance of critical broadband in tandem with the continued strength of TETRA means there are topics specific to each, and topics relevant to both – particularly the security of the network, irrespective of its bandwidth.

With this year's World Radiocommunications Conference due to make decisions on spectrum allocation, we are working to influence those decisions to be as positive as possible in terms of critical broadband services.

With that in mind, please check out the conference spectrum sessions and if you can help us in our work, visit the TCCA's Members' Lounge on the show floor and speak to one of our executives.

Cooperation is always key to the successful delivery of an event. On behalf of TCCA, I would like to thank all our speakers, our sponsors, and our exhibitors for their time and their support, as well as all our visitors for their attendance. And of course, the teams at Mark Allen Group and the Messukeskus for all their hard work.

I look forward to seeing everyone in Helsinki. Please, enjoy the event and the city – we wish you a memorable week!

MLADEN VRATONJIĆ,
BOARD CHAIR, TCCA

WHAT TO EXPECT AT CCW 2023

EXHIBITION

CCW unites our global sector, providing the best opportunity for you to discover cutting-edge technology, watch first-hand demonstrations, try out equipment yourself, and discuss the needs of your business with leading experts.

At CCW you will meet 150-plus international manufacturers, supplying everything from narrowband and broadband radio technology, command and control solutions, AI, IoT, network services, satellite communications, cybersecurity and much more.

Visitors will have the opportunity to connect with brands such as our Platinum Sponsor, Motorola Solutions, Gold Sponsors Ericsson and Leonardo, and silver sponsor Savox. With thousands of innovative products and solutions on show, CCW is the best place see the technology at the forefront of critical communications.

MEET 150-PLUS LEADING MANUFACTURERS AND SUPPLIERS

TECH TOURS

Led by a member of the event team, these free of charge tours take a detailed look at specific areas. They offer the opportunity to meet carefully selected exhibitors and watch live product demonstrations, ask questions, and explore new and innovative technologies.

Tour themes this year include emerging technology, narrowband devices, LTE/ transition to broadband, cybersecurity, safe cities, and network solutions.

CONFERENCE; SUCCESS IN COOPERATION

The theme for this year's conference programme is Success in Cooperation. It focusses on the ever-increasing importance of collaborating and sharing knowledge between organisations, verticals and nations, to keep advancing the field of critical communications.

The conference consists of over 160 speakers in four theatres, across three days. It will present a huge range of cutting-edge sessions, specifically curated to expand your knowledge.

Hosted by some of the most respected thought leaders in the sector, the packed programme consists of keynote addresses, presentations and panel discussions.

These in turn cover four key sub-themes: international cooperation; cooperation between network providers and end users; verticals between


TECH TOURS WILL PROVIDE A MORE DETAILED LOOK AT SPECIFIC AREAS OF INTEREST

FOCUS FORUMS ALLOW KNOWLEDGE SHARING AND DELIVER COMPREHENSIVE UPDATES

sectors; and cooperation for innovation.

The opening keynote presentation will be a high-level state-of-the-nation address from the Finnish Ministry to discuss current priorities within critical communications.

FOCUS FORUMS

Running alongside the main conference programme, the Focus Forums are in-depth sessions that provide knowledge sharing and comprehensive updates in specific topic areas. New for this year, all Focus Forums are free to attend and are split between 'expert' and 'workshop' sessions.

'Focus Forum Expert' are technical, deep-dive sessions. They will be led by subject-matter experts, providing valuable insights into key topics. There will also be time for the audience to put their questions to the presenter panel.

'Forum Workshops' meanwhile are led by a discussion facilitator, and are interactive sessions where the participants are encouraged to bring their own challenges, experiences and issues to the table. Participants will be expected to have some knowledge and experience in the topic, so that they can contribute to the discussions.

GOVERNMENT AUTHORITIES GLOBAL VILLAGE

A dedicated space for representatives of national critical communications projects from around the world to come together to discuss ideas, challenges and best practice.

Fostering a spirit of collaboration across international borders, it facilitates knowledge sharing and benchmarking, while at the same time, enabling organisations to share the great work that they are undertaking. This year in Helsinki we are once again looking forward to welcoming government agencies from around the world. These include:

Australia: NSWTA | Belgium: Astrid | Canada: PIA | Denmark: CFB | Estonia: RIKS | Finland: Erillisverkot | France: RRF | Germany: BDBOS | Hungary: Pro-M | Iceland: Neyðarlínan | Netherlands: NOOVA | North Macedonia: MoI | Norway: DSB | Saudi Arabia: CITC | South Korea: Safe-Net | Spain: SIRDEE | Sweden: MSB | United Arab Emirates: Ministry for Foreign Affairs and International Cooperation | UK: ESN | USA: FirstNet and NIST PSCR

INTERNATIONAL CRITICAL COMMUNICATIONS AWARDS

Taking place on Tuesday 23rd May 2023 at the Scandic Park Hotel in the heart of Helsinki, the ICCAs, are the most prestigious awards in critical communications. Celebrating excellence in the sector, the highly anticipated programme recognises the success of products, organisations and individuals that have pushed boundaries and capabilities within the field.

An expert panel of independent judges will take all aspects of entries into consideration in their quest to reward the best and most innovative work, both in terms of the technology itself, and how it is being rolled out and used on the frontline.

The individuals behind these innovations are what fuels the sector, and the ICCAs also acknowledge the most influential personalities. 'Individual' categories this year include TCCA Young Engineer of the Year, and the Phil Kidner Outstanding Contribution to Critical Communications award, named in honour of the late TCCA CEO.

SPEAKER HIGHLIGHTS

LARS NIELSEN *CEO, GLOBAL CERTIFICATION FORUM (GCF)*

Lars Nielsen has been CEO and General Manager of GCF since 2013. He is responsible for expanding the global reach of the certification scheme, and its diversification into vertical industries. He has participated in GCF's work since it was founded in 1999.

HOW MISSION CRITICAL DEVICE CERTIFICATION IS BECOMING A REALITY
12:30-13:00, TUESDAY 23RD MAY, THEATRE B

CAMILLA ASP *DEPUTY DIRECTOR GENERAL, SWEDISH CIVIL CONTINGENCIES AGENCY (MSB)*

Camilla was appointed Swedish Civil Contingencies Agency Deputy Director General in 2021. Before beginning in this role, she served as the Head of the Department for crisis preparedness and civil defence at MSB, and was part of the agency's management team.

TOTAL DEFENCE - DOCTRINE TO SECURE SOCIETY
12:30-13:15, TUESDAY 23RD MAY, THEATRE A

KEN REHBEHN *PRINCIPAL ANALYST, CRITCOMMS INSIGHTS*

Over the past two decades, Ken has analysed the progress of 3GPP mobile technologies from GSM to 5G. In addition to his industry contributions as an analyst, he continues to serve as a firefighter and emergency medical technician in the Washington, DC area.

KEYNOTE ADDRESS: THE STATE OF CRITICAL COMMUNICATIONS TODAY AND THE PATHWAY TO THE FUTURE
10:15-10:45, WEDNESDAY 24TH MAY, THEATRE A

MANUEL RUIZ *GLOBAL HEAD OF MISSION CRITICAL NETWORKS, ERICSSON*

Manuel is global head of the Ericsson unit with responsibility for governments and highly regulated industries such as utilities and rail. He has more than 20 years of international experience in sales, business development and general management, in both start-ups and large multinationals.

GLOBAL EXPERIENCES AND INSIGHTS IN REALISING MISSION CRITICAL BROADBAND
11:15-11:45, WEDNESDAY 24TH MAY, THEATRE D

BILLY BOB BROWN *EXECUTIVE ASSISTANT DIRECTOR FOR EMERGENCY COMMUNICATIONS, CYBERSECURITY AND INFRASTRUCTURE SECURITY AGENCY*

Billy Bob Brown, Jr, serves as the Executive Assistant Director for Emergency Communications within the Cybersecurity and Infrastructure Security Agency (CISA). He is one of three CISA designated 'executive sponsors', as identified in the Cybersecurity and Infrastructure Security Act of 2018.

KEYNOTE ADDRESS: CYBERTHREATS: HOW TO IDENTIFY AND MANAGE RISKS
10:00-10:30, THURSDAY 25TH MAY, THEATRE A

CHRISTINE BEJERASCO *CHIEF INFORMATION SECURITY OFFICER, WITHSECURE*

Christine is Chief Information Security Officer at WithSecure, having previously held the title of CTO. She has spent two decades in the cyber security industry and is a highly respected personality within the field. She speaks regularly at peer-to-peer and business events.

NETWORK SECURITY: CHALLENGES, SOLUTIONS AND WAYS OF LEARNING AND SHARING EXPERIENCE
13:30-14:15, THURSDAY 25TH MAY, THEATRE C

FOCUS FORUM AGENDAS

23RD-25TH MAY 2023

Focus Forums are in-depth sessions that provide knowledge sharing and comprehensive updates in specific topic areas. **Focus Forum Expert** – Technical, deep-dive sessions on the selected topics below. They will consist of a number of subject-matter experts providing insights into each area, and there will be time for the audience to put their questions to the presenter panel. **Forum Workshop** – Led by a discussion facilitator, these are interactive sessions where the participants are positively encouraged to bring their own challenges, experiences and issues to the table. Participants will be expected to have some knowledge and experience in the topic, so that they can contribute to the discussions.

DAY 1 - 23RD MAY

13:00-14:00 - Room 1
FOCUS FORUM EXPERT: SECURITY AND CYBERSECURITY
Chair: TREVOR EVANS, Chair, Security and Fraud Prevention Group (SFPG), TCCA

As communications technology evolves, so does the urgent need to detect potential threats and protect the information being transmitted.

This Focus Forum will consist of high-level discussion around the latest developments in security in TETRA and 3GPP technologies.

Participants of this session will have the opportunity to directly interact with the respective subject matter experts in these important areas.

Speakers: TREVOR EVANS, Chair, Security and Fraud Prevention Group (SFPG), TCCA; MIKA LAITINEN, Security and Cryptography Architect, Airbus; BRIAN MURGATROYD, Chair, ETSI TC TCCE

14:30-17:00 -Room 1
FOCUS FORUM EXPERT: TETRA: SECURING THE NEXT DECADE AND BEYOND
Chair: FRANCESCO PASQUALI, Chair, TETRA Industry Group, TCCA

TETRA will continue to be the optimal technology for secure mission critical voice and narrowband data communications.

The recent significant innovations, introduced by ETSI in close cooperation with TCCA TETRA Industry Group, will allow TETRA to maintain its outstanding and unrivalled level of security throughout the next decade and beyond - ensuring strong protection in a continuously evolving and challenging environment, where new cyber threats are due not only to isolated cybercrime actors, but also organised hostile countries, through complex and more powerful technological means (e.g. quantum computers).

Moreover, thanks to its capabilities specifically tailored for critical comms users, and its evolution with the addition of complementary broadband technologies, TETRA will deliver key components of the hybrid multi-technology model of choice for future mission critical communications.

Speakers: TIM CLARK, Strategy Director, Motorola Solutions; ANGELO BENVENUTO, Head of Solution and Product Marketing, Leonardo Cyber Security Division; TAPIO SAVUNEN, Director, Strategic Marketing, Airbus Defence and Space; PETER HUDSON, Chief Technology Officer, Sepura; HANNU ARONSSON, Chair, TCCA Applications Working Group, TCCA; HAUKE HOLM, Vice President, Solutions, DAMM Cellular Systems

15:30-17:00 - Room 2
FOCUS FORUM WORKSHOP: INTERWORKING MCX BROADBAND WITH NARROWBAND (TETRA, P25, GSM-R) SYSTEMS
Chair: HARALD LUDWIG, Chair, Technical Forum, TCCA

This Focus Forum Workshop will build on the work carried out last year in the CCW2022 Interworking Focus Forum.

We will review together the activities and achievements of the last year and identify the open issues and challenges ahead to implement standards-based IWF (interworking) solutions to support migration to broadband networks.

Participants in this focus forum will be encouraged to engage in the discussions and actively contribute to the outcomes of the forum.

DAY 2 - 24TH MAY

11:30-13:00 - Room 2
FOCUS FORUM WORKSHOP: SETTING UP A TESTING AND CERTIFICATION REGIME
Chair: HARALD LUDWIG, Chair, Technical Forum, TCCA

In this Focus Forum Workshop, a number of experts, together with participants will work out how a user organisation or an operator can set up a testing and certification regime for its broadband MXC devices and equipment.

What should be tested? What can be tested? What is missing from testing and certification programmes so far? Who needs to be involved and how?

Participants in this Focus Forum will be encouraged to engage in the discussions and actively contribute to the outcome of the forum.

Speakers: HARALD LUDWIG, Chair, Technical Forum, TCCA

11:30-13:30 - Room 1
FOCUS FORUM EXPERT: TECHNICAL CHALLENGES FOR MISSION CRITICAL BROADBAND NETWORKS
Chairs: MARC BALLIET, Chair, Broadband Industry Group, TCCA; TERO PESONEN, Chair, Critical Communications Broadband Group, TCCA

During this session attendees will learn about:

Massive mission critical video: what do we mean by massive mission critical video? What are some of the typical use cases? What challenges does it introduce and how do we expect to overcome them?

Mission critical applications: It is essential that these broadband data applications achieve the MC Quality of Service (QoS) – priority, pre-emption, availability, security and resilience – that first responders demand. Successful deployment and management of true MC applications is a complex task. This presentation will describe the work of TCCA 'Mission Critical Applications' taskforce, including:

- Engagement with app developers
- Engagement with ecosystem suppliers
- Member knowledge-sharing

NTN for mission critical networks: what is NTN? What are the use cases? What are the performances, the challenges, the timeline?

Participants of this session will have the opportunity to directly interact with the respective subject matter experts in these three areas, in which they are conducting TCCA Task Forces.

Speakers: JASON JOHUR, TCCA Board Member & Vice Chair, Broadband Industry Group, TCCA; TIM CLARK, Strategy Director, Motorola Solutions; SANNE STIJVE, Global Business Development Director, Mission Critical Networks, Ericsson; GIAMPAOLO PANARIELLO, Chief Technology Officer, Nokia; NOEL KIRKALDY, Head of Technology, Middle East and Africa, Nokia; RENAUD MELLIES, Head of International Cooperation, Standardisation and Innovation, RRF Programme, French Ministry of Interior

14:00-15:30 - Room 2
FOCUS FORUM WORKSHOP: ENABLING CRITICAL BROADBAND: ADDRESSING THE CHALLENGES
Chairs: TERO PESONEN, Chair, Critical Communications Broadband Group, TCCA; LUZ FERNANDEZ DEL ROSAL, Vice-Chair, Critical Communications Broadband Group, TCCA

This Focus Forum is designed for joint brainstorming to address the challenges in enabling critical broadband. The three key elements of critical broadband transition: technology, environment and users will form the framework for discussion.

This session will be relevant for end-users, critical communications/public safety operators, regulators, mobile network operators, governance responsibles as well as for industry to form comprehensive views and outcomes.

Participants in this Focus Forum will be encouraged to engage in the discussions and actively contribute to the outcome of the forum, so please join to share your experience, challenge and to ask your questions.

DAY 3 - 25TH MAY

11:30-13:00 - Room 2
FOCUS FORUM WORKSHOP: TETRA DATA AND APPS: HOW TETRA SOLVES MANY MISSION CRITICAL DATA NEEDS
Chair: HANNU ARONSSON, Chair, TETRA Apps Working Group, TCCA

TETRA data capabilities are often under-utilised. This Focus Forum will demonstrate a wide variety of available TETRA data and application use cases, from public safety to transport and industrial automation.

See how others in your industry use TETRA data. Learn and discuss with top TETRA data experts how you can benefit from TETRA as a mission critical data network.

Participants in this Focus Forum will be encouraged to engage in the discussions and actively contribute to the outcome of the forum.

Speakers: HANNU ARONSSON, Chair, TCCA Applications Working Group, TCCA; KIMMO JÄÄSKELÄINEN, Product Manager, Airbus Defence and Space; PHIL WOODLEY, Head of Products, TETRA Devices, Sepura; MARCO JACOBS, CTO, Piciorgros

SESSIONS ARE FREE TO ATTEND BUT SPACES ARE LIMITED, YOU MUST BE REGISTERED AS A VISITOR TO ATTEND. YOU CAN BOOK YOUR PLACE TO ATTEND BY REGISTERING FOR THE EVENT: WWW.CRITICAL-COMMUNICATIONS-WORLD.COM/FOCUS-FORUMS.

REGISTER NOW

CONFERENCE TIMETABLE

23rd May 2023

08:30-10:00
REGISTRATION

10:00
EXHIBITION OPENING

10:30
CONFERENCE OPENING CEREMONY, THEATRE A

Theatre A
International Cooperation

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

11:30-12:00
KEYNOTE ADDRESS FROM THE FINNISH MINISTRY

12:00-12:30
KEYNOTE ADDRESS 2: SUCCESS IN COOPERATION
Timo Lehtimaki, Erillisverkot

12:30-13:15
PANEL DISCUSSION: TOTAL DEFENCE - DOCTRINE TO SECURE THE SOCIETY
Chair: Ronny Harpe, Swedish Civil Contingencies Agency (MSB)
Camilla Asp, Swedish Civil Contingencies Agency (MSB)

13:15-14:00
NEXT GENERATION EMERGENCY COMMUNICATION: DESIGNING A SHARED VISION FOR THE FUTURE THROUGH USER INVOLVEMENT
Chair: Anna Oline Tronstad, Norwegian Directorate for Civil Protection (DSB)
Eline Paxal, Norwegian Directorate for Civil Protection (DSB)
Jonathan Romm, Halogen

14:00-14:45
PANEL DISCUSSION: THE DECADE OF MANAGED TRANSITION: SUCCESS CRITERIA AND PITFALLS
Chair: Luz Fernandez del Rosal
Simon Parr, ESMCP, UK Home Office
Brad Morell, First Responder Network Authority
Scott Agnew, AT&T
Guillaume Lambert, French Ministry of Interior
Deputy Chief Anthony Odoardi, PSBN Innovation Alliance
Ronny Harpe, Swedish Civil Contingencies Agency (MSB)

15:00-15:30
NOOVA: THE STEPS FROM PLAN TO REALITY
Herman van Sprakelaar, Netherlands Police

15:45-17:30
GAGV: CRITICAL BROADBAND DEVELOPMENTS FROM AROUND THE WORLD - PART 1
Chair: Ken Rehbehn, CritComms Insights
Brad Morell, FirstNet, USA
Thomas Scholle, BDBOS, Germany
CFB, Denmark
NSWTA, Australia
Iceland
DSB, Norway
Guillaume Lambert, French Ministry of Interior, France
Saudi Arabia
Discussion

Theatre B
Cooperation Between Network Providers, Industry and End Users

12:30-13:00
HOW MISSION CRITICAL DEVICE CERTIFICATION IS BECOMING A REALITY
Harald Ludwig, Technical Forum, TCCA
Lars Nielsen, Global Certification Forum

13:00-13:15
STANDARDISATION OF 5G: HOW TO MOVE FORWARD
Adrian Scrase, ETSI

13:15-14:00
WHAT DOES IT TAKE TO GET MCX CRITICAL?
Harald Ludwig, Chair, Technical Forum, TCCA
Adrian Scrase, ETSI
Lars Nielsen, Global Certification Forum
Fidel Liberal, University of the Basque Country
Renaud Mellies, French Ministry of Interior RRF Programme

14:00-14:30
CYBERSECURITY FOR CRITICAL COMMUNICATIONS
Filippo Gaggioli, Nokia

14:45-15:00
PWC SPONSORED SESSION
NAVIGATING THE CHASM: ACCELERATION TOWARDS NEXT-GEN MISSION CRITICAL SERVICES?
Rajat Chowdhary, PwC Middle East

15:00-15:30
WORKING COOPERATIVELY WITH END USERS TO BUILD AN OPERATIONAL PSBN?
Deputy Chief Anthony Odoardi, PSBN Innovation Alliance

15:30-16:15
PANEL DISCUSSION: IN THE COMMON VIRVE 2 BOAT
Moderator: Jarmo Vinkvist, Erillisverkot
Ari Toivonen, Erillisverkot
Petteri Viitanen, Ericsson
Kalevi Westerlund, Elisa
Marko Nieminen, ERC Agency
Timo Vihervaara, Police Board of Finland

16:30-17:00
CCF SPONSORED SESSION
THE 5 MANDATORY LAYERS OF CYBERSECURITY
SPEAKERS TO BE CONFIRMED

Theatre C
Cooperation Between Different Sectors

12:30-13:15
PANEL DISCUSSION: THE USE OF LMR/ PMR OR BROADBAND AT MAJOR EVENTS AND INCIDENTS
Chair: Peter Clemons, ENENSYS Technologies
Matilde Brown Megard, Norwegian Directorate for Civil Protection (DSB)
Ryan Burchnell, AT&T
Jari Wilen, Central Finland Rescue Association
Lt Col Dr Hamad Khalifa Al Nueimi, Abu Dhabi Police
Ed Parkinson, RapidSOS

13:15-13:45
HOW MANY DEVICES DO YOU NEED?: COLLABORATION, CONVERGE, DMO
Ricardo Gonzalez, Motorola Solutions

14:00-14:45
PANEL DISCUSSION: POWER RESILIENCE AND ENERGY SUSTAINABILITY
Chair: Adrian Grilli, EUTC
Brian Lohdahl, Danish Police
Tomi Lounema, Erillisverkot
Tony Wakefeld, Wray Castle
Juergen Tusch, Dr Tusch Consulting
John Winterbourne, Ballard Europe

14:45-15:15
ENHANCING POWER GRID OPERATIONAL RELIABILITY BY TETRA IN CLP POWER
Terrance Lai, CLP Power

15:30-16:00
BROADWAY: THE NEXT-GENERATION SOLUTION FOR SEAMLESS CRITICAL COMMUNICATION ACROSS EUROPEAN PUBLIC SAFETY ORGANISATIONS
David Lund, Public Safety Communication Europe (PSCE) Forum
Eric Davalo, Airbus

16:00-16:45
THE OPPORTUNITIES FOR GOVERNMENT & INDUSTRY IN PMR TO LTE MIGRATION AND HYBRID NETWORKS, BASED ON REAL-WORLD EXPERIENCES OF MCPTT AND IWF DEPLOYMENTS THE US AND AUSTRALIA
David Deacon, CEO, Etherstack plc
Jeremy Zollo, FirstNet
Matthieu Guyot, Samsung
James Pickens, NSWTA

Theatre D
Cooperation For Innovation

12:45-13:15
TETRA: SECURING THE NEXT DECADE AND BEYOND
Francesco Pasquali, Tetra Industry Group, TCCA

13:15-14:00
AN UPDATE ON FUTURE TECHNOLOGIES
Robin Davis, Future Technologies Group, TCCA
Iain Ivory, Future Technologies Group, TCCA
LJ Rich, Presenter
Antti Kauppinen, Erillisverkot
Chris Lucas, British APCO
Jolly Wong, Shanghai University
Henning Fiellet, National Police Directorate

14:00-14:30
JAMMING DETECTION USING 4G/5G NETWORK
Nicklas Spångberg, Ericsson

14:45-15:30
CCF SPONSORED SESSION
TRANSITION: TECHNOLOGY, CULTURE, OPERATIONS – GET IT 3X RIGHT
SPEAKERS TO BE CONFIRMED

BEST PRACTICE IN OPTIMISING AND OPERATING A CRITICAL NETWORK
SPEAKERS TO BE CONFIRMED

15:30-16:45
PANEL DISCUSSION: INTEGRATING SATELLITE CONNECTIVITY INTO PUBLIC SAFETY NETWORKS AND FIRST RESPONDER COMMUNICATION
Chair: Barbara Held, Behoerden Spiegel
Zoltán Wirth, Airbus
Marko Höyhtyä, VTT Technical Research Centre of Finland
Frank Christophori, German Federal Office for Information Security (BSI)
Jens Specht, Inmarsat
Antti Kaupinnen, Erillisverkot

16:45-17:30
PANEL DISCUSSION: HELP FROM THE STARS: NON TERRESTRIAL COMMUNICATION
Chair: Antti Kauppinen, Erillisverkot
Iain Pope, GRC
Sethu Saveda Suvanam, ReOrbit
Charlie Clark, Account Director, OneWeb

CONFERENCE TIMETABLE

24th May 2023

Theatre A
International Cooperation

09:45-10:15
WELCOME TO DAY TWO
DOES TRANSFORMATION ACTUALLY HAPPEN?
Nina Myren, TCCA

10:15-10:45
KEYNOTE ADDRESS 1:
THE STATE OF CRITICAL COMMUNICATIONS TODAY AND THE PATHWAY TO THE FUTURE
Ken Rehbehn, CritComms Insights

10:45-11:15
KEYNOTE ADDRESS 2:
INNOVATIONS IN CRITICAL COMMUNICATIONS
Hannu Kauppinen, Nokia Technologies

11:15-12:00
PANEL DISCUSSION: MULTINATIONAL HYBRID OPERATIONS - USING TETRA AND BROADBAND CROSS-BORDERS IN THE NORDICS
Chair: Nina Myren, TCCA & Norwegian Directorate for Civil Protection (DSB)
Introduction: Jessica Penther Ryttberg, Swedish Civil Contingencies Agency (MSB)
Jarmo Vinkvist, Erillisverkot
Ronny Harpe, Swedish Civil Contingencies Agency (MSB)
Eline Paxal, TCCA & Norwegian Directorate for Civil Protection (DSB)
Lene Gisselo Maaloe, Danish Centre for Emergency Communication (CFB)
Magnus Hauksson, Neydarlinan, Iceland

12:00-12:30
EU LEVEL FUNDING FOR CRITICAL COMMUNICATIONS: PRIORITIES FOR DIGITAL INNOVATION
Hanna-Minna Sihvonen, Minister of Interior of Finland

12:45-13:15
FLOODS, FIRES AND STORMS: CRITICAL COMMUNICATIONS IN AUSTRALIA
Kylie De Courteney, NSW Telco Authority

13:15-13:45
SURF LIFE SAVING NEW ZEALAND (SLSNZ) PROJECT
Chris Stevens, CartGIS

14:15-15:00
PANEL DISCUSSION: WHAT IS THE FUTURE ROLE OF GOVERNMENT OPERATORS?
John Black, ESMCP, UK Home Office
Deputy Chief Anthony Odoardi, PSBN Innovation Alliance
Christophe Gregoire, Technical Director, ASTRID
Joe Wassell, First Responder Network Authority
Michael Ruehlmann, BDBOS

15:00-15:30
TETRA TO BROADBAND EVOLUTION VIA HYBRID MODEL AND COMMERCIAL NETWORK: APPROACH, EXPERIENCES AND CHALLENGES OF BUENOS AIRES GOVERNMENT AND TELECOM ARGENTINA
Ramón Gustavo D´Elia, GCBA
Fabio Providente, Leonardo

15:45-17:30
GAGV: CRITICAL BROADBAND DEVELOPMENTS FROM AROUND THE WORLD - PART 2
Erillisverkot, Finland
UAE
Netherlands
Hungary
North Macedonia
Jo Dewaele, ASTRID, Belgium
Sweden
Canada
Discussion

Theatre B
Cooperation Between Network Providers, Industry and End Users

11:30-12:00
HOW MISSION-CRITICAL USERS CAN BENEFIT FROM SYNERGIES WITH TELCOS?
Primoz Kučič, Telekom Slovenije

12:30-13:15
THE BIG DEBATE: WHO OWNS YOUR NETWORK AND DO YOU TRUST THEM? PRIVATE VS PUBLIC – WHAT DOES THAT MEAN IN AN MC-X WORLD?
Chair: Mladen Vratonjic, TCCA
Robin Davis, TCCA
Tero Pesonen, TCCA
Peter Prater, Hexagon
Iain Ivory, TCCA
Kevin Graham, TCCA

13:30-14:15
PANEL DISCUSSION: PUBLIC MOBILE NETWORK OPERATOR "NETWORK-IN-NETWORK" APPROACH FOR MISSION CRITICAL COMMUNICATION
Raphael Aebersold, Swisscom
Hélio Simeão, Swisscom

14:30-15:00
A WAY TO RAISE THE USERS' OPERATIONAL EFFICIENCY AND PRODUCTIVITY
Lene Gisselo Maaloe, Danish Centre for Emergency Communication (CFB)

15:15-16:15
PANEL DISCUSSION: MARITIME CRITICAL COMMUNICATIONS
Chair: Barabara Held, Behoerden Spiegel
Øyvind Skjervik, Tampnet AS
Dong-Chan Kim, Safe-Net
James Thomas, JET Connectivity
Christian Heinrich, Atos
Chris Stevens, CartGIS

16:30-17:15
PANEL DISCUSSION: COMMERCIAL MOBILE NETWORKS – HOW CAN EVERYBODY WORK BETTER TOGETHER TO DELIVER SERVICES THAT ARE NECESSARY?
Raphael Aebersold, Swisscom
Hélio Simeão, Ubiwhere
Øyvind Skjervik, Tampnet AS
Marja van der Kruk, Airbus

Theatre C
Cooperation Between Different Sectors

11:30-12:00
ACHIEVING RESILIENCE FOR CRITICAL COMMUNICATIONS IN A BROADBAND WORLD
Adrian Grilli, EUTC

12:00-12:45
PANEL DISCUSSION: THE CHALLENGES OF SPECTRUM FOR UTILITIES, TRANSPORT AND OTHER VERTICALS
Adrian Grilli, EUTC
Marta Fontecha, Teltronic
Terrance Lai, CLP Power
Alan Seery, Aqura Technologies

13:00-13:30
SPONSORED SESSION BY IBWAVE
NETWORK DESIGN CONSIDERATIONS TO SUPPORT THE EVOLUTION TO LTE/5G
Jalal Berrahou, iBwave Solutions

13:30 - 14:00
THE USE OF COMMERCIAL MOBILE NETWORKS FOR SIGNALLING AND TRAIN CONTROL ON THE OSLO METRO
John Ivar Kroken, Analysys Mason

14:00-14:30
DIGITALISING RAIL TRANSPORT: CURRENT STATE OF THE ART
Peteveikko Lyly, Finnish Transport Infrastructure Agency
Sonia Miguel Sauco, Teltronic

14:45-15:15
THE EXPERIENCE OF KAINUU RESCUE SERVICES WITH R&D PROJECTS: HOW TECHNOLOGIES HELP US PLAN AND ACT AGAINST INCIDENTS
Jaako Schroderus, Kainuu Rescue Department

15:15-16:00
CCF SPONSORED SESSION:
SENSING AND ALERTING – BOOSTERS OF EFFICIENCY
SPEAKERS TO BE CONFIRMED

HOW TO BUY A PRODUCT OR SERVICE IN THE BROADBAND ERA: PROCUREMENT RE-INVENTED
SPEAKERS TO BE CONFIRMED

16:15-16:45
HOW WAR IN UKRAINE HAS CHANGES THE CYBERSECURITY LANDSCAPE
Urmas Ruuto, NATO CDOCE
Raul Rikk, Milrem Robotics

17:00-17:30
DIGITAL TRANSFORMATION OF THE UTILITIES AND MINING INDUSTRIES: PRACTICAL USES OF IOT
Chair: Alfonso de la Cruz, Omdia
Julian Stafford, EUTC
Alan Seery, Aqura Technologies

Theatre D
Cooperation For Innovation

11:15-11:45
SPONSORED SESSION BY ERICSSON
GLOBAL EXPERIENCES AND INSIGHTS IN REALISING MISSION CRITICAL BROADBAND
Manuel Ruiz, Ericsson

11:50-12:20
FIRESIDE CHAT: DRIVERS AND PRIORITIES FOR INNOVATION IN CRITICAL COMMUNICATIONS
Chair: Tero Pesonen, TCCA
Chris Johnson, Nokia Enterprise

12:30-13:00
INNOVATIVE USE CASE STUDY FOR DISASTER PREVENTION BASED ON KOREA SAFE-NET
Kim Dong-Chan, Safe-Net

13:00-13:45
PANEL DISCUSSION: TECHNOLOGICAL CAPABILITIES WITH 6G: WHAT IS POSSIBLE AND WHAT WOULD END USERS WANT?
Chair: Pekka Rantala, Business Finland
Mikko Uusitalo, Nokia
Dereck Orr, National Institute for Standards and Technology (NIST), PSCR

14:00-15:30
SOLUTION SPOTLIGHT
Chair: Robin Davis, TCCA and Tony Gray

CLOUD VS ON-PREMISES: ADOPTION STRATEGIES AND CONSIDERATIONS FOR PUBLIC SAFETY ORGANISATIONS
Ranjit Pradhan & Karthik Sundaram, Motorola Solutions

AIR-TO-GROUND NETWORK COVERAGE
Aline Loiseau, Athonet France

THE DEVELOPMENT OF AI-ENABLED VIDEO-AS-A-SENSOR
Luke Alexander, Metricell

GIGABIT LOW-LATENCY SATELLITE SERVICE TO RESTORE CRITICAL COMMUNICATIONS
Diego Paldao, SES

HOW TO ENSURE A SUCCESSFUL MIGRATION
Elina Avela, Beaconsim

MISSION-CRITICAL IOT: IMPROVING EFFICIENCY AND PERSONAL SAFETY OF FIELD WORKERS
Juhani Annanpalo, Airbus

MAKING FACT-BASED DECISIONS THROUGH A PEOPLE FOCUS
Charles d'Aumale, ATOS

15:30-16:00
SPATIAL MAPPING AND AUGMENTED REALITY (AR): FUTURE OPPORTUNITIES FOR AUTHORITIES AND INDUSTRY USERS
Paivi Laakso-Kuivalainen & Anttoni Vesterinen, Immersal

16:30-16:45
SPECTRUM FOR CRITICAL COMMUNICATIONS
Noel Kirkaldy, Broadband Industry Group, TCCA

16:45-17:30
PANEL DISCUSSION: SPECTRUM FOR CRITICAL BROADBAND: WHAT ARE THE OPTIONS AND FUTURE TECHNOLOGY NEEDS?
Noel Kirkaldy, Broadband Industry Group, TCCA
Ryan Poltermann, Pacific Northwest National Laboratory

CONFERENCE TIMETABLE

25th May 2023

Theatre A
International Cooperation

09:15-09:30

WELCOME AND CCW 2024 HANDOVER

09:30-10:00

KEYNOTE ADDRESS 1: WHAT IS POSSIBLE WITH DEDICATED CRITICAL BROADBAND NETWORKS?

Scott Agnew, AT&T

10:00-10:30

KEYNOTE ADDRESS 2: CYBERTHREATS: HOW TO IDENTIFY AND MANAGE RISKS

Billy Bob Brown, Cybersecurity and Infrastructure Security Agency (CISA)

10:30-11:00

PANEL DISCUSSION: IS SUCCESS BEING PREVENTED BY REGULATION?

Chair: Nina Myren, TCCA & Norwegian Directorate for Civil Protection (DSB)
Martin Erhardt, BDBOS
Johan Levin, Swedish Civil Contingencies Agency (MSB)
Lasantha De Alwis, ESMCP, UK Home Office

11:00-12:00

GAGV: CRITICAL BROADBAND DEVELOPMENTS FROM AROUND THE WORLD - PART 2

Dong-Chan Kim, SafeNet, Republic of Korea
Spain
John Black, ESMCP, UK
Hungary
Discussion

12:30-15:30

ERILLISVERKOT CUSTOMER AND TECHNOLOGY DAY

Theatre B
Cooperation Between Network Providers, Industry and End Users

11:15-11:45

ENHANCING TACTICAL COMMUNICATIONS THROUGH INTEROPERABILITY: UPDATE FROM THE UNITED STATES

Robert Dew, Department of Homeland Security and Infrastructure Security Agency (CISA)
Walt Magnussen, TAMU Internet2 Technology Evaluation Center

11:45-12:30

PANEL DISCUSSION: MISSION CRITICAL BROADBAND DEVICE REQUIREMENTS: WHAT DO THE USERS ACTUALLY NEED?

Chair: Tuomo Ylonen, Erillisverkot
Anders Berghall, Bittium
Ricardo Gonzalez, Motorola Solutions
Bernd Vieugels, Federal Police, Belgium
Ellen Ryan, National Institute for Standards and Technology (NIST), PSCR
Ronny Harpe, Swedish Civil Contingencies Agency (MSB)
Frederik Ryberg, Swedish Police

13:00-13:45

PANEL DISCUSSION: WORKING COLLABORATIVELY WITH END USERS TO DRIVE CRITICAL COMMUNICATIONS FORWARD

Chair: Iain Ivory, Hermitage Comms
Bidar Homsey, Frequentis
Tim Clark, Motorola
Pierre Fortier, Capgemini
Bernd Vieugels, Federal Police, Belgium
Chris Stevens, CartGIS

14:00-14:45

PANEL DISCUSSION: HOW CAN IOT IMPROVE EFFICIENCY AND SAFETY OF OPERATIONS IN THE FIELD?

Chair: Alfonso de la Cruz, Omdia
Iain Ivory, Hermitage Comms
Ryan Poltermann, Pacific Northwest National Laboratory
Philippe Devos, Airbus
Ranjit Pradhan, Federal Police, Belgium
Chris Stevens, CartGIS

Theatre C
Cooperation Between Different Sectors

10:30-11:00

SPONSORED SESSION BY CRADLEPOINT

CRITICAL COMMUNICATIONS SERVICES OF FIRST RESPONDERS: LOOKING BACK TO LOOK FORWARD

Steven Winter, Cradlepoint

11:00-11:45

PANEL DISCUSSION: THE USE OF COMMUNICATION SERVICE PROVIDERS (CSPS) TO AID TRANSITION TO BROADBAND: EXPERIENCES AROUND EUROPE

Chair: Antonio Fernandez Merino, Ericsson
Cate Walton, ESMCP, UK

12:15-12:45

SITUATION AWARENESS IN FUTURE INCIDENT MANAGEMENT: MAPPING AND TECHNOLOGICAL SERVICES

Jakob Hammer Våbenø, Norwegian Communications Authority (Nkom)

12:45-13:15

SHAPING THE FUTURE OF OPERATIONAL COMMUNICATION WITHIN BELGIAN FIRE SERVICES: END USER DRIVEN DEPLOYMENT OF AN SAAS MCX BROADBAND PLATFORM

Sam Gyde, Fire Department, Ghent

12:15-12:45

PANEL DISCUSSION: NETWORK SECURITY: CHALLENGES, SOLUTIONS AND WAYS OF LEARNING AND SHARING EXPERIENCE

Chair: Mikko Karikytö, Ericsson
Oscar Blanco, Teltronic
Christine Bejerasco, WithSecure
Filippo Gaggioli, Nokia
Charles d'Aumale, Atos

Theatre D
Cooperation For Innovation

11:00-11:45

PANEL DISCUSSION: NEW WAYS OF USING DATA: WHERE WOULD WE LIKE TO BE IN 20 YEARS AND HOW DO WE GET THERE?

Chair: Phil Mason, Critical Communications Today
Peter Clemons, Global Head, Critical Communications, ENENSYS Technologies
Brianna Huettel, National Institute for Standards and Technology (NIST), PSCR
Brian Hobson, First Responder Network Authority

12:00-12:30

NETWORK INTELLIGENCE ENABLES AND CHALLENGES CYBERSECURITY IN TACTICAL BUBBLES: EXPERIENCES FROM THE FINNISH RESEARCH COOPERATION

Petri Puhakainen, VTT Technical Research Centre, Finland

12:30-13:00

WHAT TO EXPECT FROM 6G?

Mikko Uusitalo, Nokia Bell Labs

13:00-13:30

DREAM ANDOIDS NOT CALLING HOME? CRITICAL MOBILE SOLUTIONS ON COTS ANDROIDS

Sami Pienimäki, Jolla

13:45-14:15

MISSION CRITICAL IOT EVERYWHERE: UNIFIED 5G AND SATELLITE NETWORKS

Joel Scroeder, Intelsat

14:15-14:45

CHALLENGES WHEN ADOPTING AI TO SUPPORT SITUATIONAL AWARENESS IN EMERGENCY RESPONSE

Bart van Leeuwen, Netage B.V

SPONSORS AND HOST OPERATORS

MOTOROLA SOLUTIONS *PLATINUM SPONSOR* *STAND J20*

Motorola Solutions is a global leader in public safety and enterprise security. Our solutions in land mobile radio communications, video security & access control and command centre software, bolstered by managed & support services, create an integrated technology ecosystem to help make communities safer and businesses stay productive and secure. At Motorola Solutions, we're ushering in a new era in public safety and security. Learn more at www.motorolasolutions.com.

ERICSSON *GOLD SPONSOR* *STAND N40*

Ericsson is one of the leading providers of Information and Communication Technology (ICT) to service providers. We enable the full value of connectivity by creating game-changing technology and services that are easy to use, adopt, and scale, making our customers successful in a fully connected world.

LEONARDO *GOLD SPONSOR* *STAND L29*

Leonardo, a global high-technology company, is a leader in the international Aerospace, Defence and Security sector. With a significant industrial presence in Italy, the UK, Poland and the USA, Leonardo competes in international markets by leveraging its areas of leadership in Helicopters, Aircraft, Aerostructures, Electronics, Cyber & Security and Space.

SAVOX *SILVER SPONSOR* *STAND J70*

Savox Communications is a global provider of communication solutions for safety and security, defense and industrial markets. The core mission of the company has remained the same throughout the years: to save lives by providing the best communication solutions for professional working in demanding environments. Savox has built its expertise and knowledge around the requirements of these professionals working in harsh and hazardous environments, intrinsically safe products being of the specialties of the company. The products are development around the end user needs, always aiming for the innovative and end-user driven solution.

ERILLISVERKOT

CFB Center for Beredskabs-kommunikation

dsb Norwegian Directorate for Civil Protection

MSB Swedish Civil Contingencies Agency

RIKS

VIEW ALL 150+ EXHIBITORS

EXHIBITORS

TCCA Critical Communications World 2023

JOIN US AT THE SHOW

REGISTER FREE

WWW.CRITICAL-COMMUNICATIONS-WORLD.COM

Contacts

EVENT DIRECTOR - ANNA CAMPAGNOLI
anna.campagnoli@markallengroup.com

SALES AND PRODUCT MANAGER- JESSICA SZUTS-NARANJO
jessica.naranjo@markallengroup.com

SENIOR MARKETING MANAGER - PHIL GLOVER
phil.glover@markallengroup.com

Never miss an issue

Subscribe now to stay informed with:

- **News**
- **Features**
- **New Products**
- **Events**
- **Interviews**
- **Expert Opinion**

To apply for **free** regular copies of **LAND MOBILE** magazine

Please visit our registration website
registrations.markallengroup.com

3 WAYS to subscribe

Online: magsubscriptions.com
By phone: +44 (00) 1722 716997
By email: subscriptions@markallengroup.com

LAND MOBILE
WIRELESS COMMUNICATIONS FOR BUSINESS

CC NETWORK

THE NETWORK FOR LEADERS IN THE MISSION CRITICAL COMMUNICATIONS TECHNOLOGY INDUSTRY

The Crit Comms Network is a 365 hub for leaders to:

- **Share knowledge**
- **Demonstrate thought leadership**
- **Stay up to date with latest industry news**

Supported by the team behind Critical Communications Today and Critical Communications World, it provides a private, trusted space for global experts to exchange ideas all year round.

REGISTER TODAY

www.critcommsnetwork.com