Top Five Gaps and Challenges

1) Fund through commercialization (technology transfer, benchmarking)
2) MagPipe
3) Directional Drill Sensors (obstacle detection)
4) Vacuum Excavation
5) Affordable Monitoring Technologies (for damage incidents)
6) Develop technology to do Real Time As Built for locating and mapping
7) Develop Right of Ways monitoring devices for unauthorized encroachment…must be usable for LDC and transmission
8) Increase awareness of law requiring excavators to notify utility companies when gas lines are exposed (check wrap)
9) MagPipe for all industries (water, sewer, gas, etc.)
10) Excavation sensors / proximity monitors to alarm excavators
11) Affordable P/L monitoring Technology
12) Improved Excavation Tools
13) Improved Technology to locate/map P/L's
14) Infield testing or benchmarking
15) Developing a technology transfer process
16) Managing the aging infrastructure
17) Affordable/Effective Row Monitoring Technology
18) Co-funding R&D and involving State/local regulatory authorities
19) Technology Transfer/communication
20) Location system using GPS to create centimeter accuracy and conversion of utility mapping and one call mapping technology changes
21) Improved technologies to locate existing damage
22) Develop technologies to locate buried pipelines (+/- 1 ft, 10' depth)
23) Clear industry objectives
24) Clear Government objectives
25) Technology mapped to defined threats, impacts, and consequences
26) Preventative tool for 3rd party encroachment

Top 5 Gaps and Challenges (Damage Prevention)
Drill Down Exercise

Step 1

1) Funding and focus from conception through application - 2
2) Locating plastic pipe - 0
3) Avoidance sensors on digging/boring equipment - 4
4) Improved non-destructive excavation tools (vacuum, etc.) - 3
5) Monitoring of Right of Way Encroachment - 7
6) Affordable Monitoring Technologies (for damage incidents) - 4
7) Real-time as-builts/improved mapping technology/improved GPS with Automation - 2
8) Consistent state damage-prevention program /enforcement/Increase awareness of law requiring excavators to notify utility companies when gas lines are exposed (check wrap) - 1
9) Co-funding including collaboration with all stakeholders - 0
10) Improved technologies to locate existing damage - 5
11) Develop improved technologies to locate buried pipelines (+/- 1 ft, 10' depth) - 2
12) More defined industry/government needs for the commercializers - 0
13) Technology mapped to defined threats, impacts, and consequences - 0

Step 2

1) Monitoring of Right of Way Encroachment – 9
2) Improved technologies to locate existing damage – 7
3) Affordable Monitoring Technologies (for damage incidents) – 6
4) Avoidance sensors on digging/boring equipment – 6
5) Develop improved technologies to locate buried pipelines (+/- 1 ft, 10' depth) – 6
6) Real-time as-builts/improved mapping technology/improved GPS with Automation – 5
7) Improved non-destructive excavation tools (vacuum, etc.) – 5
8) Funding and focus from conception through application – 4

Step 3

1) Monitoring of Right of Way Encroachment – 9
2) Improved technologies to locate existing damage – 7
3) Affordable Monitoring Technologies (for damage incidents) – 6
4) Avoidance sensors on digging/boring equipment – 6
5) Develop improved technologies to locate buried pipelines (+/- 1 ft, 10' depth) – 6

Solution: MagPipe for all industries (water, sewer, gas, etc.)

Top 5 Gaps&Challenges/Goals/Solutions (Damage Prevention)

1) Monitoring of Right of Way Encroachment
Goal: Knowledge of Right of Way activity (Real-time 24/7)
Solutions: Systems that continuously sense, monitor, and report

2) Improved technologies to locate existing damage
Goal: Locate any damage that requires repair and affects the integrity of the pipeline
Solutions: 1) Improved information/Perfect ILI **2)** Improved above-ground survey tool **3)** Improved defect assessment tool (on the pipe) **4)** More enforcement/education or better laws requiring damage reporting

3) Affordable Monitoring Technologies (for damage incidents)
Goal: Detect any contact to the pipe
Solutions: Systems that continuously sense, monitor, and report

4) Avoidance sensors on digging/boring equipment
Goal: No contact to the pipe
Solutions: OnBoard Tools that warn, alert, or shutdown equipment in vicinity of the pipeline

5) Develop improved technologies to locate buried pipelines (+/- 1 ft, 10' depth)
Goal: Affordable and accurate horizontal/vertical location
Solutions: "Magic Wand"