



UNDERSTANDING YOUR PIPELINE. IMPROVING YOUR PERFORMANCE.

ANDRITZ Pipeline Dynamics for leak detection

ANDRITZ

Real-time monitoring and intelligent decision-making for critical pipeline infrastructure

In various fluid transportation industries, environmental awareness is essential. Meeting increasingly strict environmental standards is mandatory. We need systems that not only detect and locate leaks but also ensure intelligent pipeline management. In environments where every second counts, ANDRITZ provides intelligent monitoring to anticipate failures and protect critical assets.



Real-time pipeline monitoring across complex terrain

INTELLIGENT PIPELINE PERFORMANCE

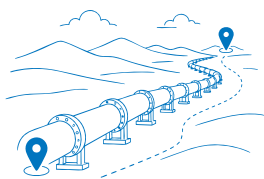
Maximize the ROI of your existing infrastructure with a zero-CAPEX, 100% software-based monitoring solution. Operating over complex distances with limited instrumentation makes risk mitigation challenging.

ANDRITZ Pipeline Dynamics creates a dynamic digital twin, continuously estimating pressure, flow, and density across hundreds of kilometers, without additional hardware.



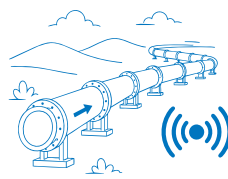
Turning insight into operational control

DESIGNED FOR COMPLEX PIPELINE OPERATIONS



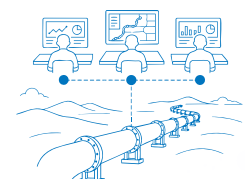
LONG-DISTANCE PIPELINES

100+ km operations



LIMITED INSTRUMENTATION

Minimal sensor environments



COMPLEX OPERATIONS

Multi-operator, dynamic conditions

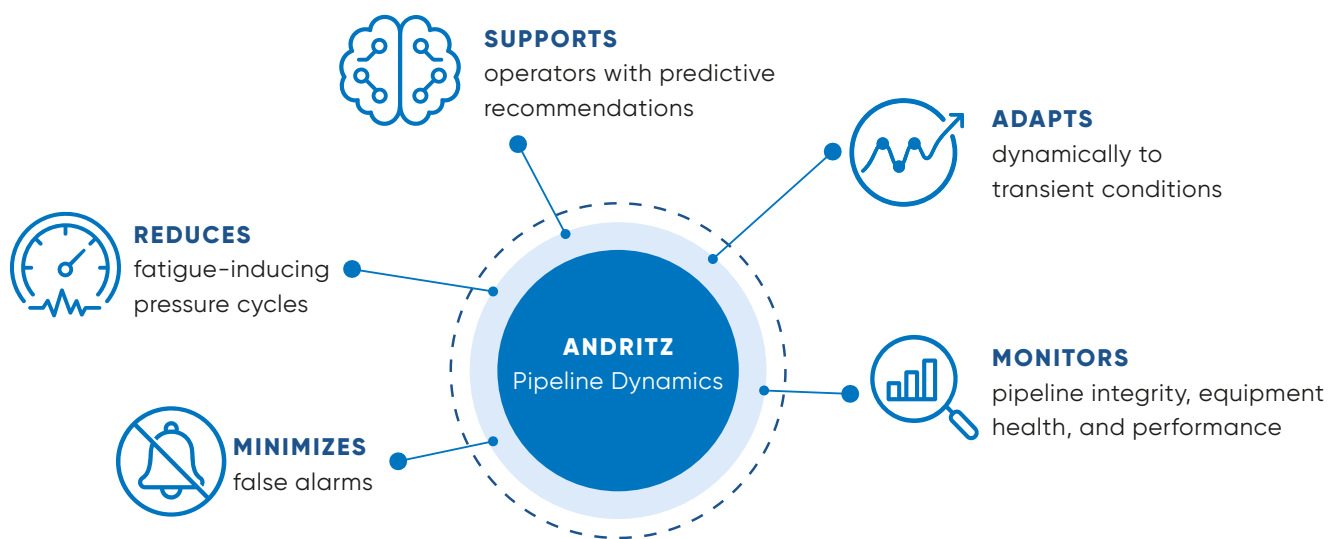


A solution that goes beyond leak detection

ANDRITZ Pipeline Dynamics provides a deeper understanding of pipeline behavior, enabling operators to anticipate risks, optimize performance, and ensure system integrity.

It is designed for a wide range of pipeline systems across industries.

THE SYSTEM



TARGET PIPELINE INDUSTRIES



MINING PLANTS



MUNICIPAL WATER AND WASTEWATER



TAILINGS PROCESSING



PALM OIL



DESALINATED WATER

TARGET PIPELINE APPLICATIONS



MINERAL CONCENTRATE



SLURRY



WATER

System architecture and monitoring logic

A hybrid digital system built for reliability and precision.

At the core of ANDRITZ Pipeline Dynamics lies a hybrid monitoring architecture that combines:

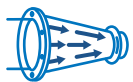
- First-principles physical modeling (hydraulics, fluid dynamics)
- Advanced data-driven analytics (machine learning, anomaly detection)

This dual-layer system continuously generates thousands of virtual sensors along the pipeline, estimating pressure, flow, and density with high precision – even in areas without physical instrumentation.

The result is a real-time dynamic virtual twin, operating 24/7. This architecture enables the system not only to monitor pipeline conditions but also to:

- Understand system behavior
- Anticipate failure modes
- Support operational decisions in steady-state, transient, and shutdown conditions

PHYSICAL MODELING



HYDRAULICS



FLUID DYNAMICS

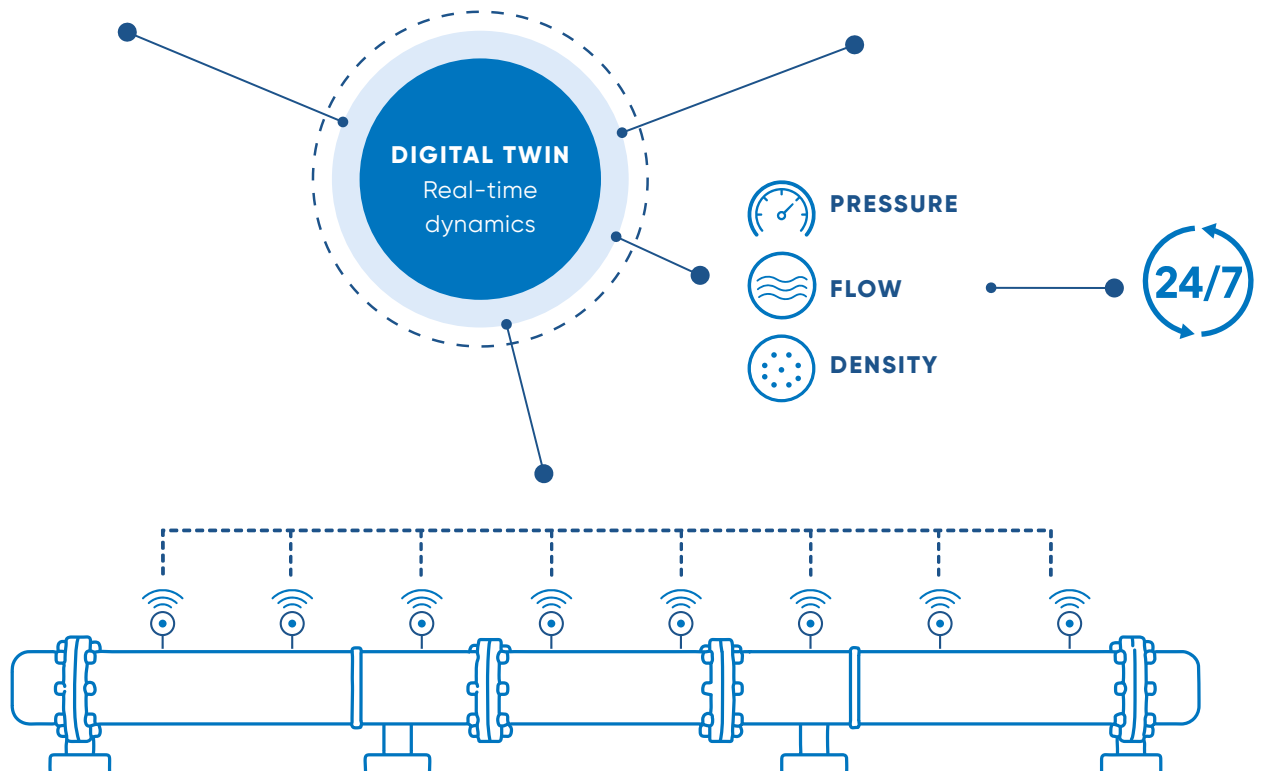
DATA-DRIVEN ANALYTICS



MACHINE LEARNING

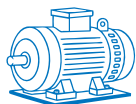


ANOMALY DETECTION



System architecture modules

The ANDRITZ Pipeline Dynamics architecture consists of four core modules.



MODELING ENGINE

Simulates steady-state and transient pipeline flow using hydraulic and thermodynamic models tailored to each pipeline.



DATA ANALYTICS MODULE

Processes real-time and historical operational data to identify trends, anomalies, and performance deviations across the pipeline system.



DECISION SUPPORT SYSTEM (DSS)

Generates alerts and operational recommendations for real-time decision-making.



USER INTERFACE & REPORTING LAYER

Provides HGL dashboards, trends, and automated exportable reports for operations and compliance.

MONITORING BEYOND THE SURFACE: FROM EVENTS TO INSIGHTS

The system provides advanced visualization and operational tools, including:

- Hydraulic Grade Line (HGL) view
- Station configuration recommendations
- Event tracking and classification
- Batch tracking and monitoring

This allows operators to move from simple monitoring to deep operational insight and control.



Turning pipeline data into actionable insight

Proven performance: global success stories

While ANDRITZ Pipeline Dynamics is applicable across multiple industries, its robust architecture has been extensively validated in some of the world's most demanding mining operations.

Across multiple global projects, ANDRITZ Pipeline Dynamics has consistently demonstrated its ability to detect, anticipate, and prevent failures.

FROM MONITORING TO PERFORMANCE

ANDRITZ Pipeline Dynamics represents a shift from traditional monitoring systems toward integrated pipeline performance management.

By combining engineering expertise, digital technologies, and real-time analytics, ANDRITZ positions itself as a partner in operational performance and continuous optimization, rather than only a technology provider.

REAL RESULTS IN OPERATION



SPEED AND PRECISION IN CHILE

During controlled leak tests at South American copper operations, the system demonstrated extreme sensitivity by detecting events in under five minutes, achieving rapid identification and pinpoint localization of unnoticed events. With 11 active systems currently operating in Chile, the solution is already delivering value at scale.



CONTINUOUS RELIABILITY IN AUSTRALIA

Successfully deployed on a long-distance operation pipeline, providing continuous, highly stable monitoring, providing operational insights and demonstrating the long-term reliability of the software-based architecture.



**UNDER
5 MINUTES**



**11 ACTIVE
SYSTEMS**



**CONTINUOUS
RELIABILITY**

Core functionalities and features

ANDRITZ Pipeline Dynamics delivers key features to ensure pipeline integrity and optimize performance, transforming the system into a virtual operational advisor.



RAPID INCIDENT RESPONSE

Detects and localizes pipeline events in under 5 minutes, enabling immediate action.



PREVENTIVE RISK MANAGEMENT

Identifies issues up to 4 hours in advance, preventing blockages and costly downtime.



FULL PIPELINE VISIBILITY

Monitors pressure, flow, and density across the entire pipeline – even without sensors.



ZERO ADDITIONAL HARDWARE

Achieves total system visibility with a 100% software-based solution.





A WORLD OF SEPARATION SOLUTIONS

ANDRITZ provides mechanical and thermal solid/liquid separation technologies, complemented by comprehensive services, automation, and digitalization solutions for the chemicals, environment, food and beverage, as well as mining and minerals industries. Our customized, innovative solutions focus on minimizing resource consumption and maximizing process efficiency, thus making a substantial contribution towards sustainable environmental protection. With over 150 years of experience and more than 2,700 separation specialists around the globe, we are a driving force in the evolution of separation solutions – enabling industries to meet tomorrow's demands responsibly. **ANDRITZ. FOR GROWTH THAT MATTERS.**

AFRICA

ANDRITZ Delkor (Pty) Ltd.
p: +27 11 012 7300
service.separation.za@andritz.com

EUROPE

ANDRITZ AG
p: +43 316 6902 1463
separation@andritz.com

ASIA

ANDRITZ Singapore Pte. Ltd.
p: +65 6512 1800
service.separation.sg@andritz.com

NORTH AMERICA

ANDRITZ Separation Inc.
p: +1 817 465 5611
separation.us@andritz.com

AUSTRALIA

ANDRITZ Pty. Ltd.
p: +61 3 8773 4888
separation.au@andritz.com

ANDRITZ Canada Inc.
p: +1 604 214 9248
automation-sales@andritz.com

CHINA

ANDRITZ (China) Ltd.
p: +86 757 8258 6802
separation.cn@andritz.com

SOUTH AMERICA

ANDRITZ Chile
p: +56 9 4030 7815
automation-sales@andritz.com

ANDRITZ Separation Ltda.
p: +55 47 3387 9100
separation.bra@andritz.com

ANDRITZ.COM/SEPARATION

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