The satellite space race and underground networks that are taking connectivity to new levels

While mobile coverage has cast its net over most of the world, the hardest-to-reach places have remained stubbornly cut off. In the Americas, **22 per cent** of the rural population has no coverage. In Africa, the figure is **18 per cent**. In the UK, up to **four per cent** of the landmass has no good mobile signal at all.

To illustrate this digital divide, the UN's tech agency reports the share of internet users is twice as high in urban areas as in rural areas.

Fact file: latest global coverage | (Source: International Telecommunication Union)

40%	**89%**	**3G**	**39%**	**78%**
5G covers almost 40 per cent of world population	89 per cent of people in high-income countries covered by 5G	For many low-income countries, 3G is only way to get connected	4G only reaches 39 per cent of the population in low-income countries	Mobile phone ownership higher than internet use. 78 per cent of people own one

Critical comms have been restricted to legacy systems

For government agencies and private enterprises managing operatives in far-flung locations, the options for critical communications have historically been restricted to legacy radio systems, which are expensive to install, difficult to maintain and limited in range. As a result, the organisations have been denied the benefits that come with enhanced data capabilities, such as increased safety, reduced cost and improved productivity.

All this is changing, driven by new developments in satellite communications and surging demand for private networks, with positive implications for mobile workforces and their managers who are now able to take advantage of huge leaps in connectivity.

Satellites are delivering high-speed internet to users across the world

Starlink, the internet service of Elon Musk's rocket manufacturer SpaceX, is the world's first and largest satellite constellation using a low Earth orbit to deliver high-speed, low-latency internet to users across the world. It has frequent, low-cost launches, a network of 4,800 satellites and, according to the Wall Street Journal, more than one million subscribers.

The self-orientating antennae connect in minutes so long as they have a clear view of the sky. Customer stories show users from the Arctic and Alaska to Baha and Brazil.

Not to be outdone by his fellow billionaire, Amazon founder Jeff Bezos is planning to launch 3,200 rockets over the coming years to bring fast, affordable broadband to unserved and underserved communities across the planet. Project Kuiper plans to start serving customers by the end of 2024.

Then there is the Anglo-French Eutelsat OneWeb contender with its constellation of 600 satellites. Rival services are popping up in China, the EU, the US and Canada.

This rush to market will help voice, video and data communications to span the gap between distant locations regardless of terrestrial infrastructure limitations. Research firm Spherical Insights expects the $21bn satellite communications sector to expand to $52bn over the next decade, due to soaring demand for high-speed connectivity from industries including telecoms, government and defence, aerospace, maritime, media and entertainment and emergency response services.

Strong growth in number of private networks

Meanwhile, that same demand is also behind strong growth in the number of private cellular networks based on 4G LTE and increasingly 5G technologies. Private networks are exactly as their name suggests – only authorised users can connect to them. This gives private networks an edge on control, security and service, ideal for environments that handle sensitive data and require a constant connection for mission-critical operations.

GSA, the Global mobile Suppliers Association, estimates there are 1,279 organisations with private networks switched on in 2023, up from 1,081 in 2022. It reports that organisations of all types are combining these new connected systems with big data and analytics to transform operations, increase automation and efficiency or deliver new services. GSA states that wireless networking enables these transformations to take place even in the most dynamic, remote or highly secure environments.

Equip workforces with latest technologies

In a particularly eye-catching example, a leading gold producer partnered with telecoms specialists to design and deploy the world's deepest underground private LTE network in Canada. The subterranean network has improved safety and work experience for miners, enabled the tracking of plant and machinery and ushered in new remote operating capabilities to increase efficiency, productivity and environmental performance in the mining complex 3.2 kilometres under the ground.

In another example, one of the world's most automated container terminals is using a private LTE network to deliver data communications to automated guided vehicles, terminal trucks and tablets. The infrastructure replaced the unreliable, insecure and expensive WiFi network and is being used by 100 different clients at the European port.

The extension of connectivity to places that were previously off the chart bridges the digital divide and empowers government agencies and private enterprises to equip their workforces with the latest technologies while operating in hard-to-reach locations.

Push-to-talk over cellular is new frontier

Push-to-talk over cellular technologies represent this new frontier in critical communications. Mobile Tornado's push-to-talk platform has now been deployed in more than 30 countries worldwide with mobile network operators, government agencies and enterprises in Europe, the Middle East, Africa and the Americas.

Mobile Tornado has system availability of 99.999 per cent: its platform adapts according to local topology to underpin robust and reliable communications in challenging environments. Users download an app to their Android or Apple smartphone, register to start the service and begin communicating instantly with individuals, groups and dispatchers virtually anywhere the world. Alternatively, Mobile Tornado is available via a range of ruggedised devices for the most demanding environments.

Command, control and communicate instantly

Mobile Tornado's push-to-talk over cellular application enables more than private one-to-one calls. It also enables users to broadcast to larger groups of up to 5000 participants with a single push of a button, anywhere in the world. Users can also share written messages, images, videos and files. The application also comes with a range of add-on features, including lone worker, push-to-locate, workforce management and a world-class dispatch console.

The Mobile Tornado browser-based dispatch console is used by control rooms to command, control and communicate instantly with remote workers and groups. The console enables live location monitoring, historic location tracking and reporting via an interactive map. Managers create geo-fences and receive notifications and reports when mobile workers enter or leave an area.

In emergencies, users alert other users as well as their controllers via an SOS button to trigger assistance. Other benefits include time and attendance, guard patrol and incident reporting. Knowing where every mobile worker is located at any given time improves safety, response times and decision making. Emergency alerts, activity monitoring and impact detection provide an extra layer of protection for individual operatives. Being able to locate and manage mobile workers and communicate with them boosts efficiency and productivity.
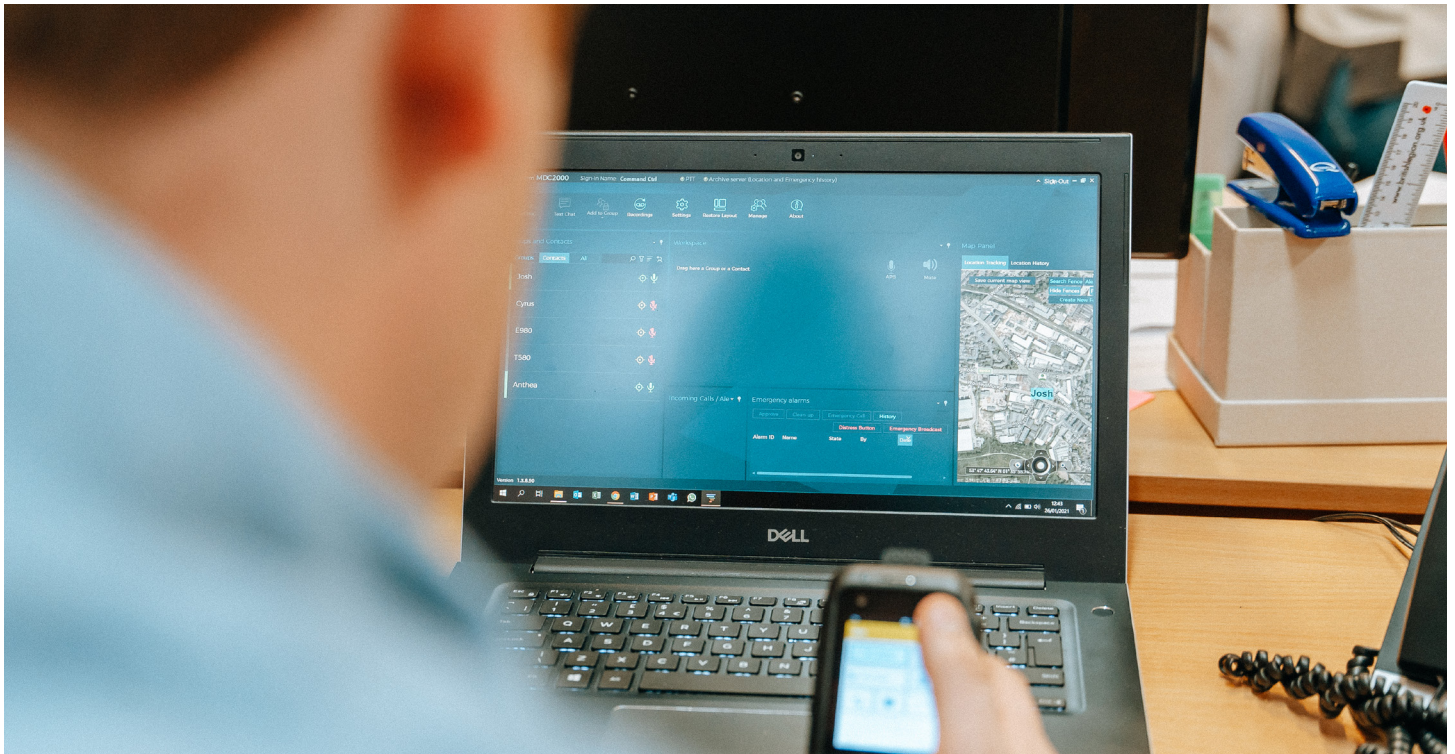
In summary, strong growth in satellite communications and private networks is bringing connectivity to the hardest-to-reach locations, meaning government agencies and private enterprises no longer need to rely on expensive legacy systems and can turn instead to push-to-talk over cellular for their critical communications.

Mobile Tornado

To find out more or to arrange a demo,
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