

Anomaly Detection and Characterization Track

"Linking Inside, Outside and Above Pipe Inspections"

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- ⊕ Applus RTD: 2100 Employees worldwide
- ⊕ Presence in 5 continents
- ⊕ Presence in 40 countries
- ⊕ Strong organic growth
- ⊕ Market leader in different countries and global markets

APPLUS+ RTD Group Network

permanent offices in over 40 countries



APPLUS RTD

Part of Applus Group



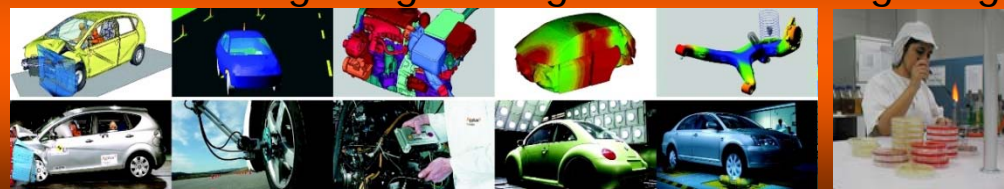
Auto Vehicle Inspection

Vehicle Inspections on safety & pollution emissions



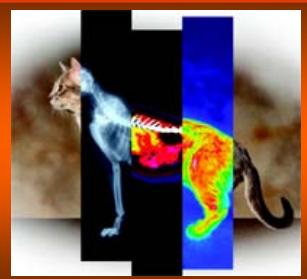
Engineering, Testing & Certification

- Certification of Product quality considering pre-defined regulatory standards;
- Advanced design engineering services with high degree of complexity



Non-destructive Testing & Inspection

Asset integrity Management: Determination of construction and maintenance integrity of critical installations



Inspection, Technical Assistance & Consulting

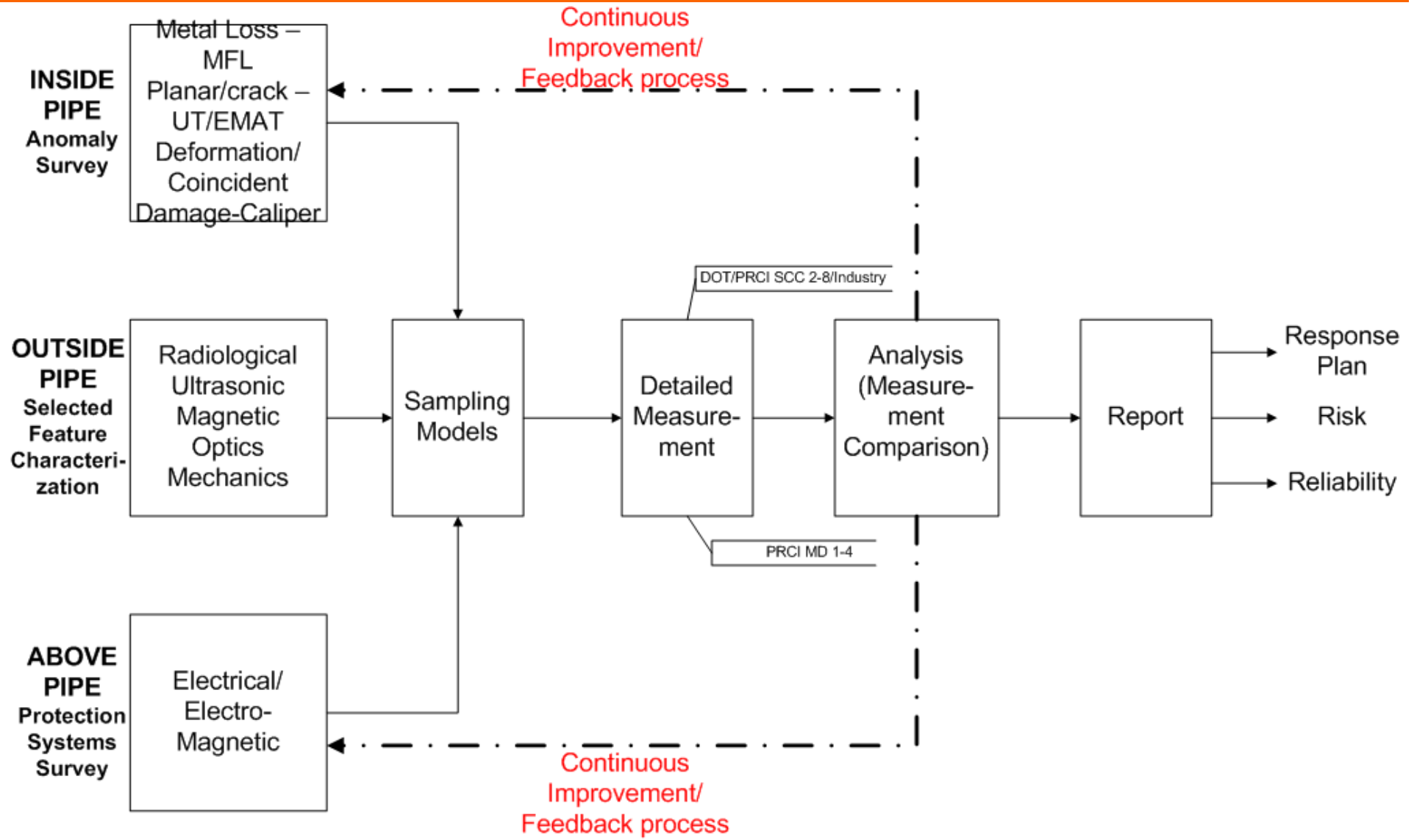
Engineering assessment towards design optimization of quality, safety and efficiency

APPLUS Headquarters in Barcelona

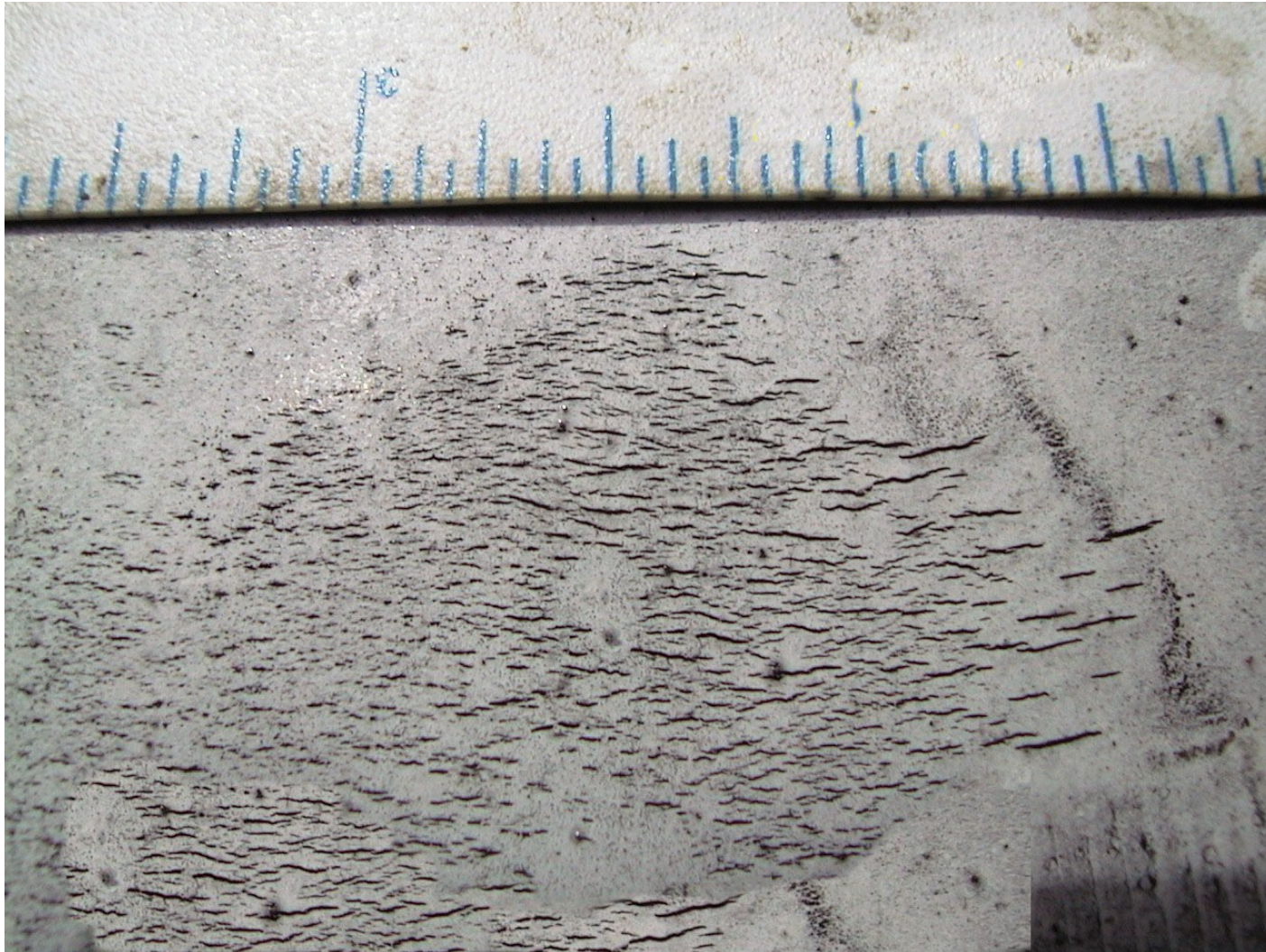
Applus[®] RTD



Qualification - Verification

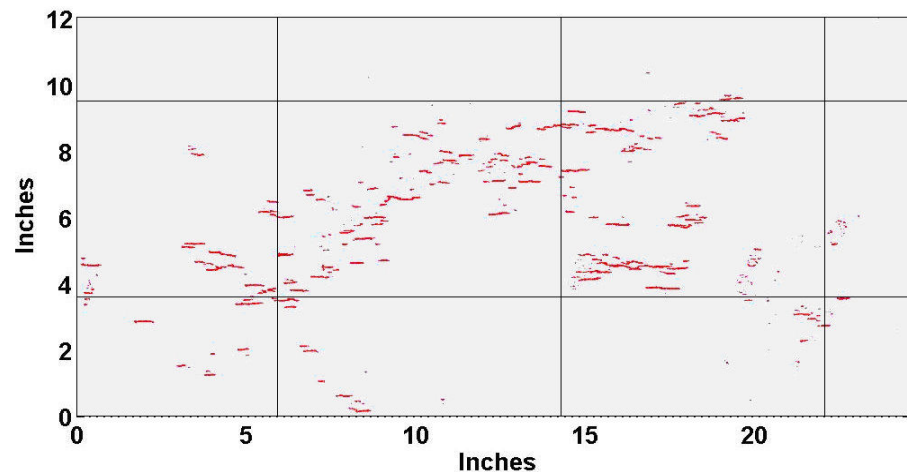
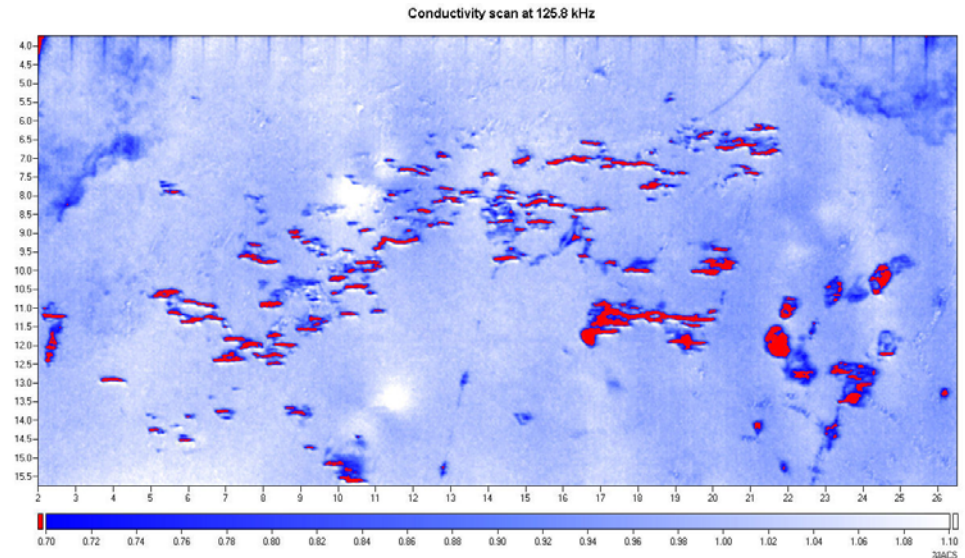


How to characterize SCC?



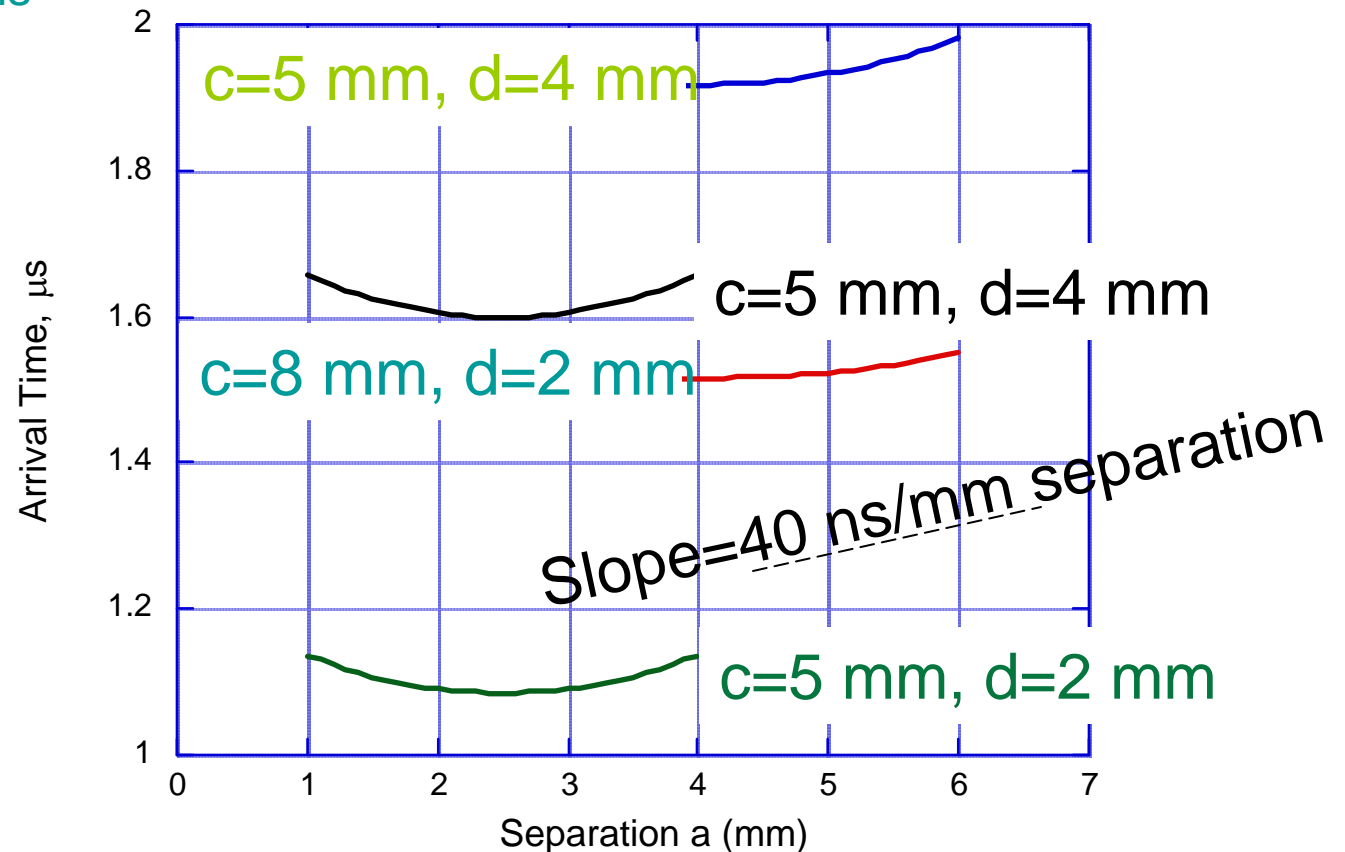
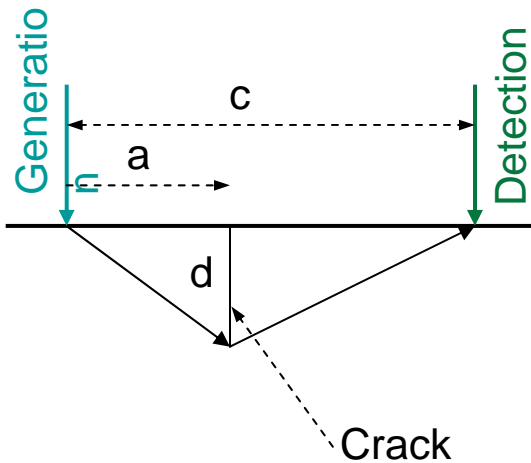
Approach (DOT/PRCI SCC 2-8)

- ⊕ Utilizes an eddy-current based technology to obtain a 2-D map of SCC
- ⊕ The data is filtered and evaluated (modelling) to identify and isolate cracks and to identify the cracks to be sized
- ⊕ The scan path coordinates for LaserUT sensor head are extracted



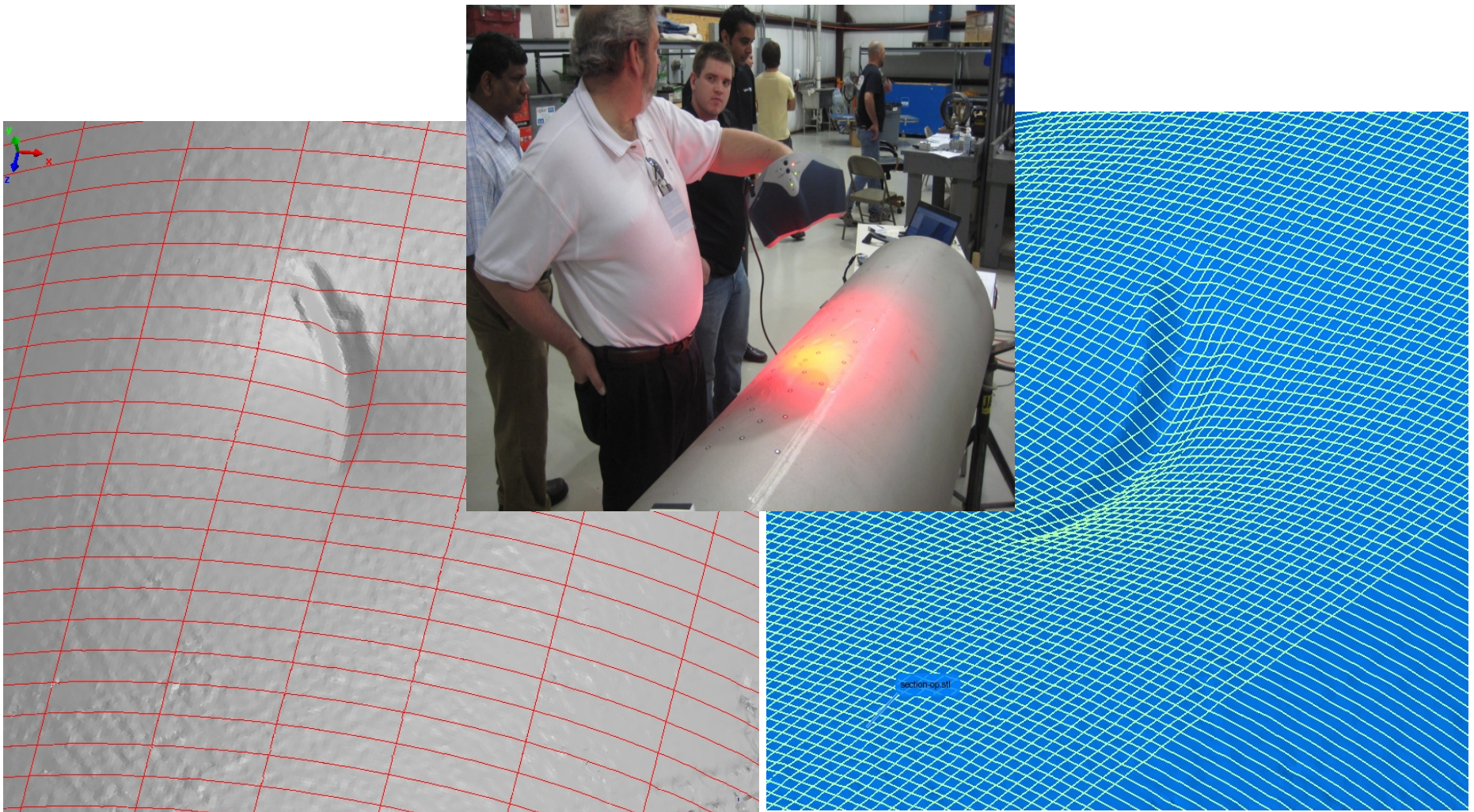
Sensitivity Of TOFD Arrival Time On Crack Position

Beam and crack configuration shown below. Beam spacing c is fixed; crack position a is varied



For slope of 40 ns/mm (see plot), a 25% variation in separation corresponds to a ~3% change in arrival ti

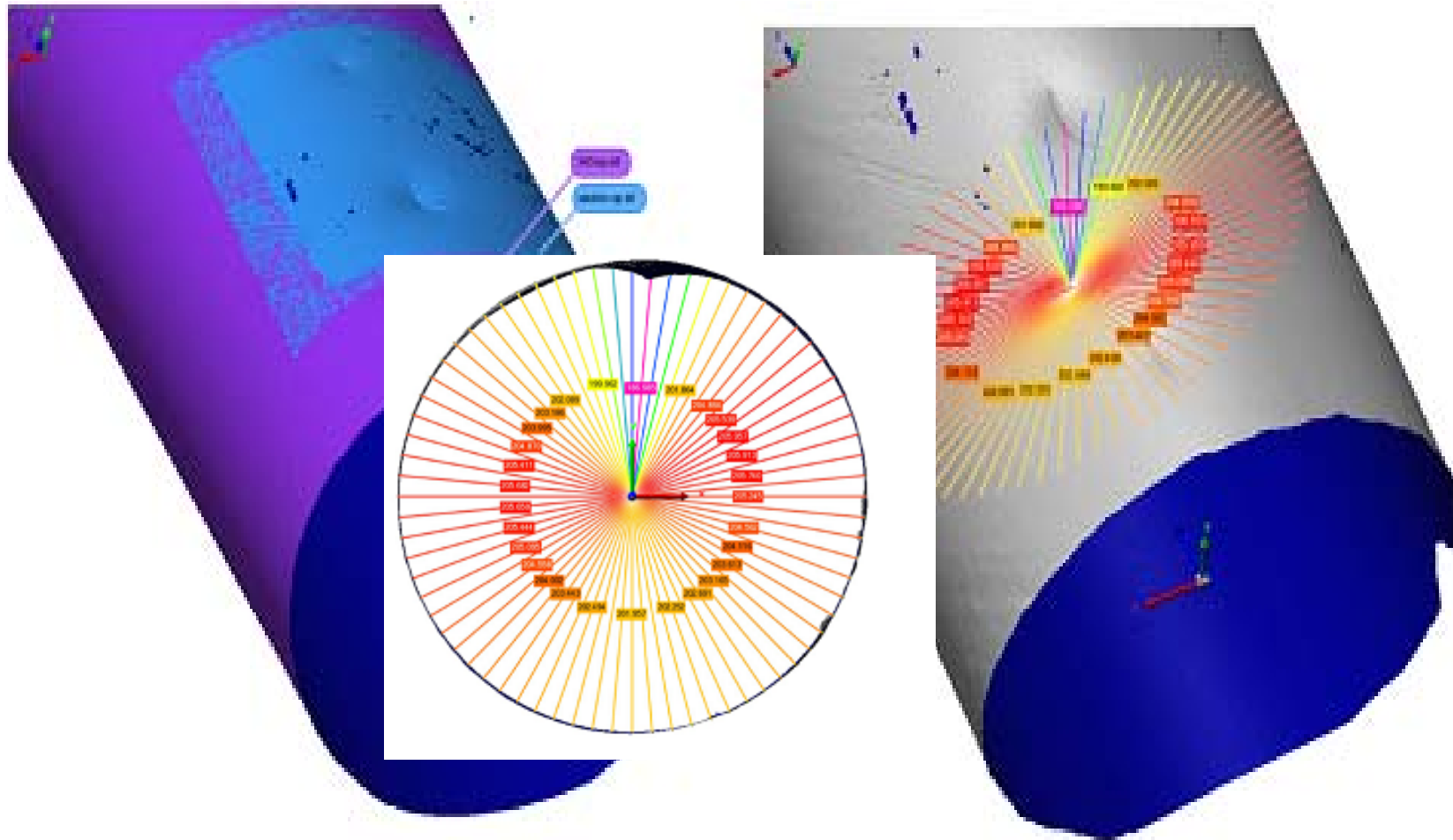
Measurement Comparison 16" Diameter with Dent & Gouge (PRCI MD 1-4)



Grid: 10 mm axially, 30 mm circumferentially
Representative Caliper tool Resolution

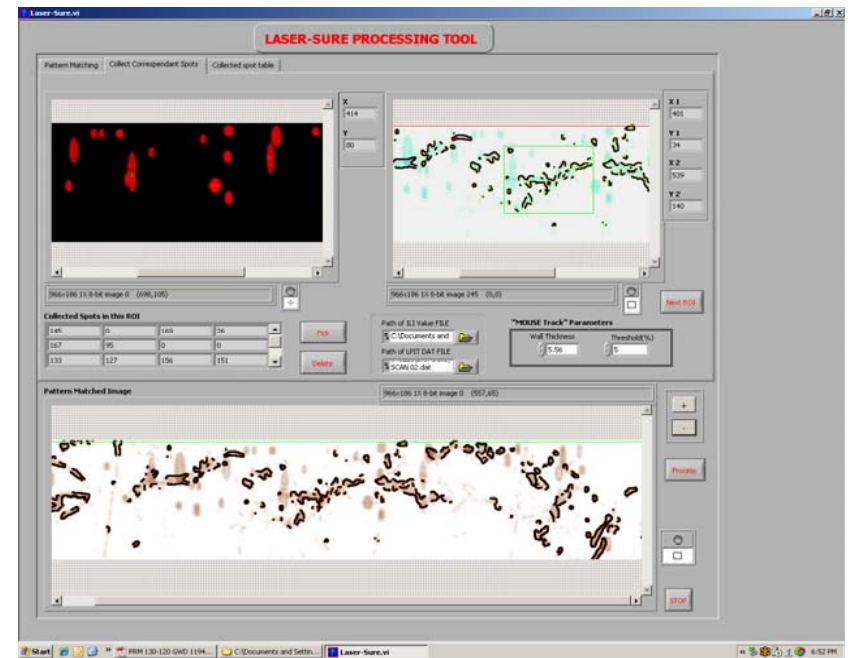
Grid: 2 mm axially, 1.78 mm circumferentially
Representative Laser-scan (post process resolution)

Simultaneous co-ordinate map & dent strain (circumferential & axial)

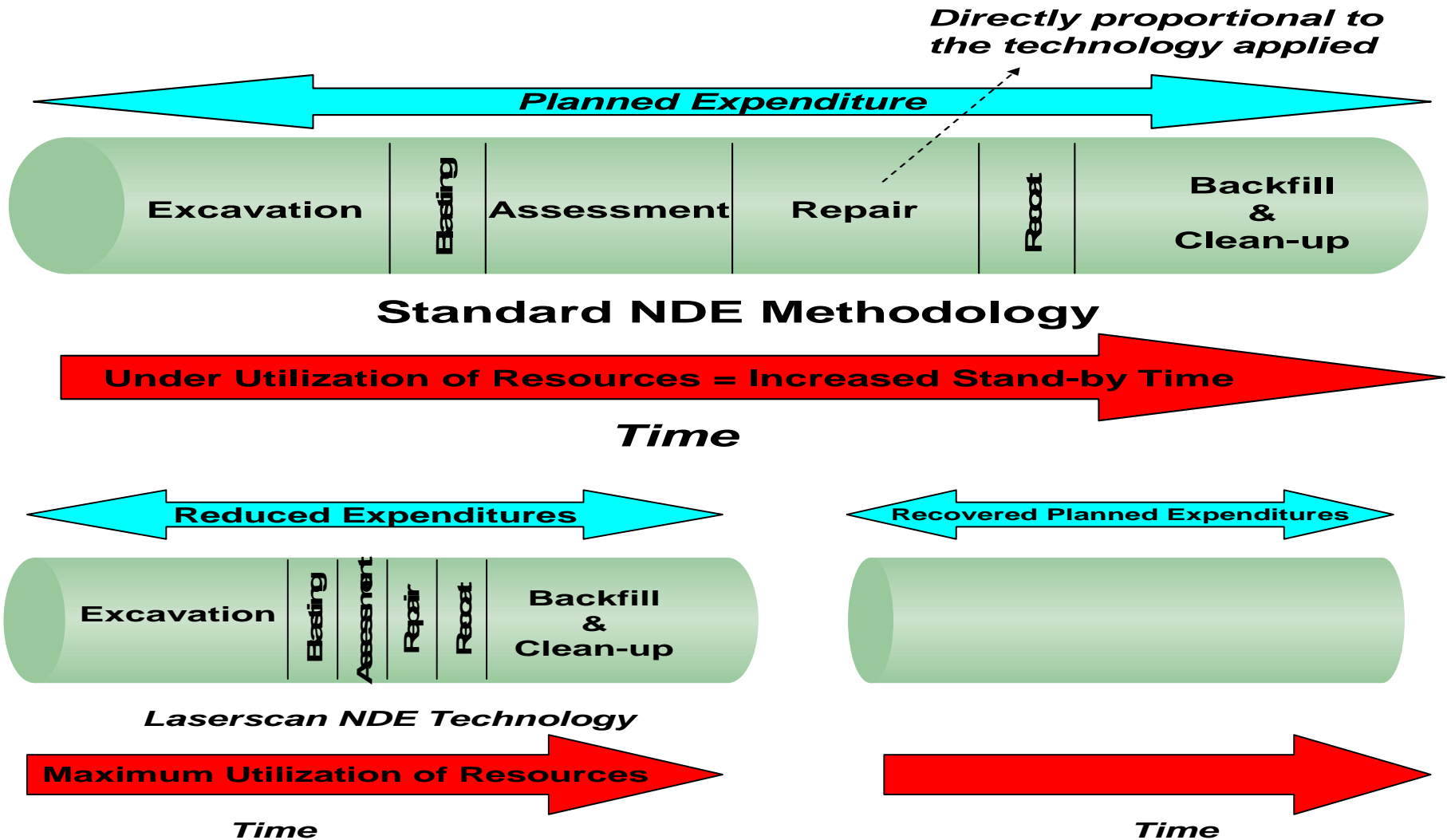


Measurement comparison & Analysis – Corrosion

- ⊕ Data Assimilation
- ⊕ Classification
- ⊕ Matching the data points
- ⊕ Data Extraction
- ⊕ Analysis
- ⊕ Validation
- ⊕ Re-clustering
- ⊕ Failure pressure calculations



Linkage Goal – Assessment Confidence & Budget Recovery



Gaps

