MineNet Africa

SMART TECHNOLOGY • CONNECTED MINING



COMPANY PROFILE / 2026

Operational visibility. Accountable response.

Mining technology that connects workforce location, worker risk, equipment condition and the decisions that follow.

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Underground connectivity | Image supplied

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THE MINENET AFRICA PROPOSITION

Mining intelligence with a defined purpose

MineNet Africa (Pty) Ltd is a Rustenburg-based mining technology business established in 2026. Our proposition connects **people, equipment and operational evidence** across surface and underground environments.

A useful system must answer three questions: **What changed? Who must act? What confirms closure?** We build the solution scope around those decisions, then specify the instruments, communications, interfaces and operating responsibilities needed to support them.

01

Workforce visibility

Identity, location confidence and shift accountability.

02

Asset intelligence

Condition, duty and loss information tied to maintenance.

03

Operational evidence

Time-stamped events, assigned actions and verified records.



Connected infrastructure | Illustrative technology visual

Delivery position. The portfolio sets out our solution scope and development roadmap. The Rustenburg monitoring centre and modular software platform are proposed programmes; product suitability, integration capability and delivery partners are confirmed for each engagement.

Our direction

VISION

To be a leading provider of smart mining technologies that connect people, equipment and operations across Africa and the world, advancing safety, efficiency and sustainability.

MISSION

To design, integrate and support mining technology solutions that turn field information into informed decisions and accountable action.

- **Connect the operation.** Link field devices, mine networks and authorised decision-makers.
- **Protect the workforce.** Support location accountability and professionally governed worker-risk monitoring.
- **Improve asset decisions.** Connect equipment condition, operating duty and maintenance priorities.
- **Prove performance.** Set acceptance criteria, validate in working conditions and report against agreed measures.
- **Build lasting capability.** Equip site teams with training, usable procedures and support across the system lifecycle.

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THE OPERATING ARCHITECTURE

From field signal to verified action

The target architecture separates sensing, data transport, interpretation and response. Each layer has an owner, a quality test and a defined behaviour when information stops arriving.

01

Instrument the task

Tags, wearables, environmental instruments and machine interfaces. Record device identity, units, calibration status and the measurement method.

02

Process at the edge

Time-stamp observations, flag invalid readings and buffer records where supported. Keep approved local functions available during a backhaul interruption.

03

Transport securely

Use surveyed mine coverage and controlled backhaul. Specify delivery latency, availability, power resilience and authorised data routes.

04

Build operational context

Join each observation to an asset, person, zone and shift. Apply version-controlled rules and show freshness, uncertainty and missing data.

05

Assign and verify response

Route exceptions to a named role. Record acknowledgement, action, escalation and closure evidence; carry outstanding work into shift handover.

Integration principle: agree a data contract before connecting systems: identifiers, units, quality flags, timestamps, update rates and ownership. Select supported APIs, OPC UA or MQTT interfaces against the actual equipment and security architecture.

A PORTFOLIO ORGANISED AROUND OPERATING DECISIONS

Eight connected solutions

Start with one operating constraint, establish its baseline and expand after the pilot meets its acceptance criteria. Each solution has a defined scope, product stack and evidence trail.

06

Personnel tracking and accountability

Who is where, how current is that position, and who remains unaccounted for?

07

Worker health and fatigue risk

Which indicators require a qualified review or an agreed site response?

08

Machine performance and industrial IoT

Which assets are losing availability, capacity or energy performance?

09

Mining connectivity and communications

Which work areas can deliver usable information, and what happens during an outage?

10

Environmental and resource monitoring

Which conditions or resource losses require operational investigation?

11

Remote monitoring and intelligence

Who reviews each exception, follows the response and hands over unresolved work?

13

Digital compliance and project readiness

Which requirement lacks valid evidence, and who closes the gap?

14

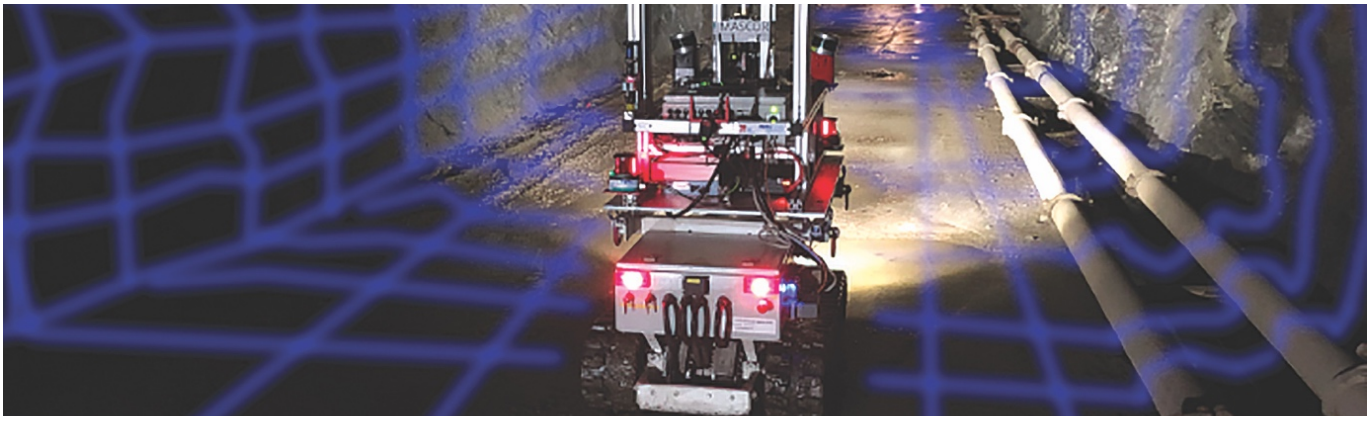
Rail and underground equipment support

Which failure mode, duty or supply constraint is limiting reliability?

01 / LOCATION IS AN OBSERVATION, NOT AN ASSUMPTION

Personnel tracking and accountability

Specify location quality against the decision: **zone presence**, **passage detection** or a validated **real-time location system (RTLS)**. A last-known position must always carry its age and confidence. [1]



Underground tracking context | Illustrative connectivity overlay

What the solution controls

Identity: link tag allocation to a verified person and shift.
Movement: compare detected zones with an authorised assignment.
Exceptions: review SOS, inactivity or zone events supported by the selected device.

What the shift record shows

Entry and exit reconciliation; last detected zone; observation time; coverage gaps; reviewed deviations; emergency notifications; outstanding accountability exceptions.

Design scenario / an unresolved zone transition

A tag stops reporting at a mapped coverage boundary. The console marks its position as stale, records the gap and starts the agreed check-in process. It does not invent a new location.

Product stack: rugged tags or compatible cap-lamp modules, readers/anchors, emergency interfaces, zone maps and reporting software. Evaluate RFID, BLE or UWB against geometry, installation, accuracy and power requirements.

Acceptance: location error or zone accuracy; observation age; missed events; evacuation reconciliation. [1]

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02 / VALIDATED INDICATORS. PROFESSIONAL OVERSIGHT.

Worker health and fatigue risk

The proposed solution combines **wearable indicators**, **working conditions** and **shift context** to support the mine's occupational-health and fatigue programmes. Clinical interpretation and fitness-for-work decisions remain with authorised professionals. [2]

Physiological indicators

Specify the actual measurement and its limitations. Separate measured skin temperature from estimated core temperature; validate any derived strain score for its intended use.

Heat and workload context

Review suitable heat-exposure measurements, work intensity, PPE and recovery conditions. Ambient temperature alone does not describe an individual's heat strain.

Fatigue risk context

Combine relevant roster, work/rest and task information with validated indicators. A wearable score does not establish a clinical diagnosis or fitness for duty.

Local and remote response

Agree who receives each alert, how it is checked and what happens without connectivity. Restrict identifiable health information to authorised roles.

Engineer the wearable around the work

Compare protected belt modules with upper-arm or chest sensors. Assess impact, ingress, snagging, skin contact, motion artefacts, cleaning, PPE fit and battery endurance across the full shift.

Pilot evidence: usable-data time; reference agreement; nuisance alerts; wearability; response follow-through. [2]

03 / MEASURE THE LOSS MECHANISM

Machine performance and industrial IoT

Build an asset hierarchy, identify credible failure modes and select measurements that change a maintenance or operating decision. **Condition monitoring** detects abnormal behaviour; **efficiency analysis** also needs operating inputs and useful output.

Measure the asset in context.

CONDITION / DUTY / OUTPUT



Mechanised underground mining | Image supplied

ASSET / SYSTEM	MEASUREMENT BASIS	DECISION MEASURE
Pumps and water	Flow, head, power, vibration and duty point	kWh per m3 at comparable duty
Fans and compressors	Pressure, flow, power and running state	Specific energy; unloaded running
Conveyors and mobile assets	Tonnes or cycles, hours and delay codes	kWh/t; tonnes per operating hour
Rotating equipment	Vibration, temperature, current and load	Condition trends; repeat fault patterns

Maintenance workflow: validated exception → inspection request → confirmed defect or operating cause → planned intervention → verified closure. Link records to the maintenance management system where an authorised interface exists.

Performance discipline: compare like-for-like duty. Use OEE only where availability, performance and quality have defensible definitions; do not label every condition signal an efficiency gain.

Connectivity engineered for underground reality

Design from the mine plan and an RF survey: bends, advancing faces, machinery, attenuation, power and maintenance access shape performance. Select Wi-Fi, private cellular, leaky feeder or other supported technologies against the use case. [1]

CONCEPTUAL MINE NETWORK / NOT A COVERAGE GUARANTEE



Connected

Report live information within verified coverage and the contracted delivery latency.

Backhaul unavailable

Retain approved local functions and buffer data where supported. Reconcile event time on reconnection.

No device path

Remote updates and alerts cannot arrive. Show last-known data and invoke the agreed local procedure.

Acceptance: coverage by zone; alert delivery p95; end-to-end availability; backup endurance; recovery. [1]

05 / ADD CONTEXT TO THE MEASUREMENT

Environmental conditions and resource performance

Specify the instrument, location, sampling method and response owner for each parameter. Keep **personal exposure**, **fixed-area readings** and **modelled estimates** distinct.

Heat and ventilation

Suitable heat-exposure measures, humidity, airflow and equipment status. Review with ventilation and occupational-hygiene specialists.

Gases, dust and noise

Select hazard-specific instruments and exposure methods. Track calibration, sensor faults, range limits and missing records.

Water and dewatering

Link level, flow, pressure and pump state. Investigate abnormal inflow, duty cycling, delivery constraints and lost energy.

Energy and compressed air

Submeter relevant loads. Compare consumption with production, operating hours and demand; isolate leaks and idle losses.

Design scenario / rising pump energy per unit of water

A higher kWh/m3 reading triggers a duty-point and instrumentation check. The team reviews flow, head, blockage, wear and operating pattern before attributing the change to equipment efficiency.

Outputs: time-aligned trends; instrument-health exceptions; calibrated measurement records; zone and asset summaries; investigations assigned to the correct technical discipline.

06 / A PROPOSED RUSTENBURG OPERATIONS CENTRE

The MineNet remote monitoring model

Our proposed centre would bring authorised workforce, equipment and environmental information into a managed exception workflow. Its value lies in **disciplined review, timely escalation and complete shift handover**. [1, 3]



MineNet monitoring-room visualisation | Illustrative data

An accountable response cycle

Detect: receive a qualified exception.
Triage: confirm age, validity and priority.
Assign: notify the responsible site role.
Follow through: track acknowledgement, escalation and closure evidence.

A shift pack with a clear owner

Workforce reconciliation; individual reports for authorised recipients; reviewed location deviations; equipment and environmental exceptions; network gaps; action status; unresolved items and the next-shift owner.

The service level is part of the system design

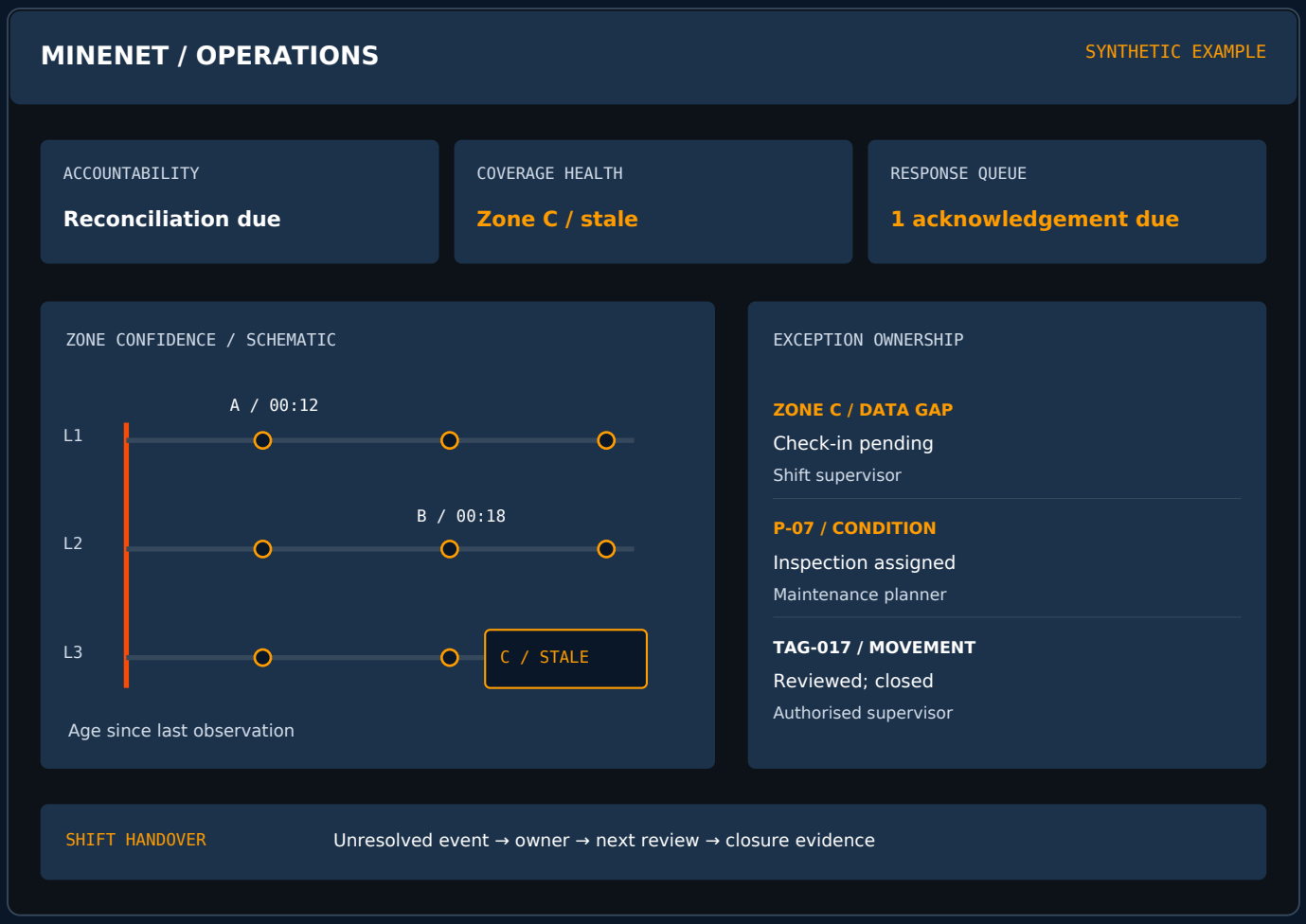
Agree coverage hours, response windows, escalation contacts, severity rules, record retention and fallback procedures. Site emergency command and approved control actions remain with the mine.

Proposed service. Centre capacity and staffing are confirmed before contracted operation.

MINENET OPERATIONS CONSOLE / INTERFACE CONCEPT

One operational view. Clear next actions.

A proposed interface organised around **location confidence, operational exceptions and response ownership**. It shows data quality alongside the reading so a missing signal cannot masquerade as a safe condition.



Illustrative design only. All events, identifiers, zones and time values above are synthetic. This is an interface concept for the proposed MineNet service, not a deployed product or an operational screenshot.

Role-based access

Operational and health views separated.

Visible uncertainty

Freshness, gaps and confidence displayed.

Closed-loop records

Every response retains an evidence trail.

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07 / EVIDENCE CONNECTED TO THE REQUIREMENT

Digital compliance and project readiness

The proposed modular platform links each requirement to an **owner, controlled record, validity period and review decision**. Its purpose is to expose readiness gaps before mobilisation and preserve the evidence behind approval.

01

Opportunities

Qualify opportunities against capability, scope and evidence.

02

Decoder

Convert tender requirements into a controlled obligation register.

03

Contractor Passport

Link enterprise credentials, scope and supporting evidence.

04

Readiness

Assess country, client, site and assignment requirements.

05

GapClose

Assign gaps, due dates, evidence and verified closure.

06

Workforce Passport

Track competence, authorisation and record validity.

07

Equipment Passport

Link inspections, calibration, maintenance and release records.

08

Academy

Connect training and assessment to identified capability gaps.

09

CountryConnect

Maintain local requirement sets and specialist referrals.

10

Projects

Control mobilisation, progress, change and close-out evidence.

11

Verify

Record provenance, reviewer decisions and evidence versions.

12

Insights

Report readiness, overdue actions and expiring records.

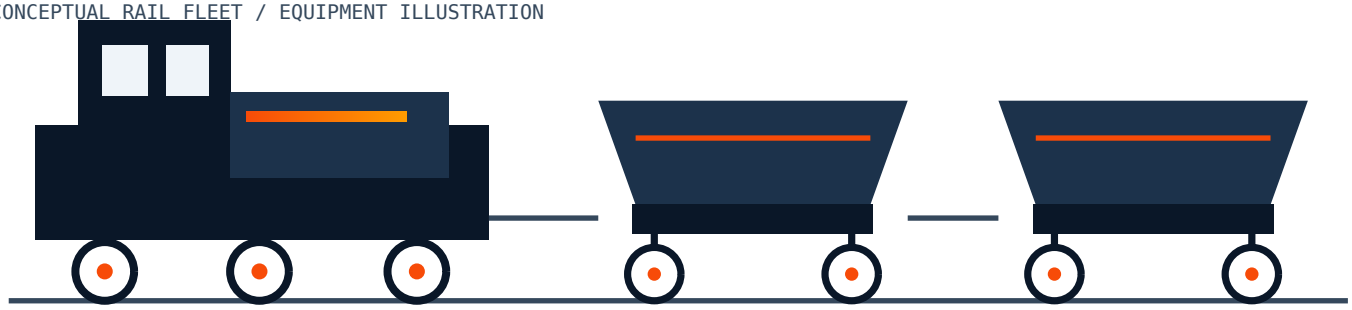
Management systems: controlled policies, procedures and training records can support ISO 9001, ISO 14001 and ISO 45001 readiness. A passport records evidence; the authorised client or professional makes the acceptance decision.

08 / CONNECT THE COMPONENT TO ITS DUTY

Rail and underground equipment reliability

Start with asset duty, failure history and the applicable OEM requirements. Match sourcing and maintenance support to the failure mechanism, then connect inspection and operating evidence to the equipment record.

CONCEPTUAL RAIL FLEET / EQUIPMENT ILLUSTRATION



Battery and charging systems

Duty cycle, charging records, operating temperature, capacity evidence and suitable replacement specification.

Locomotives and material cars

Recurring failures, service history, wheel/axle and coupling records, spares criticality and competent inspections.

Rail infrastructure

Track condition, fastening and turnout requirements; inspections and repairs through authorised specialists.

Pumps, air and vacuum systems

Application duty, performance data, wear components, consumables, maintainability and lifecycle cost.

Practical entry project / a fleet reliability assessment

Create the asset register; rank repeat failures and supply risks; review battery/charging compatibility; define critical spares; prioritise corrective work with an owner and acceptance evidence.

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PILOT DESIGN AND DELIVERY GATES

Prove value before scaling

Select one work area or asset system with a clear decision problem. Establish the baseline, document the test conditions and agree the pass/fail criteria **before** installing the pilot.

01

Define

Use case, baseline, risk owner and acceptance plan.

02

Validate

Field trials, device checks and deliberate failure tests.

03

Release

Signed results, training and operational handover.

04

Sustain

Support, calibration, change control and review.

PILOT MEASURE	WHAT THE EVIDENCE MUST SHOW
Coverage and freshness	Valid updates within the agreed age / expected updates, by zone.
Alert delivery	95th-percentile event-to-recipient time; delivery failures recorded.
Response discipline	Acknowledgements within target / actionable events; closure evidence checked.
Device suitability	Usable shift-data time, battery reserve, failures and wearer/maintainer feedback.
Asset or resource outcome	Comparable-duty energy intensity, delay hours or repeat faults versus baseline.

Acceptance pack: test method, sample period, exclusions, raw records, results, unresolved defects and the client's release decision. Agree numeric targets for the site; publish performance claims only after validation.

ASSURANCE AND TECHNICAL FOUNDATIONS

Govern the data. Own the response.

The proposed delivery model treats **data integrity, operational resilience and access control** as acceptance requirements. Specialist reviews and mine approvals form part of the engagement scope.

Secure the connection

Separate operational and enterprise traffic; authorise data flows and remote access; log privileged activity. Test backup and recovery. [4]

Protect the worker record

Define purpose, authorised access, retention and permitted disclosure. Separate identifiable health information from general production reporting.

Preserve evidence quality

Retain source identity, units, timestamps, calibration, configuration versions and quality flags. Record missing observations explicitly.

Control deployment change

Confirm environmental suitability and applicable equipment approvals. Revalidate coverage, alert logic and interfaces after material changes.

SELECTED TECHNICAL FOUNDATIONS

[1] NIOSH / Wireless communications and electronic tracking

Tutorial Parts 2, 3 and 6: communications, tracking and mine operations centres.

[2] NIOSH / Occupational exposure to heat and hot environments

DHHS (NIOSH) Publication 2016-106. Specialist basis for heat-risk assessment.

[3] GMG / Short interval control in underground mining

2019 guideline. In-shift review and structured operational improvement.

[4] NIST / Guide to operational technology security

SP 800-82 Rev. 3 (2023). Risk-based OT security and system resilience.

Scope note: these are technical references, not MineNet certifications or endorsements. Photographs show third-party operations; interface visuals are labelled concepts. Site requirements, specialist decisions and contracted scope govern each deployment.

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START WITH AN OPERATIONAL CONSTRAINT

Define the problem. Design the evidence.

Bring a work area, asset system or reporting challenge. We will structure the assessment around the decision, the available infrastructure and the evidence a pilot must produce.

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Selected images supplied by MineNet Africa. Monitoring-room visualisation and interface show illustrative concepts.