Current OTD/GTI Research

Locating and Preventing Damage to Pipelines

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ESTABLISHED 1941

GTI Overview

- Independent, not-for-profit established by the natural gas industry
- GTI tackles tough energy challenges turning raw technology into practical solutions
- Downhole to the burner tip including energy conversion technologies

Operations Technology Development (OTD)

- Stand alone, 501c(6) not-for-profit, member-controlled company where gas utilities work together to develop technology solutions to common issues

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Industry Issues/Needs

- Unlocatable non-metallic infrastructure
- Crossbores – legacy and new
- Inaccurate locates
- Data Gathering – storage and dissemination of infrastructure data
- Improved industry best practices
  - HDD and vacuum excavation
- Technology implementation pilot programs to assist the industry to better understand and adopt new technologies.
- Improved protection of above ground assets

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Cross-Bores Detection and Prevention

- **Cross-Bore Best Practices Guide** provides a single source of information that can be used by natural gas operators to investigate and remediate existing cross-bores as well as prevent future cross-bores
- **Outreach and Education** efforts provides information to effect positive changes in attitude, practices and operations (informational videos)
- **Technology** development for prevention and detection methods
  - Acoustic Pipe Locator
  - Cleanout safety device
  - HDD “Look Ahead” development, Acoustic and GPR

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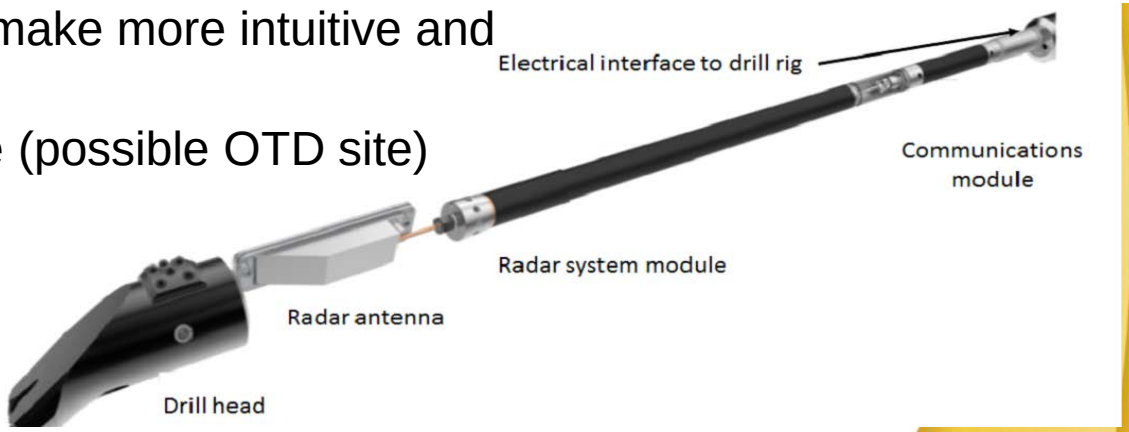
PHMSA/OTD – ORFEUS Obstacle Detection Technology for Horizontal Directional Drilling

- **Objective**
  - Make operational improvements to the current existing prototype
  - Improve radar capabilities based on past testing
  - Improve communications through drill rods (lengthen from 300’ to 600’)
  - Improve software system to make more intuitive and operator friendly
  - Field test improved prototype (possible OTD site)



- **Deliverables**
  - Pre-commercial prototype with the ability to detect obstacles in front of, and to the side of the drill head

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PHMSA/GTI - Improved Tools to Locate Buried Pipelines in Congested Underground

Objective

- To mitigate third-party pipeline damage at the earliest stages through the development and commercialization of geospatial probes to map existing buried utilities by being inserted inside of a live gas pipelines.
- Probe capable of mapping live underground pipes 3-dimensionally and provide very accurate locations (x, y & z) of utilities.

Deliverables

- Field ready system to map pipes in simulated field conditions and at participating utility sites (OTD member sites).
- Demonstrations of geospatial probes to accurately map underground.
- Demonstration of a cloud-based data collection system used to collect and store data, so it is easily accessible to the utilities.

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Excavation Damage Prevention Using Real-Time GIS

- **Overview**

  To identify risk of excavation damage to buried gas facilities by:

  - Characterizing excavators' behavior by analyzing and transferring data from excavators to cloud-based GIS,
  - Increasing awareness of construction equipment activity

- **Deliverables**
  - Deliver a low cost 'black box' installed in excavation equipment,
  - A high-accuracy GPS location, which overlays with the utility's GIS pipeline maps,
  - Situational awareness: A real-time characterization of the "state" of the excavator and excavation activity

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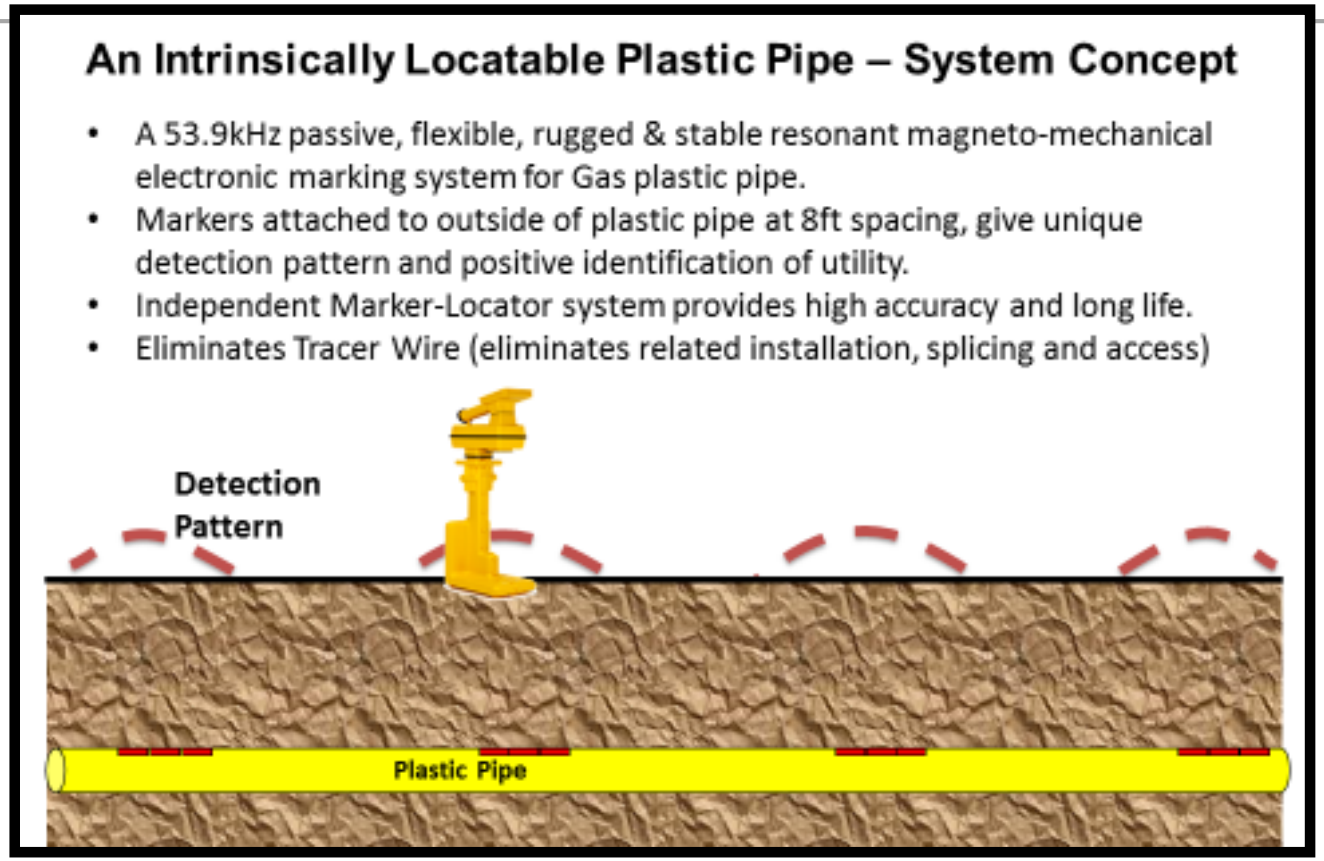
Intrinsically Locatable Technology for Plastic Piping System - (U.S. DOT / OTD / 3M / GTI)



The program will be compatible with existing Plastic-Pipe Path locating products such as the EMS Locatable Tape and EMS Rope.

Makes locating faster because there's no transmitter connection, and more accurate because it's an "echo" based transponder rather than a current loop which uses the earth (or other conductors) for return.

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Breakaway Fittings for Meter Safety

- Breakaway disconnect / shutoff fitting for meter set assemblies (MSA) and other aboveground gas systems
- Reduce the risk from vehicle collision or ice/snow falling from a building
- Beta prototypes available 2017
  - OPW Engineered Systems

What Could Happen to “At Risk” Meters

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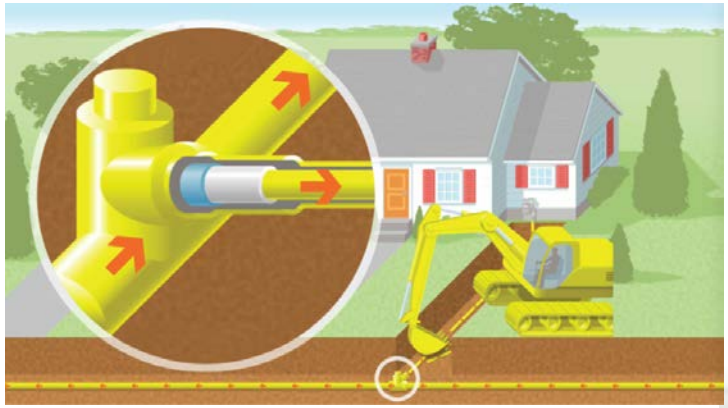
Integrated Intelligent Safety System (IISS)

- Developing an Integrated Intelligent Safety System (IISS) (Lorax Valve) to mitigate the risk of gas leaks due to third party damage on commercial, multi-family, and small industrial service lines by shutting off the flow of gas.
- Intelligent safety shutoff device that will shut off the flow of gas in the event of line or meter set damage or failure.
- Working towards field pilot evaluations with utilities.

LineGuardian +NG



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Recent HDD Incidents

- Recent incidents have highlighted the need for better trenchless practices and better damage prevention rules
  - JJ's Restaurant in Kansas City, MO – Feb 19, 2013
  - Royal Oaks, MI – Feb 27, 2013
  - Louisville, KY – Feb 19, 2013
  - Ashville, NC – Jan. 2014
  - Ewing, New Jersey – March, 2014
  - Omaha, Nebraska – January, 2016
  - Canton, IL – Nov. 2016
  - Sun Prairie, WI – July, 2018
  - Homerville, GA - August 2018

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Creation of Trenchless Best Practices

- Recent trenchless best practices developed
  - Keyhole group (OTD utilities and trenchless manufacturers)
  - AGA (Distribution Construction & Maintenance committee)

FINAL

TRENCHLESS BEST PRACTICES FOR DAMAGE PREVENTION

GENERAL DOCUMENT

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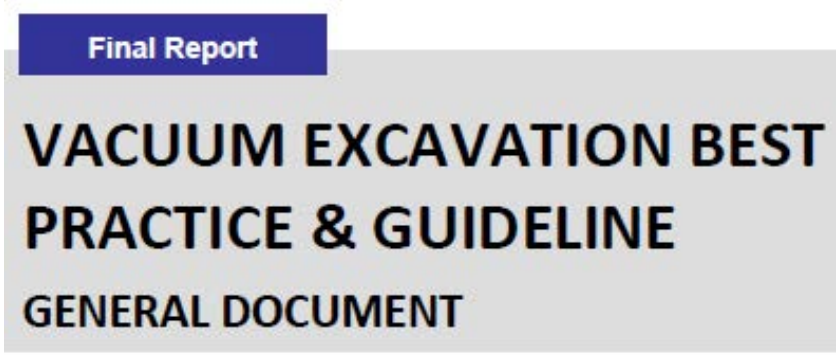
Creation of Vacuum Excavation Best Practices

- Developed Vacuum Excavation Best Practices to support the proper use of vacuum excavation to eliminate damage
  - Keyhole group (OTD utilities and vacuum equipment manufacturers)



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Research Gaps and Needs

- Require all newly installed underground facilities to be locatable
- Continue to make non-metallic piping intrinsically locatable.
- Crossbore detection technologies – for both legacy and new
- Data Collection – Improving the means of gathering, storing, and sharing of infrastructure information
- Technologies to improve accuracy of locates
- Implementation support for new damage prevention technologies and alternative methods of excavation (vacuum).
- Technology implementation pilot programs to assist the industry to better understand and adopt new technologies.
- Effective excavation best practices and outreach programs to disseminate knowledge/practices – all stakeholders.

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Questions

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