



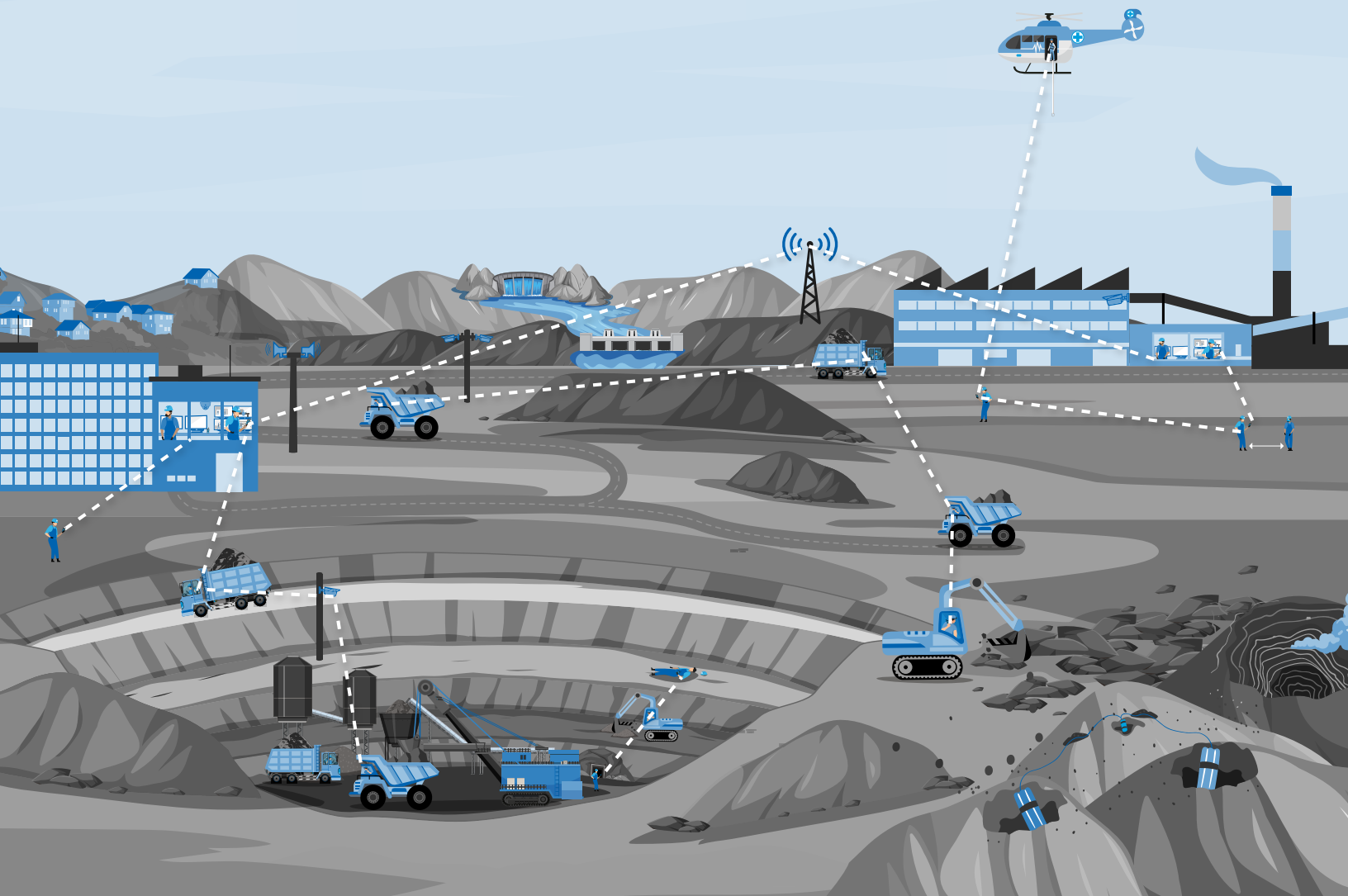
# EXTRACT ALL THE BENEFITS OF A HYPERCONNECTED MINE

Digital transformation in the mining industry is not an option anymore, it's an absolute necessity. Today, mining companies are focusing their investments on areas that can help them improve operating efficiencies, increase productivity and maintain a safe working environment while struggling to meet increasing regulatory requirements.

Greater interconnectivity enabling sharing of information with embedded intelligence across people, processes and technology can help those companies better understand their operations in real time, boost performance and reduce safety risks.

## A HYPERCONNECTED MINE HELPS UNEARTH BETTER INSIGHTS

Information can be collected anywhere within the mine's environment, providing useful insights into what's happening in real time and indicating how and where to focus attention or make improvements. A connected mine uses data from sensor technology to effectively manage underground and pit mining operations. From a single application on a mobile device, supervisors at mine sites can receive alerts via voice, text or in-app notifications. Advanced data analytics can be applied to the raw data to create insights, visualizations and recommendations. **This information is instantly delivered to mine managers and employees on their mobile devices.**

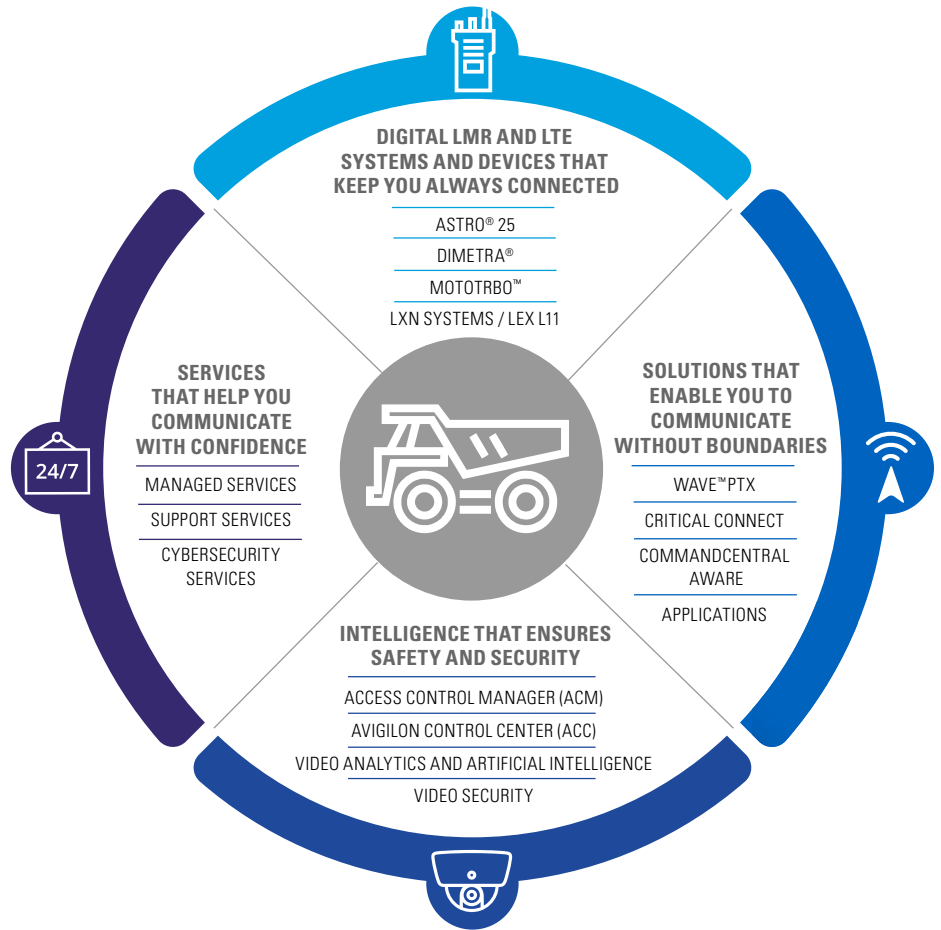


# BRING TOGETHER YOUR ENTIRE COMMUNICATIONS INFRASTRUCTURE

**Motorola Solutions is a global leader in integrated business and mission critical communications.** Our technology platforms provide extended connectivity, video security and analytics solutions, effective control room software that keeps everybody aligned and in the know, all supported by services that ensure operations run smoothly, communities are protected and businesses thrive.

This comprehensive ecosystem of critical connectivity is supported by real-time video monitoring driven by artificial intelligence throughout the operational area, and beyond. In the mining industry, it enhances risk prevention, accelerates response in emergencies, and ensures 24/7 control that optimizes the safety and security of mining workers and surrounding communities alike.

In such advanced technology environment, you drive the performance of your entire mining operation with resilient and reliable unified communications — underground, on the surface, in the field, at the center of integrated operations, on route and at the headquarters. All this comprehensive source of information helps you make better and smarter decisions in real time.



**You're ready today and always prepared for the future as the mining industry evolves.**



## THE EVOLUTION OF THE MINING INDUSTRY

The increasing importance of the global concepts of security, sustainability and efficiency is causing the mining industry to reinvent itself and transition from a majority of surface operations in the past to an increasing number of underground operations today and toward the future. This responds, in part, to the fact that underground mining incurs less damage in the surface environment of the mine area, and becomes more cost-effective in the long run.

**Innovation and advanced automation technologies are crucial to ensure safety and security,** a top priority in mining operations. People and equipment working in sync to avoid siloed information that delays processes. Unified communications that help accelerate incident response, increase productivity and reach higher performance levels from mine to market, across its entire value chain.





## UNDERGROUND COMMUNICATION SOLUTIONS

**The Internet of mining things comes to mind when considering an advanced digital communications system (radio, voice, data, video).** Today, with increasing operational challenges and the reality of a new normal due to the COVID-19 pandemic, the need to have everything interconnected, monitored and seamlessly relayed to the surface demands far more advanced systems than the ones traditionally used in underground mines.

Big mining operations in Latin America have already expressed their intention to increase the budget dedicated to digital transformation and automation to be able to reinforce remote work, improve control, ensure continuous operations monitoring, and optimize safety and productivity. It is important to mention that those mining operations that had already implemented digitization, automation and remote control before the pandemic, fared much better during the lockdown.

New technologies can also dramatically improve their ability to reach ongoing objectives, such as reduce carbon footprint and improve the use of water, among others, to add value to their workers and communities.

Systems can now track and monitor access, movement and distancing of mine workers underground. A distress signal can be transmitted through radio should a worker become incapacitated for any reason. Scalable and reliable ready-to-use telemetry features help manage remote assets spread across geographically dispersed infrastructure. Following Wi-Fi, Broadband LTE is the next frontier in mining communications, bringing together broadband and mobility from the surface to underground. Moving forward, other new technologies that rely on always-on mobile communications will be installed in underground mines globally.



## THE POWER OF PRIVATE INDUSTRIAL LTE

**Private industrial LTE delivers full underground mobility for voice, data, video, dispatch and HSE systems and any other system or application the new digital mine requires.**

It delivers a full suite of employee safety and digital transformation applications, such as people, machine and asset tracking, LMR/DMR transition to LTE Push-to-Talk (PTT), voice, data and video applications, emergency notifications, fatigue monitoring, autonomous vehicles and machinery, security surveillance camera monitoring, remote control operation of fixed and mobile mining machinery, equipment health monitoring, and a lot more.

It provides increased data speeds with decreased latency.

It supports interoperability between current and next generation cellular systems and other data networks, including emergency groups.

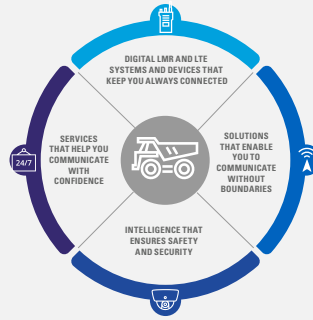
**A successful implementation of an underground Private Industrial LTE system is more than just products working together. It's a holistic approach that builds a solid foundation on which all digital transformation applications can rely.** The result is an industrial environment that can run productively, predictably and with much lower risk. Reaching this goal has the potential to bring forth huge improvements in safety, productivity and efficiency.



# AN ECOSYSTEM OF INTEGRATED SOLUTIONS TO BUILD YOUR HYPERCONNECTED MINE

Mining companies worldwide trust Motorola Solutions to help them advance their digital mining transformation with an end-to-end ecosystem of integrated solutions. Our devices, systems, applications and services seamlessly work together to provide a proven end-to-end mining communications solution.

As a trusted advisor, we help our customers find the best way to apply disruptive



technology to leverage and bring together all the data generated in every area of their business.

This partnership empowers those companies to successfully manage their operations maximizing production, increasing asset reliability, and improving workforce safety with the highest standards of corporate social responsibility that go beyond the mine boundaries to help ensure the well-being of the surrounding community.



## DIGITAL LMR AND LTE SYSTEMS AND DEVICES THAT KEEP YOU ALWAYS CONNECTED

Mining is one of the most challenging communications environments. Motorola Solutions provides **equipment designed with the highest standards of safety and reliability requirements in the industry**, able to withstand extreme temperatures, dust, noise, rain and toxic exposure. That is how we ensure those critical communications are delivered safely and dependably each and every time.



ASTRO® 25

**Get extreme reliability and performance** for your demanding environment, from ultra-rugged two-way radios to a complete turn-key P25 system.



DIMETRA™

**Trust our tough, resilient and efficient TETRA systems** for your challenging mining communications, and secure your mobile information with powerful encryption solutions.



MOTOTRBO™

**Equip your team to collaborate better and work more efficiently** with a DMR II / III systems designed to the highest specification for both underground and surface communications.



LTE BROADBAND

**Get the intelligence advantage** to revolutionize your mining operations with an LTE broadband system and devices, purpose-built for your mining operations.



**INTRINSICALLY SAFE DEVICES FOR HOSTILE ENVIRONMENTS ARE AVAILABLE**

**Take Push-to-Talk (PTT) further.** Now you can cost-effectively communicate seamlessly wherever you are, whenever you want, and by whatever means you decide — network, media, or device. Enhance collaboration and increase productivity sharing voice, data, video and text across individuals or groups at the push of a button.



## SOLUTIONS THAT ENABLE YOU TO COMMUNICATE WITHOUT BOUNDARIES



WAVE™ PTX

**Combine the speed and simplicity of instant radio communication** with the flexibility of sharing any multimedia information on one platform.



CRITICAL CONNECT

**Seamlessly exchange voice, video and data** between networks, locations and applications with this flexible and scalable solution.



COMMANDCENTRAL AWARE

**Obtain a complete operating picture** that integrates critical real-time intelligence in a single display including video, alerts and geospatial mapping.



APPLICATIONS

**Get more out of your communication systems** with a variety of telemetry, worker's safety and access control features.



## INTELLIGENCE THAT ENSURES SAFETY AND SECURITY

**Motorola Solutions Avigilon is a powerful solution that keeps control of everything and everybody on the surface, underground or on the go.** Get a clear view of all the working environment in any condition, even in darkness, dust storms, and more, with the most advanced video analytics driven by the power of artificial intelligence. Protect your teams with reliable access control provided by powerful sensors that automatically detect hazards earlier, enabling you to take proactive action and create a safer workplace.



### ACCESS CONTROL MANAGER (ACM)

**Keep people, property and assets safe** with access control systems that are browser-based and are fully integrated with Avigilon Control Center™ video management software.



### AVIGILON CONTROL CENTER (ACC)

**Verify access control** alarms; create rules for access control events; grant door access remotely; perform identity verification from ACC; bookmark, export and archive video connected to ACM panels, subpanels and inputs.



### VIDEO ANALYTICS AND AI

**Find out what's going on faster.** Be ready to detect, verify and act on critical and/or atypical activities or events with state-of-the-art deep learning algorithms that change the way video is monitored and data is used.



### VIDEO SECURITY

**Understand what you're seeing in or out of the mine and access it from anywhere.** Advanced video management software, powerful infrared and explosive-resistant cameras with built-in intelligence, all connected to the cloud, makes it possible.

24/7

As technology advances, so does the complexity of your devices and networks. Supporting them doesn't have to be a burden — we can manage that complexity for you. **With Motorola Solutions Managed and Support Services, you're never alone.** We're always ready to help you overcome challenges, keep your infrastructure working at top performance with minimal disruption, protect your investment in technology and, yes, we will also be there when the unexpected occurs. Concentrate on your task at hand, and place your entire communications system in the hands of experts.

## SERVICES THAT HELP YOU COMMUNICATE WITH CONFIDENCE



### MANAGED SERVICES

**Downtime is not an option for your challenging mining operations.** Place the complexities of managing technology, ensuring fast response and the effective monitoring of your network performance, in the hands of experts.



### SUPPORT SERVICES

**Enjoy peace of mind with hardware repair and preventive maintenance, on-site and remotely.** Get the technical expertise that provides the support you need to keep your operations-critical communications up and running without interruptions.



### CYBERSECURITY SERVICES

**Prevent sophisticated cyber attacks** that can cost millions. Protect your critical operations with cybersecurity services designed to effectively prevent, detect and respond to cyber attacks.





## TRANSFORM YOUR MINING OPERATIONS WITH THE POWER OF HYPERCONNECTIVITY

With 90+ years of innovation and worldwide expertise in developing end-to-end mission and operations critical communications, **Motorola Solutions can help you drive your mining business into the future, today.** We continue true to our promise: we innovate to mobilize and connect people in the moments that matter.

**Contact us.** Together, we can find the best customized integrated solution for your mining operations.

For more information, please visit:  
[www.motorolasolutions.com/en\\_xl/solutions/mining.html](http://www.motorolasolutions.com/en_xl/solutions/mining.html)



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