Working Group #4

Expanding In-Line Inspection Capabilities & Application

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Attendance Breakdown

Approximate total attendance	**~32 persons**
Regulators (Federal, State, International)	4 persons
Pipeline Operators	**7 persons**
Pipeline Industry/Service Providers	**12 persons**
Standard Developing Organizations	2 persons
Researchers	**7 persons**
General Public	*0 persons*
Media	*0 persons*

Top 3 Identified R&D Gaps

Gap #1 – **Adapting existing ILI sensor technology or expanding platform range** would close the gaps for available sensor technology for "Unpiggable" pipelines and physical space challenges sometimes experienced in inline inspection. (New or Improved Technology)

Gap #2 –**Advance and evolve Computer Tomography for application on full joint spools** in order to improve sample quality and preservation of the inventory for ILI and in-ditch validation through both open and blind qualification testing. (New or Improved Technology)

Gap #3 – **Currently no methodology to determine toughness in absence of destructive testing.** Objective is to have a direct measurement applicable along entire pipeline, perhaps starting first with extrapolation from other attributes. (New or Improved Technology)

Associated Details
(Gap #1)

Adapting existing ILI sensor technology or expanding platform range would close the gaps for available sensor technology for "Unpiggable" pipelines and physical space challenges sometimes experienced in inline inspection. (New or Improved Technology)

a. Technology should **target both traditionally "Unpiggable" pipe (for liquids and natural gas transmission, distribution) and pipelines with existing vintage launching/receiving facilities.**
b. Technology **must work in natural gas initially envisioned to operate in urban areas**; and **may have value in operating in liquids**.
c. For functionality and or performance requirements, **technology must be able to inspect 6-inch and larger diameter pipelines**. Other sizing options may be valuable for industry.
d. Foreseen technical roadblocks are **challenges of miniaturization, range challenges, and diversity of vintage launcher/receiver facilities**. **No foreseen regulatory roadblocks or barriers** preventing this technology foreseen at this time, as it would leverage existing sensor technology currently used and accepted in conventional ILI operations.
e. Anticipated target for research completion is estimated at **2-4 years.**

Associated Details
(Gap #2)

Advance and evolve Computer Tomography for application on full joint spools in order to improve sample quality and preservation of the inventory for ILI and in-ditch validation through both open and blind qualification testing. (New or Improved Technology)

a. Technology should **target all pipe** (Liquids, Natural Gas Transmission and Distribution).
b. Pipeline operating environment the technology must operate in is a **shop setting, e.g., TDC Facility.**
c. **Accurate sizing and characterization of cracks or embedded flaws** are the functionality and performance requirements.
d. Technical roadblocks are the **challenges of making existing, lab-based tech to sizing thresholds, proper resolution, protocols. No regulatory roadblocks** foreseen at this time.
e. Anticipated timeframe to complete this research is ~2 years.

Associated Details
(Gap #3)

Currently no methodology to determine toughness in absence of destructive testing. Objective is to have a direct measurement applicable along entire pipeline, perhaps starting first with extrapolation from other attributes. (New or Improved Technology)

a. Technology should target **Liquids, Natural Gas Transmission and Distribution pipelines**.
b. Technology **must operate in all typical pipeline operating environments.**
c. **Accurate resolution of joint-specific toughness** are the functionality and performance requirements.
d. **Technical roadblocks are to be determined.** Regulatory roadblocks would be both **acceptance of new technology, and an issue with meeting Code-required repair/response requirements** during testing and implementation.
e. Timeframe to complete this research is ~2-5 years.

Additional Identified Gaps

- UT Technology – Single Crystal PZT; taking transducer to tool
- UT Technology – Proving Acoustic Resonance for crack detection
- Accurate delineation of defect location (in bond line v. in the upset)*
- Accurate delineation of seam type (e.g., high- v. low-frequency ERW)*
- Standardize science of reliability for ILI data management
- Accurate identification and sizing of complex corrosion*
- Consensus document on delineating valid causal relationships
- Increase accuracy of model/reduce bias, metal loss*
- Improve accuracy, alignment with source data, Cluster Criteria*

- Other gaps (including those in flight for research, and those industry may consider addressing) were identified in a supporting document, available with presentations.

NOTE: Identify gaps with* that may be addressed with University Partnerships