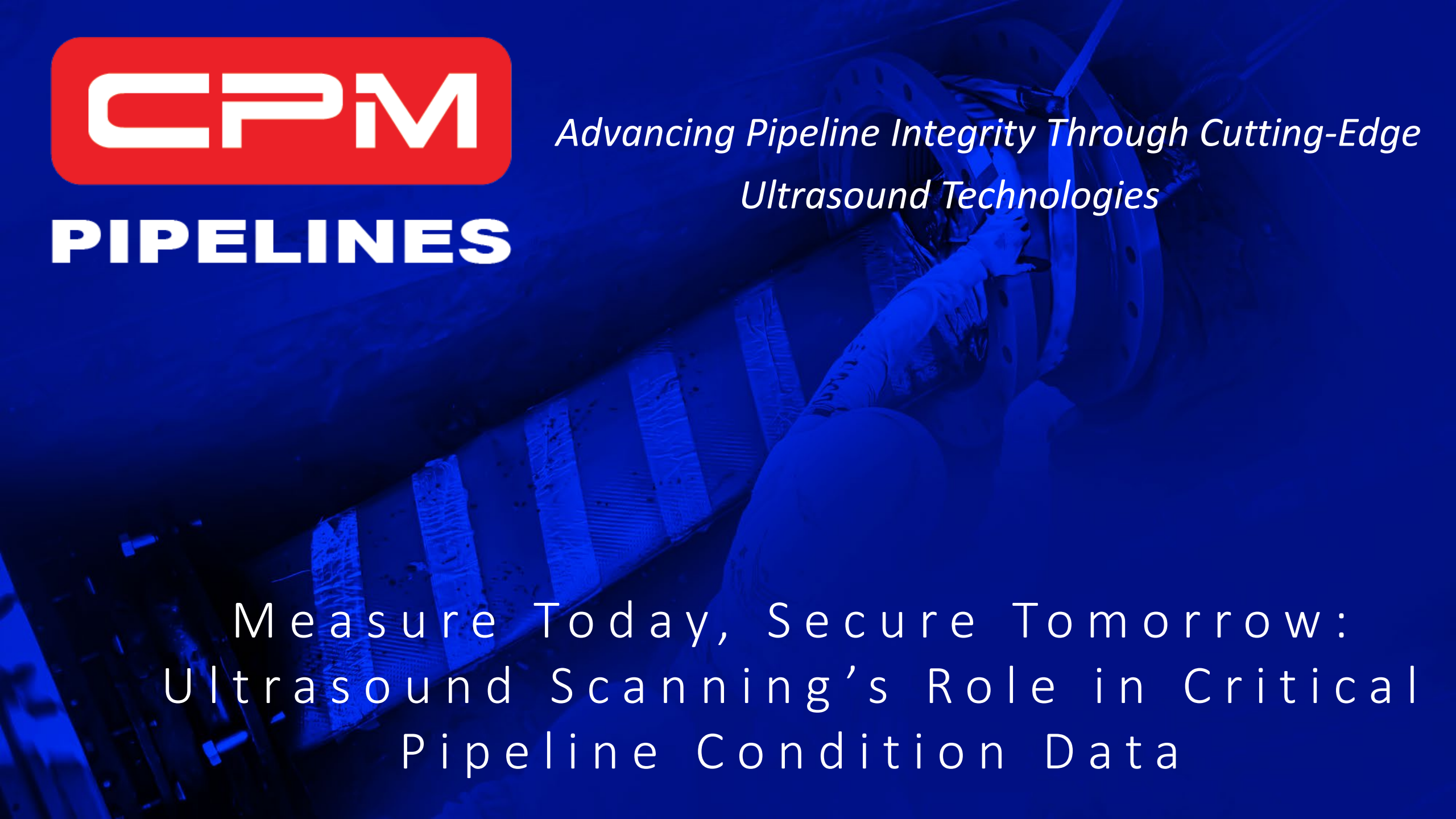


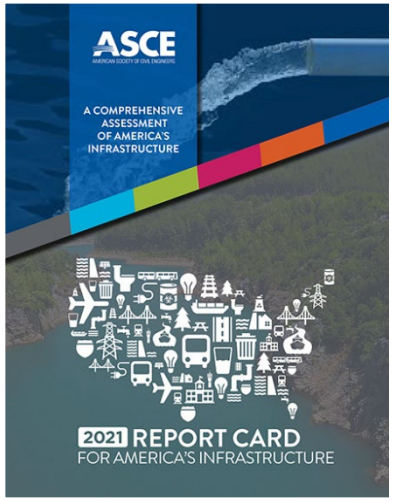
CPM PIPELINES

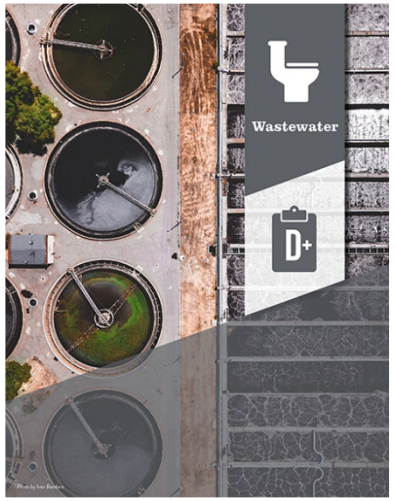
Advancing Pipeline Integrity Through Cutting-Edge Ultrasound Technologies

Measure Today, Secure Tomorrow: Ultrasound Scanning's Role in Critical Pipeline Condition Data

Why Pipeline Condition Assessment Matters

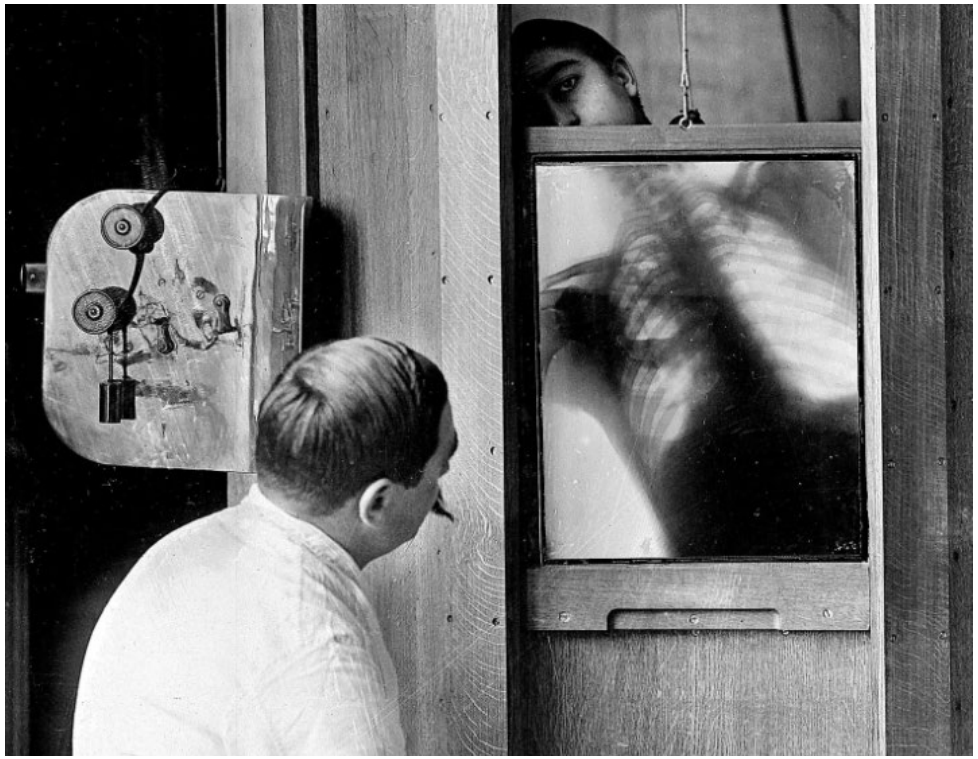
- Owners prioritizing pipeline projects
- Limited budgets
- Employ new technologies and innovations

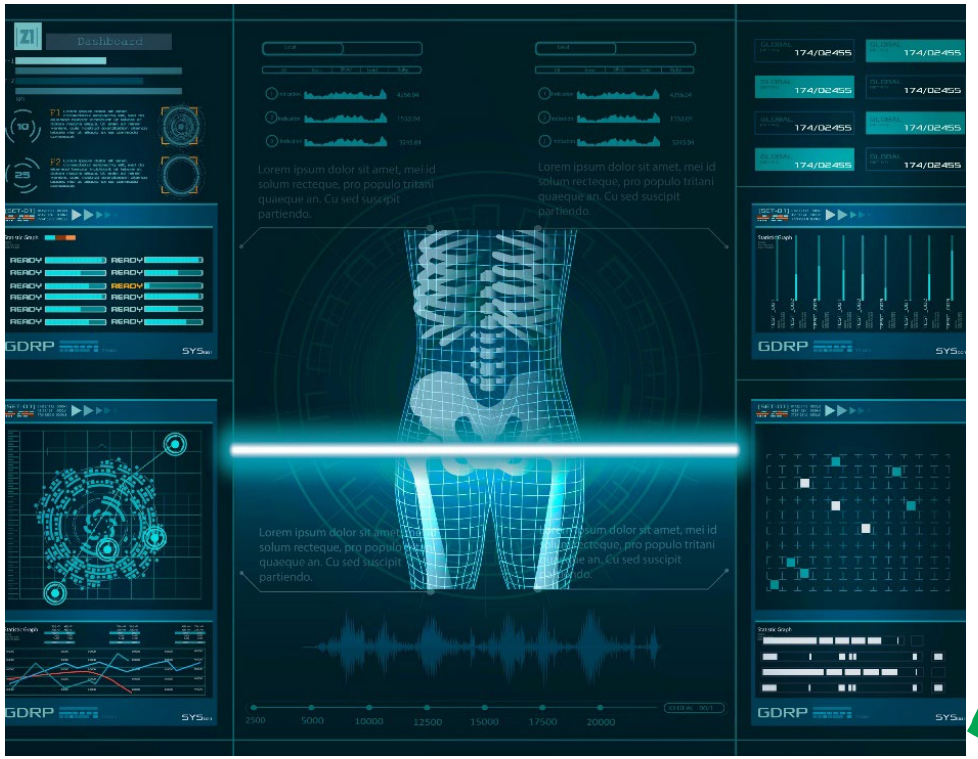




Visibility

Pipelines: Ability to see critical features and anomalies for proactive asset management and risk mitigation





Questions to Ask for Pipeline Condition Assessment

1. What is the purpose of the inspection?
2. What level of detail and information is really needed?
3. What is the size, condition, and location of the access

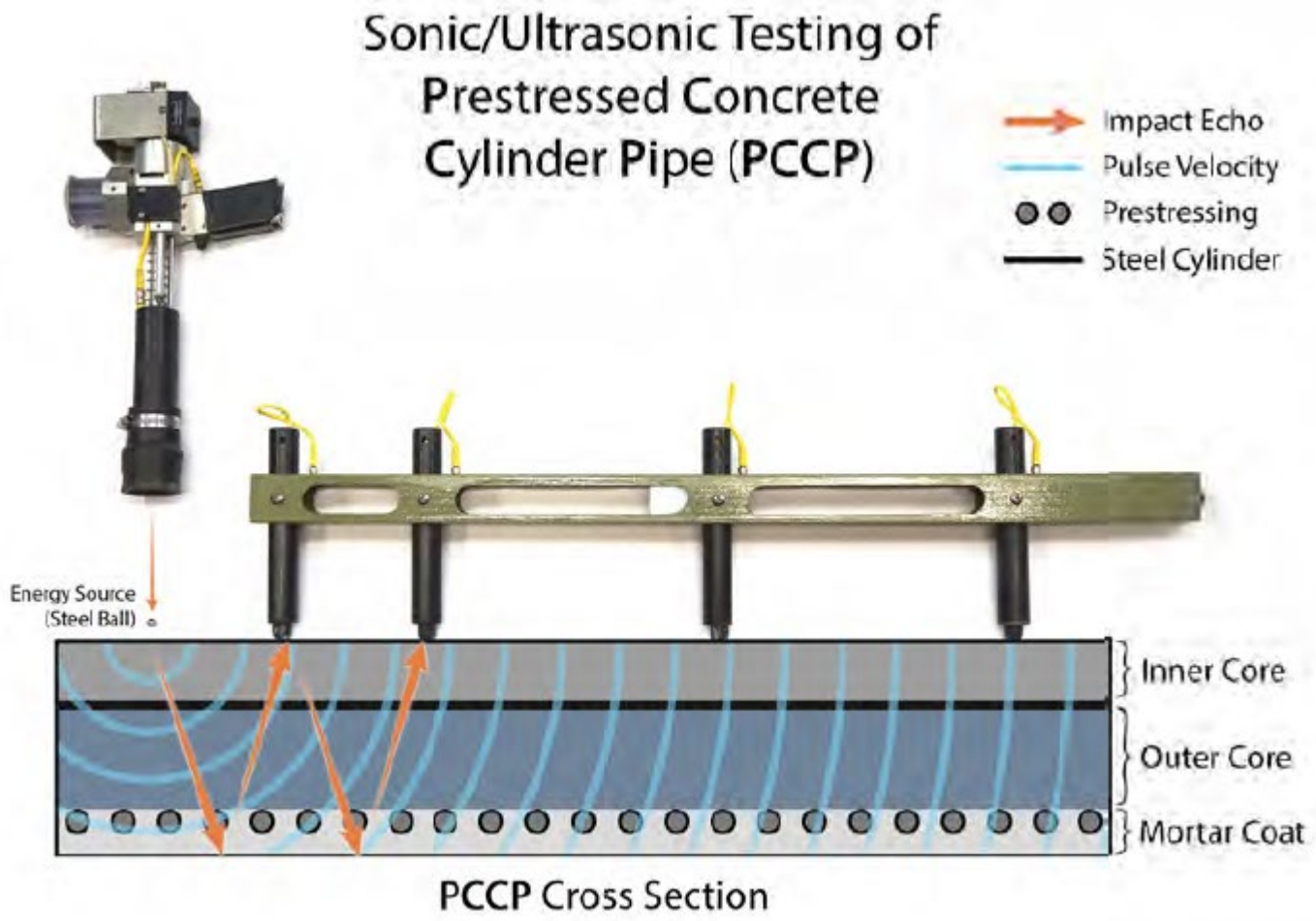
More Advanced Technologies Needed When

1. Shut-down is not desirable

2. Detailed quantitative data is needed

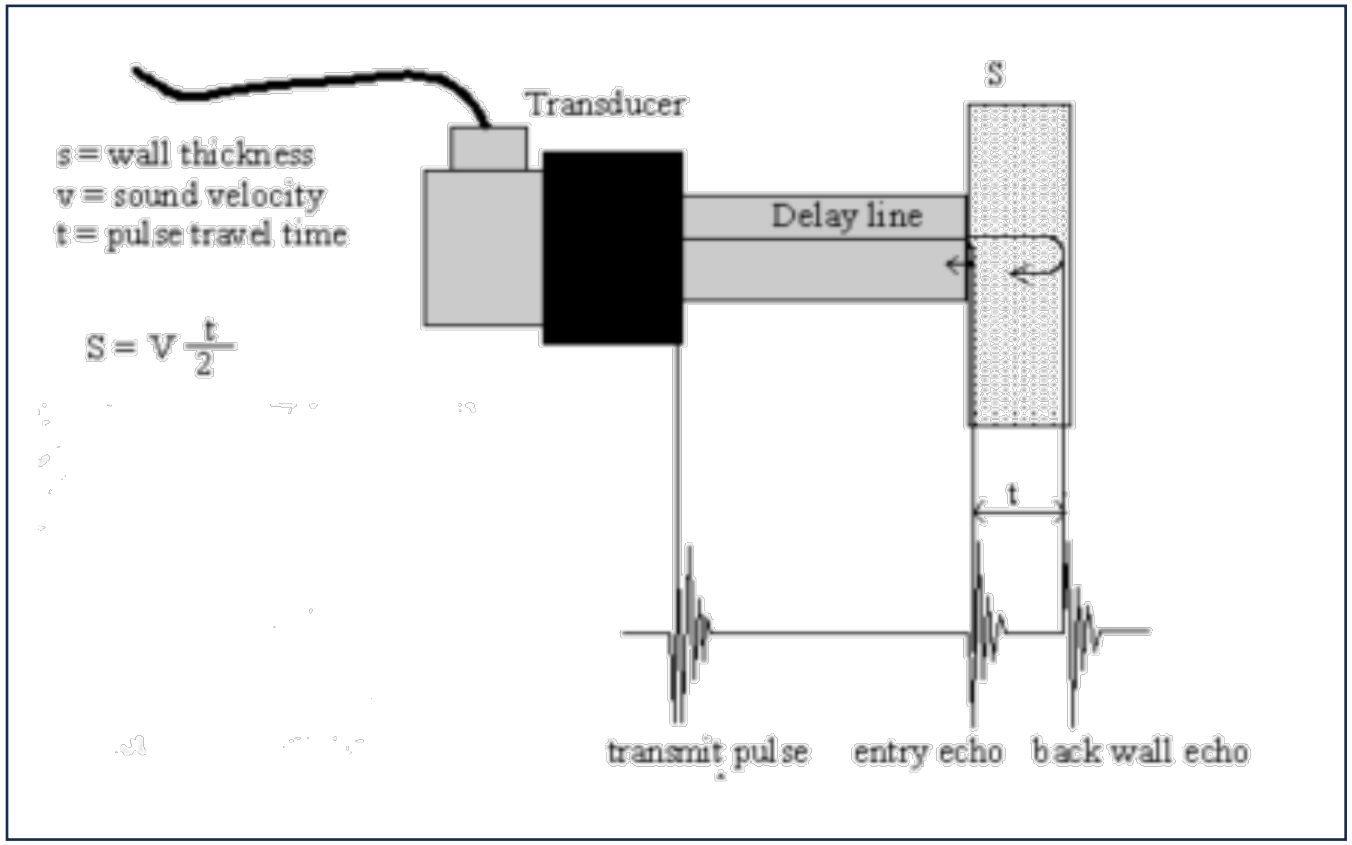
Ultrasound Technology

- Used for 25+ years
- Large water mains for condition assessment of PCCP
- Identifies
  - Wire Breaks/Failures
  - Delamination
  - Cracks
  - Wall thining



Ultrasound Scanning/Inspection

- Electrical energy converted into high-frequency ultrasonic sound waves
- Travels through pipe wall
- Entry and back wall echo time determines wall thickness



Ultrasound Evolution

- Point pulse echo
- Phased array type sensor
- PipeScanner
- High-resolution in-line PIG

Olympus Point Pulse Echo 36D Sensor

The Starting Point

- **Technology Overview**
  - Manual single-point
  - Limited coverage
- **Capabilities & Use Cases**
  - Spot-checking
- **Limitations**
  - Labor-intensive, slow
  - Lacks full pipe coverage
  - No high-resolution mapping

Phased Array Type Sensor Technology

Advancing Coverage and Resolution

- **Technology Overview**
  - Multi-element
  - Improved scanning speed and resolution
- **Capabilities & Use Cases**
  - Greater surface coverage
  - Detect more complex defects
- **Limitations**
  - Still limited
  - Requires trained operators

Acquaint Pipescanner

Bridging the Gap

- **Technology Overview**
  - Next-generation
  - Full circumferential scanning
- **Capabilities & Use Cases**
  - High-resolution mapping
  - Real-time data collection with advanced reporting

Acquaint Pipescanner

Bridging the Gap

- **Advantages Over Previous Technologies**
  - Greater efficiency, better data accuracy, enhanced visualization
- **Limitations**
  - External-only scanning

Acquarius PIG

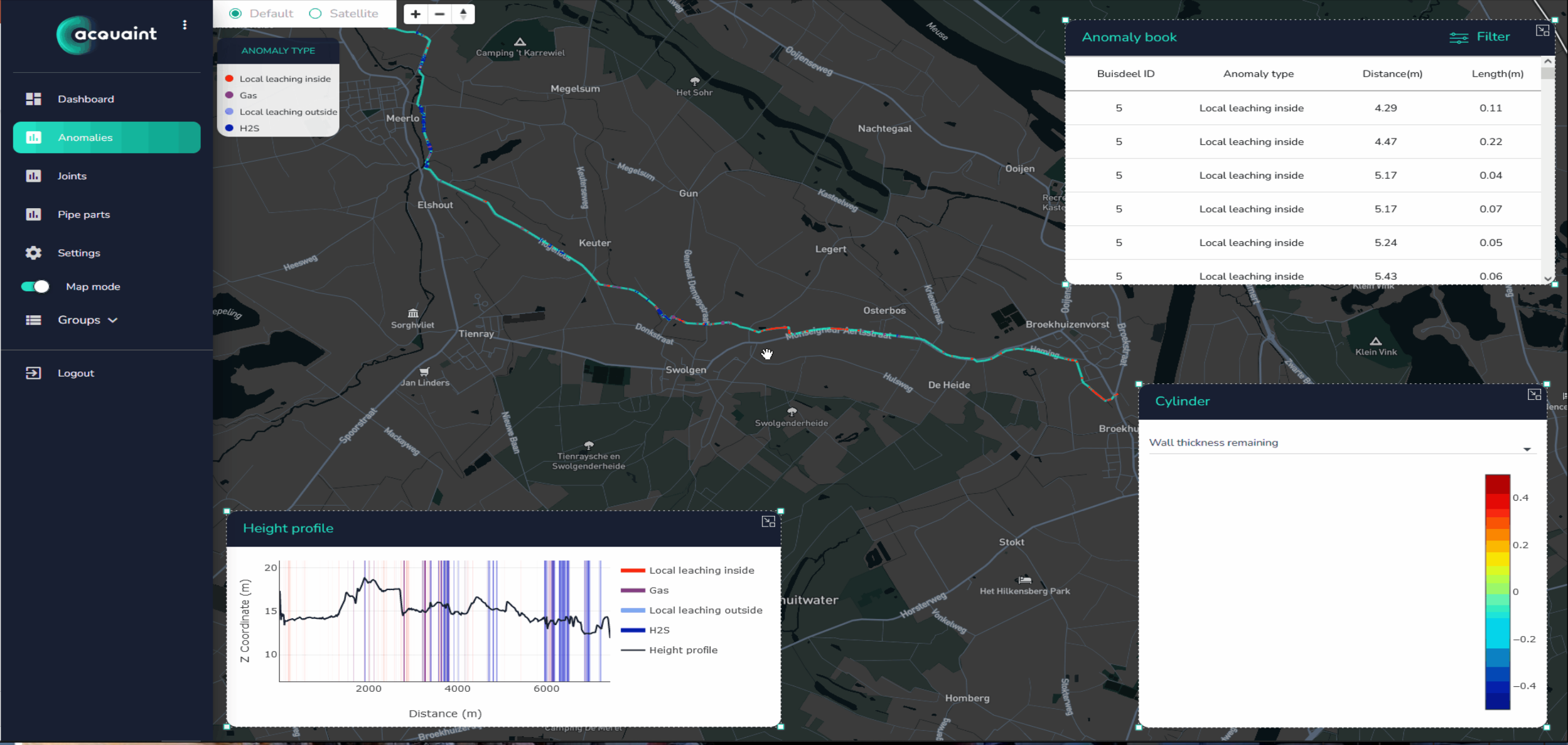
High-Resolution In-Line Inspection

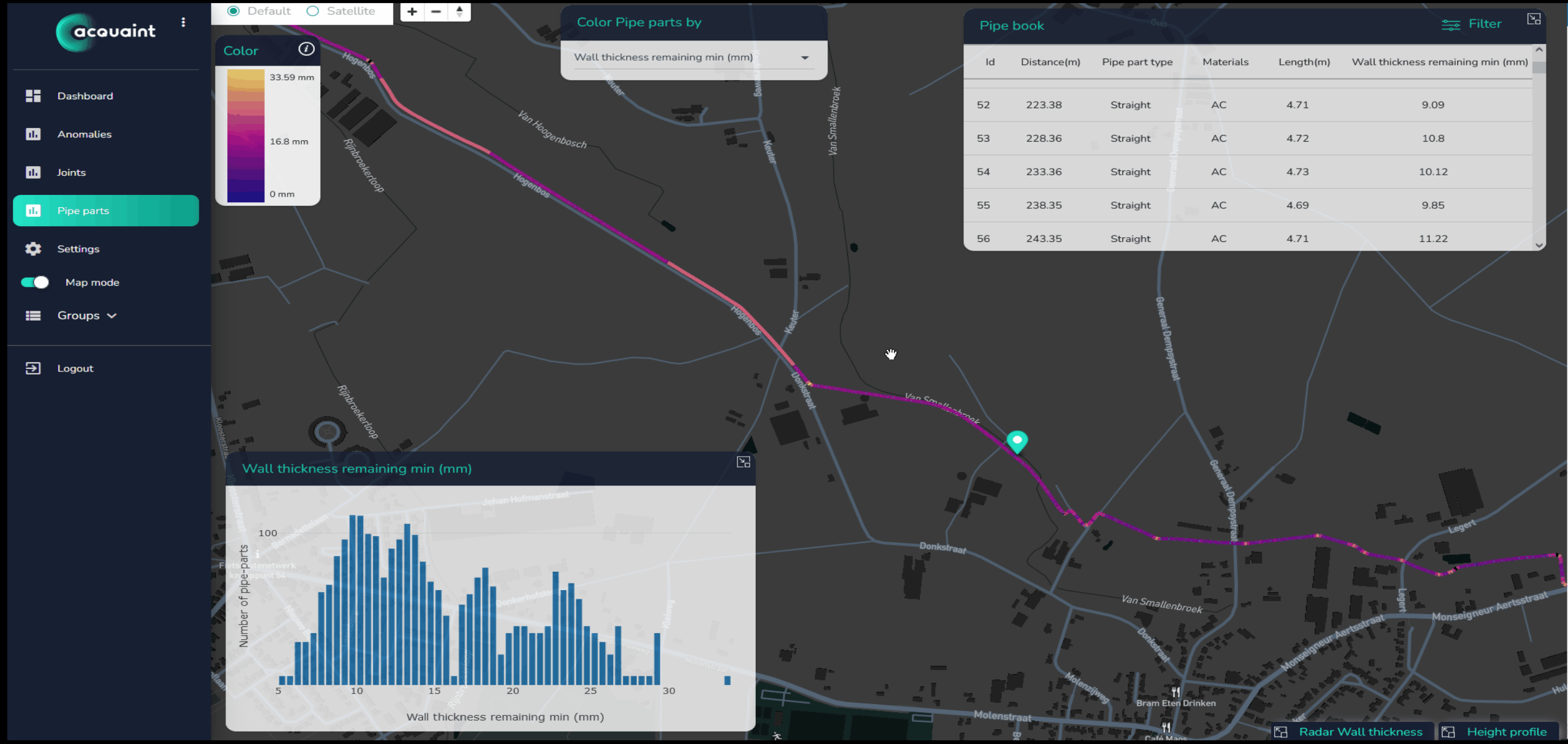
- **Technology Overview**
  - Autonomous ILI tool
  - Full internal pipeline scanning
- **Capabilities & Use Cases**
  - 360° imaging
  - Detects corrosion, cracks, and wall thickness variations

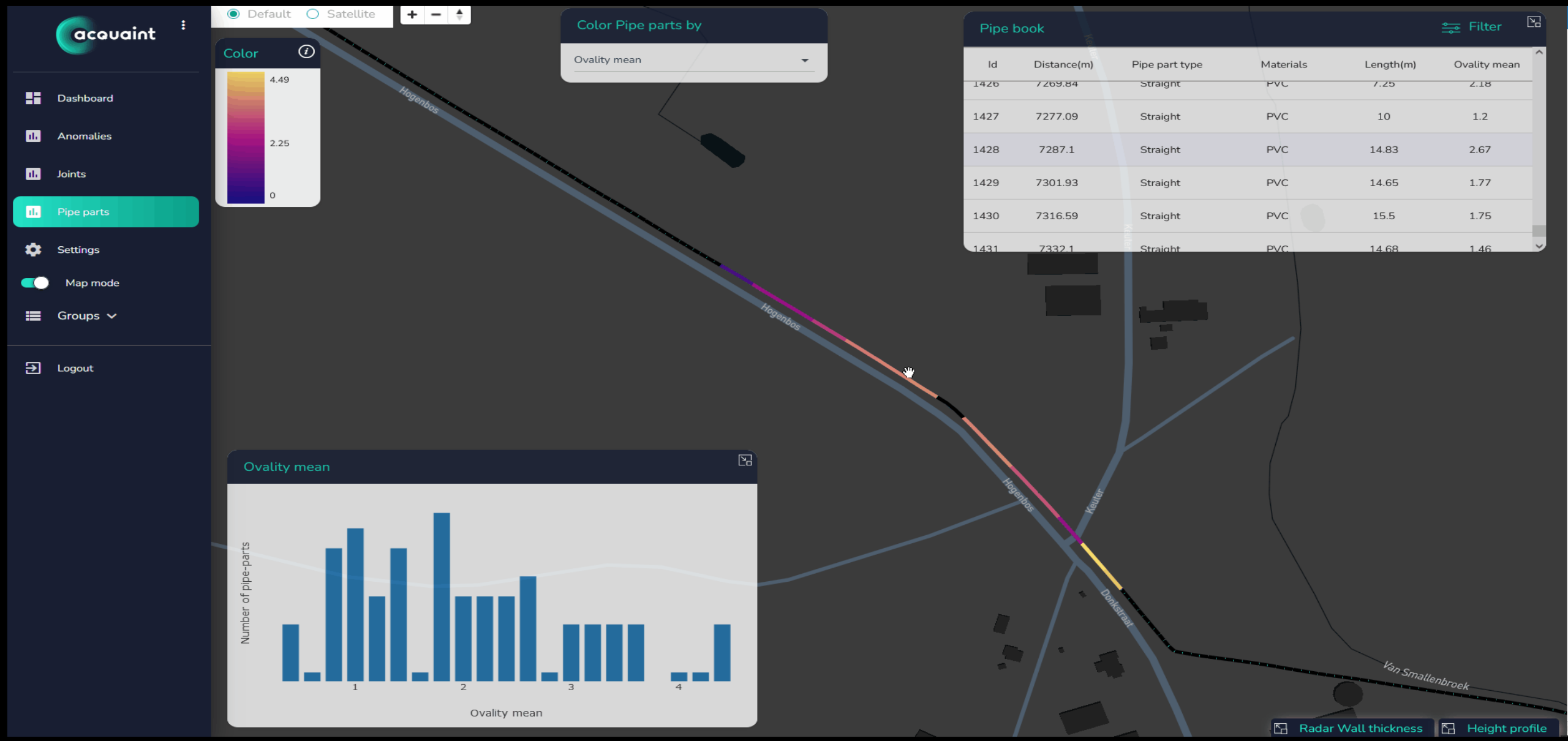
Acquarius PIG

High-Resolution In-Line Inspection

- **Key Advancements Over External Scanning**
  - Internal pipeline access enables full coverage
  - Can operate in live pipelines with minimal disruption







Summary

- Ultrasound technology has evolved.
- Each technology serves a unique role.
- Pipeline owners must consider the best tool for their specific needs based on access, resolution, and data requirements

Questions

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Advancing the Nation's infrastructure providing innovative inspection technologies and rehabilitation solutions that protect the environment and deliver efficient, sustainable results and value to our trusted network.

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