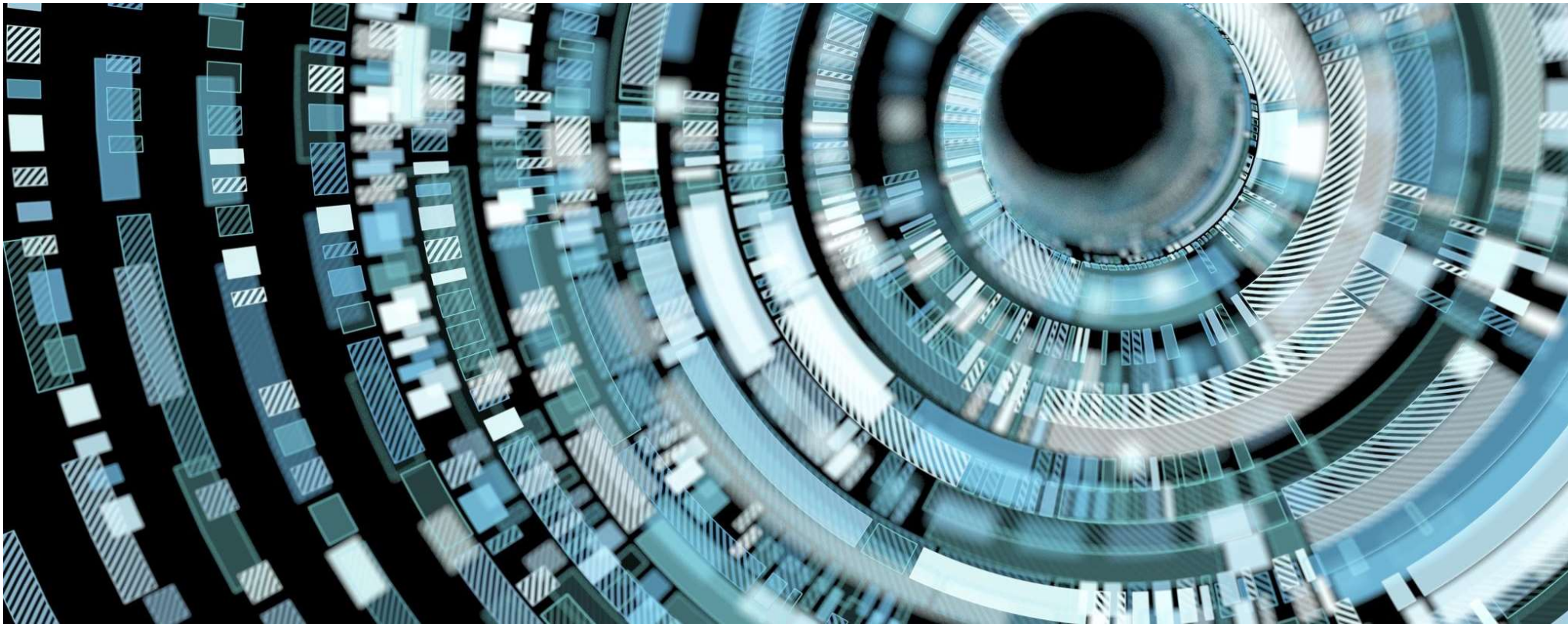
Colorado Mission 2024
Amanda Adams - Stantec

Tailings Dams Data Management Systems: Moving Beyond GISTM Compliance



Tailings Dams Data Management Systems: Moving Beyond GISTM Compliance

GISTM Topics

Best Practice Approach

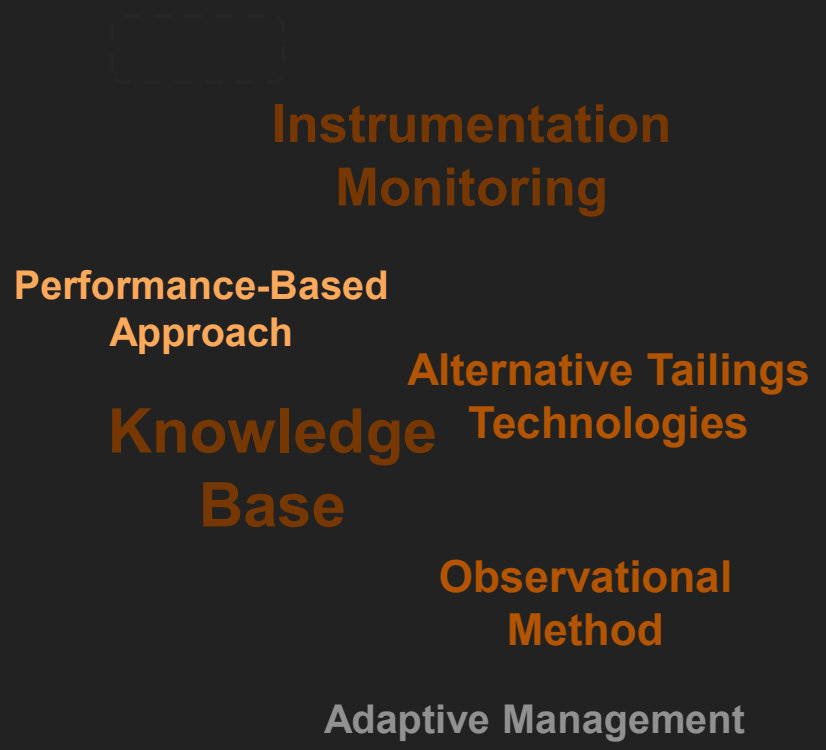
- To be compliant with GISTM, Operators must use specified measures to prevent the catastrophic failure of tailings facilities and to implement **best practices** in planning, design, construction, operation, maintenance, **monitoring**, closure and post closure activities..

Iterative Data Review

- It asks for the knowledge base to be used by the owners and key stakeholders in an iterative way.

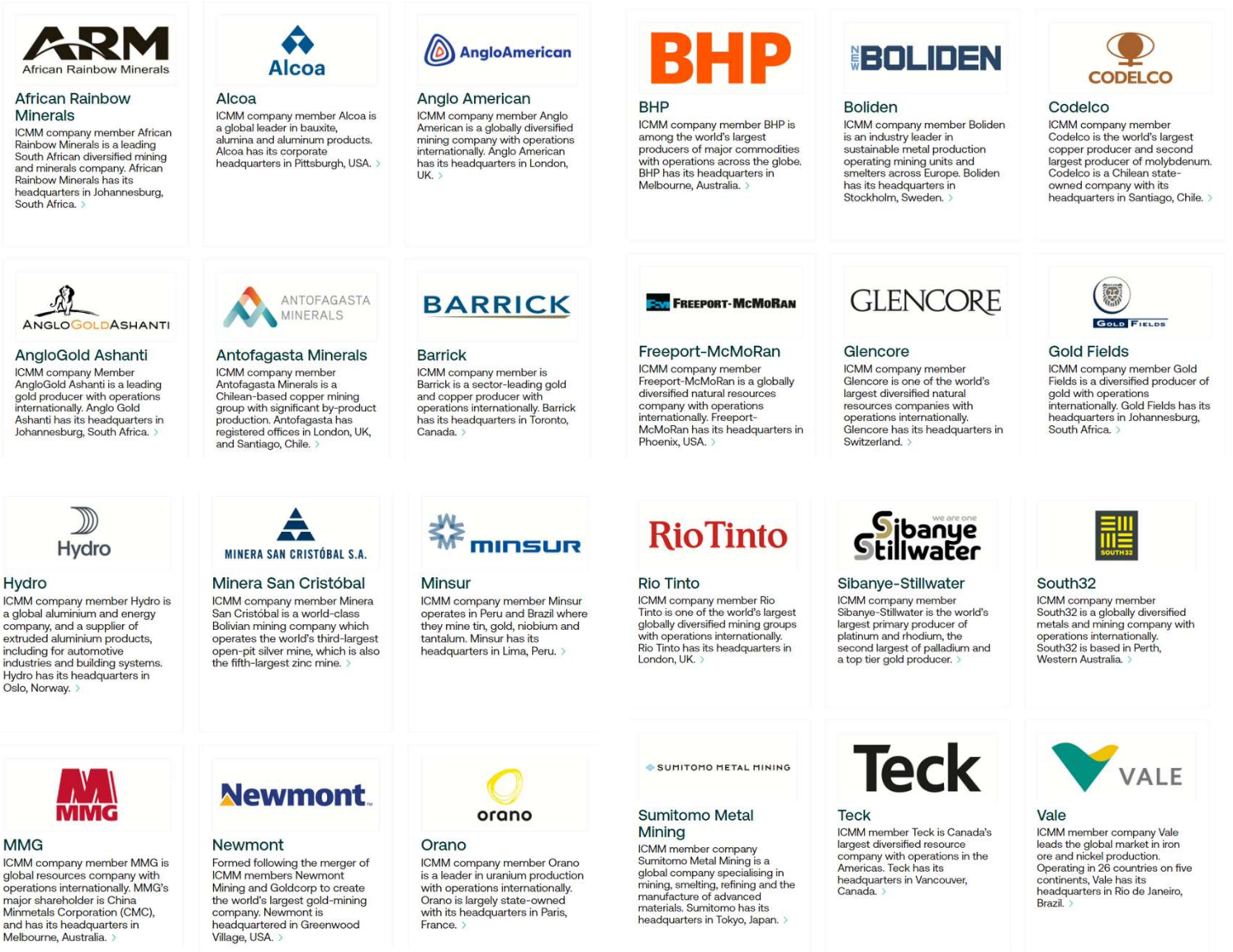
Comprehensive Monitoring System

- A comprehensive monitoring system must support the full implementation of the **Observational Method**, through which “best estimate” design parameters on the basis of available data can be progressively verified, validated, or refined, as real data becomes available.



ICMM Company Members

When Global Industry Standard on Tailings Management was published in August 2020, ICMM members committed to conform with the GISTM for all tailings facilities classified as ‘extreme’ or ‘very high’ consequences by August 2023, and all other facilities by August 2025.



GISTM Journey

ICMM Members Commitment to Compliance

What comes **after** GISTM?

What GISTM Calls For

Adaptive Management
Design of the monitoring program for the tailings facility should be in accordance with the principles of Adaptive Management, which is a structured, iterative process of robust decision-making with the aim of reducing uncertainty over time via system monitoring. (Requirement 7.1)

Comprehensive Monitoring System
GISTM calls for comprehensive monitoring of tailings facilities for verifying design assumptions and for monitoring potential failure modes. (Requirement 7.2)

Life-Cycle Monitoring
GISTM emphasizes recording and evaluating the data at appropriate frequencies to measure performance throughout the tailings facility Lifecycle. (Requirement 7.3)

Monitoring Frequencies Recommend by EOR
GISTM calls for analyzing technical monitoring data at the frequency recommended by the EOR. It requires promptly submitting evidence of deterioration to the EOR for review. Performance outside the expected ranges shall be addressed promptly through Trigger Action Response Plans (TARPs) or critical controls. Requirement 7.4)

Integrated Tools Can

Provide decision-makers access to real-time, reliable data. It helps in risk assessment, understanding trends, and implementing preventive or corrective actions quickly, all of which align with GISTM's focus on data-driven management

Integrate the performance metrics from various instruments and vendors, providing operators with a comprehensive overview of the facility's health

Store historical data, facilitating long-term trend analysis and aiding in lifecycle decision-making

Integrate TARP notification systems. Real-time data is continuously monitored, with automated alerts activated when thresholds are breached. The dashboard can display these alerts using color-coded statuses.

Log response actions, including the steps taken to address the issue and the time between trigger events and responses. This ensures prompt action and real-time monitoring of response effectiveness.

Holden Mine Data Management System

We worked with Rio Tinto to tailor a more efficient data management system at their Holden Mine, featuring GIS Inspection Forms and Mosaic.

First, we developed 18 customized digital forms for field inspections and routine maintenance tasks.

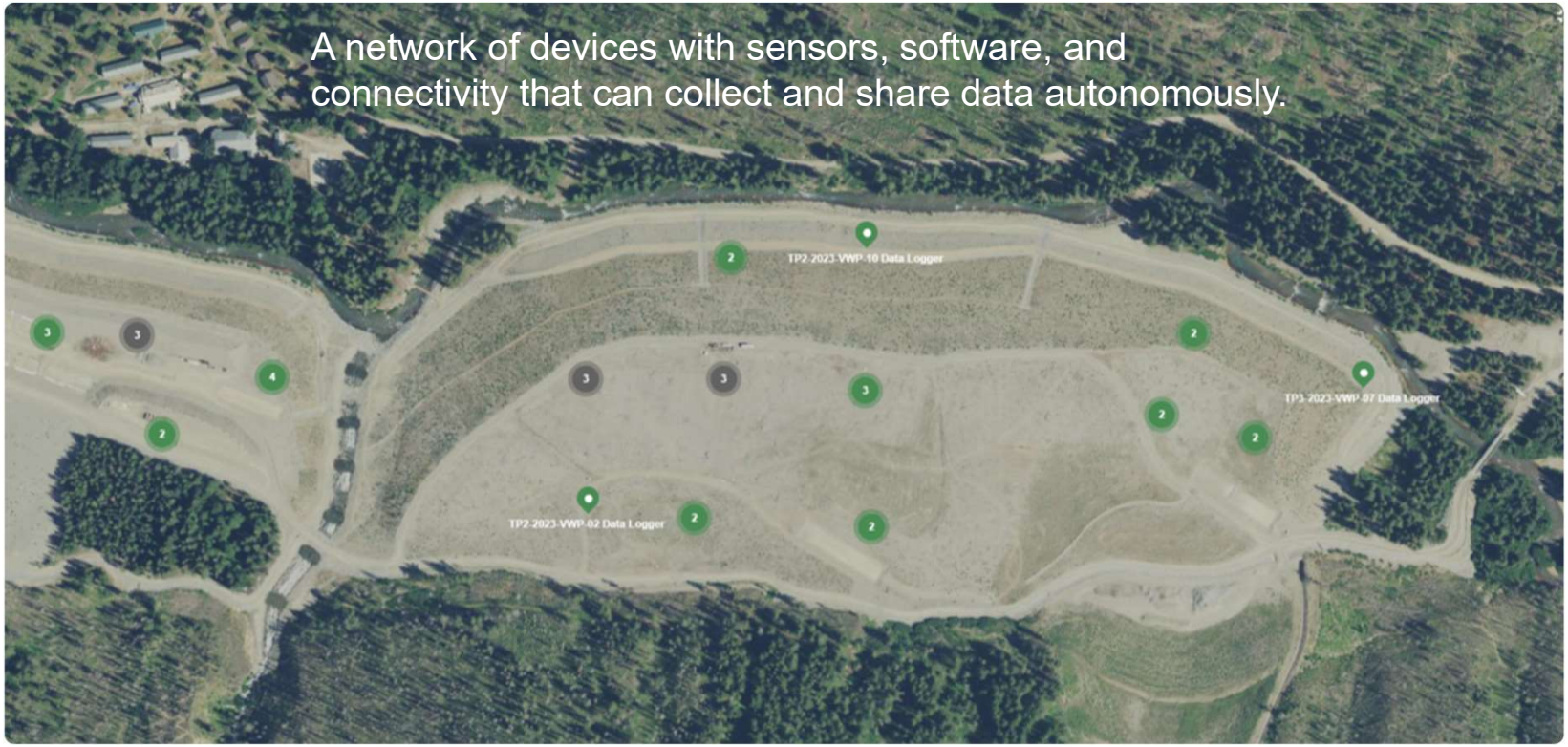
Mosaic took this further by integrating:

- Data from geotechnical instruments placed around the mine
- Real-time weather station data
- Threshold triggers and notifications
- Automatically generated tables and charts

This system allows real-time access to asset data and easy analysis of trends, regardless of the site's remoteness.

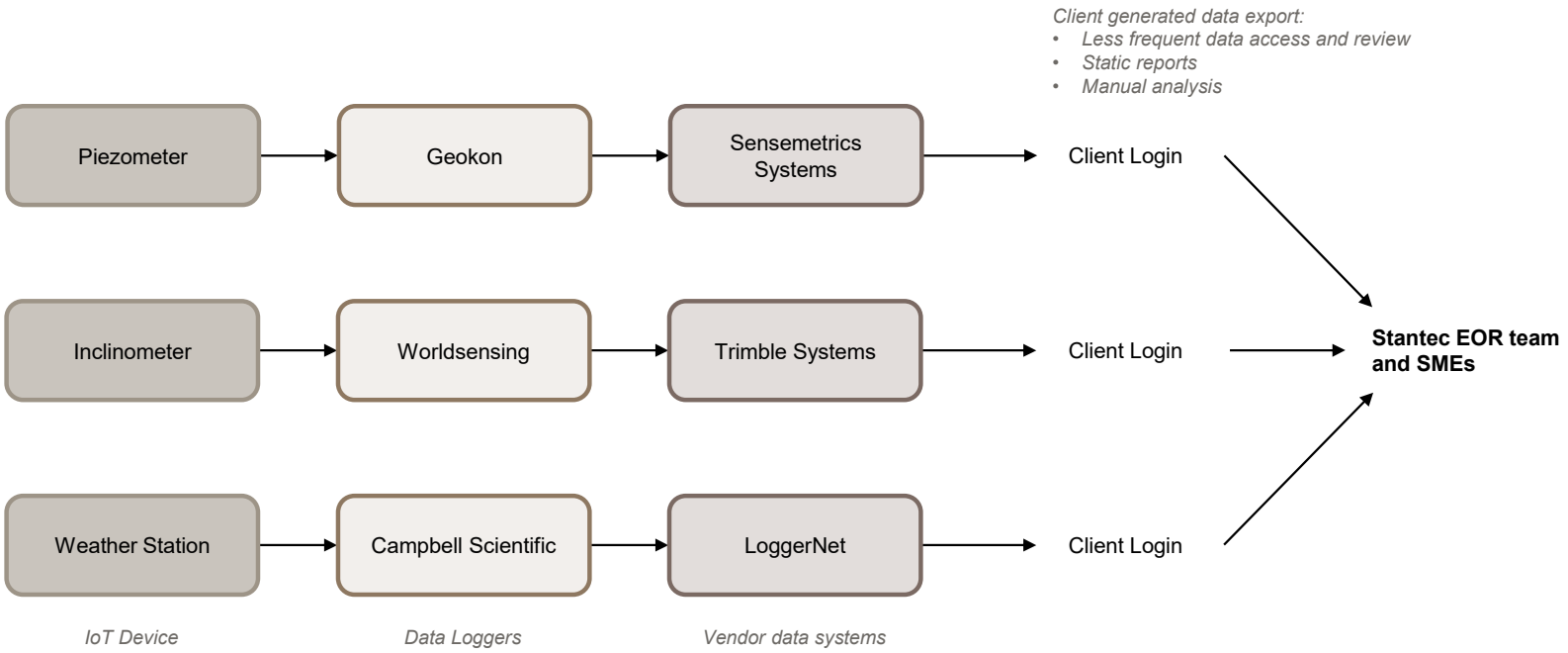
Chelan County, Washington

The Internet of Things (IoT)

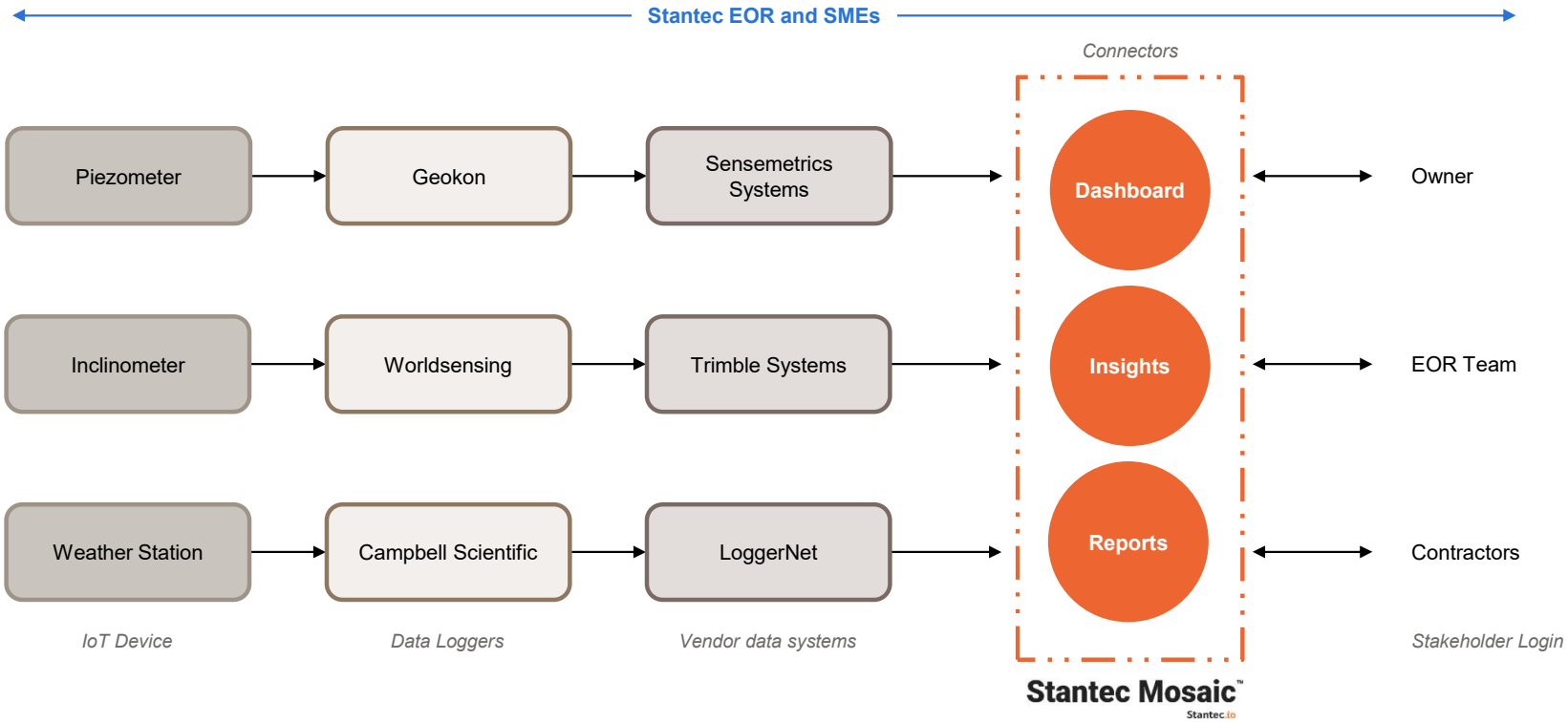


← Multiple IoT devices from different vendors

Example data workflow at a mine

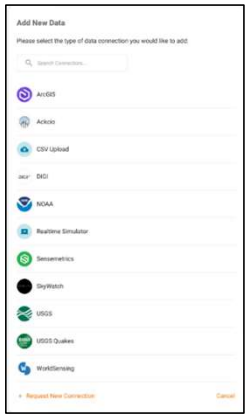


Integrated Data Management Workflow

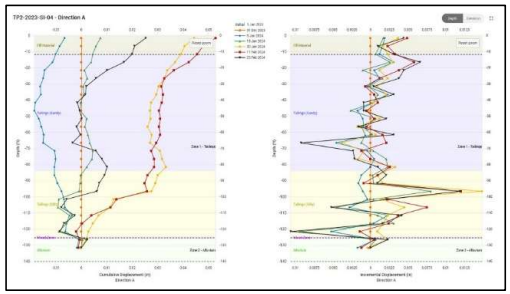


Data, Data, Data

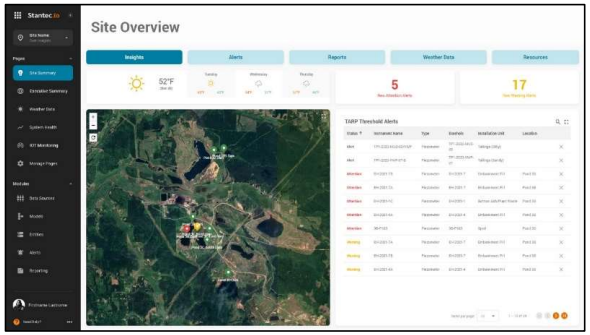
Data Integration → **Data Analysis** → **Data Reporting**



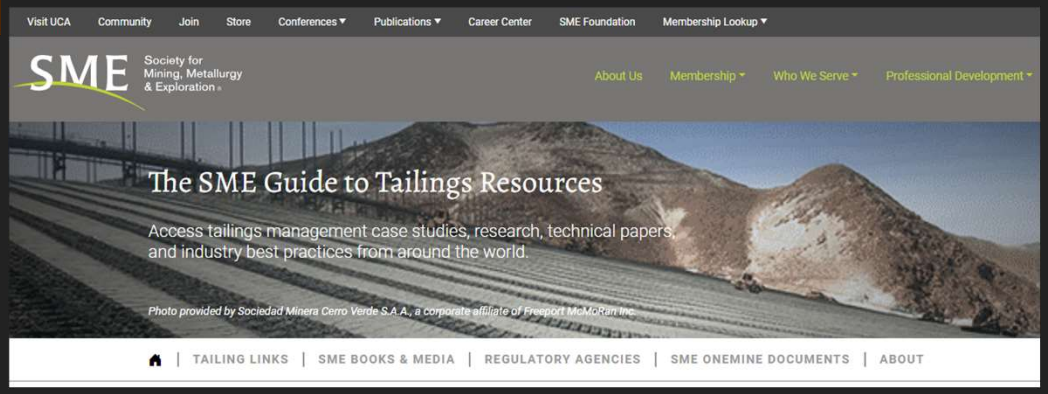
- Integrates data connectivity with automated data capture from remote areas and from any type of sensor
- Standardizes data management and storage of data over time
- Maintains data integrity and usability

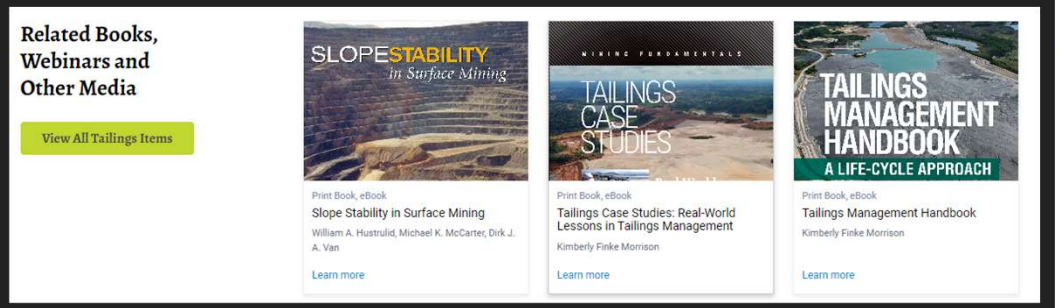


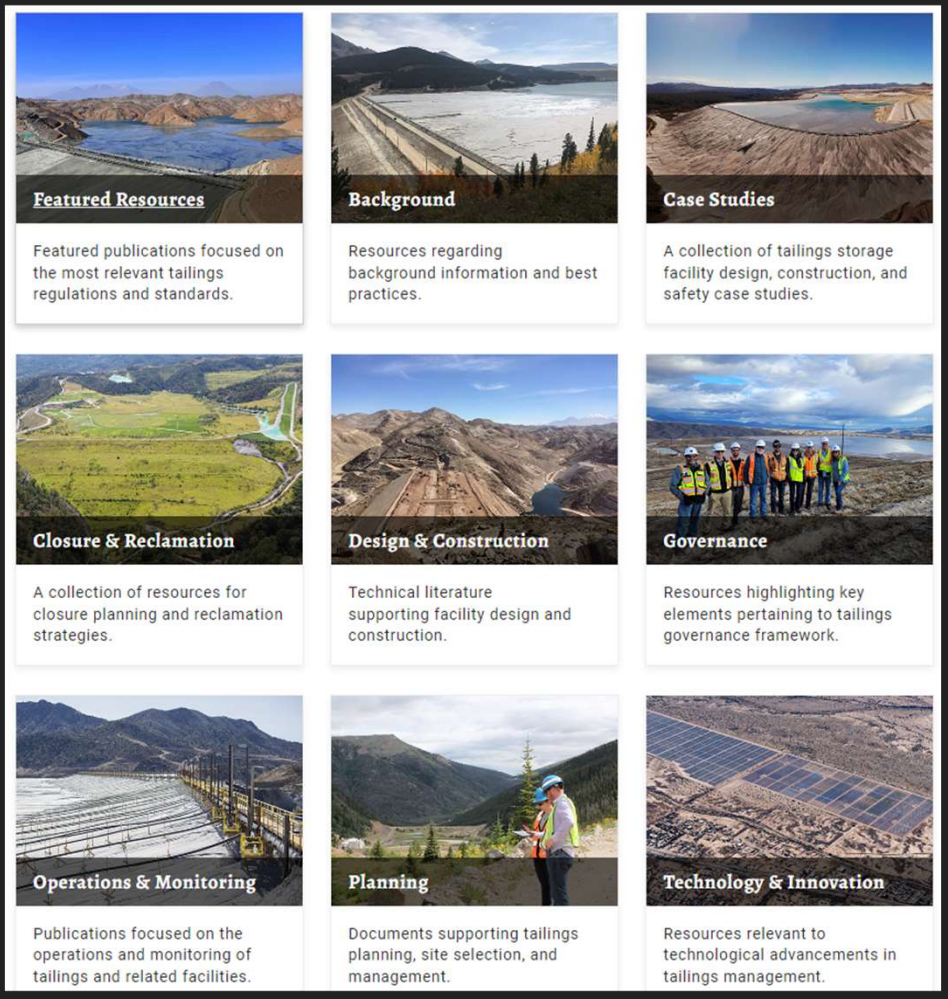
- Embeds engineering algorithms and analytics for real-time insights
- Detects trends that may be indicators of emerging problems
- Raises alerts using TARP thresholds



- Customizable graphical insights
- Provides real-time access to site insights using templatized dashboards
- Provides on-demand access and data export







SME Tailings Portal – Consolidated Resources

The Tailings Information Portal, offering a curated database of resources, aligns with SME's values of promoting qualified personnel development and transparent information dissemination, crucial for mining industry success. https://www.smenet.org/tailings

Questions?