Enabling intelligent operations with Mission Critical Networks
Enabling intelligent operations with 4G and 5G

Communication service providers have a significant market opportunity to explore: helping public safety agencies and critical infrastructure industries to embrace and reap the full benefits of digitalization.

A wide variety of organizations are realizing that now is the time to begin modernizing their existing mobile communication networks, much of which is based on narrowband technologies. That includes first responders such as the police, firefighters, and ambulance and rescue services, along with utilities, and railway companies. Because for a public safety network or a critical infrastructure communications network to be trustworthy, its performance must be enhanced with critical capabilities. That way, instead of putting lives at risk, people’s safety can be achieved — and any key property at stake can be protected.

This represents a significant market opportunity for communication service providers. By leveraging existing network infrastructure that delivers regional or even nationwide critical connectivity, they can help public safety agencies and critical infrastructure industries to embrace and reap the full benefits of digitalization and innovative technologies such as AI. And in this way, a superior level of safety and protection can be enhanced for individuals and property through robust and efficient operations.

The adoption of standardized technology and ecosystems in the mission-critical communications networks domain is essential. This is because it facilitates communication interoperability, breaks organizational silos and allows key intelligence to be unlocked through a single, secure and resilient network used in all related operations, locations and activities.
The solution on offer

Ericsson Mission Critical Networks are deployed nationwide and across regions to enable public safety and government agencies, power utilities and rail companies to modernize their respective networks with future-proof investments.

Ericsson collaborates with service providers to empower public safety agencies and critical infrastructure industries through digital transformation. Our Mission Critical Networks and applications offering – which is built on leading 4G and 5G technology – enables the service provider to deliver secure, resilient and high-performance mobile broadband connectivity with a complete range of services.

Ericsson Mission Critical Networks are deployed nationwide and across regions to enable critical agencies to modernize their respective networks with future-proof investments. In this way, interoperability is achieved among agencies and beyond borders, and sensors, robots and drones can be used to save lives and enhance operational effectiveness.

Energy utilities benefit significantly from the speed, flexibility and reliability of our Mission Critical Networks, all of which enable them to cope with fundamental changes – both in terms of the generation and distribution of power, and new patterns of consumption.

Railway companies profit from the interoperability enabled with legacy networks and across multiple communication infrastructures. They achieve enhanced connectivity with a high level of reliability and availability with 5G, preparing them well for the Future Railway Mobile Communication System (FRMCS).
Benefits of a use case cluster approach

Cellular technology — especially 3GPP 4G and 5G — strengthens business and operational processes, empowering organizations in the public and private sector alike. This technology is also the key to enabling a wide range of vertical use cases, facilitating networking and connecting the entire value chain. As public safety and critical infrastructure industries embark on their digitalization journey, they tend to use cellular technology to enable simple use cases such as monitoring and tracking to begin with. They then progress to highly sophisticated use cases including real-time automation and remote operations.

Cellular technology enhances critical operations

Use cases can be grouped into the following clusters, inspiring a structured approach to their implementation and maximizing investment synergies for the service provider and network user alike:

- **Monitoring and tracking**: assets are covered extensively across a large area — often in real-time and in combination with next-generation navigation capabilities. For example, sensors are used for location tracking of train cabins and monitoring of an energy grid’s performance.

- **Hazard and maintenance sensing**: with sensors and algorithms, applications can provide alerts for mission critical activities to aid decision-making. For example, utility companies use drones and other unmanned aerial vehicles to provide visibility of their infrastructure to carry out inspections and damage assessments.

- **Smart surveillance**: large numbers of objects can be identified and analyzed in real time using cameras and sensors. For example, the police mobilize street video cameras and sensors for special operations.

- **Enhanced video services**: these accommodate today’s users’ content-consumption habits.

- **Augmented reality (AR)**: visual and audio aids enhance live real-world environments. For example, AR-assisted virtual dispatchers can provide comprehensive information to a first responder team leader on site to aid decision-making.

- **Connected vehicle**: applications provide continuous nationwide connectivity. For example, vehicles used in public safety operations are equipped with prioritized network connectivity.

- **Remote operations**: machinery and vehicles such as remote control locomotives are operated from other locations.

- **Real-time automation**: applications use data transferred from sensors in real time to trigger specific autonomous actions such as self-healing processes in the power distribution network.

- **Autonomous robotics**: machines perform tasks with very limited human intervention.

The benefits of a use case cluster approach: a more sizable opportunity than individual use cases

- Enables shared investments and resource allocation across a larger revenue pool
- Possible to prioritize opportunities depending on investment and timing
- Increase scalability across industries
The service provider’s competitive advantage

Service providers are well positioned to provide widespread mission critical mobile broadband services leveraging their existing network infrastructure and assets.

- Licensed spectrum can be used for nationwide or regional coverage.
- Service providers have network and service deployment, operations and lifecycle-management capabilities.
- They often have extensive coverage for roaming and mobility services.
- Service providers can leverage existing investment and help industries benefit from continuous 3GPP innovations and enhancements, progressing towards mission critical 5G.
- They can offer value-added services by bundling critical mobile broadband, IoT, cloud and applications.

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<th>Scale</th>
<th>Coverage</th>
<th>Evolution</th>
<th>Value added services</th>
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<tr>
<td>Existing assets</td>
<td>Extensive roaming and mobility services</td>
<td>Access to continuous 3GPP innovations and</td>
<td>Enrich existing offerings</td>
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<td>Operational reach and</td>
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<td>capabilities</td>
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<td>IoT, cloud and applications</td>
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Service providers are well positioned to provide widespread mission critical mobile broadband services leveraging their existing network infrastructure and assets.
Ericsson Mission Critical Networks offering

Our offering covers the entire Ericsson portfolio with enhanced features and capabilities to ensure mission-critical grade performance.

Built on our leading 4G and 5G technology, Ericsson’s cutting-edge Mission Critical Networks and related applications are designed to complement or replace existing national or regional Land Mobile Radio (LMR) networks, providing comprehensive voice, data and video services.

Our Mission-Critical Networks offering leverages the entire Ericsson portfolio, spanning areas such as radio, core networking infrastructure, network management, operational and business support systems, expert analytics, security and services. It includes enhanced features and capabilities to ensure mission-critical grade performance in the areas outlined in the figure below:

Securing essential network performance

Critical network capabilities

Network availability
High availability required to safeguard lives, property and business operations.

Multi-network operation
Delivering the required networking infrastructure and level of control, whilst optimizing overall investment cost.

Coverage and capacity
Extending network coverage and capacity for mission-critical users; beyond what is typically available for commercial users.

Security and hardening
Providing multi-layer security, and addressing operational and regulatory requirements.

QoS, priority and preemption
Control of application priority to guarantee latency and capacity requirements.

Key offerings
Mission Critical Networks
Mission Critical Push to Talk

Related offerings
Network Services
Managed Services
Ericsson Network Location
Ericsson Security Manager
Network deployment models and the evolution to 5G

The evolution from legacy LMR to 3GPP networks allows a wider range of network deployment models to be used, and more cost-effective solutions to be delivered. These range from isolated networks to commercial mobile networks with specialist embedded mission critical capabilities. Here are some of the models currently in use:

Deployment model of nationwide mission critical 4G networks, leveraging CSP existing RAN coverage

**Dedicated networks**
A service provider can establish a dedicated critical communications network that is run on separate infrastructure from its commercial network, although both networks can share physical sites and transmission facilities.

**Shared RAN — dedicated spectrum usage**
By enabling RAN sharing, the service provider can complement the use of its commercial network with dedicated apps as well as core and RAN infrastructure. This was the initial model for the French Ministry of Interior.

**Shared RAN — dynamic spectrum usage**
Critical communication users and consumers benefit from shared access to the commercial network’s RAN as well as dedicated RAN, though critical communication users have priority. AT&T took this approach with FirstNet in the US. The public safety operator Erillisverkot in Finland uses shared RAN in a mobile operator core network (MOCN) configuration with a dedicated core.

**Secure mobile virtual network operator (S-MVNO)**
This model relies on the shared use of the commercial network RAN along with routing capabilities in the core. But this is complemented with a dedicated core (complete or upper part only) and applications to partition sensitive user and network data. Now operational, the UK’s Emergency Services Network is an example of this type of model.
The Journey to mission critical 5G

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<th>2020</th>
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<th>~2025</th>
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<td><strong>MC services</strong></td>
<td><strong>MBB</strong></td>
<td><strong>MC services</strong></td>
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<td>NSA core LTE broadcast</td>
<td>Baseband</td>
<td>NSA core 5G broadcast</td>
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<td>LTE</td>
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<td>UE</td>
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- NR used for data off-load
- Fragmented NR coverage
- MC 4G+5G UE non-existing
- NR used for MC services requiring low latency or high throughput
- Few MC 4G+5G UE available
- Device ecosystem start to mature

Many of the 3GPP mission critical network enablers are already standardized for 5G, but some will be standardized in Release 17. Meanwhile, the standardization of integrating mission critical push-to-X services with the network is being planned for Release 18. At present, the LTE path of a non-standalone 5G network can be used to support the mission critical services, and the 5G New Radio (5G NR) path can be used for data offload.

From 2022, NR deployments are likely to be more widespread, and more mission critical 5G devices will be generally available. NR-supported use cases will become a reality. These include real-time drone control using ultra-reliable low latency communication (URLLC), or multiple real-time bodycam streaming during major incidents – taking advantage of the high throughput enabled by NR. Mission critical push-to-talk will continue to be supported on the LTE path of the network since critical networking capabilities, such as broadcast and device-to-device communications, will not yet be available on 5G NR.

As we approach 2024-2025, there will be the possibility for a mission critical network to evolve to a full standalone 5G network using just NR as the radio interface, if so desired, running all mission critical services on mission critical 5G devices.

Benefiting government and the public sector

Ericsson Mission Critical Networks enable

- Situational awareness to help protect property and save lives
- More automation for higher operational efficiency
- Real-time sensors and information sharing
- Safer trains with more efficient maintenance
- Safer and more efficient working environment
- More productivity with less risk for employees
- Better control and higher accuracy using less personnel
- Faster and better handling of operations 24/7
We deploy Mission Critical Networks for our leading partners in the public safety and critical infrastructure industries in multiple countries.

Built on the strength of our ICT portfolio and leveraging our leadership in 3GPP technology, Ericsson deploys Mission Critical Networks for our leading partners in the public safety and critical infrastructure industries in multiple countries. Ericsson’s investment in research and development and our expertise in network design, deployment and maintenance empower the delivery of next-generation mission critical mobile broadband communication solutions, which are high-performing, secure and resilient. Ericsson’s Mission Critical Networks portfolio is leading the transformation of critical communications with ever advancing 3GPP technology for public safety agencies, government bodies, utilities and rail companies across the globe.
Ericsson enables communications service providers to capture the full value of connectivity. The company's portfolio spans Networks, Digital Services, Managed Services, and Emerging Business and is designed to help our customers go digital, increase efficiency and find new revenue streams. Ericsson’s investments in innovation have delivered the benefits of telephony and mobile broadband to billions of people around the world. The Ericsson stock is listed on Nasdaq Stockholm and on Nasdaq New York.

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