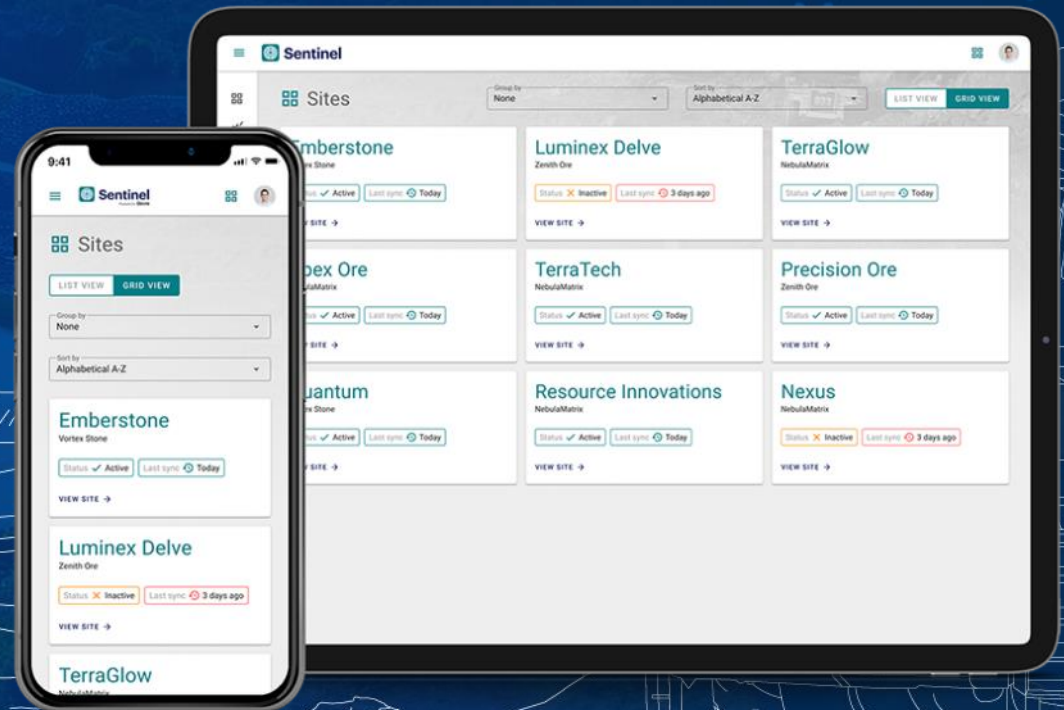




Sentinel

Powered by **Davra**

Remote monitoring solution for dam safety & compliance



In partnership with the European Space Agency,
funded as part of the InCubed program.

Executive Summary

IoTdc is developing a **cloud-based personnel locating and monitoring platform** for the mining industry. The platform provides **near real-time location visibility, behavioural alerting, and personnel accountability** for surface mining operations, specifically tailings facilities and wide-area sites where traditional GSM connectivity is unavailable.

The solution addresses a significant gap in the South African market: while existing providers excel at underground collision avoidance systems, there is no strong local offering for wide-area surface RTLS with integrated personnel management software. This gap, combined with mandatory compliance requirements, creates a compelling market opportunity.

Problem Statement

Mining operations face critical challenges in personnel safety and accountability on surface facilities:



Regulatory Compliance Gap

MHSA amendments (March 2025) mandate tagging and tracking for all operations, yet many surface and tailings facilities lack adequate systems.



Connectivity Constraints

Remote tailings areas have no GSM coverage, requiring non-GSM solutions such as LoRaWAN, mesh, or satellite.



Personnel Accountability

No robust system exists for booking devices to individuals, tracking entry and exit, and maintaining real-time headcounts.



Incident Response

Inability to quickly locate personnel, detect stationary or man-down situations, or replay historical movements for incident investigation.



Software Fragmentation

Existing solutions focus on hardware and collision avoidance; software for booking, playback, and alerting is weak or absent

TSF Management Problems



Operational Inefficiencies

Manual readings are slow, infrequent, and error prone. Manual data entry is slow and inefficient – 1000's of spreadsheets!



Regulatory Compliance

August 2025 deadline for all remaining TSF. Risk fines, penalties, reputational damage, impact on stock price. Reduce impact through application of best practices.



Reporting Requirements

Manual report writing costs TSF management companies ~ 6 business days per year per site.



TSF Failure

4 major dam failures per year for the past decade, resulting in 668 deaths & missing persons, long-term environmental damage, fines, penalties, cleanup and rehabilitation costs, & stock price collapse.



Response Plans

Too complex - hundreds of rules, multiple sites, various response levels. Error prone. Too slow – up to 3 weeks from event to response plan triggering.

Framing the Risk

Between 2008 and 2018, apart from the devastating and well documented failure of the Vale SA mine tailings dam in Brumadinho, Brazil on 25 January 2019, there have been **31** recorded mine tailings failures. As a result of the disaster, the Vale SA stock price fell **24%** losing **\$19 bn** in market capitalisation, the biggest single day loss in the history of the Brazilian stock market. In addition, they are likely to incur approximately **\$6bn** in cleanup costs for the disaster. Other notable failure events include:



**Samarco (2015,
Brazil)**

**\$5.1
billion**

in damages with a proposed settlement of \$23.7 billion to cover the extended damages of the breach.



**Mount Polley
(2014, Canada)**

**\$67
million+**

in cleanup costs.



**Jagersfontein (2022,
South Africa)**

**\$27.5
million**

and includes costs associated with rebuilding homes, compensating farmers, replacing infrastructure, and addressing environmental damage.



**Sino Metals Chambishi
(2025, Zambia)**

**Significant
financial
losses**

including costs associated with environmental remediation, infrastructure damage, and potential legal liabilities. The exact total cost is difficult to determine, but it is substantial, with estimates reaching tens of millions of dollars.

Stakeholder Benefits

Mining Client

- GISTM Standard and statutory compliance
- Near real-time visibility into Tailings Dam status
- Enhanced auditability of risk mitigating steps and procedures
- Technically and economically viable for small, medium and large mining installations.
- Sustainable data delivery addressing social, environmental and economic requirements metrics.
- Readily implemented on a large scale to multiple jurisdictions

Contractor

- No paperwork – eliminate manual error ridden processes
- Increase integrity and assurance of data
- Proactive TARP messaging & alerts
- Automated site scheduling & reporting
- Automated weekly consolidated Client reporting
- Always connected – All platforms (IOS/Android/Windows)
- Opportunity to on-sell and earn additional revenue

EOR/Consultant

- Ongoing compliance assessment & monitoring – Owner/Operator & General Stakeholder access
- Leverage industry leading Industrial IOT platform to consolidate all data sources
- Apply analytical methodologies on combined dataset (edge sensors, Lidar, drone footage, EO data, weather data etc.)
- Predictive modelling.
- Produce actionable insights and reporting
- Single pane of glass for regulatory, client and other stakeholder reporting



Market Opportunity

A purpose-built surface RTLS software platform with strong booking and accountability features, designed for non-GSM environments.

In Scope (MVP)

Feature	Description	RFP Alignment
Real-time Map Dashboard	Interactive map with live position display, zoom/pan controls, optimised for 24"+ screens.	Direct requirement
Device Booking System	Check-in/out workflow linking devices to personnel with timestamps.	Direct requirement
Stationary Alerting	Visual on-screen alert when device stationary >20 minutes (configurable threshold).	Direct requirement
Occupancy Count	Real-time headcount of personnel within each site.	Direct requirement
Historical Playback	Shift-based movement review with play/pause/seek controls.	Direct requirement
Role-Based Access	Three roles: Admin (config/users), Manager (operations/reports), Monitor (view/acknowledge).	Direct requirement
Audit Trail	Immutable log of all booking actions and user activities.	Direct requirement

Out of Scope (MVP)

Feature	Rationale	Target Phase
Email/SMS alert escalation	Visual alerts sufficient for control room in lean MVP.	Phase 2
PDF/print reporting	On-screen data sufficient initially.	Phase 2
Multiple geofence zones	Single site boundary sufficient for MVP.	Phase 2
External system integrations	Standalone operation first.	Phase 2
Mobile/tablet responsive UI	Desktop control room focus for MVP.	Phase 2
Multi-tenant provisioning UI	Single tenant initially; manual onboarding acceptable.	Phase 2
Advanced analytics/heatmaps	Value-add feature, not core safety requirement.	Phase 2+

Key Differentiators



1

Software-First Approach

Purpose-built platform, not a hardware vendor afterthought.



2

Booking System Excellence

Full personnel accountability lifecycle, not just location dots on a map.



3

Multi-Tenant Architecture

Designed for SaaS scale from day one with a Platform → Tenant → Site hierarchy.

GSM

4

Non-GSM Nativ

Built for LoRaWAN and mesh environments, not retrofitted GSM solutions.



5

Local Deployment

AWS for South African data residency with a local support model.

Sentinel: Safe, Efficient, Compliant Tailings



Remote Monitoring

- Continuous monitoring of critical infrastructure.
- Remote data from ground sensors, satellite imaging, and more.
- Trigger alerts automatically.
- Integrated weather reports.



Operational Efficiency

- View and manage all sites in one centralised platform.
- Access from anywhere in the world.
- No more manual data collection. No more spreadsheets.
- Save thousands of hours of manual collection, processing, and report writing.



Safety

- Reduce risk of TSF failure with up-to-date, accurate measurements.
- Remote data collection reduces risk to workers.
- Send automated alerts to key personnel ensures fast action and quick resolution.
- Integrated response plans ensure correct action is always taken.

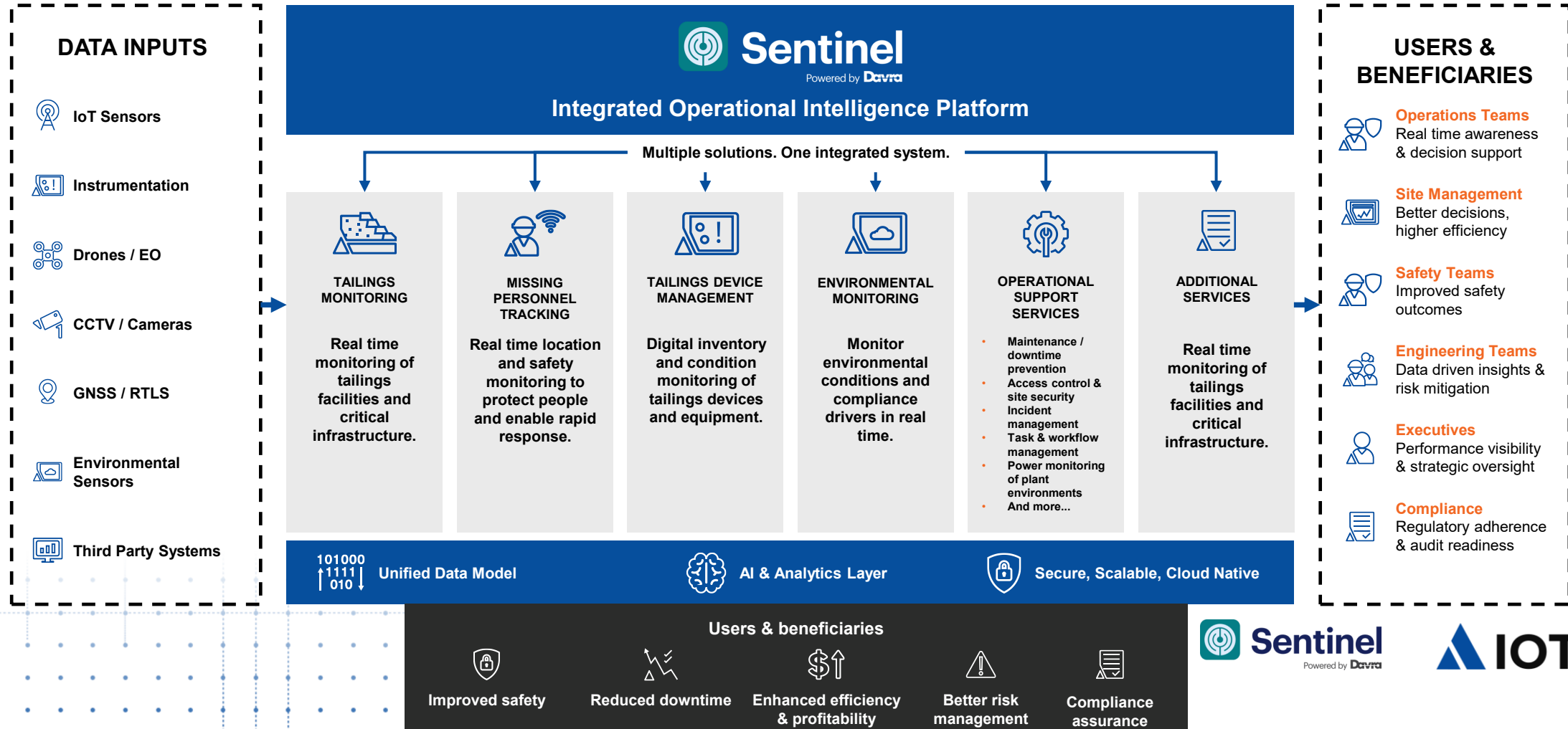


Regulatory Compliance

- Simplify GISTM compliance.
- Collect, manage, and report tailings data using approved templates.
- Enhance regulatory adherence, and safeguard against environmental and reputational damage.

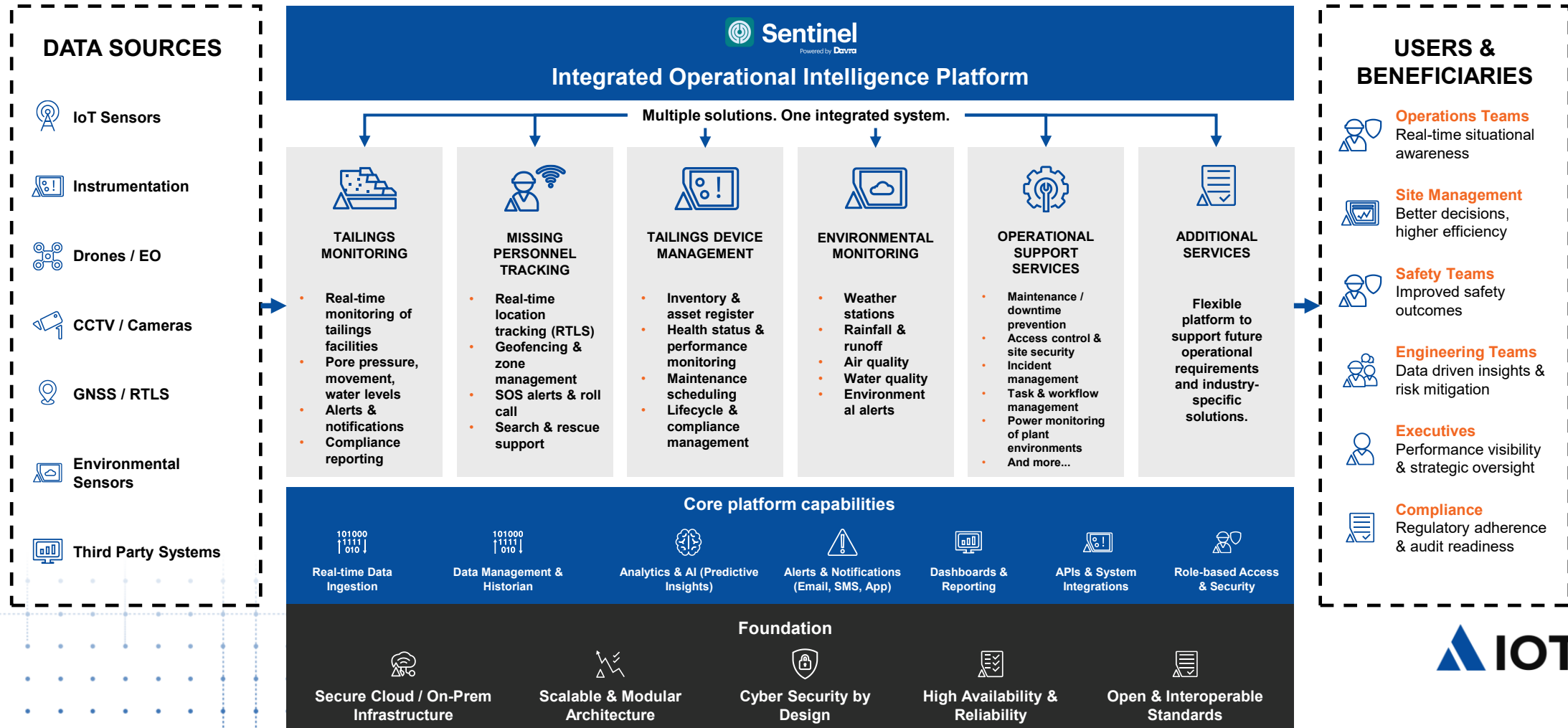
One platform. Multiple solutions. Measurable impact.

Delivering integrated operational intelligence and services for the mining industry through a single, unified system - **Sentinel**



One platform. Multiple solutions. Measurable impact.

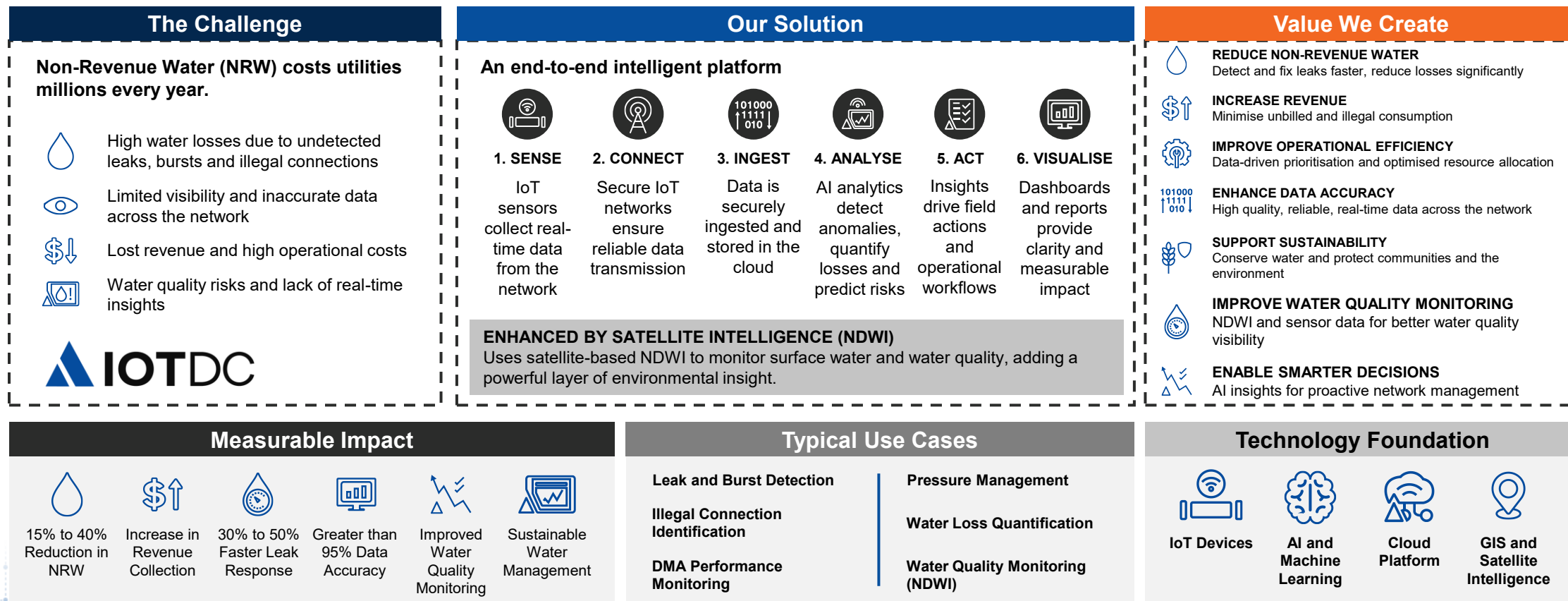
Delivering operational intelligence and services across the mining value chain through a single integrated system architecture.



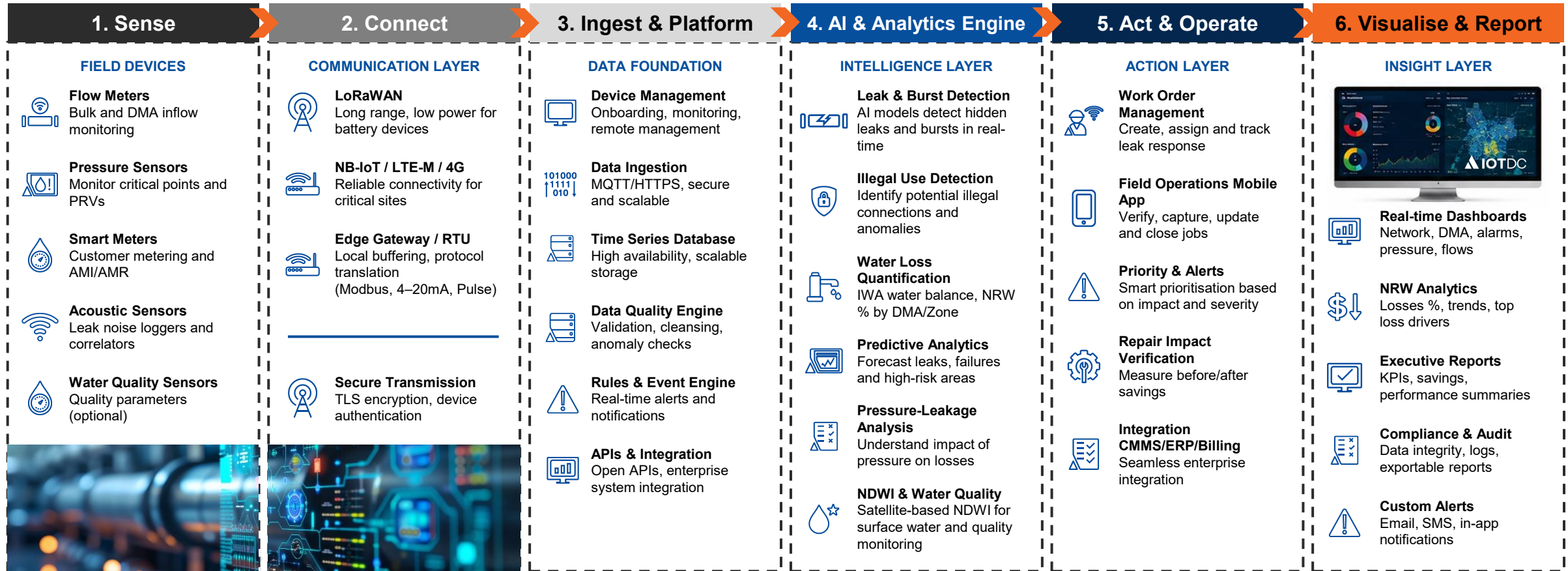
IOTDC NRW Solution

IoT + AI + Satellite Intelligence for Smarter Water Networks

Our end-to-end digital platform empowers utilities to detect losses, improve data accuracy, quantify water loss and make data-driven decisions to **improve efficiency, protect revenue and deliver better service.**



IOTDC NRW Solution Architecture



DATA SOURCES

- IoT Field Data
- GIS & Network Data
- Billing & Customer Data
- Satellite Data (NDWI)

IOTDC NRW Solution Architecture

Smarter data. Faster action. Less water loss. Better service for communities.

ENHANCED BY SATELLITE INTELLIGENCE (NDWI)

Uses satellite-based NDWI to monitor surface water and water quality, adding a powerful layer of environmental insight.



Surface Water Monitoring



Water Quality Assessment



Trend Analysis Over Time



Risk & Contamination Indicators



Geospatial Insights

MEASURABLE IMPACT



15% to 40%
Reduction in NRW



Increase in Revenue
Collection



30% to 50%
Faster Leak Response



Greater than 95%
Data Accuracy



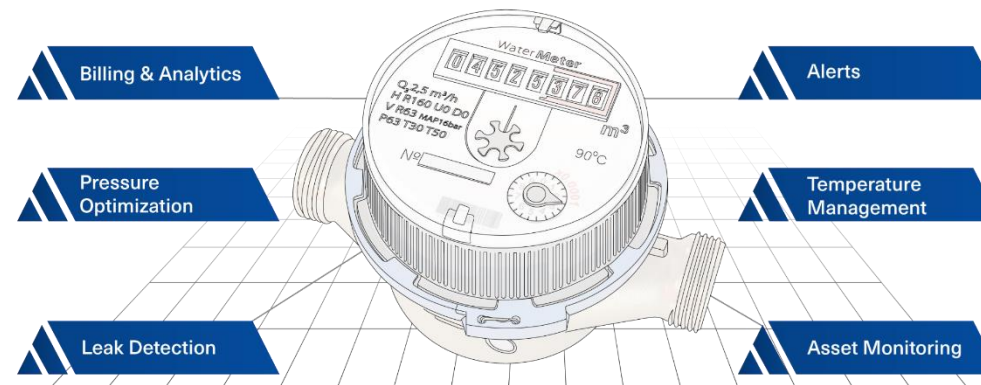
Improved Water
Quality Monitoring



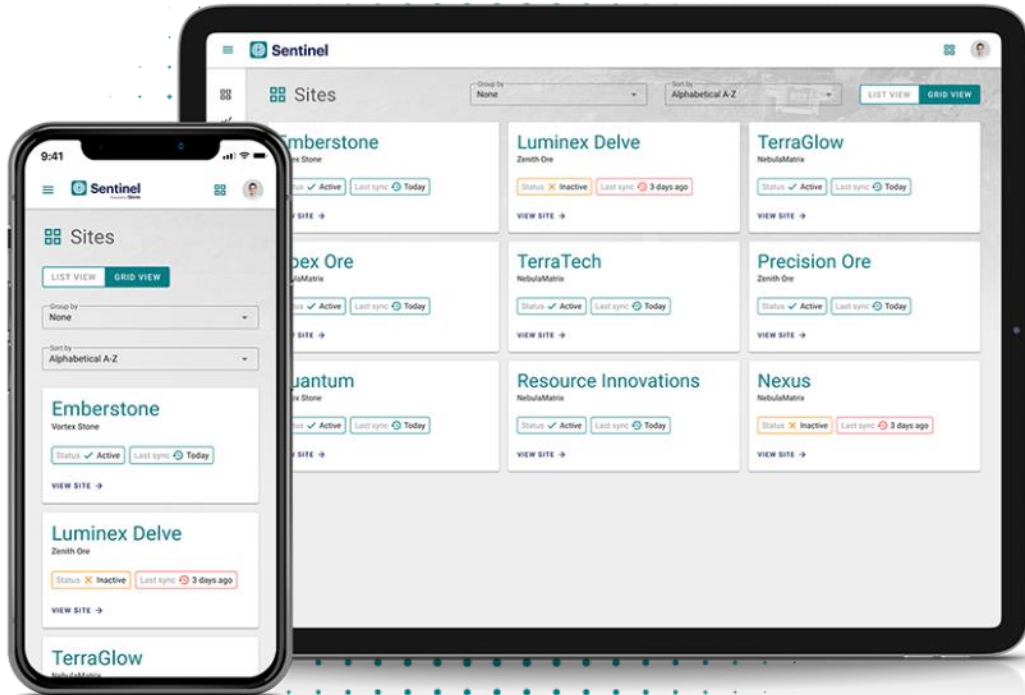
Sustainable Water
Management

Value We Create

- **REDUCE NON-REVENUE WATER**
Detect and fix leaks faster, reduce losses significantly
- **INCREASE REVENUE**
Minimise unbilled and illegal consumption
- **IMPROVE OPERATIONAL EFFICIENCY**
Data-driven prioritisation and optimised resources
- **ENHANCE DATA ACCURACY**
High quality, reliable, real-time data
- **SUPPORT SUSTAINABILITY**
Conserve water and protect communities and environment
- **ENABLE SMARTER DECISIONS**
AI insights for proactive network management
- **IMPROVE WATER QUALITY MONITORING**
NDWI and sensor data for better water quality visibility and protection
- **SCALABLE & FUTURE-READY**
Modular architecture that grows with your needs



Operational Dashboard



- Collect, display and manage your data
- Unlimited number of dams
- More than 10 trackable metrics
- Integrated weather reports
- Customise alerts to response plans

Sentinel: Remote Monitoring & Compliance Solution

- Davra Sentinel is a remote monitoring application for safe, efficient, and compliant tailings management.
- Developed in partnership with ESA, Sentinel uses the latest in satellite and Internet of Things (IoT) technology to monitor your tailings 24/7. When it detects a problem, it raises an alert in line with your response plan.
- Streamline your operations, manage all your sites from anywhere in the world, simplify regulatory compliance, and create reports with just a few clicks.



Streamline operations with Remote Data Collection & Report Generation



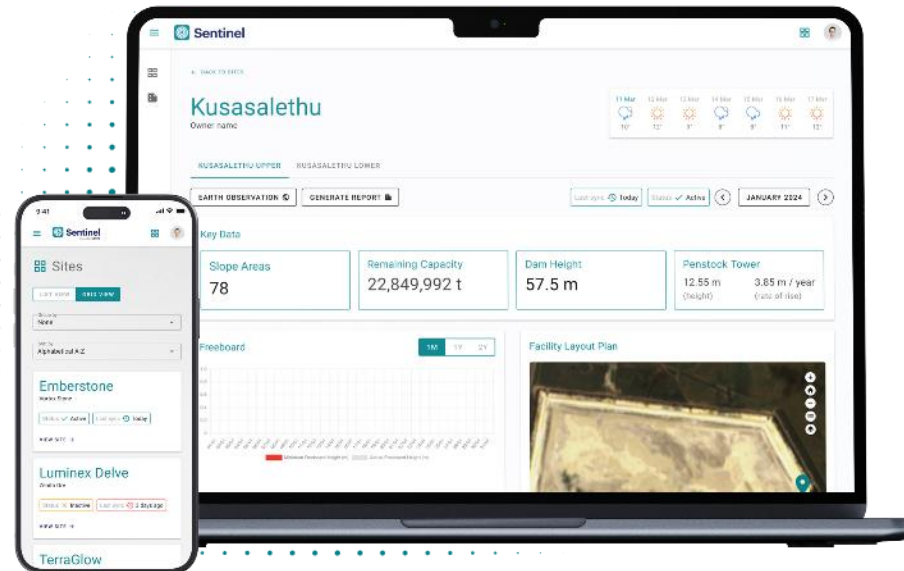
Simplify your GISTM compliance journey



Instant alerts in line with response plan



Reduce risk of TSF failure



Ideal for:



Mine Owners/
Operators



Tailings Service
Providers



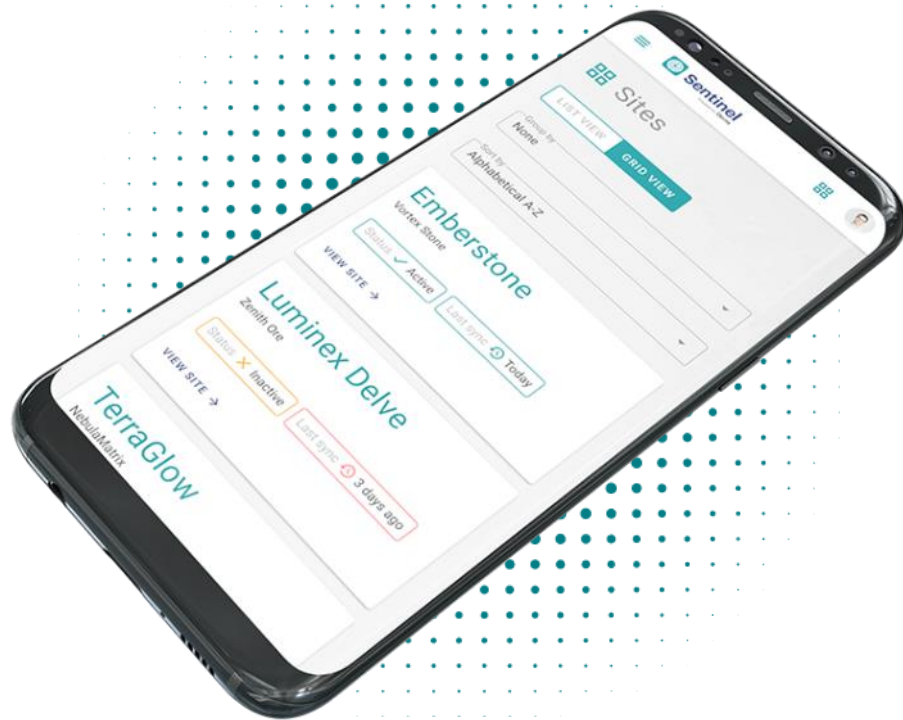
Regulatory
bodies

**Reduce
Operational
Costs**

**Simplify
Compliance**

**Improve TSF
Safety**

Mobile Application



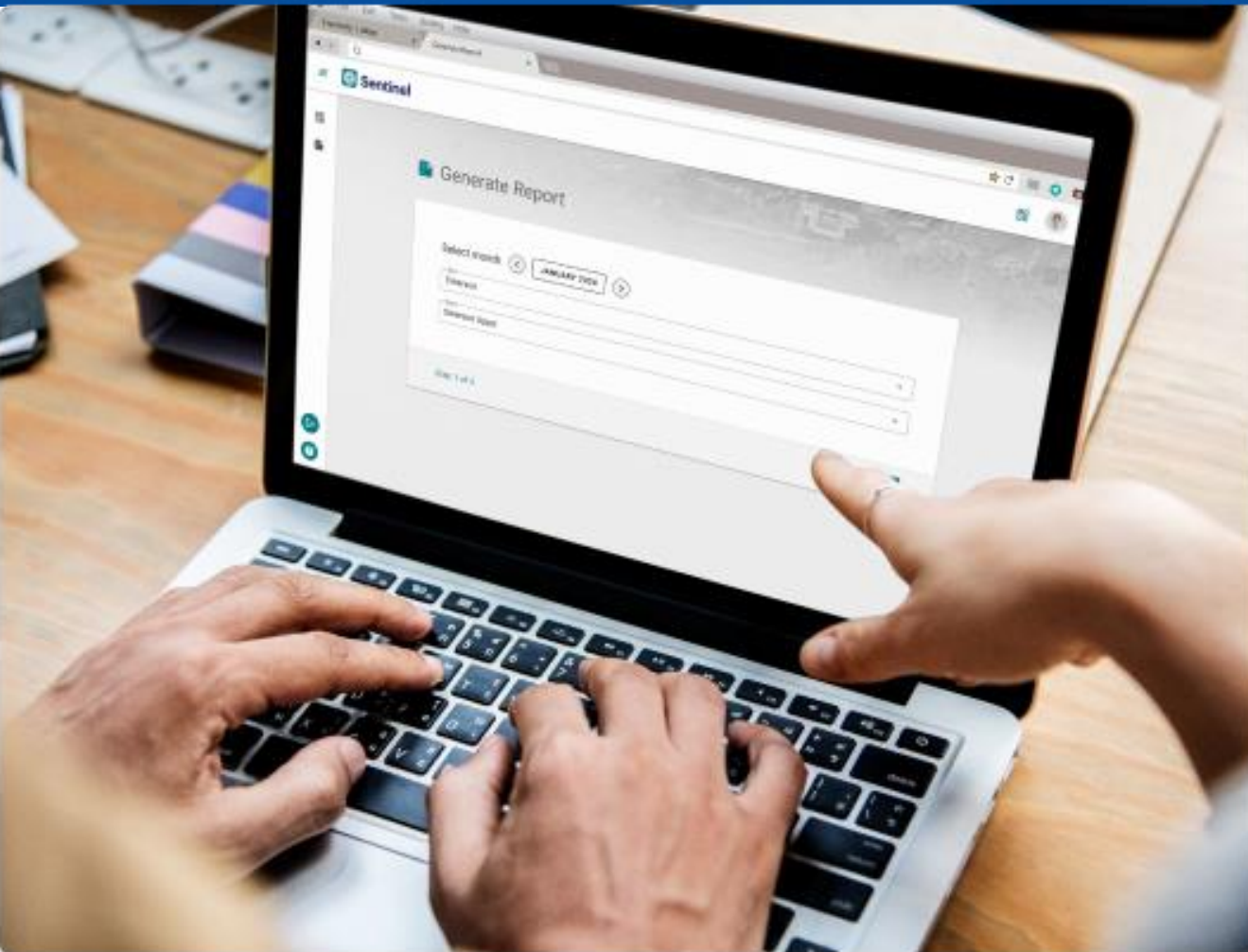
- Secure login with 2FA and RBAC
- Easy-to-use manual data entry
- Context-aware inputs
- Offline data storage
- Automatic network sync

Automated Data Collection



- Integrated remote sensor data
- Automated analysis & processing
- CCTV, satellite, LiDAR, drones, and ground sensors
- LoRa, cellular, & Wi-Fi connectivity

Report Generation



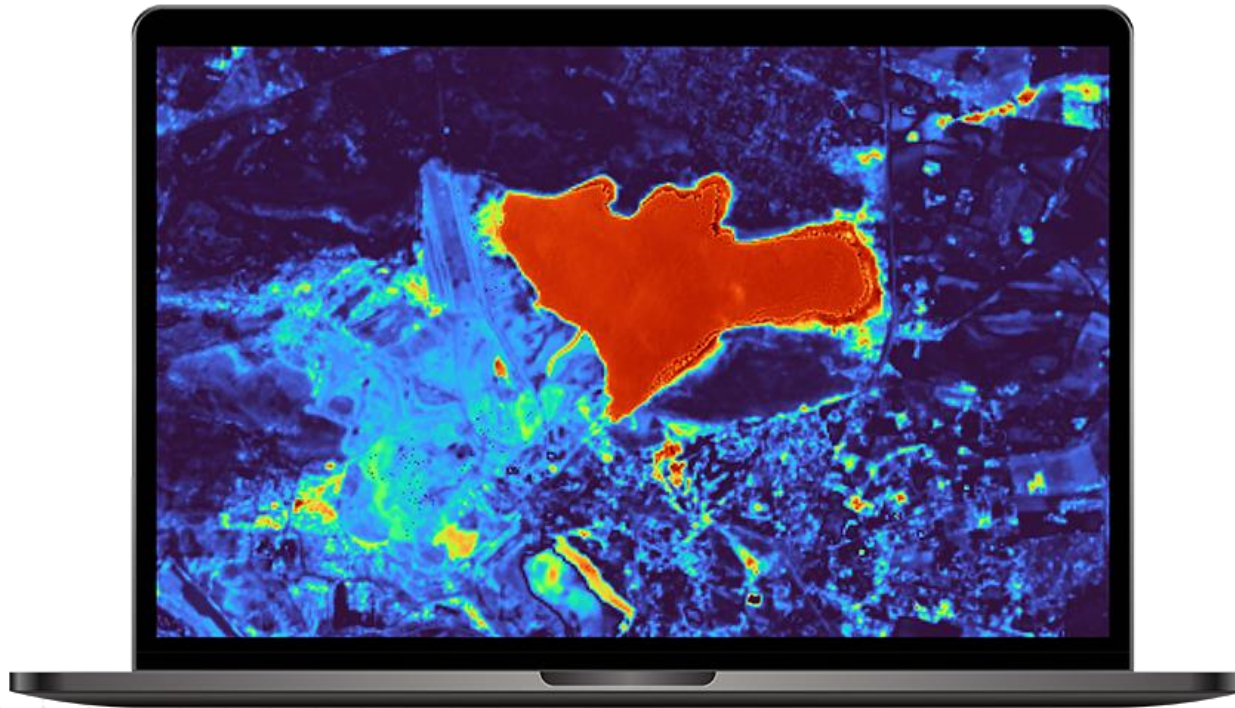
- Automated report generation
- Integrated IoT data
- Flexible templates
- Fully compliant with GISTM standards

Earth Observation



- ESA-powered satellite imagery
- EO dashboard & reporting tools
- Multiple measurements type supported
- Millimetre accurate displacement
- Automated alert system

Geo-Monitoring



- Multiple remote-sensing methodologies
- Displacement monitoring (inSAR)
- Soil moisture analysis (OPTRAM)
- Vegetation health assessment (NDVI)
- Land classification capabilities

About Davra

Founded in 2011 by a team of Big Data and Data Analytics veterans, Davra is a pioneering Internet of Things company that helped coin the term Application Enablement Platform (AEP).

At a glance

1000+

Customers

4,000,000+

End points (Sensors, Gateways, Cameras, Drones etc)

4 Countries

Global Offices
60+ Employees

6 Regions

Globally connected partners

Target Industries

- Equipment Manufacturing
- Mining & Natural Resources
- Transport & Logistics



- Founded 2011
- Office locations: Ireland, Italy, United Kingdom, United States
- Highest Ranked Privately Owned Company in Gartner IIOT Magic Quadrant
- Accolades: ISO 9001, ISO 27001, SOC-2 Type 1, Gartner MQ 2019 – 2023, Fedramp Compliant, DOD IL5





www.iotdc.co.za

davra.com/sentinel