Working Group 1
Threat/Damage Prevention

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Attendance Breakdown

Approximate total attendance	58
Operators (Dist/Trans)	18/7
Regulators	3
Academia	12
Service Company	9
Technology Provider	4
Press	0
Research Institute	5

Top Identified R&D Gaps

Gap #1 – (Technology) Capture of accurate location of legacy existing assets

Gap #2 – (Technology and General Knowledge) Predictive analytics to sort the major risks using multiple data sources

Gap #3 – (General Knowledge) Adoption of best practices and education of public

Gap #4 – (Technology and General Knowledge) Broad use of GPS with accuracy standards

Associated Details
(Gap #1)
Capture of accurate location of legacy existing assets

1. New or Improved Technology

a. What pipeline type(s) does the technology target?

All pipelines (nonmetallic and metallic)

b. What operating environment(s) would the technology operate?

All operating pipeline environments

c. What are any functionality and or performance requirements?

Accuracy (<1ft), user friendly, verifiable

d. What road blocks or barriers prevent the technology deployment?

Locating plastics, reliability, user knowledge, cost, speed, system integration

e. What are anticipated targets or timeframes to complete this research?

1-3 years

Associated Details
(Gap #2)

Predictive analytics to sort the major risks using multiple data sources

1. New or Improved Technology

a. What pipeline type(s) does the technology target?

All pipelines

b. What operating environment(s) would the technology operate?

All

c. What are any functionality and or performance requirements?

90-95%

d. What road blocks or barriers prevent the technology deployment?

Data silo mentality, communication, legal framework/liability

e. What are anticipated targets or timeframes to complete this research?

1-3 years

3. Creation and Dissemination of General Knowledge

a. What pipeline type(s) does the new knowledge target?

 All

b. What operating environment(s) does the new knowledge target?

 All

c. What technical details or scope items are necessary and recommended?

Excavation activity (or planned), economic activity (permits and forecasting), past performance of excavators, leading indicator

d. Can any targets or timeframes be identified to complete this research?

Substantial database of input data (One Call)

Associated Details
(Gap #3)

Adoption of best practices and education of excavators and public

Creation and Dissemination of General Knowledge
c. What technical details or scope items are necessary and recommended?
More authoritative best practice/faster practice, PHMSA stamp of approval

Associated Details
(Gap #4)

Broad use of GPS with accuracy standards

1. New or Improved Technology

a. What pipeline type(s) does the technology target?

All

b. What operating environment(s) would the technology operate?

All

c. What are any functionality and or performance requirements?

<1ft, ease of use, speed, cost, integrated systems

d. What road blocks or barriers prevent the technology deployment?

Urban canyons, tree cover, cloud cover

e. What are anticipated targets or timeframes to complete this research?

1-5 years

3. Creation and Dissemination of General Knowledge

a. What pipeline type(s) does the new knowledge target?

All

b. What operating environment(s) does the new knowledge target?

All

c. What technical details or scope items are necessary and recommended?

Accuracy, ease of use, validation, data uniformity, scalability

d. Can any targets or timeframes be identified to complete this research?

1-5 years

Additional Identified Gaps

- **Identification of higher than anticipated degradation of materials in pipeline systems**
- New assets should be locatable
- Accurate mapping of underground facilities
- Standardization of pipeline localization
- Technology deployment
- Miniaturization and reliability of cameras
- IoT for remote monitoring
- Cost reduction and plug and play of encroachment detection
- Combined systems for encroachment detection (camera and fiber optic)
- Regulations to support safer installation addressing the root cause of damage prevention
- Analyze root causes of threats and damage preventions
- Predictive modelling from the data that are already available
- River crossing/river behavior sensor to detect erosion
- Data repository (standard)
- Design integrating ground movement threats
- Under canopy encroachment

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

Additional Identified Gaps (cont)

- Outreach and education
- Accuracy of pipe location
- Standardization of localized tools using RFID (or eqiv) markers
- Application of breakaway fittings for earthquake
- IoT for intelligent shut-off valves
- Trenchless best practices dissemination
- Vacuum excavation best practices dissemenation
- High accuracy GPS collection and mapping of assets
- Using routine maintenance opportunities to GPS record assets
- Collecting depth of cover assets
- Standardization of GPS data quality
- Making the GPS mapping technology usable by construction crews
- Integration of GPS mapping GIS in real time and workflow
- Review of regulation that are in place and result in an increase of risk
- Use of IR wave lengths to confirm equipment activity
- Leading indicator tracking combined with patrolling and surveys
- Integration of imagery and manual process for threat detection

Additional Identified Gaps (cont)

- Improved GPS signal in urban areas
- Software analysis for quality feedback about GPS coordinate collection
- Mapping assets through inline inspection associated with video
- Early coordination with utilities before construction
- Risk based for data collection and exchange with construction companies
- Integration of multiple sensors (Lidar, imagery, radar, etc) +data fusion
- Practice of field inspection
- GPR with enough power (FCC)
- User friendly interface to deploy construction crew
- Use of drones for collecting data about construction work
- Highway railroad crossing and longitudinal
- Harsh environment impact on PE
- Creep under constant P on PE
- Sharing data about the pipeline locations: education, quality quantification/standard
- Data standard for utility exchange of information
- Education and enforcement: Gold shovel standard
- Connections with construction training and programs