



ERICSSON

Where IT meets OT: The new engine of the oilfield

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Contents

- 3 Introduction
- 4 Why legacy networks fall short
- 5 Private 5G: Powering operational transformation
- 7 Four steps to ensure digital transformation success
- 7 Enter a new era of oil and gas innovation



Introduction

Less than a decade ago, the oil and gas industry began exploring the possibilities of private cellular networks. The initial focus was solely on information technology (IT) use cases, such as replacing land mobile radio push-to-talk systems with advanced mobile devices and applications or replacing Wi-Fi to improve coverage across the plant.

Today, the focus has evolved. Operational technology (OT) teams are now driving digital transformation to create real business value and boost the bottom line. This convergence of IT and OT is enabling:

- Enhanced worker safety
- Extended asset life through improved monitoring and maintenance
- Reduced unplanned maintenance
- Compliance with sustainability goals like carbon-neutral operations and zero flaring
- More efficient, cost-effective operations

Private 5G networks are no longer a support function—they're becoming the backbone of operational innovation, largely because [no location is too remote](#) for their use and the coverage and flexibility they provide for OT use cases.



Why legacy networks fall short

Oil and gas operations demand networks that support high-speed, high-capacity, low-latency connectivity. To enable use cases like real-time asset monitoring, autonomous inspection and preventative maintenance, networks must support robotics, sensors and AI—capabilities that traditional systems often cannot meet. Today's legacy solutions struggle with:

- **Data latency**—Slow sensor-to-platform transmission prevents real-time monitoring and decision-making.
- **Reliability**—Conventional wireless systems (Wi-Fi, LoRa) struggle in harsh, highly metallic industrial environments, causing connectivity gaps.
- **Capacity**—Legacy systems cannot handle the surge of Internet of Things (IoT) devices and massive data volumes.

- **Security**—Critical OT systems remain vulnerable, risking breaches and operational downtimes.

Legacy networks were designed for IT needs and cost control—effective for their time, but insufficient for today's OT-driven, profit-focused use cases.

Traditional wired networks lack mobility. Wi-Fi is insecure, prone to interference, unable to provide consistent coverage and can't handle the demands of the growing number of connected devices.

Private 5G changes the game, delivering secure, high-speed, high-capacity, ultra-low-latency connectivity that enables seamless mobility across complex oil and gas operations.



Private 5G: Powering operational transformation

Oil and gas companies are turning to private 5G networks to bridge IT and OT, unlocking operational transformation across the entire value chain. Adoption began in the most obvious locations like offshore platforms where limited connectivity and Wi-Fi struggle—especially indoors—due to the highly metallic operating environments.

Today, private 5G is expanding across onshore oil and gas fields, refineries, shipping hubs and storage and processing facilities. It is powering critical use cases, including:

- Real-time assets monitoring
- Predictive and preventative maintenance
- Remote and automated operations
- AI-powered robotics for autonomous inspection
- Real-time alerts and connections to outside expertise for workers
- Augmented reality (AR) tools
- Digital twin modeling

These applications—especially AI-powered robotics, connected workers, preventative maintenance and digital twins—deliver the broadest applicability and greatest value across a wide range of oil and gas operations.

Autonomous monitoring and AI-powered inspection

Robots and drones can autonomously patrol and inspect many types of assets, including hard-to-reach areas. Equipped with sensors and cameras, they detect gas leaks, smoke or fires and feed the data to AI-powered systems that can trigger immediate actions, such as immediately shutting down equipment. 5G connectivity ensures minimal interference, enabling real-time monitoring and control.

In one deployment, Ericsson partnered with a leading drone company to combine drone technology, advanced sensors and AI-powered analytics—all powered by 5G connectivity. The platform enabled emissions reduction, accident prevention, enhanced security and improved crisis management across a multitude of oil and gas use cases. Private 5G-connected, AI-powered robots save workers from unsafe and time-consuming work. Operations that used the platform reduced inspection time by 90% and downtime costs compared to manual inspection by 65%.



Connected workers

Private 5G connects wireless sensors to mobile devices, enabling real-time monitoring of worker vitals, fall detection, and fatigue and heat exposure prevention. In addition, gas detection and geofencing can protect workers from entering dangerous zones, while workers gain instant access to knowledge and real-time data capture.

In collaboration with a leading industrial wearable technology company, Ericsson enabled a hands-free, voice-activated helmet for oil and gas professionals. The connected helmet boosted operational efficiency, enhanced worker safety and reduced knowledge loss due to workforce retirements. Results included a 33% increase in maintenance efficiency, a 70% enhancement in worker safety compliance and a 10% increase in overall worker productivity.



Preventative maintenance

Oil and gas machinery operates in harsh environments and uses sensors that generate massive amounts of sensor data. Private 5G provides the robust connectivity needed to power advanced data analytics and AI—turning raw information into actionable insights for predictive and preventative maintenance. With real-time monitoring of vibration, heat and acoustics, maintenance teams can analyze performance and detect anomalies the moment they occur. Instead of relying on rigid, time-based maintenance schedules, they can focus only on equipment that truly needs attention—knowing with confidence about what’s wrong and when to act.

Ericsson is working with a European refinery to enable preventative maintenance on machinery engines and pumps that were installed in the 1950s. The only way to perform maintenance was to shut down equipment and undertake a labor-intensive process to access it. The challenging process meant the refiner would perform maintenance when strictly necessary. Private 5G allows the OT team to securely connect this mission-critical equipment with sensors that monitor the equipment’s operation like never before. The result will be a shift from routine maintenance to preventative maintenance that optimizes asset performance and extends the life of the asset, thus increasing revenue.

Digital twins: Real-time operational awareness

As oil and gas operations strengthen their connectivity and invest in new monitoring and measuring capabilities, they are laying the groundwork for the next major step forward: the ability to use data to virtually recreate the entire operating environment—a digital twin.

At the most dynamic level, a real-time digital twin can instantly analyze variables ranging from weather conditions to worker locations, identifying potential issues and recommending optimal solutions. For example, if a sensor detects smoke, the digital twin can autonomously trigger evacuation alerts for nearby workers. However, to achieve this vision, everything in the operating environment requires seamless connectivity—something only private 5G can truly deliver.

Ericsson partnered with global IIoT technology and services companies to provide digital twin solutions tailored for the oil and gas industry. The digital twins enable remote asset monitoring, optimize processes with AI, create operational predictability and improve decision-making. Increased energy efficiency, reduced costs and increased asset performance were just a few of the benefits private 5G helped unlock by supporting digital twin use cases.



Four steps to ensure digital transformation success

Across the oil and gas industry, operators share a common goal: to roll out dynamic digital transformational capabilities at their facilities before the end of the decade. Reaching that vision won't happen with a single leap. True transformation is a journey—built one investment, one connected asset and one workflow at a time. Success depends on following a clear roadmap that harmonizes IT and OT to unlock lasting value.

When organizations rush into technology adoption without aligning people, processes and priorities, they often find that investments fail to deliver the expected return. To capture the full potential of digital transformation—driving both efficiency and profitability—leaders must approach change through a structured framework focused on four dimensions: maturity, ROI, people and processes.

1. Maturity—Every oil and gas operation is at a different point in its operational transformation journey. However, honest self-assessments of where operations stand can be a challenge, which means leaders don't have clarity on what investments they should make next. To overcome this, leaders should benchmark their transformation readiness, identify gaps and seek recommendations on tailored next steps. Based on market studies, consulting work and feedback from partners, Ericsson developed a [Smart Oil Field Maturity Assessment](#) tool to help IT and OT leaders evaluate their progress in advancing digital solutions.

2. ROI—The typical oil and gas OT team can't expect to receive the go-ahead for multiple transformation investments before delivering a return on investment. Their mindset must be that each innovation drives measurable results, even as they build to something bigger. Ericsson offers its [Oil and Gas Value Calculator](#) to help OT leaders understand the financial impact of deploying a private 5G network tailored to their specific needs.

3. People—When transformation initiatives are driven from the top down rather than the bottom up, they risk missing what engineers actually need to make new OT use cases a reality. OT leaders pursuing a new digitally-enabled operational capability should start by talking to field engineers to understand their pain points and what they need to make a solution a success.

4. Processes—When OT teams deploy a new technology but engineers continue to do things the old way, it's often because there's a disconnect between legacy processes and the processes required by the new use case. Before deploying an innovation in the field, leaders should engage all work groups impacted by the change to create an end-to-end change management plan that addresses design, implementation and training. This process allows engineers to feel engaged with new ways of working and prepared to ensure successful adoption.

Enter a new era of oil and gas innovation



The convergence of IT and OT in the oil and gas industry is unlocking a new era of operational innovation, bridging the physical and digital worlds. Private 5G delivers the reliable, high-performance connectivity needed to power these digital capabilities across every critical oil and gas use case.

With proven expertise and real-world deployments, Ericsson enables oil and gas businesses to harness the full value of connectivity to drive efficiency, safety and sustainable growth and, ultimately, help operations achieve their transformation visions.

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[Schedule a demo](#) to see private 5G in action, explore concrete use cases, and quantify the impact on efficiency, safety and ROI for your operations.

Ericsson enables communications service providers and enterprises to capture the full value of connectivity. The company's portfolio spans the following business areas: Networks, Cloud Software and Services, Enterprise Wireless Solutions, Global Communications Platform, and Technologies and New Businesses. It is designed to help our customers go digital, increase efficiency and find new revenue streams. Ericsson's innovation investments have delivered the benefits of mobility and mobile broadband to billions of people globally. Ericsson stock is listed on Nasdaq Stockholm and on Nasdaq New York.

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