MFL RESULTS LIKE A LASERSCAN
TAKING ANALYSIS OF COMPLEX CORROSION AND PINHOLES TO THE NEXT LEVEL

Michael Rapp
Group Business Line Manager
Proficient Pipeline Diagnostics
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• Pipeline Operator Challenges

• Step Change in MFL Technology
  • Sensor Technology
  • Tool Mechanics
  • Data Evaluation

• Conclusion
Limitations of currently available ILI Services across the industry

- Resolution not high enough to evaluate certain difficult to assess defect types
- Data Evaluation dependent on ‘human factor’, impacting repeatability of results
- Integrity Assessments are quite conservative, leading to unnecessary and costly field verifications
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- **Step Change in MFL Technology**
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  - Tool Mechanics
  - Data Evaluation
- Conclusion
STEP CHANGE IN MFL SENSOR TECHNOLOGY

New sensors allow MFL-based inline inspection to move from individual data points to true Pipeline Imaging™

- Fully triaxial MFL sensor elements consisting of three-dimensional integrated circuit modules
- Circumferential track pitch: 1.6 millimeters (0.063 inch)
- Axial sampling rate: 1 millimeter (0.04 inch)
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HIGHLY PRECISE ILI TOOL MECHANICS

Dual sensor ring of MFL-A Ultra ILI tool
as prerequisite to exploit full potential of new sensors

Traditional MFL high-resolution tools
• Sensor carriers placed on one sensor ring
• Carriers located min. two mm (0.08 inch) apart because of mechanical constraints

MFL-A Ultra tool
• Two sensor rings within magnetic yokes
• Carriers mounted in slightly offset fashion to achieve desired circumferential resolution
• Improved axial track precision
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Machine-based learning algorithms embedded in entire evaluation chain

Benefit: More accurate, reliable and reproducible results
Example: Data Preparation
Normalization of Magnetization to improve Accuracy

Original:

Normalized:

-> significant quality improvement as basis for higher evaluation accuracy!
AUTODATA™ EVALUATION

AutoData™ Classification - MFL feature space

Example of feature classification result

![Feature Classification Diagram](image-url)
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BENEFIT

More realistic Effective Area / ERF

- Ultra resolution will split some MFL-A feature boxes into multiple smaller ones
- Effective Area / ERF calculations are more realistic, less conservative

MFL-A

MFL-A Ultra

Effective Area

Identical total length and depth, but only 2/3 Eff.Area!
Reliable / Lifelike Pipeline Imaging™

**Highest ILI resolution in the market**, similar to laser scan imaging, optimized to **assess heavily corroded pipelines and detect even 1mm (0.04”) pinholes**, while running within standard MFL operating conditions.

Precise Autodata™ algorithms

**Adaptive algorithms** and **automated data evaluation** lead to higher quality and accuracy.

Conclusive integrity assessments

More accurate depth profiles, higher sizing accuracy and revised feature clustering will significantly improve the reliability and reduce conservatism of integrity calculations, **avoiding unnecessary verification dig-ups**.
THANK YOU FOR JOINING THIS PRESENTATION.