



# MFL Robotic ILI Inspection

When it comes to the inspection of your company's pipelines, challenging infrastructure often forces tough choices. Compromising the quality of your inspection data shouldn't be one of them.

To meet the growing demand for richer data and more comprehensive inspections of challenging pipelines, we developed Pipe Explorer, a fleet of advanced inspection robots designed to tackle the most difficult pipelines no matter where they are found. Untethered, modular, remotely-controlled, bidirectional, and self-powered, only Pipe Explorer enables visual and non-destructive inspection with multipoint data collection regardless of the difficulty of the location or complexity of the pipeline.

# Pipe Explorer Works Anywhere, With No Strings Attached

Self-propelled, remotely controlled, and fully articulated, Pipe Explorer goes where most cannot.

Our ground-breaking technology is the result of a research and development program led by Northeast Gas Association/NYSEARCH, and refinement by our own R&D capabilities.

With a minimal footprint; the ability to operate in active pipelines, both low pressure or no pressure; and by collecting comprehensive multipoint data in one pass – Pipe Explorer is the standard against which all others should be compared.

The execution of an inline inspection is no small feat. When you're conducting a robotic inline inspection of a challenging or "unpiggable" pipeline, the complications multiply. After more than 1200 successful pipeline inspections, we've learned a thing or two about how to do it successfully.

We pride ourselves on providing impeccable, reliable service from the first phone call to the final analyses and delivered report. We take great pains to ensure our projects are planned and executed with high levels of detail and precision.

Minimizing disruption by minimizing our footprint is one reason why we are seen as an industry leader. Pipe Explorer uses a launch tube that acts as a single point of entry and exit, reducing the extent of the site excavation required. Pipe Explorer can also operate in both live pipes and in low-pressure pipes, ensuring good, solid data capture without interrupting service.

Our robots themselves are untethered and self-propelled, permitting us to gather comprehensive, multipoint data regardless of the direction of travel. And, as a result, we can often complete thorough inspections in minimal time frames.

While still on site, our team of dedicated data analysts perform a preliminary review of the Pipe Explorer data to confirm that it's accurate and complete. Knowing we have good integrity data before we demobilize makes us both time- and cost-effective.

For pipeline operators, the agility, flexibility, and versatility of our Pipe Explorer fleet means the collection and analysis of visual and non-destructive inspection data that is both comprehensive and actionable. Owners, operators, and engineers can have confidence in their inspection data, knowing they didn't have to compromise on its quality.

**1200+**  
Successful  
Inspections

**10 miles  
(16 km)**  
Our Longest  
Project

**13 years**  
Comprehensive  
Experience

**2000 ft  
(600 m)**  
Longest River  
Crossing

## Inner City

There are few scenarios more challenging than a pipeline inspection in the inner city. In addition to dealing with complex, interwoven, and often older infrastructure; vehicular and human traffic make effective inspection difficult.



## Communities

Urban and suburban communities present a unique set of logistical issues for pipeline inspection. Municipal requirements to minimize disruption and inconvenience can remove some methodologies from consideration.



## Obstacles and Infrastructure

When topographic obstacles or pipeline infrastructure make conventional inspection technologies unsuitable, you can count on Pipe Explorer to provide consistently reliable results. Pipe Explorer robots provide high-accuracy, multipoint data across a range of challenging scenarios and situations.



## Fragile Nature

The environmental impact of pipelines continues to be an important priority in every region. Protecting and preserving fragile environments is of primary importance to us. Our technology provides pipeline operators with a complete, thorough, and accurate picture of their pipeline without compromising data collection or putting the environment at risk.



## Terminal, Facility, and Station Pipes

Terminal and facility pipes are often not set up for traditional inline inspection. As a result, many of these pipes have never been "pigged" previously.

To inspect terminal, facility, and station pipes with Pipe Explorer, pipelines must be displaced of any liquid product. Then, the Pipe Explorer robot can venture inside to provide you with the superior data typical of all our inline inspections.



CHALLENGING  
PIPELINES



ACCESSIBILITY  
CHALLENGES



COMPREHENSIVE  
DATA



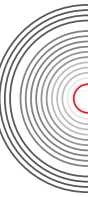
MINIMAL  
ENVIRONMENTAL  
IMPACT



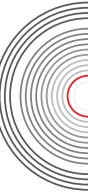
# Pipe Explorer Specifications



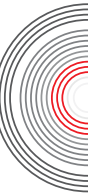
6



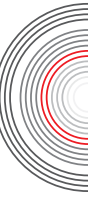
8



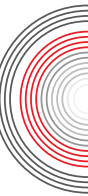
10/14



16/18



20/26



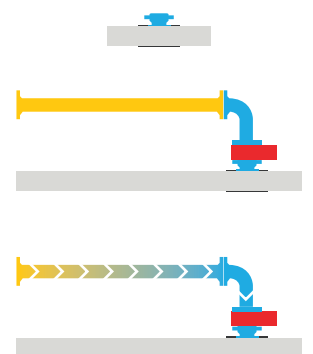
30/36



## Pipe Explorer Robots Employ an Innovative Launch/Receive Technology

Because our robots are self-powered and bidirectional, they can enter and exit from the same hot tap fitting, minimizing the overall inspection footprint.

1. Hot tap is fitted to pipeline.
2. Pipe Explorer launch tube is secured to sandwich valve.
3. Pipe Explorer is launched into pipeline for inspection.



## Magnetic Flux Leakage Sensors Specifications

| Specification                    | General                  | Pitting                  | Axial Grooving           | Circumferential Grooving | Circumferential Slotting |
|----------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Depth at POD = 90%               | 0.1t                     | 0.1t                     | 0.2t                     | 0.1t                     | 0.1t                     |
| Depth accuracy (80% confidence)  | ± 0.10t                  | ± 0.10t                  | ± 0.15t                  | ± 0.10t                  | ± 0.10t                  |
| Width accuracy (80% confidence)  | ± 0.75 inches<br>± 20 mm | ± 0.75 inches<br>± 20 mm | ± 0.75 inches<br>± 20 mm | ± 0.75 inches<br>± 20 mm | ± 0.75 inches<br>± 20 mm |
| Length accuracy (80% confidence) | ± 0.5 inch<br>± 12 mm    | ± 0.5 inch<br>± 12 mm    | ± 0.75 inches<br>± 20 mm | ± 0.5 inch<br>± 12 mm    | ± 0.5 inch<br>± 12 mm    |

t = wall thickness. Detection threshold and sizing accuracy in bends are unspecified. Detection threshold increases to 0.15t and depth sizing accuracy degrades to ±0.15t in seamless pipe. Depth sizing accuracy degrades to ±0.20t near girth welds or in heat affected zones.

## Laser Deformation Sensors Specifications

| Dent Sizing Specification | Explorer 8, 10/14, 16/18, 20/26, 30/36 | Explorer 6              |
|---------------------------|----------------------------------------|-------------------------|
| Depth at POD = 90%        | 1% of pipe nominal OD                  | 2% of pipe nominal OD   |
| Depth Accuracy = 80%      | ± 1% of pipe nominal OD                | ± 2% of pipe nominal OD |
| Width Accuracy = 80%      | ± 2 in / 50 mm                         | ± 2 in / 50 mm          |
| Length Accuracy = 80%     | ± 1 in / 25 mm                         | ± 1 in / 25 mm          |

Visit [www.intero-integrity.com/services/unpiggable-mfl-robotic-inline-inspection](http://www.intero-integrity.com/services/unpiggable-mfl-robotic-inline-inspection) for more detailed specifications.

## Comprehensive Data

|                                                             | Conventional ILI                                                                    |                                         | Pipe Explorer                                                                         |            |
|-------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------|---------------------------------------------------------------------------------------|------------|
| MFL magnetic saturation                                     |  | Equivalent                              |  | Equivalent |
| Circumferential resolution of MFL sensor                    |  | Equivalent                              |  | Equivalent |
| Axial sample rate                                           |  | Equivalent                              |  | Equivalent |
| Speed controlled to eliminate speed degradation             |  | Possible                                |  | Yes        |
| Continuous circumferential resolution of deformation sensor |  | Limited by spacing of mechanical sensor |  | Yes        |
| Capable of collecting redundant dataset                     |  | No – Rerun required                     |  | Yes        |
| Supported by video                                          |  | No                                      |  | Yes        |



## **Intero Integrity Services**

[sales@intero-integrity.com](mailto:sales@intero-integrity.com)

[intero-integrity.com](http://intero-integrity.com)

## **Elevating the Standard for Robotic Inline Inspection**

Intero Integrity Services is the leading specialist for keeping complex oil, gas, and petrochemical facilities clean, safe, well-maintained, and highly productive. Our unique range of industrial, inspection, and environmental services maximizes your asset availability.

Turnkey. Innovative. Optimized. We listen to customers constantly, so we understand what's important to them: the highest possible performance, protection, and predictability.

**Ever-evolving solutions** ●