Track # 1
Threat Prevention

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Attendance Breakdown

Approximate total attendance	20 persons
Federal Regulators	1 persons
State Regulators	2 persons
International Regulators	0 persons
Pipeline Industry	10 persons
Standard Organizations	0 persons
Researchers	3 persons
Academics	0 persons
Other	4 persons

Top 4 Identified R&D Gaps

Gap #1 – Educate the Excavators and Evolve the Technologies Developed for the VUPS One Call Pilot – General Knowledge and Improved Technology

- Spread the Virginia experience to other states
- Push for phase 1, white lining
- Add GPS equipment to all excavating equipment
- Add a warning notice on all excavating equipment
- Add GPS to HDD equipment and trenchers

Gap #2 – Early Monitoring Systems – Improved Technology

- Reduce cost, improve range, improve response time, triangulate
- Algorithms, response times, miniaturize
- Discriminate between dig and bucket movement
- Guidelines to support selection of appropriate system
- In ground, mounted, aerial, satellite

Top 4 Identified R&D Gaps

Gap #3 – Distribution Integrity Management - General Knowledge

- Advanced Risk Assessment Tools
- Priority Risk Mitigation Techniques
- Risk Based Inspection Techniques
- Get this to the market quickly- 6 months
- Process sharing with transmission industry

Gap #4 – Pipe Location for All Materials – Improved Technology

- Plastic pipe with no tracer wire
- Bridging the gap between practical deployment and cost effectiveness

Associated Details

Gap #1

Educate the Excavators and Evolve the Technologies Developed for the VUPS One Call Pilot

1. New or Improved Technology

a. What pipeline type(s) does the technology target? **Transmission and Distribution**
b. What operating environment(s) would the technology operate? **Onshore**
c. What are any functionality and or performance requirements?
d. What road blocks or barriers prevent the technology deployment?
e. What are anticipated targets or timeframes to complete this research? **Short Term**

3. Creation and Dissemination of General Knowledge

a. What pipeline type(s) does the new knowledge target? **Transmission and Distribution**
b. What operating environment(s) does the new knowledge target? **Onshore**
c. What technical details are necessary and recommended? **Standards need to be decided to accept the same phone and software (xml) in each state. Maps may not be available in each state.**
d. Can any targets or timeframes be identified to complete this research? **Short term**

Associated Details

Gap #2

Early Monitoring Systems

1. New or Improved Technology

a. What pipeline type(s) does the technology target? **Transmission and Distribution**
b. What operating environment(s) would the technology operate? **Onshore, Offshore**
c. What are any functionality and or performance requirements? **Range, accuracy, reliability, response time, Real-time, miniaturization, data processing**
d. What road blocks or barriers prevent the technology deployment? **Cost, algorithms, friend or foe**
e. What are anticipated targets or timeframes to complete this research? **Short term and Long term**

Associated Details

Gap #3

Distribution Integrity Management

3. Creation and Dissemination of General Knowledge

a. What pipeline type(s) does the new knowledge target? **Distribution and Transmission**
b. What operating environment(s) does the new knowledge target? **Onshore**
c. What technical details are necessary and recommended? **Data warehousing, open architecture, flexibility**
d. Can any targets or timeframes be identified to complete this research? **Near term**

Associated Details

Gap #4

Pipe Location for All Materials

1. New or Improved Technology

a. What pipeline type(s) does the technology target? **Distribution and Transmission**
b. What operating environment(s) would the technology operate? **Onshore**
c. What are any functionality and or performance requirements? **Depth, realtime, practical, handheld, user-friendly**
d. What road blocks or barriers prevent the technology deployment? **Laws of Physics, congestion**
e. What are anticipated targets or timeframes to complete this research? **Long term**

Additional Identified Gaps

- Improve/reduce cost of early warning systems
- Pipe location for all materials
- Technology transfer for existing technologies in final stages
- Distribution integrity data including
  - Data mining
  - Advanced risk assessment tools
  - Integrate with transmission data
- Extend range of early warning systems
- Enhance capabilities and reduce cost of early warning systems
- Discriminate between actual dig v. bucket movement on A-Gas technology
- Triangulate or ID actual threat location on Senstar system
- DIMP programs must come to market very quickly
- Time lags for response on warning systems
- Involved people, processes and technology
- Bring to market technology for locating and warning:
  - In the ground
  - In the air
  - On the ROW
  - From space (satellite)

Additional Identified Gaps

- Best practices that energize technology and people
- Guidelines for vacuum / soft dig excavation (some states/cites have banned it)
- How to spread the Virginia One Call experience to other states? Possible next phase to pick another state.
- Push for phase 1 (of VUPS) adoption by all excavators
- How to get info out to other states regarding VUPS
- Add GPS equipment on all excavation equipment, even rental equipment and Mom and Pop
- Improve understanding of current systems
- Data mining- predictive modeling
- New technologies – emerging technologies
- Advanced sensors –robotic threat sensors
- Guidelines to support selection of appropriate monitoring method. When and where to use different systems.
- Real time processing
- Public awareness
- Research to support enforcement/new info to help repeal bad legislation (such as to remove marks)

Additional Identified Gaps

- Development of algorithms- improve speed, accuracy, reliability
- Advanced sensors- better resolution, miniaturize
- Data processing- integrating with both aircraft and ground systems
- "Warning notice" to be actually placed on excavating equipment
- Cased crossings
  - Studies showed casings could be eliminated
  - DOTs nonetheless wanted them incorporated in design
  - Research needed to help eliminate the need for casings in most cases
- Database needed on all older non-metallic distribution pipe materials in the ground. Include name, manufacturer, test results and life expectancy and share with the industry.
- Plastic pipe risk model for high consequence areas (PIM)
  - Include SCC
- Camera to monitor subsidence in river banks or bridge crossings
- VUPS phase 3- add GPS to HDD equipment and trenchers
- DIM Risk Model to prioritize risk mitigation techniques
  - Risk based inspection intervals
- Remote and automated QA/QC- camera for inspections

Additional Identified Gaps

- Integration of other monitoring technologies with one-call operations (satellite, geophone, acoustic, video, etc)
- Locate buried plastic, esp with no tracer wire
- Active monitoring of critical facilities during construction activities
- Satellite imagery, bring down the cost
- To ID various utilities by inducing frequencies on different utilities