

Unlocking RD&D Potential: An Overview of NYSEARCH & Utility Pipeline Robotics Inspections

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NGA Gas Operations School

June 5, 2026

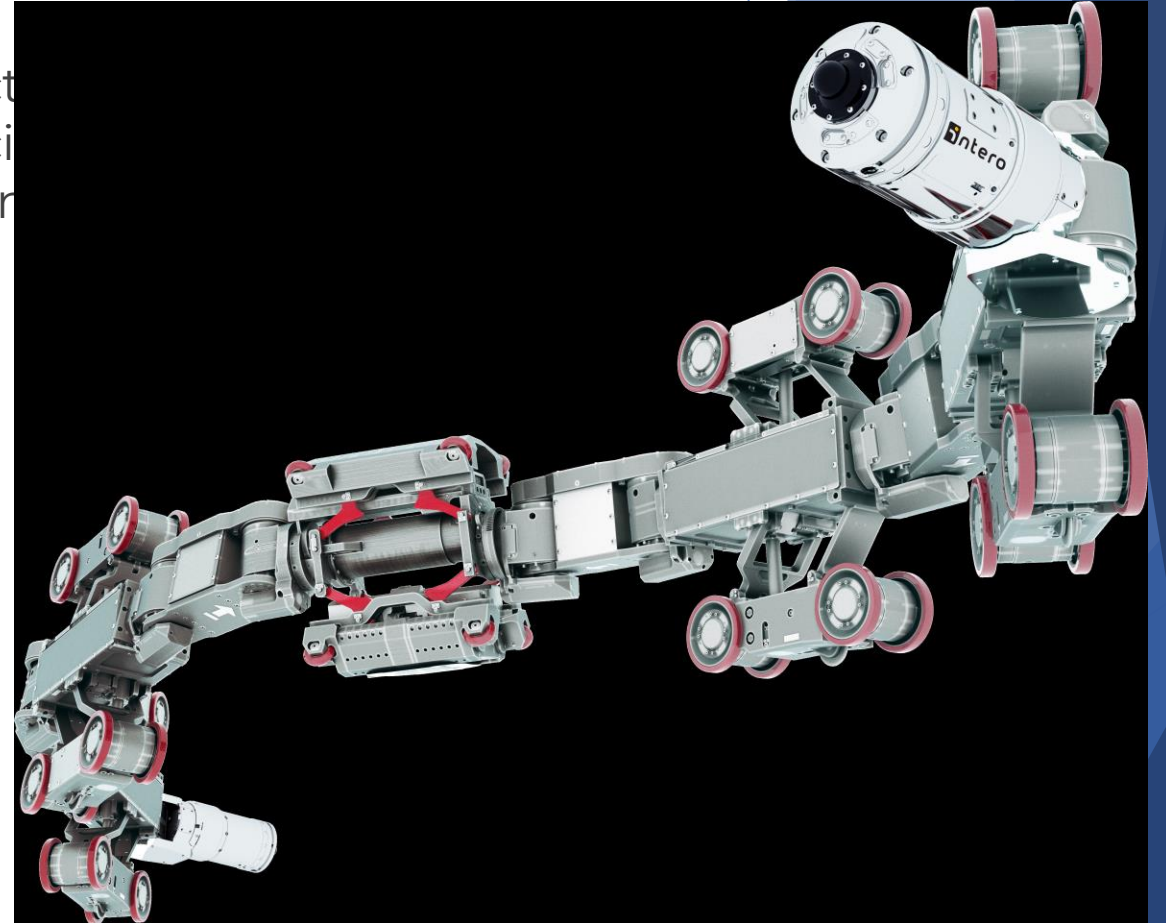
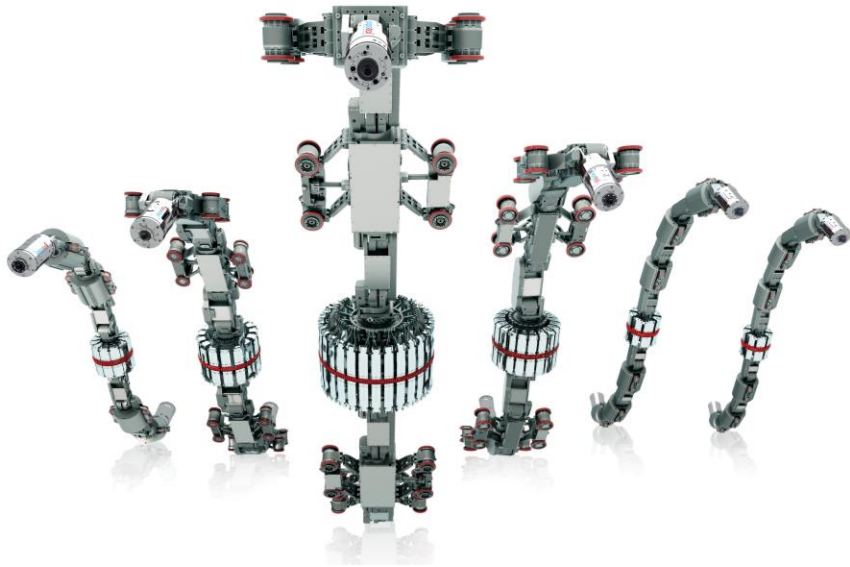


NYSEARCH RD&D

Division of the **NORTHEAST GAS ASSOCIATION**

Robotic MFL Inline Inspection

- ▶ Value proposition
- ▶ Robotic MFL Inspection of difficult to inspect pipelines in distribution gas networks reducing risk of incident costs and enhance uptime and product throughput
- ▶ [Why Choose Pipe Explorer?](#)





NYSEARCH began development of tech funded by various LDCs, PHMSA, DOE, SDTC etc.



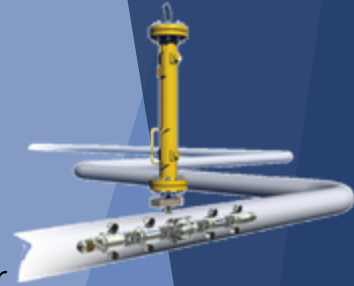
InvoDane began integrating all technologies and field testing.



Pipetel formed to be a service provider.



*Explorer 10/14 MFL.



First Laser Deformation Signal (LDS); In-Line Charging (ILC) capability.



2002

2007

2010

2012

2014

2004

2009

2011

2013

InvoDane began development of MFL sensor for plug valve.

InvoDane began commercialization of services.

First Explorer 6/8 inspection.



Explorer 20/26 MFL.





Explorer 30/36
MFL LDS; Trailing
Explorer
CMFL/EMAT
sensor for crack.

2016

Trailing Explorer
hardness testing
module.

2018



Trailing Explorer
automation.

2021



Explorer 20
CMFL; 16 CMFL
(next generation)

2023

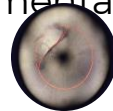
2015

Explorer 16/18 MFL
LDS; Trailing
Explorer Cleaning
Module.



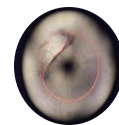
2017

Explorer 8 MFL LDS;
Developed Explorer
8 EC sensor for
crack; Module
operational
implementation



2019

Explorer 6 MFL LDS.



2022

Explorer 16 CMFL

Explorer 20/24
Energy Harvesting.



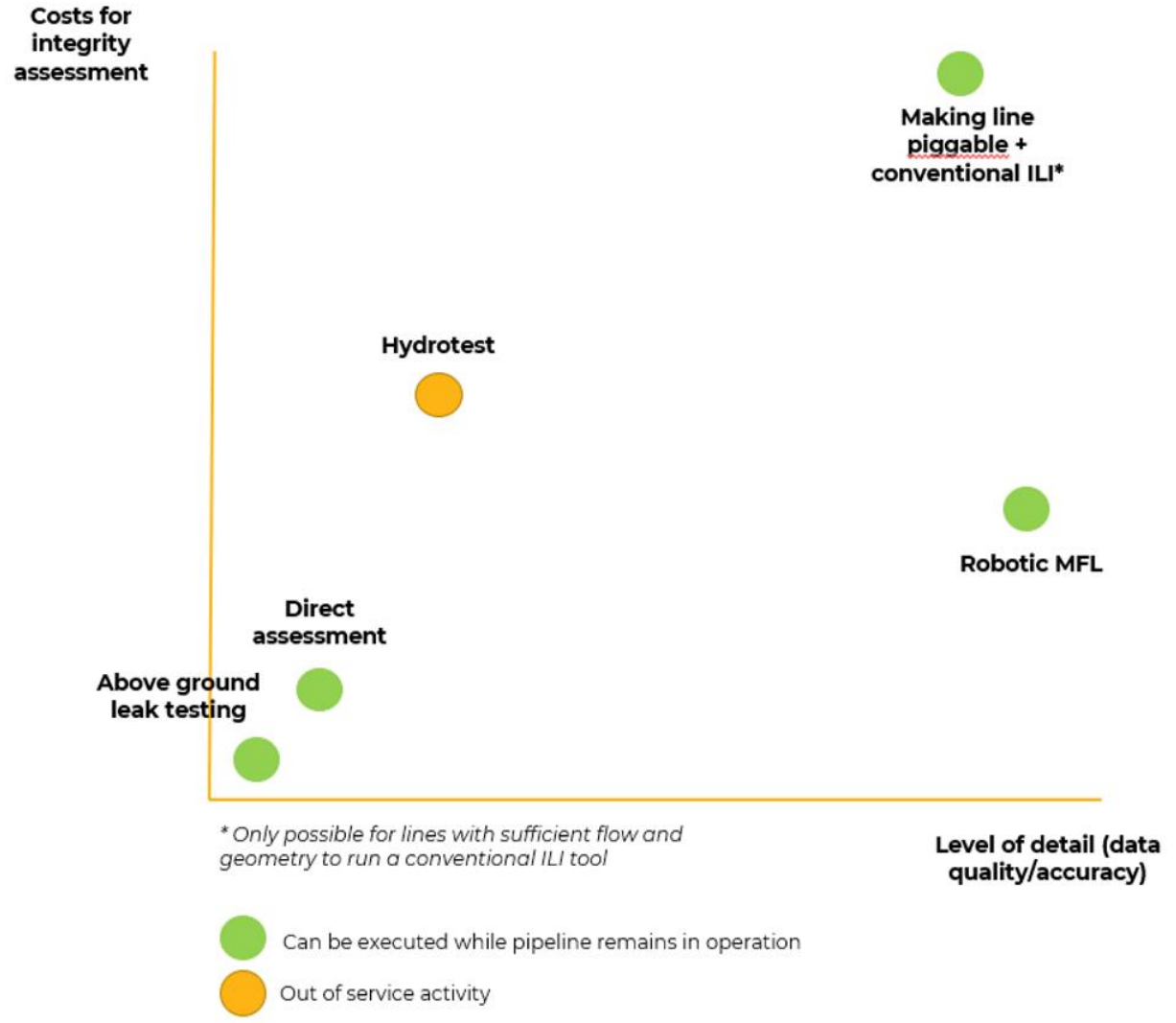
**2024
2025**

XYZ mapping
16-36

*CMFL 10-12

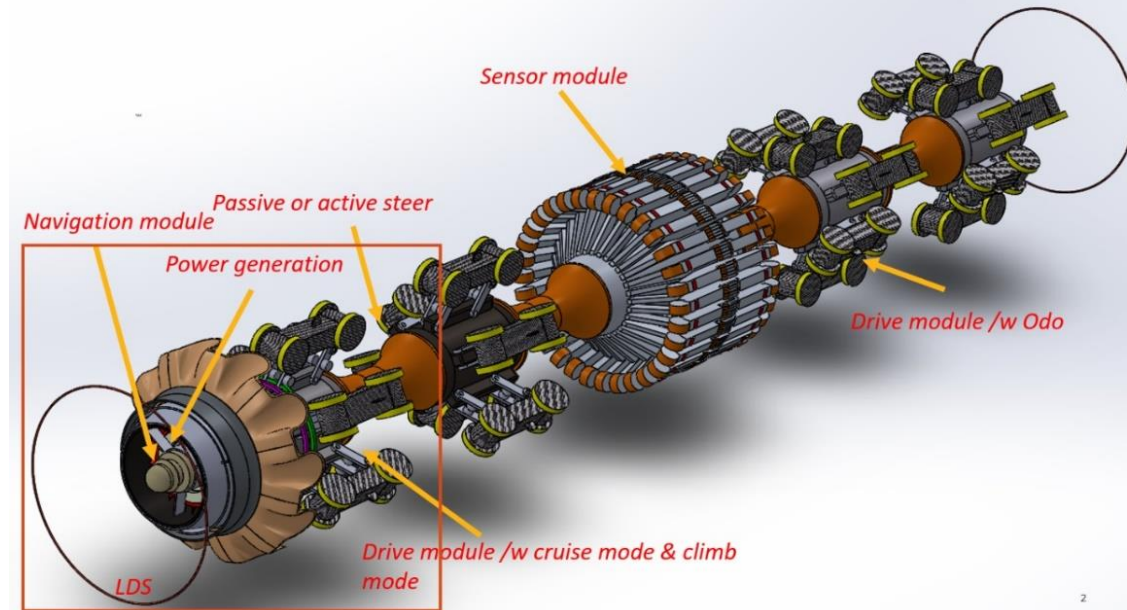
Benefits

- Certainty and reduced risk in “challenging-to-inspect” pipes
- Peace of mind for safety and integrity of pipes
- Data-driven decision making
- Planned maintenance
- Ensure product delivery
- Confidence to increase throughput
- Towards zero incidents



Concept Explorer Gen II

- Self-propelled autonomous robot for data collection of pipeline condition
- Pipelines with gas flow: Unlimited power and communication range
- Pipelines without flow: Range increase by 2X
- Revised platform with integrated sensor technologies: A-MFL, C-MFL, Geometry, Crack, IMU, navigation, environmental, etc.
- Latest technologies including battery/power mgmt (2024 vs 2008)
- Increased payload capability
- Variety of NDT technologies, delivering more & better data
- Automatic upload of data to cloud-based storage
- Advanced AI data analysis. Greater quantity and higher accuracy data collection



2 Inch Pipe Glider System - 2025 release

Problem Statement:

Current gas camera inspection systems can only inspect up to 200ft at a time. This means to inspect ~1000ft, at least 3 Bell Holes need to be constructed.

Objective:

Increase the amount of pipe that can be inspected at one time, while reducing operating cost.

System Overview:

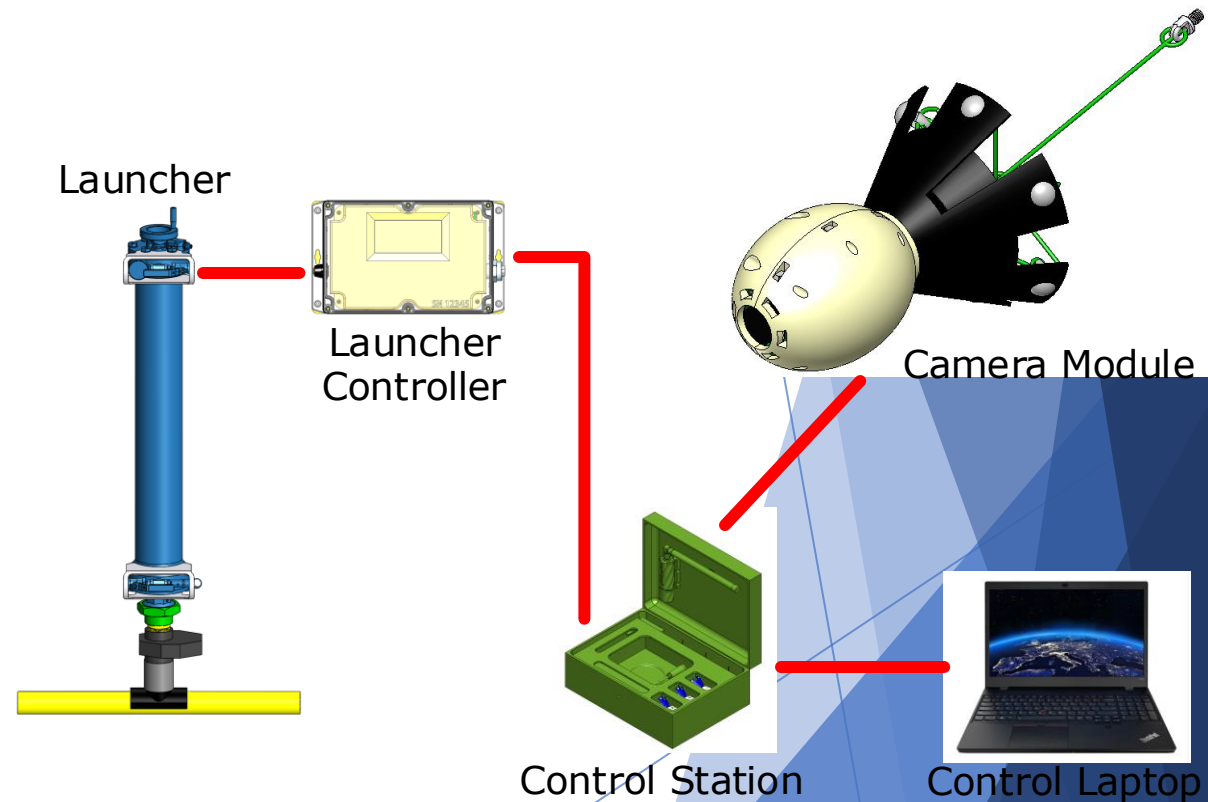
Camera Module: Camera system that traverses and records the pipe interior.

Launcher: Launches and receives the camera module inside the pipe.

Launcher Controller: Gives camera module telemetry feedback to the operator.

Control Station: Operation hub for setup.

Control Laptop: Data retrieval and video processing



4 inch Plastic Pipe ILI - Under Development

Problem Statement:

Industry needs a tool capable of inspecting long distance live distribution main 4-inch plastic pipe (Driscopipe 8000) detecting “bubbling” or/and delamination negotiating obstacles such as bends and tees

Objective:

Develop a prototype inspection device that will inspect 4-inch plastic pipe used in natural gas distribution mains.

System Overview:

Control Module

- Communication / control
- Camera
- Odometer
- Launch / receive interface feature

Launcher / Receiver

- Houses inspection tool before / after inspection
- Assists inspection tool into / out of pipe

Sensor Modules

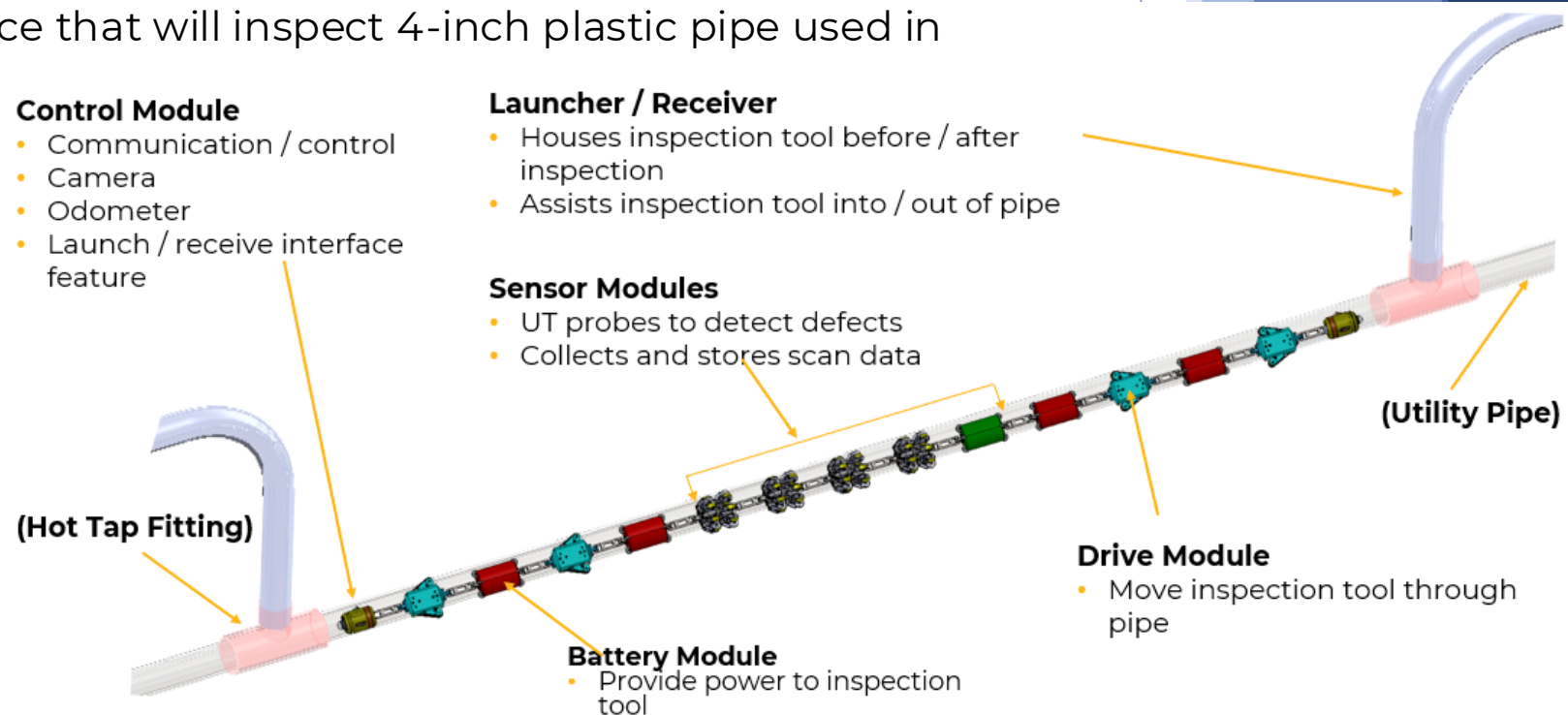
- UT probes to detect defects
- Collects and stores scan data

Drive Module

- Move inspection tool through pipe

Battery Module

- Provide power to inspection tool



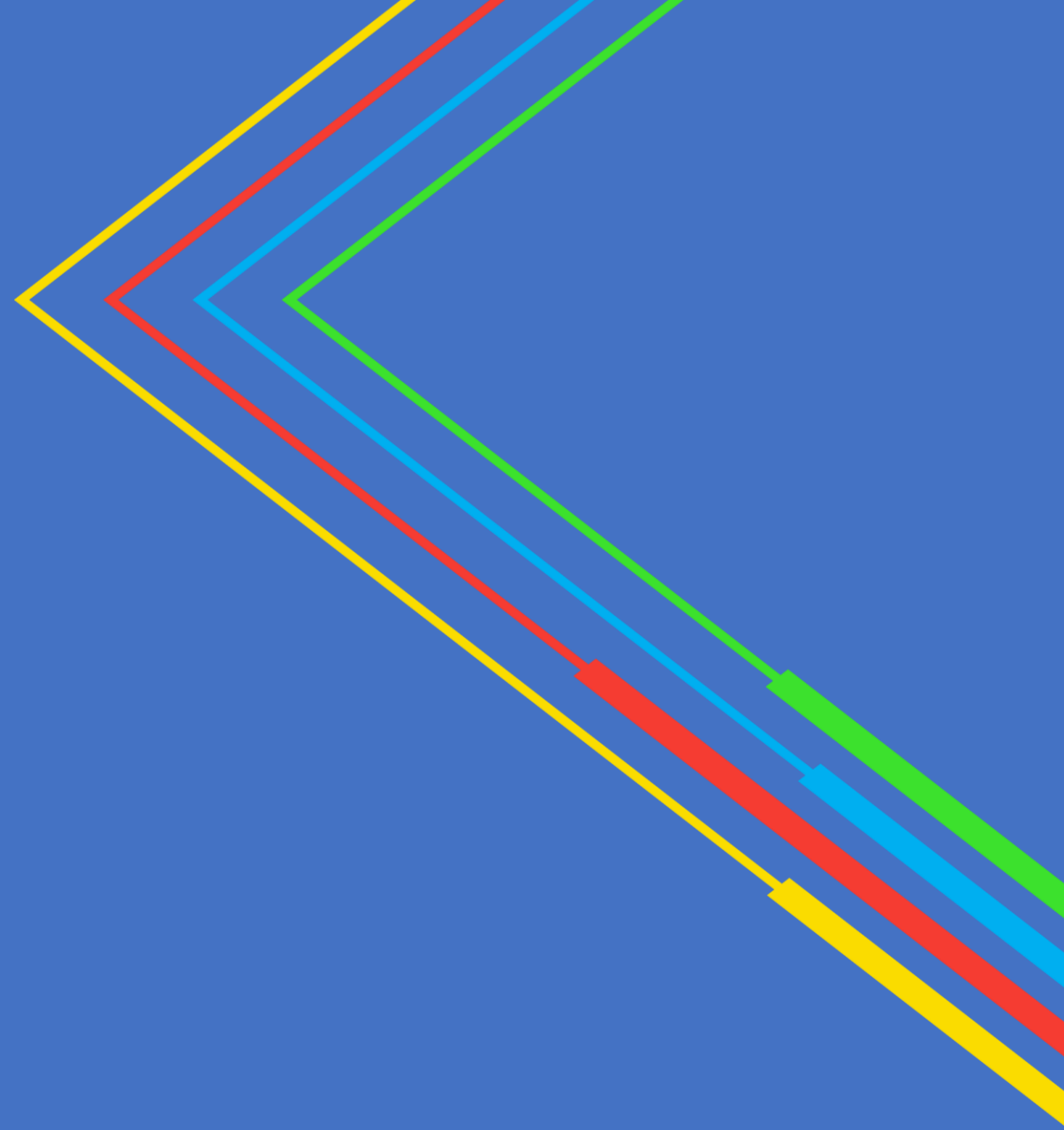
NGRID and AvanGrid Operational Use Cases

David Lessard - NGRID

Nathan Wrighter - AvanGrid

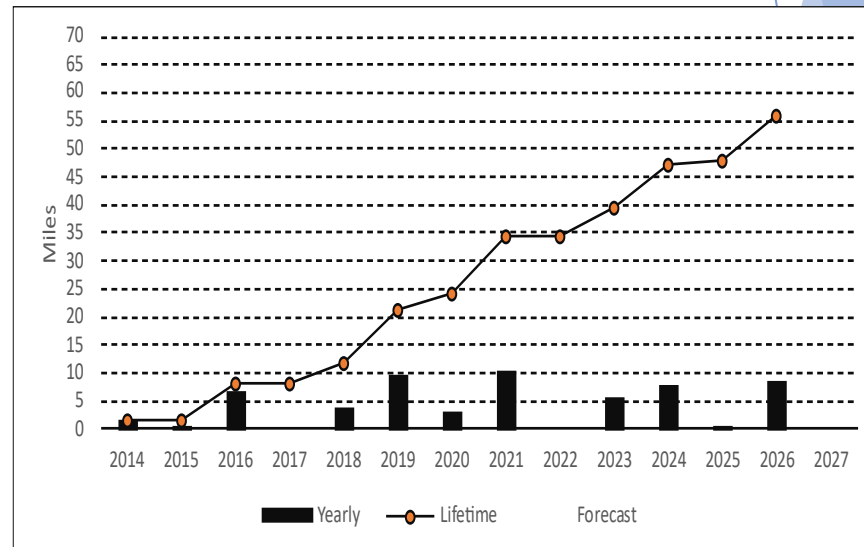
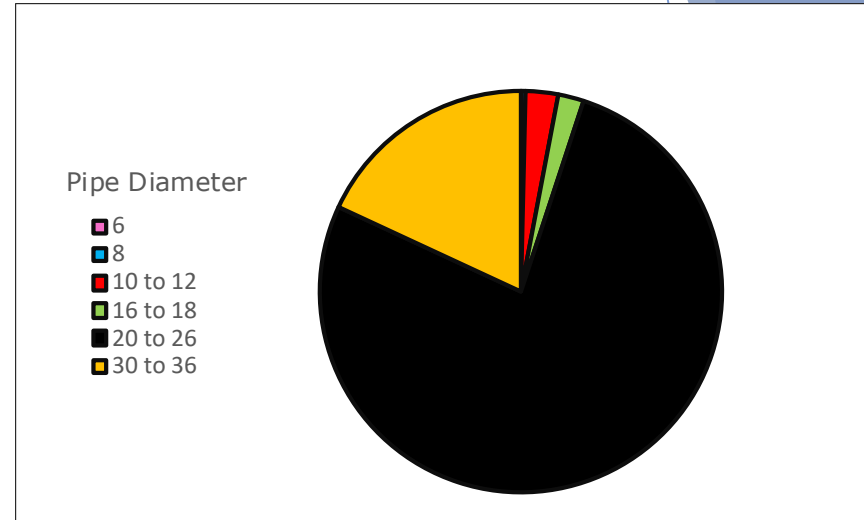
NGA Gas School Robotic ILLI at National Grid

- ▶ David Lessard
 - ▶ June 5, 2026



In-Line Inspection at National Grid

- ▶ **National Grid NY**
- ▶ **One of the top users of Robotic ILI**
 - ✓ Over 55 miles of transmission main inspected
 - ✓ Average ~ 25,000 ft per year
 - ✓ Expected over 40,000 ft in 2026
- ▶ **Focus on Large Diameter in NY**
 - ✓ 75% of pipeline inspected 20" - 26" diameter main
 - ✓ Large volume of 30" - 36" main
 - ✓ Select smaller diameter inspections
- ▶ **National Grid MA**
 - ✓ Select projects as needs arise
 - ✓ 2018 - 1450ft of 24" pipeline
 - ✓ Typical Pig unable to be used due to out of plane back-to-back fittings



Types of Anomalies Found

▶ Project 1

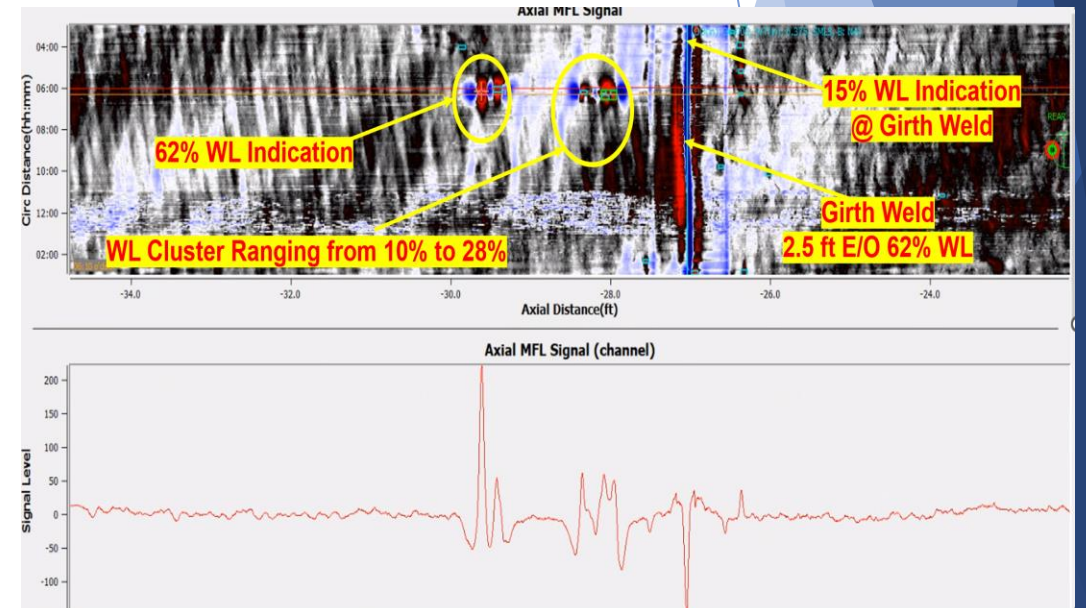
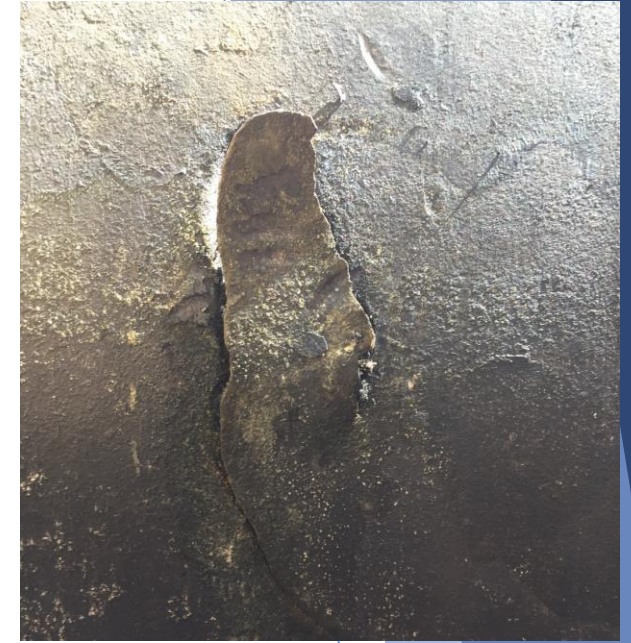
- ▶ 25% wall loss due to corrosion
- ▶ Surface delamination up to 3"

▶ Project 2

- ▶ 62% wall loss
- ▶ Multiple clusters of 10-28% wall loss
- ▶ >60% wall loss at Girth Weld

▶ Project 3

- ▶ Areas of corrosion pitting
- ▶ Repaired with clockspring, wrapped with wax tape & rockshielding



In-Line Inspection at National Grid

► Inspection of Cased Transmission Main

- ✓ 20" main inside 26" casing
- ✓ MTA Subway tunnel passing underneath and perpendicular to gas main
- ✓ High Traffic area of NYC
- ✓ Casing had 5+ changes of direction
- ✓ High Voltage power lines & transit fiber optics in close proximity of gas main

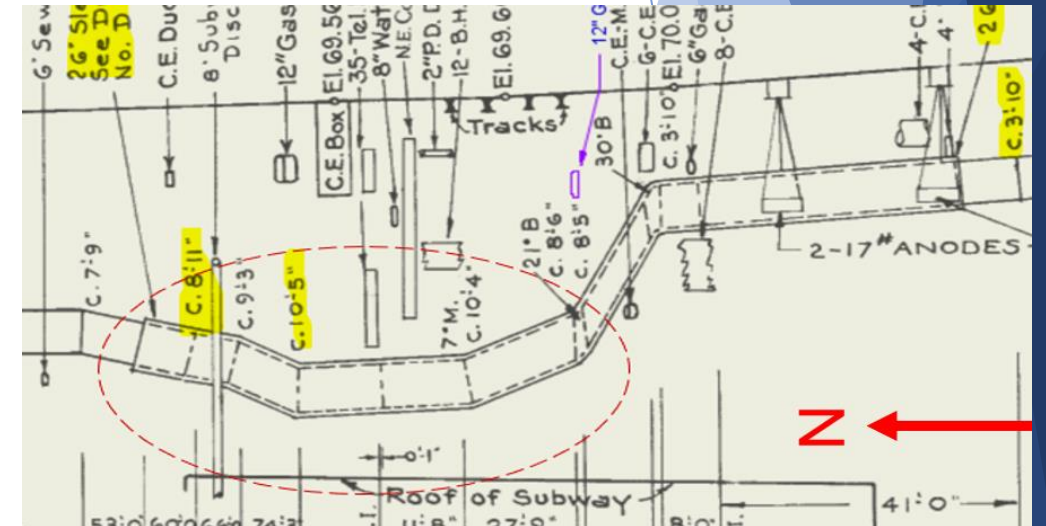


► Significant Corrosion Risks Found

- ✓ Clusters of 10% - 20% wall loss
- ✓ Two locations of 36% wall loss
- ✓ One location of 40% wall loss

► Risk Mitigation

- ✓ Attempted window cuts in casing to perform clockspring repair
- ✓ Ultimately determined that the segment needed replacement
- ✓ ILI was critical for identifying this risk





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NYSEARCH Website

NYSEARCH - Natural Gas RD&D

