MST

AXON

EMPOWERING MINING OPERATIONS WITH INTELLIGENT CONTROL, AUTOMATION, AND CONNECTIVITY.

DISCLAIMER

CONTENTS

OVERVIEW

MST's AXON platform is the foundation for building your digital mine . Built for harsh mining and tunnelling environments and developed with flexibility in mind, AXON is a modular, multifunctional platform designed to support existing and future wireless communication, tracking and automation technologies through high-bandwidth fibre.

AXON PLATFORM OVERVIEW

CONNECTING YOUR MINE TO THE FUTURE

AXON is MST Global's cutting-edge, modular platform engineered to excel in the demanding environments of mining and tunneling. Designed with flexibility and future-proofing in mind, AXON integrates both hardware and software to support a wide range of current and emerging technologies. Whether it's wireless communication, tracking, or automation, AXON's high-bandwidth fiber infrastructure ensures that all critical systems operate seamlessly, enhancing operational efficiency and safety. The platform's modular design allows for easy expansion and customization, making it adaptable to the evolving needs of modern mining operations.

The AXON product family includes specialized modules that cater to various aspects of mining processes, such as edge computing, control, and automation. These modules, combined with powerful software capabilities, enable real-time data processing, remote monitoring, and precise control of mining equipment and environmental conditions. By leveraging the power of Microsoft Azure, AXON not only provides robust connectivity but also supports advanced analytics and decision-making tools. This makes AXON an essential component for mining companies looking to optimize their operations and drive digital transformation in an industry where efficiency and safety are paramount.
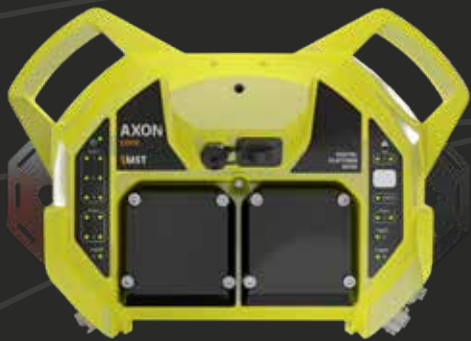
AXON CORE
POWERING PRECISION IN MINING OPERATIONS

MST's AXON core is one of the highest performing network platforms with speeds of up to 1Gbps enabling simultaneous voice, video, and data transmissions; and IoT, Cloud and Edge Computing applications to operate at maximum functionality at any scale.
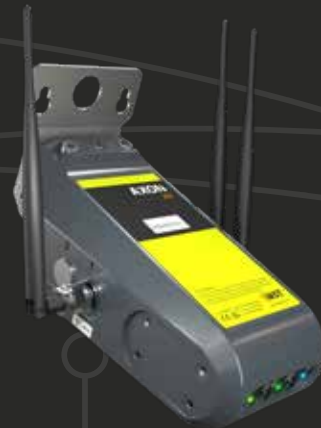
AXON AIR+
ELEVATING CONNECTIVITY UNDERGROUND

MST's AXON air is a Wi-Fi access point designed with power and coverage in mind. It can be daisy-chained via its 1Gbps PoE+ port to provide dual-frequency Wi-Fi coverage in hard to access locations such as declines, work shops and last mile connectivity. The most simple and affordable way to connect your mine using Ethernet cable.

AXON MESH
CONNECT. EXTEND. OPTIMISE

MST Global's AXON mesh – portable wireless access point - is an industry leading intrinsically safe, mobile, self-meshing, network extender and access point. Intended for the adhoc extension of a mine or tunnel's existing Wi-Fi network, the AXON mesh is fit for purpose for VoIP, tracking and data transport.

AXON EXPANSION MODULES
SEAMLESS CONTROL AND AUTOMATION

AXON Expansion Modules boost the flexibility of the AXON platform, allowing seamless integration of additional capabilities to meet evolving operational needs. They enhance data processing and connectivity, ensuring efficient and scalable underground operations.

COMPOSITE FIBER

WATER PUMP
CONTROL RELAY

AXON
Control module

WATER LEVEL
SENSOR
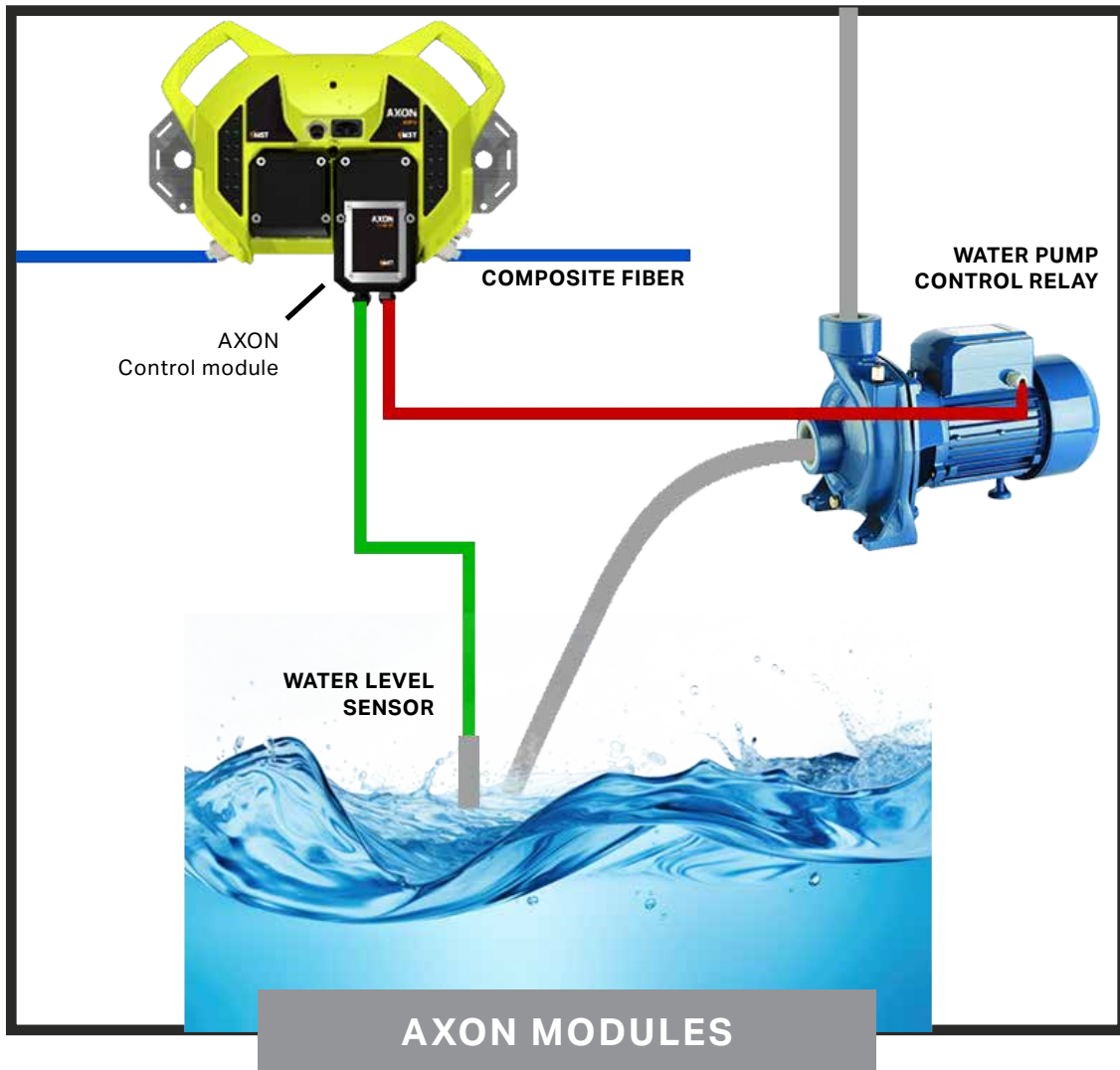
AXON MODULES

AXON Modules - An example of a control and automation pump solution with simple set up using MST's plug in Control module. Edge computing made easy.

Applications include: Traffic Management Systems | Tag Reading & Geo-location | Personnel & Asset Tracking | LTE/5G Connectivity | Fleet & Asset Management | Secure VoIP Communication | Remote IP Video & Data Transfer | Control Automation

MST'S INNOVATIVE, ALL-IN-ONE AXON SOLUTION COMPRISING BOTH HARDWARE AND SOFTWARE OPTIMALLY SUPPORTS YOUR PRODUCTIVITY AND SAFETY INITIATIVES DELIVERING A HIGHER RETURN ON INVESTMENT THAN ANY OTHER SYSTEM.

AXON provides the two-way connectivity needed to acquire and leverage the power of big data and software management systems to enable the optimization of underground operations in real-time.

How can AXON address and solve the unique operational challenges faced by mining companies?

AXON delivers tailored solutions that enhance safety, boost efficiency, and future-proof operations, tackling the unique challenges of the mining industry head-on.

01

Key Challenges in Mining Operations

Safety Risks: AXON enhances safety by providing real-time tracking and communication, enabling swift response to emergencies and reducing the likelihood of accidents.

Operational Efficiency: AXON's automation and edge computing capabilities streamline workflows, optimize resource use, and increase overall operational efficiency in mining.

Environmental Impact: AXON supports better environmental management by enabling precise control of ventilation, reducing energy consumption, and minimising emissions.

Cost Control: AXON's scalable, modular design allows for cost-effective deployment and expansion, ensuring that mining operations can stay within budget while maximizing ROI.

02

Need for Real-time Data and Automation

Real-time Data Access: AXON provides instant access to critical data from across the mining site, enabling real-time monitoring and informed decision-making for more efficient operations.

Seamless Automation: AXON's Control and Automation software automates routine tasks, reducing manual intervention and increasing productivity while maintaining operational accuracy.

Integrated Systems: AXON's modular design ensures that real-time data and automation tools work together seamlessly, optimizing resource management and enhancing overall operational efficiency.

03

Safety and Productivity Concerns

Enhanced Safety Monitoring: AXON's real-time tracking of personnel and equipment improves safety by allowing swift responses to potential hazards and ensuring compliance with safety protocols.

Accident Prevention: With its advanced communication systems, AXON minimizes the risk of accidents by providing constant connectivity, even in remote areas of the mine.

Productivity Optimization: AXON's automation capabilities streamline workflows, reducing downtime and enabling more efficient use of resources, leading to higher productivity.

Data-Driven Decisions: AXON's real-time data analysis supports quick, informed decisions that enhance both safety and productivity, ensuring operations run smoothly and efficiently.

THE BACKBONE OF HIGH PERFORMANCE MINING

AXON core

THE FOUNDATION OF YOUR DIGITAL MINE

MST's AXON core is the foundation of your digital underground ecosystem, enabling high-performance voice, video, and data transmissions, as well as real-time IoT and edge computing for mission-critical operations.

Featuring a modular architecture, AXON Core offers dual expansion sockets for flexible integration of plug-and-play technology modules such as AXON Control for automation and AXON Power for additional PoE+ ports.

Key Features:

High-Bandwidth Fibre and PoE+ Connectivity: Provides fast, reliable network performance essential for high-demand applications.

Simultaneous Voice, Video, and Data Transmissions: Supports multi-channel communication and data processing for efficient operations.

Real-Time IoT and Edge Computing Capabilities: Facilitates immediate data processing and application deployment in critical environments.

Modular Design with Dual Expansion Sockets: Allows for flexible integration of additional technology modules.

Integration of AXON Control and AXON Power Modules: Offers enhanced automation and additional PoE+ ports for greater system versatility.

Optional AXON Air Wi-Fi Access Point: Transforms AXON Core into a robust Wi-Fi distribution point for improved connectivity.
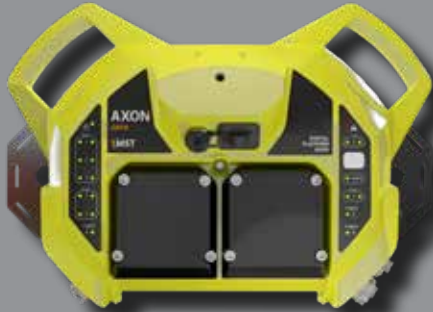
AXON Core modular network platform

AXON Core core with Helical Antenna

AXON Power distribution and management module

SCALABLE SOLUTIONS FOR MISSION-CRITICAL CONNECTIVITY

AXON Core delivers key benefits by providing a robust and adaptable network platform designed for mission-critical environments. Its high-bandwidth fibre and PoE+ connectivity ensure reliable performance, while simultaneous voice, video, and data transmissions enhance operational efficiency. The real-time IoT and edge computing capabilities facilitate immediate data processing and application deployment. With its modular design, AXON Core supports flexible integration of additional technology modules, ensuring scalability and future-proofing. Simplified maintenance with remote and local support further reduces downtime and operational disruptions, making AXON Core an ideal solution for dynamic and evolving mining operations.

Key Benefits:

Reliable Communication and Data Processing: Ensures robust performance for mission-critical tasks in underground environments.

Customizable and Scalable Network Solutions: Adapts to specific operational needs and supports future expansion.

Enhanced Automation and Power Management: Streamlines operations and optimizes power distribution.

Future-Proof Design with Easy Expansion: Facilitates upgrades and integrates new technologies with ease.

Simplified Maintenance: Offers both remote and local support options for efficient system management.

SUPERIOR WI-FI FOR CRITICAL CONNECTIVITY

AXON air+

DELIVERING RELIABLE, HIGH-PERFORMANCE WI-FI FOR CRITICAL MINING OPERATIONS

AXON Air+ revolutionizes wireless communication in underground operations with its cutting-edge Wi-Fi technology. It is tailored to work harmoniously with the AXON Core, offering superior connectivity that extends across challenging mining environments. AXON Air+ supports critical applications, such as real-time data streaming and voice communication, ensuring that all networked systems remain synchronized and efficient even in the most demanding conditions.

Engineered for resilience and high performance, AXON Air+ delivers exceptional Wi-Fi coverage in tough mining environments. Its robust design and seamless integration with the AXON Core platform allow for reliable wireless access, enhancing operational workflows and safety protocols. By ensuring a stable connection for both personnel and equipment, AXON Air+ helps maintain smooth, uninterrupted operations, reducing downtime and improving overall productivity.

Key Features:

High-Performance Wi-Fi Access Point: Delivers fast and reliable wireless connectivity.

Seamless Integration with AXON Core: Enhances connectivity within the AXON network.

Supports Voice, Data, and Geo-Location Tracking: Facilitates comprehensive communication and tracking.

Robust and Durable Design: Built to withstand challenging environments.

Key Benefits:

Reliable Wireless Coverage: Ensures consistent connectivity in demanding operational settings.

Enhanced Operational Efficiency: Improves communication and data transfer speed.
Improved Safety and Tracking: Supports accurate geo-location and real-time tracking.

Durable and Dependable: Performs reliably in tough conditions.

REAL-TIME FLEET MANAGEMENT AND PRODUCTIVITY TRACKING

AXON mesh

THE FLEET MANAGEMENT MODULE OF THE HELIX ENTERPRISE PLATFORM

AXON Mesh provides a cutting-edge networking solution that enhances connectivity and communication in challenging environments.

By creating a scalable and resilient mesh network, AXON Mesh ensures reliable, high-speed data transmission across complex terrains. Its seamless integration with other AXON products allows for a unified network system that supports mission-critical applications and improves overall operational efficiency.

Designed for durability and adaptability, AXON Mesh offers flexible expansion options that accommodate growing network demands and evolving conditions. Its robust design withstands harsh environments, ensuring continuous, uninterrupted communication and optimized network performance. This makes AXON Mesh an essential component for maintaining high levels of connectivity and reliability in demanding settings.

Key Features:

Scalable Mesh Networking: Flexible network structure that grows with operational needs.

Seamless Integration: Compatible with other AXON products for a unified system.

High-Speed Data Transmission: Reliable and fast communication across the network.

Durable Design: Built to endure harsh and challenging environments.

Key Benefits:

Enhanced Connectivity: Consistent and robust network performance in complex terrains.

Flexible Expansion: Adapts to changing network requirements and conditions.

Improved Network Resilience: Reduces downtime and ensures reliable operation.

Optimized Performance: Supports critical applications with high-speed data transfer.

MST GLOBAL'S AXON MESH – PORTABLE WIRELESS ACCESS POINT - IS AN INDUSTRY LEADING INTRINSICALLY SAFE, MOBILE, SELF-MESHING, NETWORK EXTENDER AND ACCESS POINT. INTENDED FOR THE ADHOC EXTENSION OF A MINE OR TUNNEL'S EXISTING WI-FI NETWORK, THE AXON MESH IS FIT FOR PURPOSE FOR VOIP, TRACKING AND DATA TRANSPORT.

AXON EXPANSION MODULES

POWERING FLEXIBILITY AND PERFORMANCE UNDERGROUND

MST Global's AXON Modules are designed to enhance and expand the capabilities of the AXON Core digital platform, offering a versatile and scalable solution for various underground mining operations. Each module, whether it's AXON Control, AXON Power, AXON Gateway, or AXON Dock, serves a specific purpose, from extending power distribution and enabling process automation to connecting wireless sensors and expanding deployment options. These plug-and-play modules are built for harsh environments, ensuring reliable performance and quick deployment in even the most challenging conditions. By integrating seamlessly with the AXON Core, these modules allow mining operations to scale and adapt to changing needs without significant investment or disruption.

AXON Modules provide a cost-effective way to implement advanced technology in underground mining operations, offering significant benefits in terms of flexibility, efficiency, and control. For example, AXON Control simplifies the activation of automation processes, while AXON Power increases the number of available PoE+ ports and provides regulated DC power outputs. AXON Gateway facilitates the connection of wireless sensors using LoRa or BLE protocols, and AXON Dock extends the placement options for AXON modules, enhancing the overall system's adaptability. Together, these modules enable mining operations to optimise their processes, improve safety, and increase productivity, all while maintaining a robust and scalable digital infrastructure.

SEAMLESS INTEGRATION, PRECISION CONTROL

AXON power

A ROBUST, PLUG-AND-PLAY MODULE THAT EXTENDS POWER CAPABILITIES IN HARSH UNDERGROUND ENVIRONMENTS.

When integrated with the AXON Core digital platform, AXON Power expands the number of PoE+ ports from three to six and adds a regulated 24W DC power output. This allows customers to leverage AXON's advanced power distribution capabilities efficiently and effortlessly. The module's design ensures that additional devices like cameras, sensors, and wireless access points can be quickly connected to any AXON Core node, providing instant access to both power and data without the need for expensive, time-consuming network upgrades. The AXON Power module also offers user-selectable voltage outputs of 12, 24, or 48 volts, making it versatile enough to power a range of devices, including PLCs, alarms, and call points, in various underground applications.

Key Features:

Expanded PoE+ Ports: Increases from 3 to 6 ports, providing more connectivity options.

Regulated 24W DC Power Output: Supports 12V, 24V, and 48V outputs, selectable by the user.

Plug-and-Play Design: Enables quick and easy deployment without extensive setup.

Harsh Environment Durability: IP65 rated, withstanding temperatures from 0-50°C and 95% humidity.

LED Indicators: Provides clear status updates for power and DC output.

Key Benefits:

Enhanced Connectivity: Simplifies the addition of devices in the underground with increased PoE+ ports.

Versatile Power Solutions: User-selectable voltage outputs meet a variety of power needs.

Cost and Time Efficiency: Reduces the need for extensive network upgrades and traditional power solutions.

Ease of Deployment: Plug-and-play functionality enables quick installation, even in ad hoc situations.

Reliable Performance: Built to operate effectively in challenging underground environments.

POWERFUL UNDERGROUND PROCESS AUTOMATION

AXON control

STREAMLINING UNDERGROUND AUTOMATION AND ENHANCING OPERATIONAL EFFICIENCY WITH FLEXIBILITY

MST's AXON Control module provides a simple and cost-effective solution for activating control and automation processes in harsh underground environments. As a plug-and-play edge computing gateway with advanced I/O capabilities, AXON Control is designed to optimize various mining operations when integrated with the AXON Core digital platform.

Unlike full-scale SCADA systems, AXON Control can be quickly deployed by plugging into an existing AXON Core device, offering immediate access to high-bandwidth fibre and PoE+ connectivity for processing large amounts of data. This versatility makes it ideal for applications such as remote water pump control, ventilation fan management, predictive maintenance, and more.

Key Features:

Plug-and-Play Deployment: Easily connects to existing AXON Core devices for rapid setup.

Advanced I/O Capabilities: Supports various sensor inputs for diverse monitoring needs.

Built-in Software with Geolocation: Enables location-based operational logic.

High-Bandwidth Connectivity: Utilizes AXON Core's fibre and PoE+ for efficient data processing.

Key Benefits:

Cost-Effective Automation: Provides an affordable alternative to full-scale SCADA systems.

Versatile Application: Suitable for a wide range of control and automation processes.

Quick and Easy Installation: Simplifies the deployment of automation solutions in the mine.

Enhanced Operational Efficiency: Supports real-time data processing and event reporting for better decision-making.

POWERFUL UNDERGROUND PROCESS AUTOMATION

AXON gateway

STREAMLINING UNDERGROUND AUTOMATION AND ENHANCING OPERATIONAL EFFICIENCY WITH FLEXIBILITY

MST's AXON Gateway Module offers a cost-effective, plug-and-play solution for connecting wireless sensors using LoRa or BLE. It integrates seamlessly with the AXON Core digital platform and can be quickly deployed anywhere in the mine via direct connection or through the AXON Dock.

Leveraging the AXON Core's high-bandwidth fibre and PoE+ capabilities, the AXON Gateway efficiently processes large volumes of data, making it ideal for applications such as remote system monitoring, environmental condition tracking, and predictive maintenance.

Key Features:

Simple Integration with AXON Core: Easily connects to the AXON Core, either directly or via PoE+ using the AXON Dock.

Support for LoRa and BLE Protocols: Compatible with a wide range of wireless sensors.

Edge Computing Capabilities: Processes large amounts of data efficiently in real-time.

Rugged Design: IP65 rated for durability in harsh mining environments.

Versatile Applications: Supports monitoring of environmental conditions, remote systems, and more.

Key Benefits:

Cost-Effective Connectivity: Simplifies the integration of wireless sensors into the mining network.

Quick Deployment: Plug-and-play design allows for rapid setup and scalability.

Enhanced Monitoring: Enables real-time data processing for predictive maintenance and event reporting.

Reliable Performance: Operates efficiently in challenging underground conditions.

Scalable Solution: Supports multiple AXON Gateways per AXON Core, providing flexibility for expanding monitoring needs.

POWERFUL UNDERGROUND PROCESS AUTOMATION

AXON dock

STREAMLINING UNDERGROUND AUTOMATION AND ENHANCING OPERATIONAL EFFICIENCY WITH FLEXIBILITY

MST Global's AXON Dock enhances the flexibility and deployment options for AXON digital plug-in modules by allowing them to be positioned up to 100 meters from an AXON Core. The AXON Dock provides secure mounting and connectivity for a single AXON Control or AXON Gateway module, ensuring that these modules can be placed in the most effective location for their specific tasks.

AXON Dock allows multiple AXON modules to be connected to a single AXON Core, maximizing the system's scalability and adaptability in challenging environments.

Key Features:

Extended Deployment Range: Enables AXON modules to be positioned up to 100 meters from the AXON Core.

Versatile Module Compatibility: Supports both AXON Control and AXON Gateway modules.

High-Speed Connectivity: 1Gbps PoE+ port ensures reliable data transmission.

Compact and Durable Design: IP65 rated for use in harsh environments.

Key Benefits:

Increased Flexibility: Allows optimal placement of AXON modules for enhanced operational effectiveness.

Scalable System: Supports multiple modules on a single AXON Core, offering a cost-effective solution for expansion.

Reliable Power and Data: Ensures stable power and high-speed connectivity for critical operations.

Simplified Deployment: Easy to install, enabling quick setup and adaptability in various mining scenarios.

HELIX AUTOMATION & AXON CONTROL

INTELLIGENT INTEGRATION, ENHANCED EFFICIENCY

HELIX Automation seamlessly integrates with AXON Control, providing a robust solution for managing and automating mining operations. This interaction enables the creation and execution of complex Boolean logic and geospatial rules through an intuitive interface. AXON Control units receive and process these rules, facilitating real-time adjustments and automation of critical tasks. The system supports flexible dashboards for monitoring process variables, sensor values, and manual control of outputs. By leveraging the combined capabilities of HELIX Automation and AXON Control, mining operations can achieve heightened efficiency, precise control, and improved safety across all activities.

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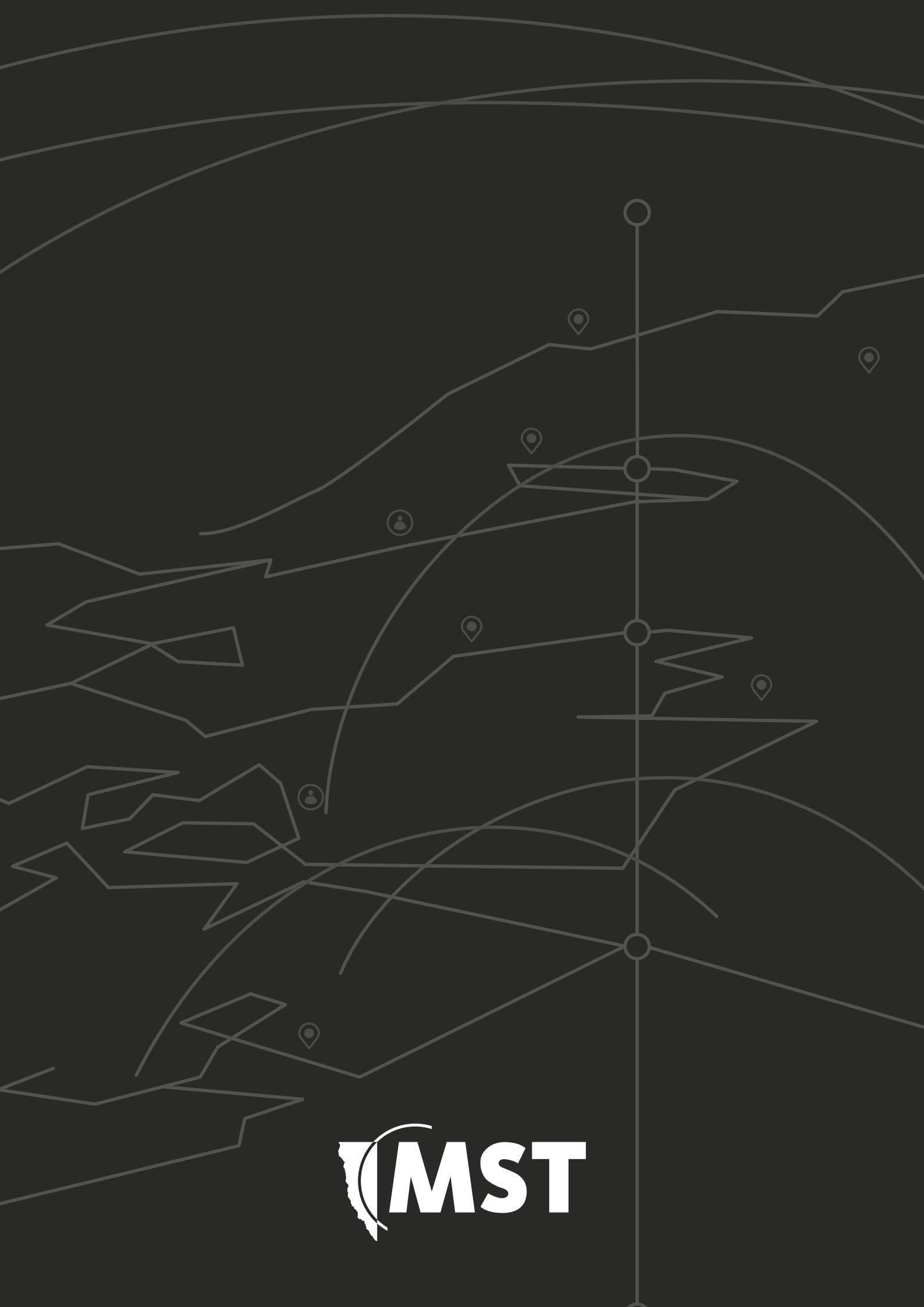Johannesburg, 2191, South Africa

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