



Innovarpel 2025

TECHNICAL DAYS

**DIGITAL TRANSFORMATION
& INDUSTRIAL CYBERSECURITY**
IN THE OIL&GAS INDUSTRY

arpel  60
YEARS

JUNE, 24 & 25
Rio de Janeiro, Brazil

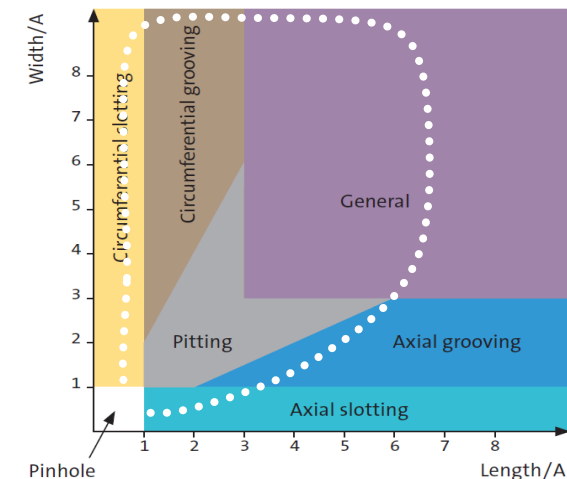
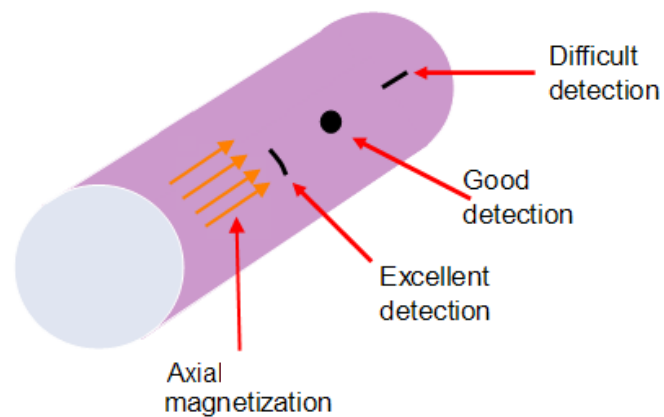
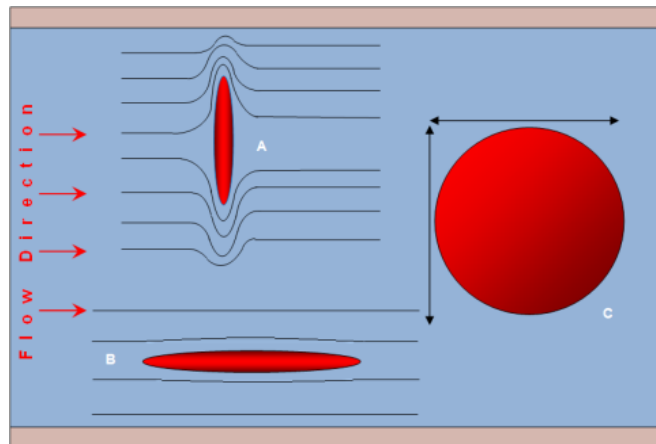
Data Fusion – Fusão de Dados de Pig MFL-A e MFL-C

Rafael Almeida

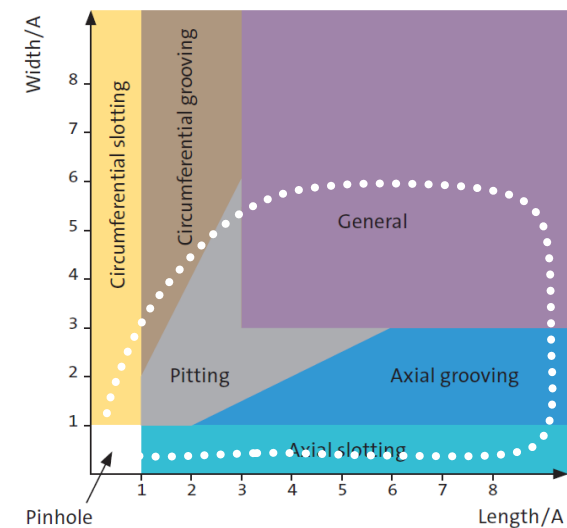
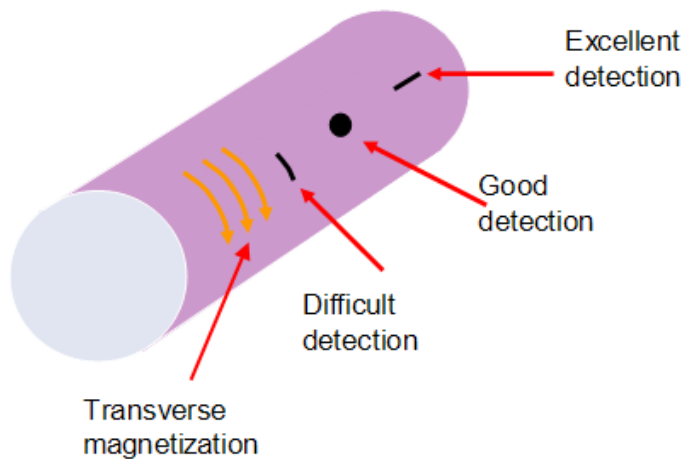
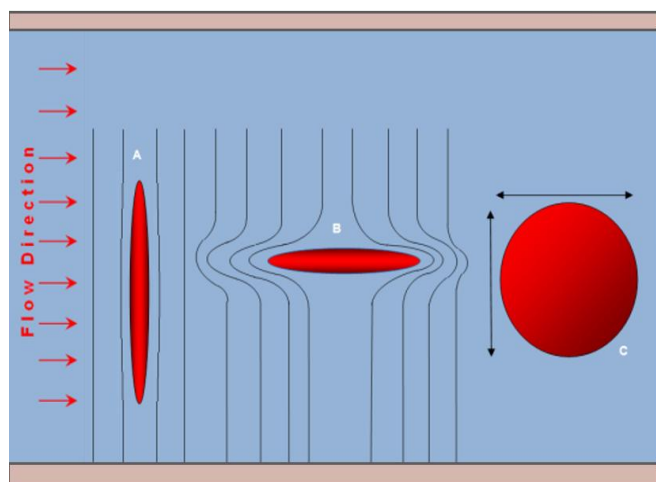
ROSEN Group – Business Line Manager

Traditional MFL Technology

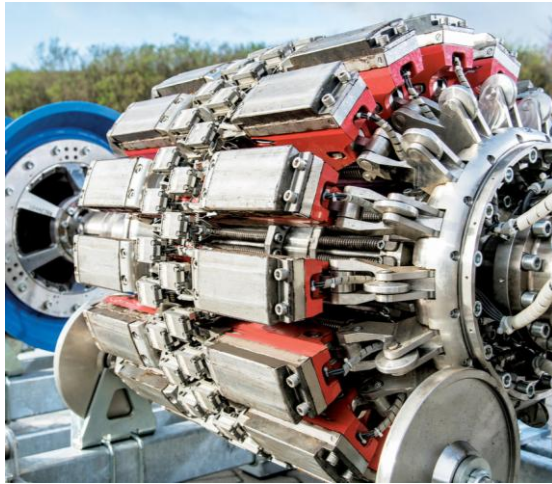
MFL-A



MFL-C



Integrity Management Challenges



**Pipeline Inspection
Technology Selection**



Precise Digs

- ILI Results and Integrity studies with uncertainties result in in-ditch investigation on non threatening defects. Extra expense.



**Complex Anomalies
Identifications Challenges**

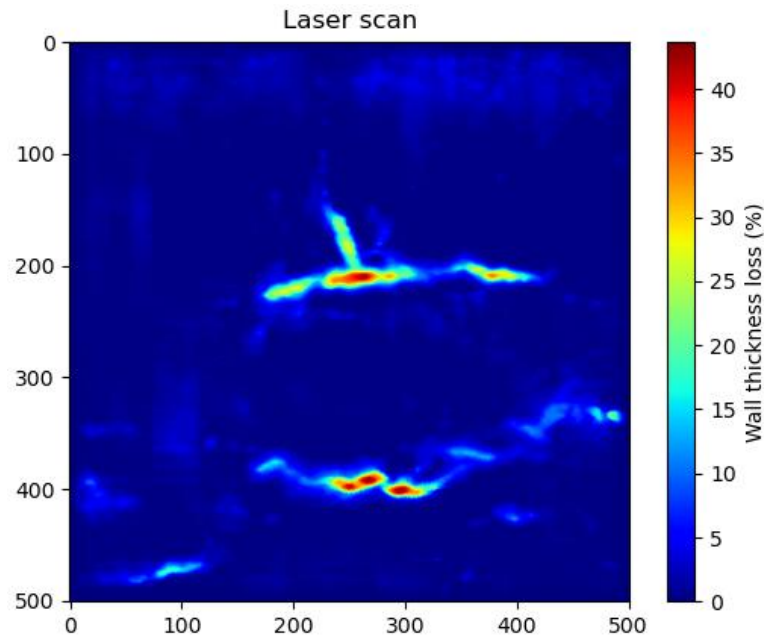
- Deepest part identification within general defect



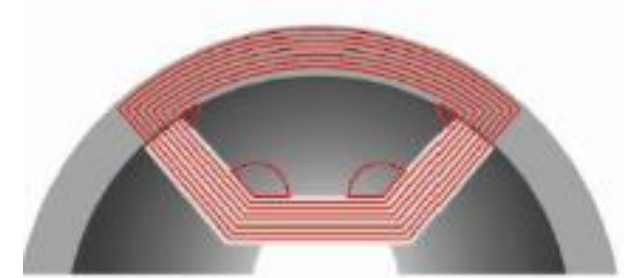
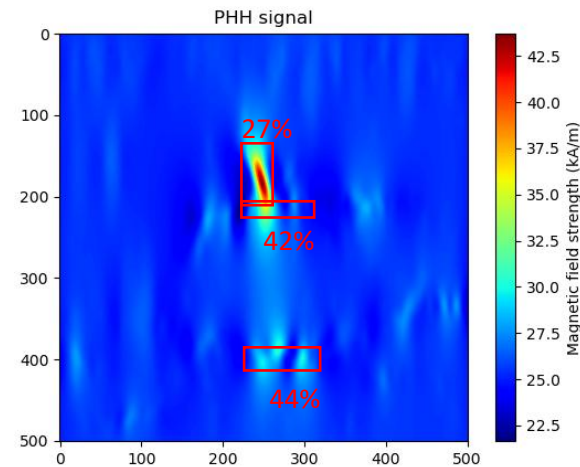
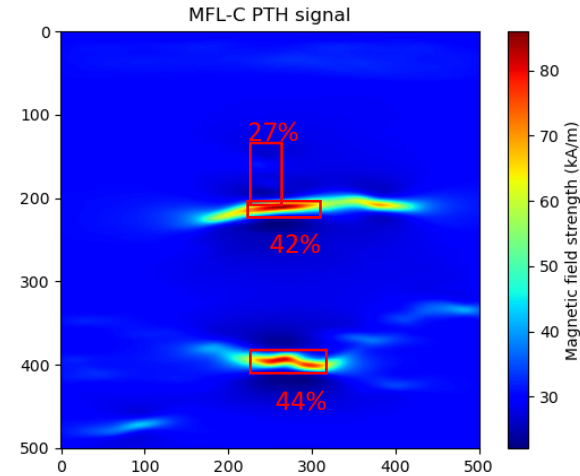
Uncertainties in Sizing

- Inaccurate failure pressure calculations.

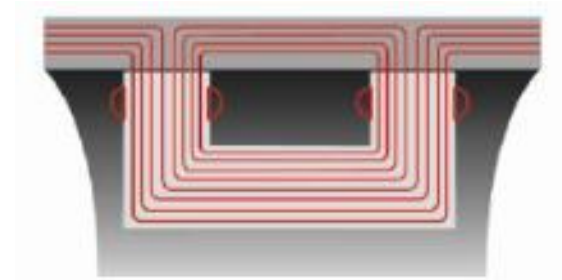
Laser vs. Traditional MFL



Two magnetization directions are needed to capture all the defect information

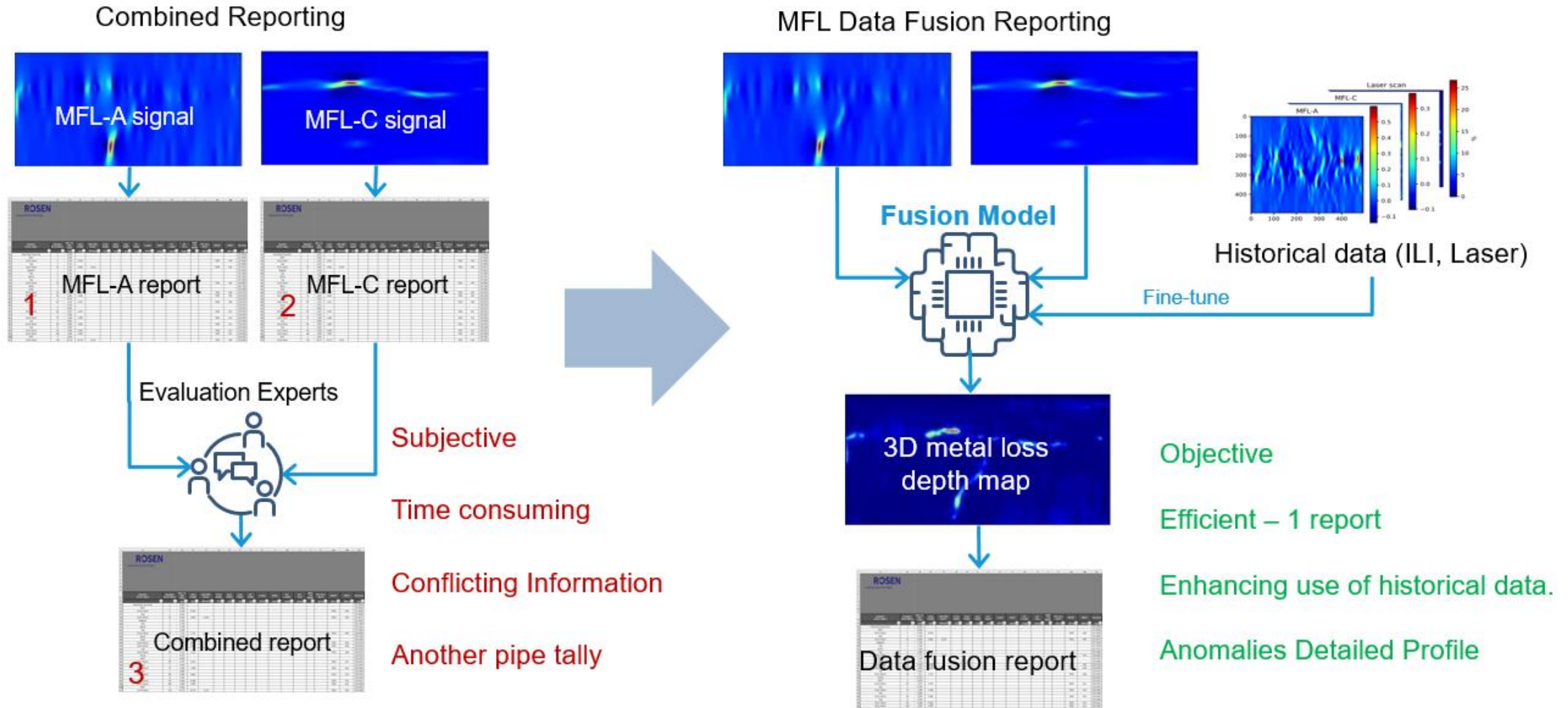


MFL-C

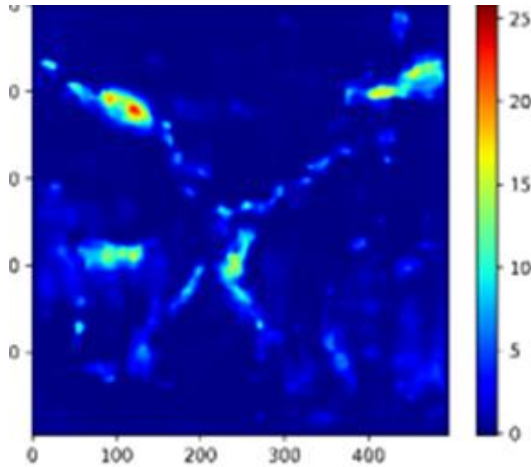


MFL-A

Enhancing ILI Reporting Process

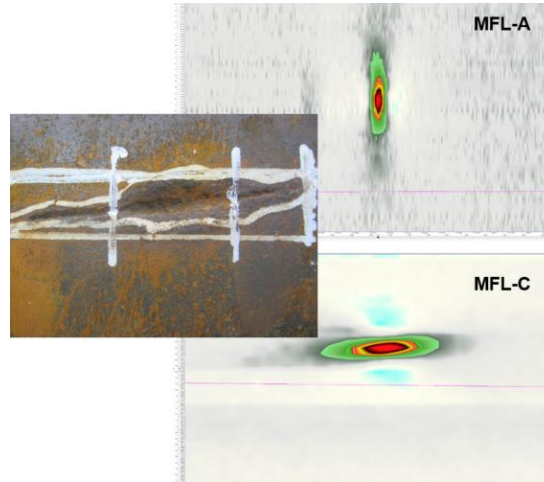


How to Solve the Issue



Major Enhancement on the Input ILI data

Better visualization of the data for operators.



Minimize impact of physical limitation of Standard MFL Technologies



New Approach of Anomalies Reporting

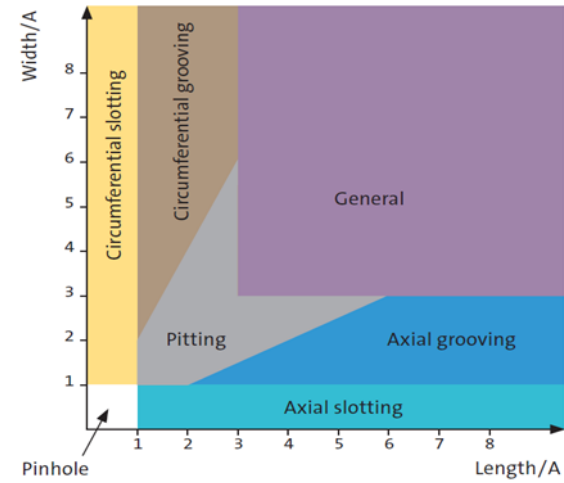
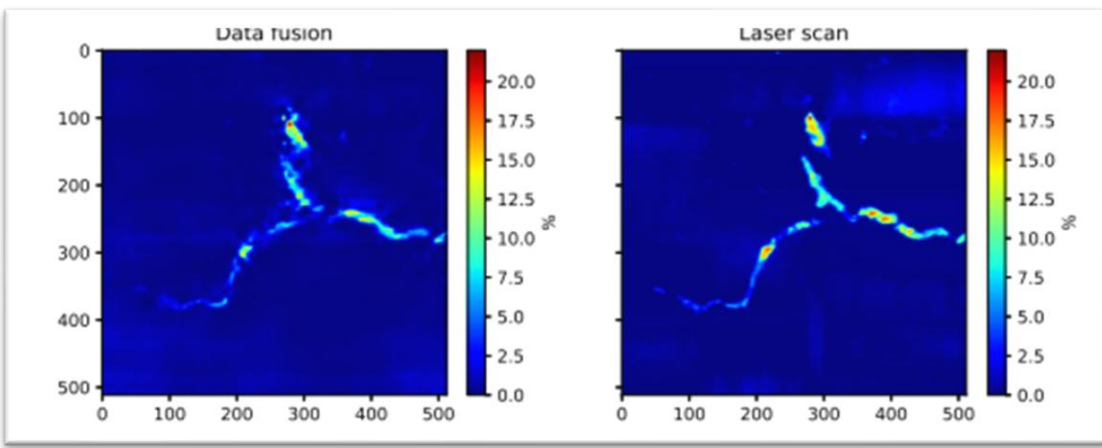
- Individual Profile based “Failure Pressure” is calculated directly during reporting.



Minimize subjectivity in Analysis

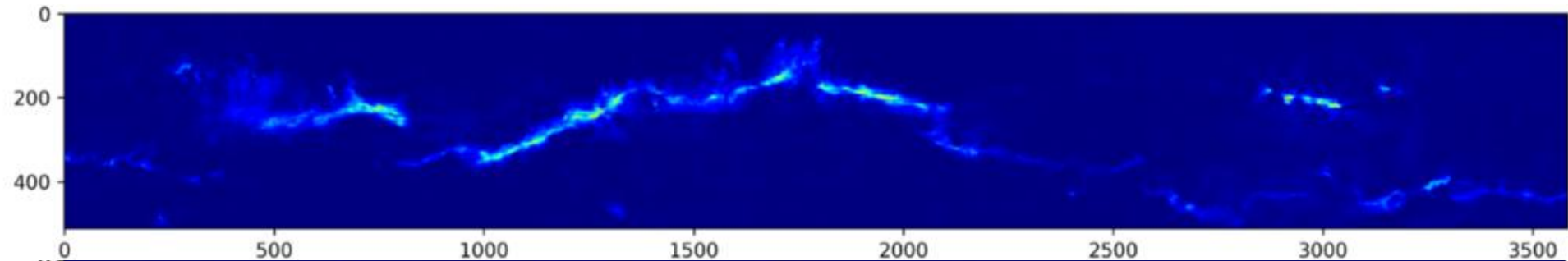
- Enhanced Analysis Approach that minimizes Human impact on ILI results by conscious use of AI

Characterize all Morphologies with High Accuracy

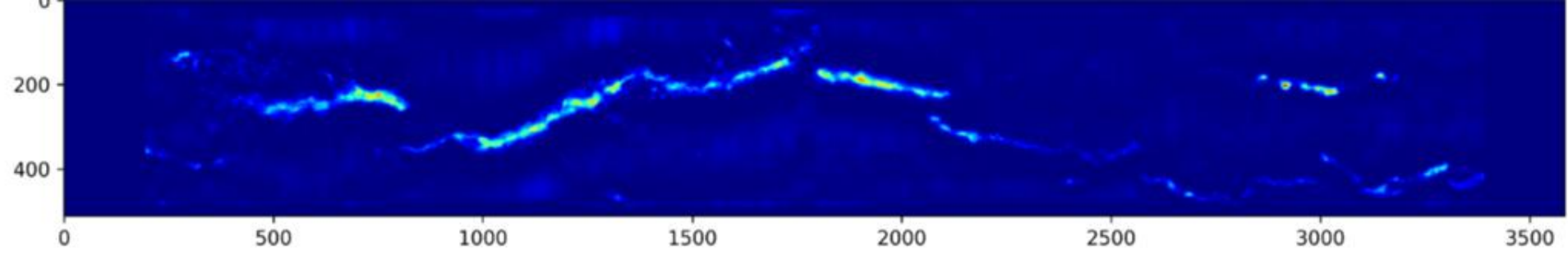


Covering
ALL POF
cagegorites,
and “more”

MFL Data Fusion

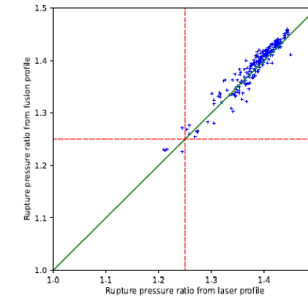
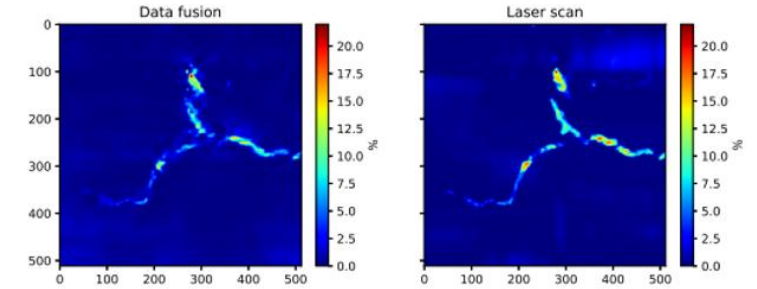
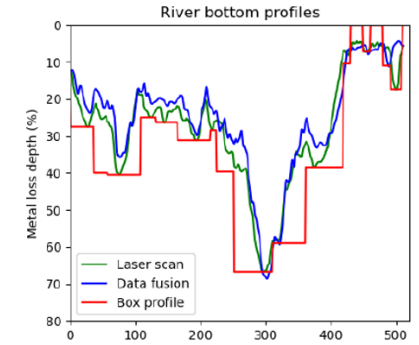


In-Ditch Laser Data

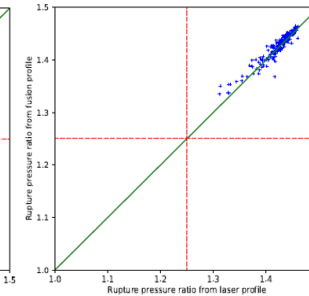


Conclusion

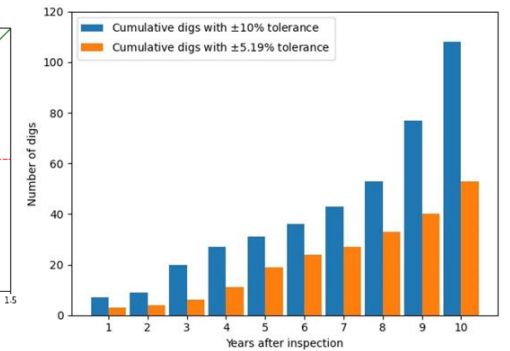
- Data Fusion leverages information from both MFL-A and MFL-C
- Data Fusion generates a 3D Depth Profile
 - neural network
 - Efficiently for the entire line
- Increased certainty in depth measurements
 - API 1163
 - Reduces the number of digs in safe remaining life analysis
- Non-conservative failure pressure calculations
 - Compared to Laser BP calculation



(c) *RSTRENG* for 3D depth maps vs laser scans



(d) P^2 for 3D depth maps vs laser scans





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