

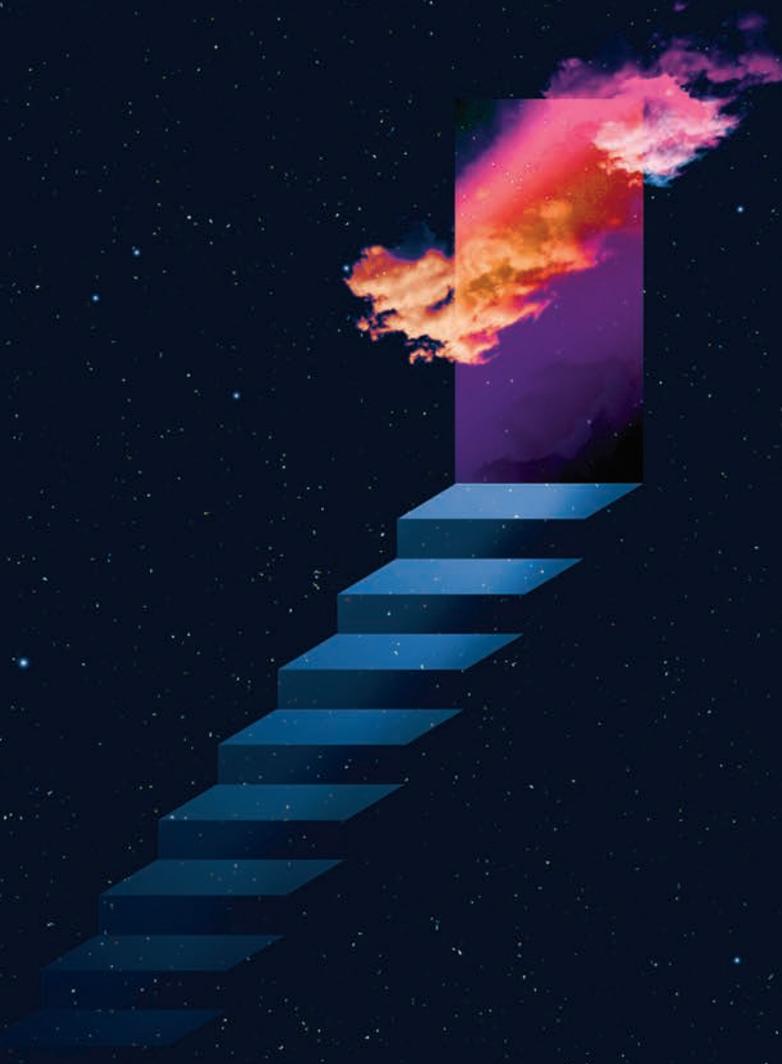
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contents

News & Comment

News 4
We need a new social contract 8
Public policies should be based on the facts of the human lifecycle, suggests Albert Weale

Emergency management

The moral compass.....12
Beverley Griffiths maps out an ethical emergency management framework

Hubris, hierarchy & humanity14
Emily Hough speaks to Lucy Easthope about emergency and disaster management

Talking preparedness.....18
After Covid are people risk fatigued or more risk aware? Amanda Coleman investigates

Legal facets20
Legal frameworks, tools and expertise in disaster risk management are underestimated and underutilised, says Olga Shashkina

Towards national resilience.....22
Raditya Jati describes the journey towards implementing Indonesia's concept of 'risk to resilience'

Climate technology24
Emily Hough speaks to Wake Smith about possible climate change solutions, however unpalatable they might be

Leadership

Leadership: What it takes28
Competencies are shifting from what to do to who you are, according to Eric McNulty

Human factors30
Andy Blackwell explains how empowering and motivating frontline responders benefits organisational performance, innovation and culture

The lost art of oration.....32
There's great power in being an outstanding orator, says Brad Borcan; and it's a vital communication skill for leaders

A university experience34
Anthropologist Melissa Schrift examines one university's leadership response to the Covid-19 pandemic

The importance of creativity..... 37
A creative element is helping the EPS as it reviews and revises its competence framework, writes Jeannie Barr

Public safety & security

The new battlefield of the brain38
Information warfare is an integral component of military strategy, explains Ekaterina Kostioukhina

Catapulting cows.....42
Chris Needham-Bennett presents an overview of psychological operations and commercial disinformation

From hope to reality.....46
Chris Singer examines the CBRN threat landscape and preparedness

The perils of 2G and 3G switch-off.....48
European roamers might not be able to call 911 on their cellphones in the USA, warn Freddie McBride and Rudolf van der Berg

Urban security50
Lina Kolesnikova examines the blame game after Liverpool fans were tear gassed, crushed in bottlenecks at turnstiles and assaulted at a football match in Paris

Crowded venues.....52
Christopher Kemp says a crisis can create the opportunity to rethink safety and security

Societal effects of disaster.....56
Cristina Pogorevici looks at far reaching ramifications of a nightclub fire in Bucharest on Romania's emergency response and the country's political atmosphere

Escalation of mass shootings 60
Violence in the US and elsewhere is at an all-time high, writes Jennifer Hesterman. What can we learn to prevent or mitigate it?

Conflict zones & crime62
Conflict offers opportunities for criminal networks, says Lina Kolesnikova, from smuggling to human trafficking

Violence, trafficking & abuse
Domestic violence in Ukraine64
The war in Ukraine could set us back 20 years, undoing progress made in tackling domestic violence, and exacerbating the issue even further, writes Valeriia Troshchilo

A deep and enduring disinterest..... 67
Disasters give a rare opportunity to theorise about causes of increased violence against women. Debra Parkinson elaborates

Covid-19 and trafficking.....70
Manika Kamthan examines how the pandemic and lockdown in India combined to create an environment ripe for exploitation, including trafficking and abuse

Climate & modern slavery.....72
The climate change and slavery connection has yet to make itself overtly obvious in Pakistan. But that doesn't make it any less lethal. Luavut Zahid investigates.

Breaking the silence.....76
Emily Hough speaks to Purna Sen about a call to address sexual aggression at – or in the name of – the United Nations

Space matters

Do look up 80
Gianluca Pescaroli provides an introduction to why we should all be aware of future hazards in outer space

The new iron curtain.....84
Johan Eriksson and Giampiero Giacomello examine natural risks and antagonistic threats in space

Health risks86
What do crisis planners and responders need to know about health risks in outer space, and why? Ilan Kelman and Myles Harris elucidate

Space capabilities.....88
No feature on space would be complete without the issue of space debris – and the consequences of not managing it responsibly. Henry Heren starts the discussions

Space is hard 90
Growing environmental and geopolitical complexities are arising from ever greater expansion into space, explains Ewan Haggarty

A tragedy of the commons.....92
Dead satellites in earth orbit accumulate as junk, increasing the risk of catastrophic collisions with active spacecraft or other debris. Kristen Lagadec looks at what we need to do

The risk to first responders94
The pace at which technology has advanced and the appetite for consumption mismatch industry progress to ensure the services are robust, writes Chloe Van Dop

Regulars

Events & diary dates96
Frontline.....98

comment

On p76 of this edition
I talk to Purna Sen, who appeared in a BBC documentary featuring whistle-blowers. She discusses the sexual



harassment of people working at the United Nations, and examples of sexual exploitation and other abuse of those who its agencies are tasked to help. At the core of such abuses lie strict hierarchies and power that cannot be challenged, as well as the malignant construct that the mistreated person is often somehow at fault.

On page 14, I speak to Lucy Easthope; one of the areas she talks about is the very real risk of responders causing further distress to those affected by a disaster, often through poorly thought out policies that fail to centre humans at the heart of planning. Easthope also highlights hierarchies and the difficulty of challenging power.

One example of unintended consequences in technology arises on p48, where our authors warn that the 2G/3G switch off could leave Europeans travelling to the USA unable to call 911 emergency services through their cell roaming provider.

On p24 I speak to Wake Smith about the range of possible, and rather concerning, technologies that could help mitigate the effects of climate warming on our planet. Smith is calling urgently for more research to avoid any unintended consequences of deploying potentially life-changing technology on a global scale – the 'least bad' options – without understanding what could go wrong.

Elsewhere (p80), authors outline our vulnerabilities to what is happening in outer space, warning of the consequences that space debris and shifting political alliances could have down here on Earth. Here, at least, governance consensus might be forming.

It is impossible to sum up the burning indignation that the CRJ team felt when reading some articles for the first time. Among those outlining violence against women in conflict or after disasters, abuse of power and exploitation, or the self interest and slow action surrounding global climate governance, there are many articles that offer hope. But they are in danger of being overwhelmed by those that highlight human malice, ineptitude or plain indifference.

Climate change p24



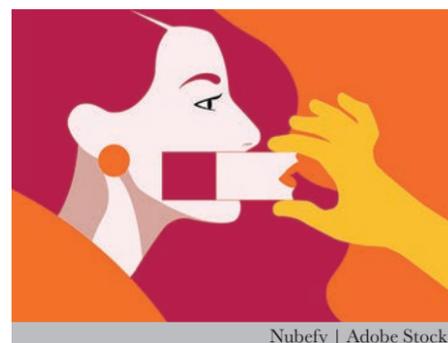
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Battle for our minds p38



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Breaking the silence p76



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Space feature p80



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The potential perils of 2G and 3G switch-off

Europeans travelling to the USA this year might not be able to speak to 911 emergency services through their cell service roaming provider – a dangerous situation that could cost lives, say **Freddie McBride** and **Rudolf van der Berg**

This year will see a return to near normal levels of travel. At some point, somebody using roaming services in the USA is going to need emergency assistance and they may not be able to call for it. Public safety cannot be a lottery with respect to the different capabilities of handsets and networks.

One of the authors recently travelled to the USA with a colleague. The author had a fully functioning voice service, while his colleague – with a different provider – could not access voice or SMS services.

The reason is simple: 2G and 3G mobile networks are being switched off and the 4G voice service, Voice over Long-Term Evolution (VoLTE), is being implemented in different ways on different networks. Compatibility and interoperability issues between networks and handsets are emerging, meaning that a voice service may not be guaranteed. Other underlying causes may include:

- Incorrect interpretation/implementation of technical standards for VoLTE;
- Varying degrees of capability of the chipsets installed in handsets;
- IPv4/IPv6 interoperability issues between networks and handsets; and
- Limitations of roaming agreements between mobile network operators (MNOs) internationally.

This article does not take a deep dive into the potential root causes of the issue. Nor does it blame any individual stakeholder or the industry as a whole. The aim is to understand how public safety risk is heightened, as well as how the risk can be mitigated in the short term and eventually resolved.

Travellers to any country that is closing down 2G/3G networks may experience similar problems. VoLTE services have been widely available for over ten years, but have run in parallel to legacy voice services over 2G and 3G networks. So even if you could not connect to a VoLTE service while roaming, you could always rely on a 2G/3G legacy voice service. The reason for shutting down 2G/3G is to reallocate their dedicated radio frequencies to new 4G/5G/6G services, which use the frequencies more efficiently to provide higher capacity services.

The rate of 2G/3G switch-off is much slower in Europe, owing to a number of critical services using

these networks. For example, utility smart metering and eCall, the emergency call system mandated in all new passenger vehicles since April 2018, rely on 2G/3G networks. Resolving these legacy issues will take time, so 2G/3G networks will prevail in Europe for some years.

The problem of people not having access to a voice service while using roaming services can be somewhat addressed by MNOs in Europe advising their customers of the issue, the risk and how to mitigate it.

Those travelling to any country that is advanced in switching off 2G/3G legacy services could be advised to purchase a separate device or SIM card or to select manually an alternative roaming partner that still offers a 2G/3G service. Resolving the underlying technical issues may take time and a shorter-term risk assessment and communications campaign is necessary in the interim.

The risk of not being able to call emergency services is a grave concern. In Europe, the slower rate of 2G/3G shutdown could be a silver lining in a dark and menacing cloud of public safety risk. It means that all involved stakeholders have time to put their heads together and take corrective action.

VoLTE services are widely available in Europe, but are not extensively used for emergency communications. When

someone makes a voice call to the pan-European emergency number, 112, the network will use available 2G/3G services to originate, transmit and terminate the call. This is referred to as circuit-switched fallback. Some of the reasons for this include: Availability of 2G/3G voice services on mobile networks offering wide

geographic and population coverage; the robustness of a tried and tested solution for voice services; and the possibility that some public networks, and the customer premises equipment installed in some public safety answering points (PSAPs), may still have active legacy components.

In 2021, the Dutch telecoms regulator recognised the risk of reliance on legacy 2G/3G services for emergency communications that were approaching end of life. It urged service providers in the Netherlands to become fully compliant, by the end of the year, with the national policy rule for emergency calls to 112 by providing access from 4G VoLTE and WiFi calling services. Subsequent stakeholder

discussions in the Netherlands led to the identification of the same compatibility and interoperability issues currently being experienced by European roamers in the USA – a clear warning sign.

It is worth considering that 2G/3G network specifications allow for a limited-service state (LSS) to be provided to a mobile device for the sole purpose of making an emergency call. When someone using a cellphone does not have access to their service provider's network or that of its roaming partners, an 'emergency calls only' message appears at the top of their screen. This also works in some countries when using a device without a SIM card – an invaluable safety net – and PSAPs in Europe receive multiple LSS calls every day.

As part of the analysis into the VoLTE compatibility and interoperability issue, stakeholders must ensure that LSS emergency calling will prevail after 2G/3G switch-off. With VoLTE, essentially an IP-based service that uses the Session Initiation Protocol (SIP), an added benefit for LSS calling would be the ability to provide the handset's location in the initial SIP message.

Decisive action required

In the short term, European policymakers, telecoms regulatory authorities, standardisation bodies, mobile network equipment vendors, MNOs, mobile virtual network operators (MVNOs), handset and handset OS providers, industry bodies and consumer organisations need to take decisive and immediate action so that citizens are made aware that they may not be able to access emergency services in the USA, and possibly other countries, while roaming. Every mobile service provider should assess the potential risk for its own customers who may be planning to travel to any country in which the provider has roaming partners. This will require discussions with roaming partners and handset providers. Based on this risk assessment, a communications campaign should inform customers of the risk and advise on steps that could be taken to mitigate it.

In the longer term, the compatibility and interoperability issues must be resolved, requiring a harmonised implementation of

the VoLTE service that is compatible and interoperable between all networks and handsets. This will involve a review of how VoLTE has been implemented on each network to ensure that it conforms with the relevant technical standards. All stakeholders need to collaborate. The European Telecommunications Standardisation Institute (ETSI) recently issued a call for expertise to extend the interoperability test specifications for VoLTE to include interworking test specifications for support of emergency services over VoLTE. This is a crucial step and the call for expertise is open to ETSI members and non-members.

Users of mobile services have been roaming seamlessly on mobile networks around the world; it is reasonable to expect that we will have access to a voice service. It is also a reasonable expectation that we can call for help when needed. Access to emergency services is a right enshrined in European legislation; those authorised to provide electronic communications networks and services are required to ensure this.

Access to emergency services can never be allowed to become an afterthought in the design of future electronic communications networks and services, although the current situation suggests that it has become so. However, there is still time to put things right before tragedy strikes.

The European Emergency Number Association (EENA) has been in contact with the main stakeholders to mobilise a collective effort to resolve these issues. EENA will be writing to the European Commission, the Federal Communications Commission in the USA, industry and consumer bodies and national telecommunications regulatory authorities in Europe to raise awareness and request that they play their part in resolving it.

Lives may depend on it.

CRJ

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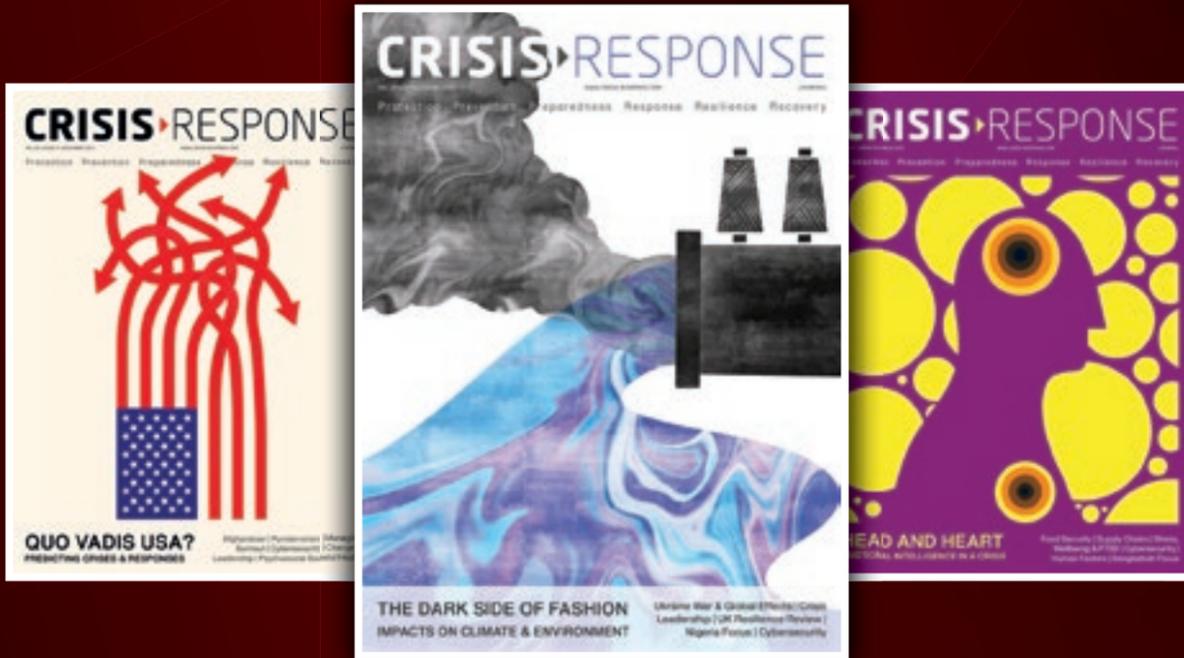


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