# PHMSA R&D Forum

## Working Group #1

Baltimore, MD, Sept 2018

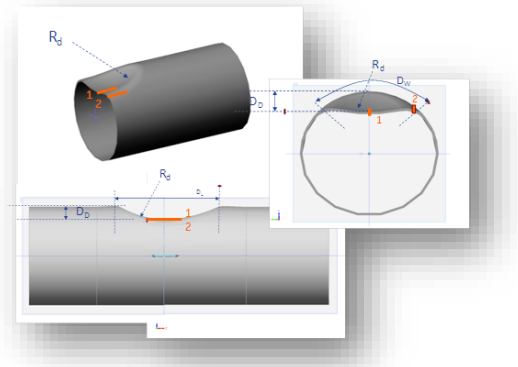
**September 12, 2018**

# Cracks in Dents - EMAT

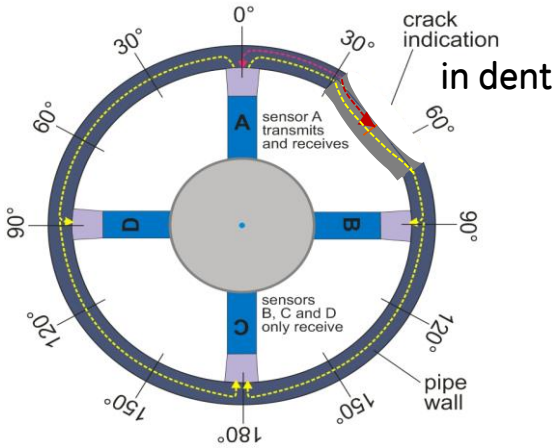
## Demonstrated through collaborative program…

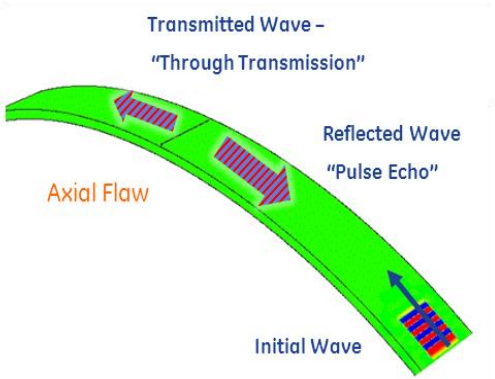

EMATScan

Feasibility

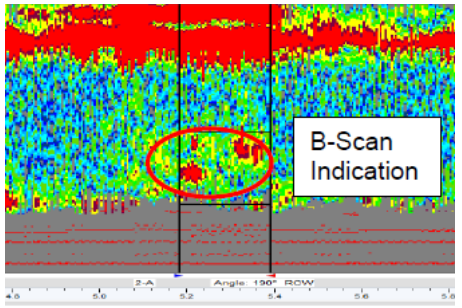


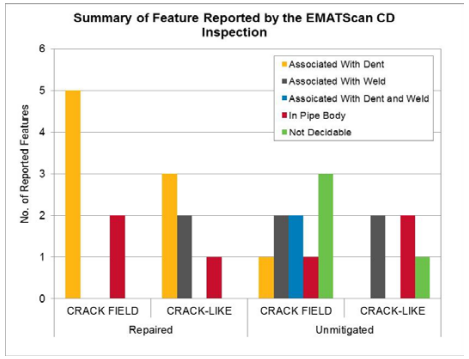
**IPC2014-33451 APPLICATION AND ADVANCEMENT OF EMAT ILI TECHNOLOGIES FOR THE INSPECTION OF CRACKS IN DENTS**




Field trials



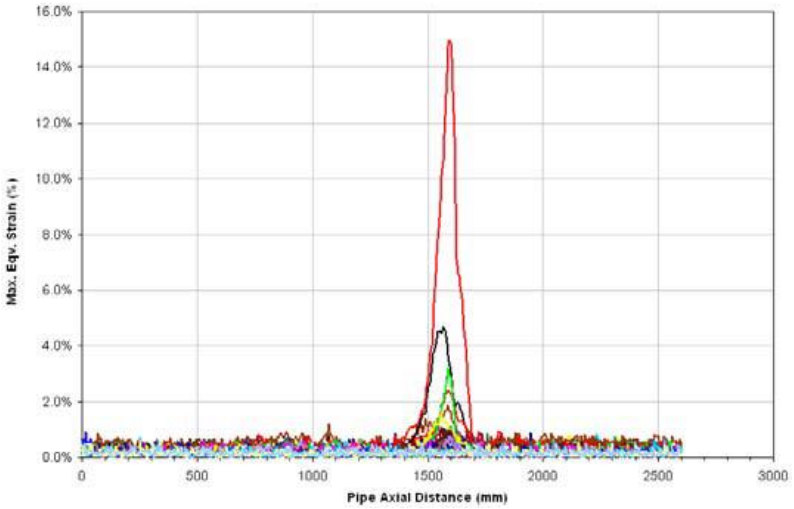



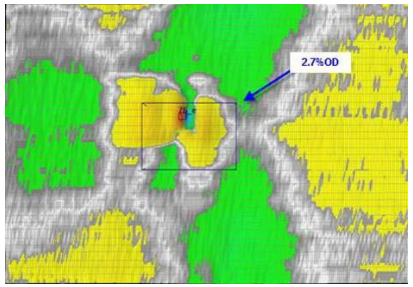

**IPC2016-64216 DETECTION OF CRACK-RELATED FEATURES WITHIN DENTED PIPE USING ELECTROMAGNETIC ACOUSTIC TRANSDUCTION (EMAT) TECHNOLOGY**

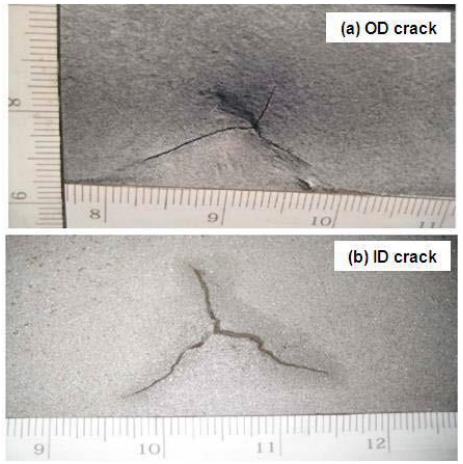
# Dents with Cracking – MFL

## Assess and identify cracking conditions…

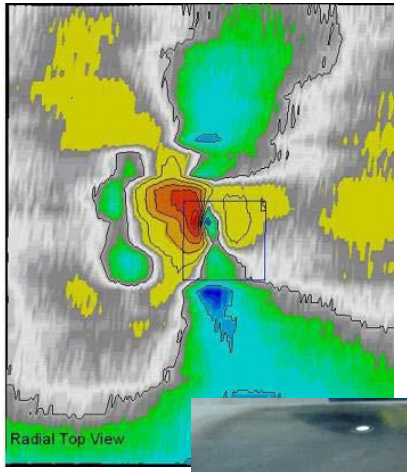
DFDI method



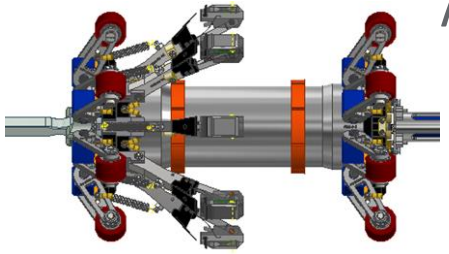

Vectra MFL



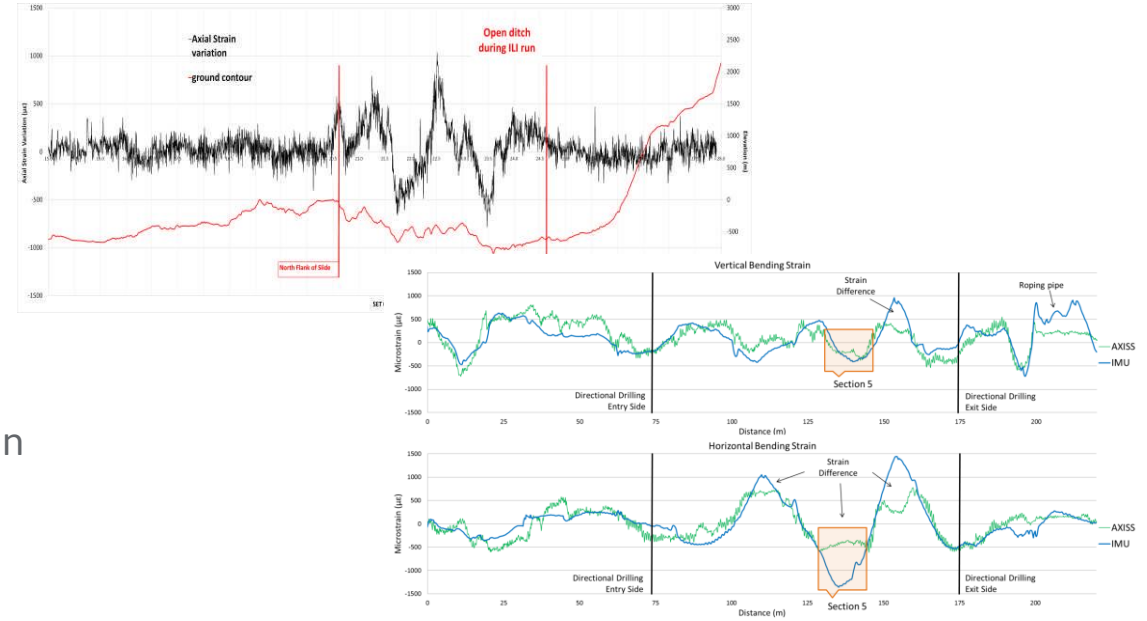

**IPC2012-90499 Combined Approach to Characterization of Dent with Metal Loss**

# Pipeline Strain and Profiling

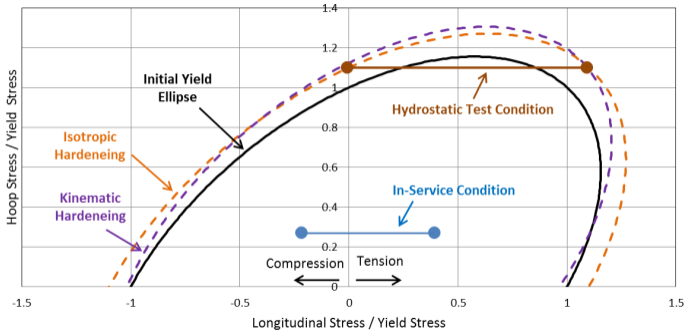
## Pipe Loading Conditions…



AXISS




Characterize Axial Strain distinct from IMU derived Bending strain Localization measurements




**IPC2018-78577 UNDERSTANDING PIPELINE STRAIN CONDITIONS –CASE STUDIES BETWEEN ILI AXIAL AND ILI BENDING MEASUREMENT TECHNIQUES**

**IPC2014-33245 IN LINE INSPECTION OF GEOTECHNICAL HAZARDS**

**IPC2008-64093 NON-CONTACTING BI-AXIAL STRAIN MEASUREMENT METHOD ON STEEL PIPELINE**


BAKER
HUGHES
a GE company

# ILI Geometry

## Designed with Intent…

Integrated high resolution caliper …

Target use: Dent profile & shape for FEA analysis & strain assessment

ASME B31.8 (2007) to estimate  total strain due to dent shape