MFL RESULTS LIKE A LASERSCAN

TAKING ANALYSIS OF COMPLEX CORROSION AND PINHOLES TO THE NEXT LEVEL

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CONTENTS

- **Pipeline Operator Challenges**

- Step Change in MFL Technology

    - Sensor Technology

    - Tool Mechanics

    - Data Evaluation

- Conclusion

PIPELINE OPERATOR CHALLENGES

**Reliability / Conservatism
of Integrity Calculations**

Unnecessary Digs

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,
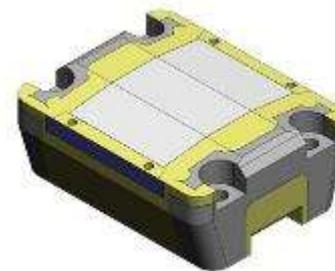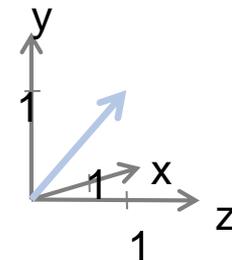 leading to unnecessary and costly field verifications

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STEP CHANGE IN MFL 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)

CONTENTS

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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

CONTENTS

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Machine-based learning algorithms embedded in entire evaluation chain

1	2	3	4	5	6
ILI Data	Preprocessing	Active Learning	Quality Assessment	Report	Central Data Service
	• Detection • Characterisation	• Human Oracle • Classifier in Background	• Data Evaluator	• Pipeline Installations • Anomalies	• Continuous Improvement

Beneft: More accurate, reliable and reproducible results

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AUTODATA™ EVALUATION

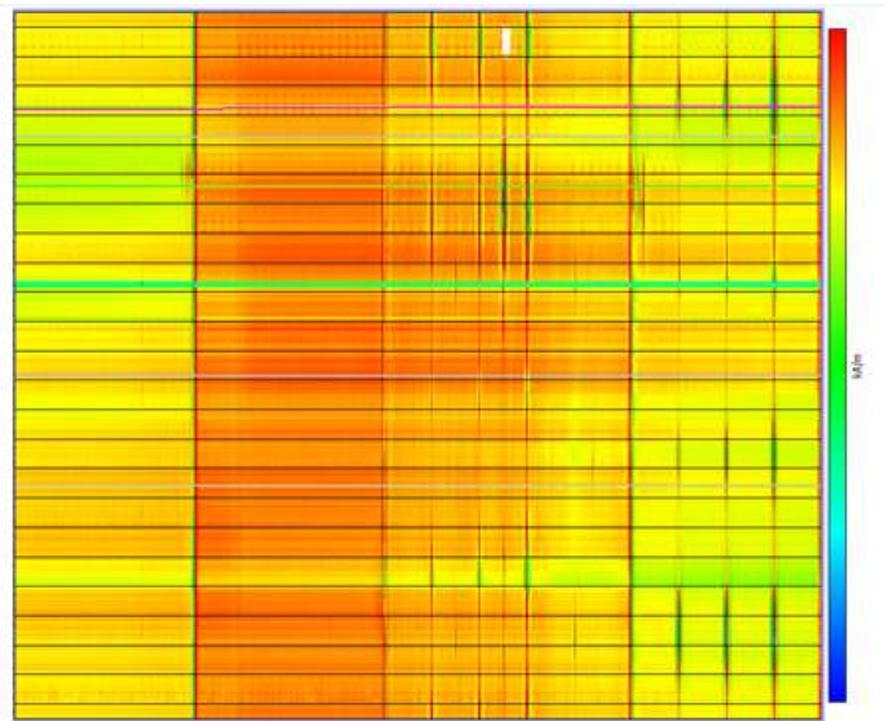**Example: Data Preparation**

Normalization of Magnetization to improve Accuracy
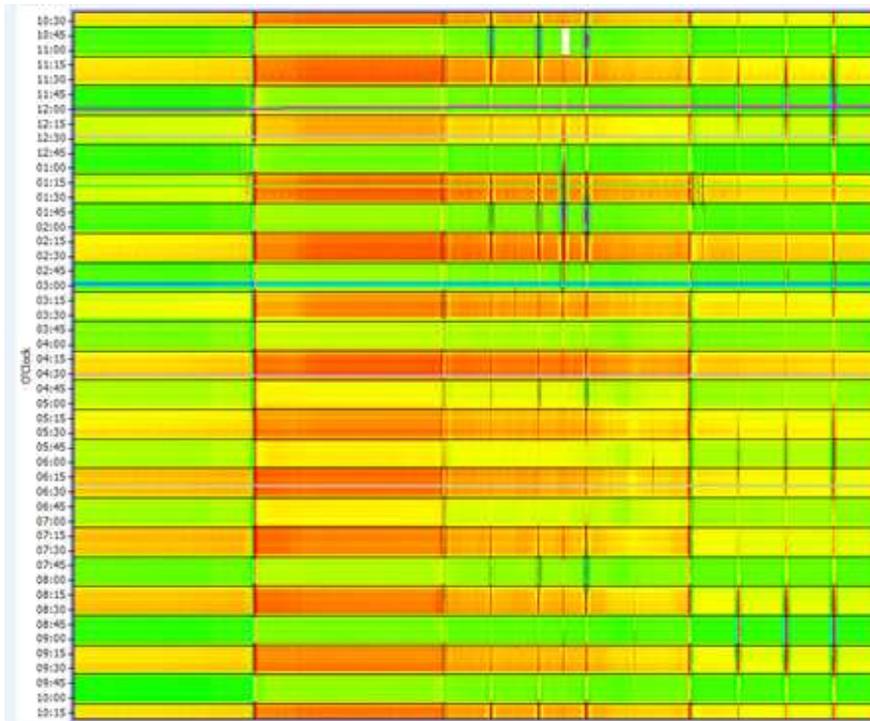
Original: Normalized:
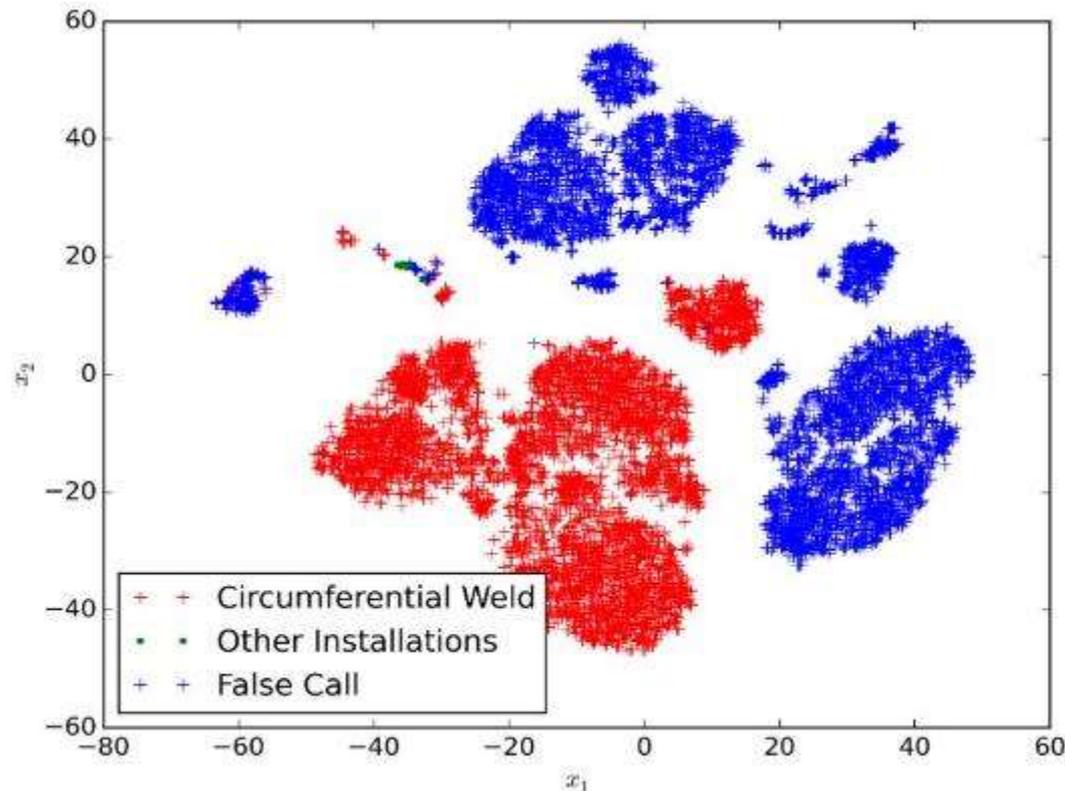

-> significant quality improvement as basis for higher evaluation accuracy!

AUTODATA™ EVALUATION

AutoData™ Classification - MFL feature space

Example of feature classification result

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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
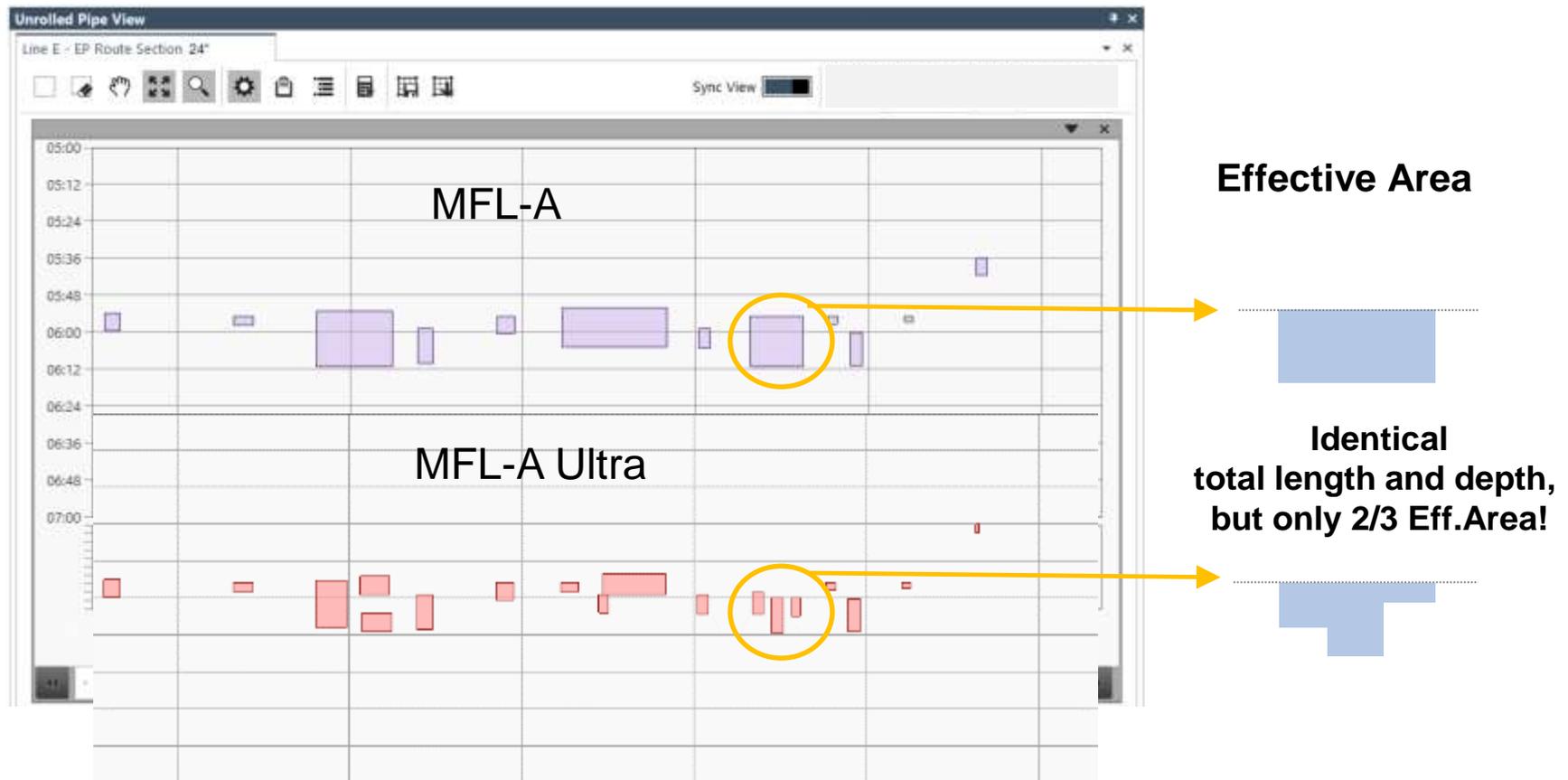
CONCLUSION

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.

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