

IMPLEMENTING RESEARCH TECHNOLOGIES IN THE FIELD (CHALLENGES AND SUCCESS STORIES)

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ABOUT NYSEARCH

NYSEARCH, a part of the Northeast Gas Association NGA, is a Research, Development, and Demonstration consortium made up of 20+ Local Distribution Companies throughout N. America

Voluntary-based funding of R&D projects

High leverage of R&D dollar

(20)+ R & D contracts with PHMSA/DOT since 2004

Nimble organization with experience in product development and moving them into deployment



CHALLENGES WITH FIELD IMPLEMENTATION

- ❑ Gaining realistic range of conditions to test in the field (geographic variability, weather conditions, congestion, varying operating procedures etc.
- ❑ Changing conditions before test data can be validated
- ❑ Gaining enough data for confidence in results – statistical significance

EXAMPLE: SUAS (DRONE) LEAK DETECTION AND EMISSION QUANTIFICATION



Challenge to gain enough data from field situations

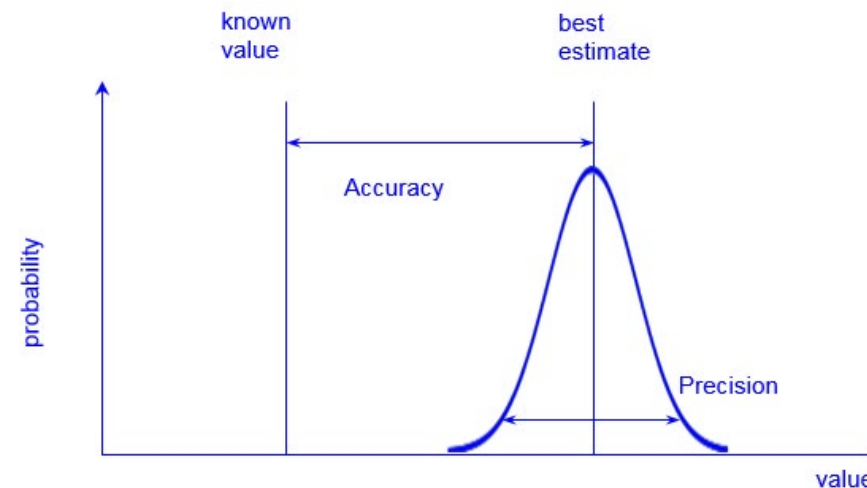
- Need extensive data collected and analyzed to refine algorithms that interpret methane localization/detection and quantification of methane

Lessons Learned

- Need at least three (3) different field sites with multiple data sets at each site for acceptable data collection and confidence in probability of detection

EXAMPLE: MOBILE LEAK DETECTION/QUANTIFICATION

Extensive Field Testing brings important insights - for mobile emissions quantification - per prior NYSEARCH programs – many variables (wind speed, direction, traffic congestion, humidity, soil conditions etc.) play into accuracy and precision



SUCCESSSES IN THE FIELD DEFINED BY...

- ❑ Multiple SMEs being involved in planning of field tests from early days
- ❑ Company Resources to focus on field test planning and stages of implementation
- ❑ Committed service/product providers who can take the time to educate and show the value of new technology
- ❑ Industry or company culture that recognizes that Technology Transfer is difficult and the products of R & D need to 'walk/crawl' before they can be compared to existing commercial technologies

IN LINE ANOMALY DETECTION IN STEEL PIPES

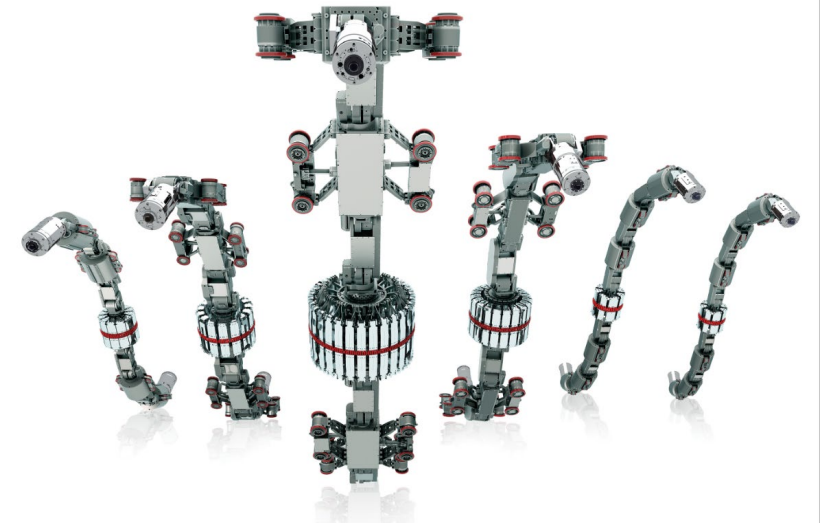
Explorer family of **robotic platforms for the inspection of unpiggable steel pipelines**

Live, tetherless inspection via battery powered robots using wireless communication for control, communication, and data transfer

- 6" – 36" pipelines, up to 0.5"WT
- Up to 750psig

Onboard sensors for detection of:

- Metal loss
 - Main pipe
 - Along bends
- Mechanical damage and ovality
- Cracks on welds



The adaptation of any sensory technology used on smart pigs on the robotic platform faces major challenges due to limited space and power availability

EXAMPLE: 16-INCH PIPELINE INSPECTION USING EXP ROBOTIC INSPECTION PLATFORM (LICENSED THRU NGA/NYSEARCH)

Operating pressure: ~500 psi

Diameter: 16"

Wall thickness: 0.25", 0.375"

10 HCAs totaling ~10.3 miles

Critical one-way natural gas feed

Inspections spanned ~15 weeks

6 size-on-size hot tap fittings

19 inline charging locations

Successful implementation of multiple sensing technologies for this pipeline



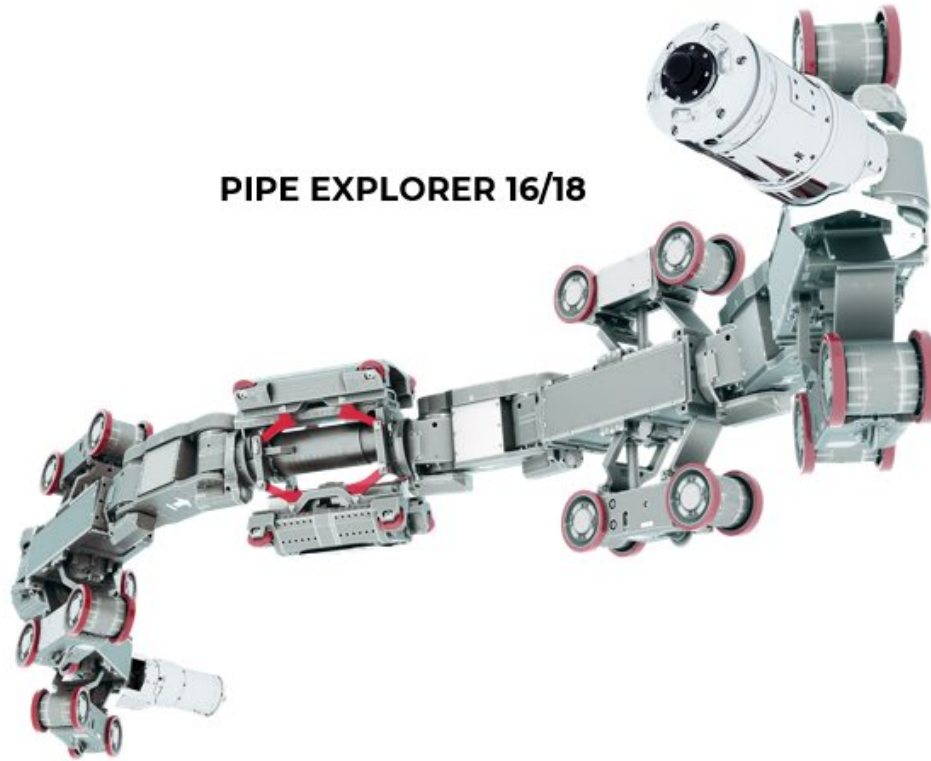


Axial MFL & Laser
Deformation Sensing



Circumferential MFL
Sensing

PIPE EXPLORER 16/18



Ever-evolving solutions ●



Live gas conditions via hot
tap fitting



Inline Charging

GAPS TO CONSIDER

- ❑ Funding support for Technology Transfer component for companies who implement R & D
- ❑ Advance Commercializers or R & D agents who can show test capabilities, unbiased results and support early pilots
- ❑ Consider co-funding for the necessary stage between successful R & D demonstrations and commercial releases
 - Such an approach could help in gaining test sites from under-resourced energy companies



Q&A

Thank you
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