

Dedicated to serving its utility member companies with focus on natural gas RD&D, technology development & commercialization, and joint industry collaboration

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A sample of field testing completed this past quarter

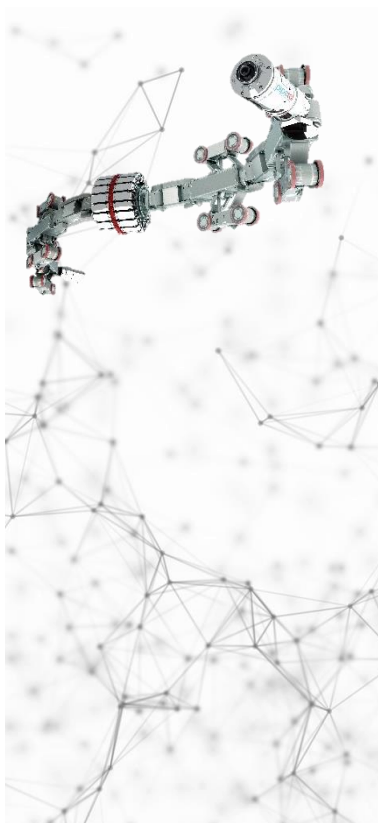


Francois Rongere of PG&E raising a question during the Eclipse Scientific demonstration of the NDE tool to inspect PE pipe fusion at the June 2022 NYSEARCH meeting in Buffalo, NY. Others captured from left to right are Bob Plewa of NFG, Joe Mallia of NYSEARCH/NGA, Rick Trieste Jr. of ConEdison, and Jonathan Lesage, PhD of Eclipse Scientific.

Commercialization of automation features of the Explorer

The Explorer (EXP) suite of robots solves the problem of internally inspecting unpiggable natural gas pipelines without disrupting service to customers. They are untethered, remotely controlled self-powered robots for visual and in-line inspection of various natural gas conditions. These robots can navigate a wide range of features in pipes including vertical segments, radius bends, and seam welds. Recently, NYSEARCH completed development of technologies with Invodane Engineering to **automate** inspection features of the robots to reduce operational complexity during live deployment and increase overall robustness of the robot during inspections.

The automation features of EXP include a newly developed Automation Drive Module, a Pressurized Inertial Measurement Unit (IMU), and a custom built 3D camera. These elements allow the EXP to automate navigation in the pipe using the IMU for pipeline mapping and the new 3D camera communicating with the drive module to auto-focus and recognize characteristics of the pipe as the robot moves forward. Successful laboratory testing of the full automation system provided confidence for a first in-field test that was completed in May 2022. Further work on fine-tuning these features is underway as additional field tests are scheduled for 2023. As field tests confirm reliability and repeatability of EXP automation, Invodane/Intero will focus on commercializing these new features to expand benefits to the industry.



Demonstration of NDE tool for PE butt fusion joints at June NYSEARCH Meeting

The NYSEARCH committee re-convened in person for the first time since the start of the COVID-19 pandemic in Buffalo, NY for the June NYSEARCH meeting. The picture on the front page of this issue highlights a demonstration presented at the June meeting by Eclipse Scientific of an automated non-destructive examination (NDE) tool to inspect PE pipe butt fusion joints. The NDE tool is being developed as a red light/ green light tool to be operated by properly trained but non-NDE expert gas operators. The tool uses a Phased Array Ultrasonic Testing (PAUT) technique along with a custom-made refractory housing and a scanner chain that rotates around the pipe to capture the UT signal and process pipe fusion data.

At the June meeting, project status reports, updates, and voting items were presented and supported with lively discussion from the NYSEARCH members both in person and online. We welcomed many returning and new faces and look forward to welcoming everyone back at future meetings.

Expanding ‘Low Carbon Fuels’ program area with new projects

NYSEARCH’s newest program area of Low Carbon Fuels explores paths to carbon neutrality and conversion of current infrastructure to support the energy transition. A few recent projects have been approved and highlights the growing significance of decarbonization to our consortium.

Common RNG Interconnection Skid Development for Utilities: A need to standardize the RNG interconnection design process was identified to lower costs and maximize opportunities for interconnection with biogas producers. Campos EPC is leading this effort to build a design database that will allow utilities to build an RNG interconnection using a foundational design that can be modified to meet utility specific requirements. The final database is expected to be complete and delivered at the end of September 2022.

Impacts of H₂-Enriched NG (HENG) on Feedstock for LNG Liquefaction: This project develops the framework for risk assessment to investigate the likelihood of change in procedures, processes, and feedstock for LNG liquefaction and determine if any such processes or procedures need to be isolated from hydrogen blending. If applicable, the project will also investigate how isolation can be achieved with available gas separation or de-blending technologies.

Study on Accuracy & Variability of Therm Zones Affecting Metering of New Gas Supplies: One of the challenges of hydrogen blends in natural gas streams stems from the fact that the element does not have the same energy density as the methane molecules it displaces. Hydrogen’s energy content by volume is approximately one-third that of methane. Volume measurement will also be affected by hydrogen blends as hydrogen is notoriously difficult due to its small molecular size and weight. This project with the Southwest Research Institute will investigate the effects on metering with NG/H₂ blends

AGA awards Ed Newton the John B. McGowan Research Award



In May at the AGA Ops conference, the John B. McGowan Research Award, sponsored by Hubbell/ GasBreaker, was presented to Ed Newton of SoCalGas; a long-time member and contributor to NYSEARCH. Ed is being recognized for his dedication and leadership on research and demonstration of technologies to provide an aerial leak mapping solution in populated distribution service areas, covering 3,500 miles of main and service in Southern California. Congrats Ed!

LDC Focused Gap Analysis and State-of-the-Art Study on Decarbonization completed

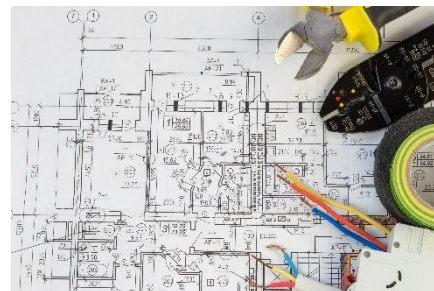
In July, NYSEARCH completed this gap analysis and SOTA study bringing together detailed technical information on the current state of decarbonization technologies for producing, upgrading, and interconnecting Renewable Natural Gas (RNG) and Blending Hydrogen into existing natural gas infrastructure. The study identified technical R&D gaps, market challenges, educational, and regulation policies where further research is needed to achieve the full potential of RNG and hydrogen blending safely and economically. The final reports have been issued to funders.

and RNG/H₂ blends and provide recommendations to recalibrate or replace meters based on those research findings.

Hydrogen-Natural Gas Living Lab: A 2-year demonstration and materials testing project to simulate hydrogen blending (25 - 35% vol H₂) in a high pressure and medium pressure closed loop system. This project work is being completed in partnership with SoCalGas who will construct, operate, and test at the Situation City location in Pico Rivera, CA. Materials testing on pipeline equipment will involve periodic removal of pipe and components to examine material changes:

- PE pipe, steel pipe, gaskets, elastomers, fittings, regulators, valves
- Compressor
- Pressure regulator station

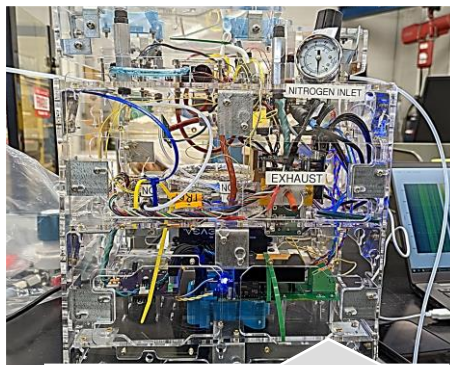
Additional testing of current and new leak survey/detection/quantification technologies as they become available is also a part of this project.



NYSEARCH continues conducting field testing as pandemic restrictions ease



Surface area expression measurements were completed in July in National Grid territory. This project focuses on improving and standardizing the surface area expression method to quantifying methane emissions.



A pre-commercial prototype of the mercaptans sensor was brought out to PSE&G territory in July. The new GC-DMS technology can detect mercaptans concentrations to single ppb levels and is designed to be portable for real time analysis.



First pass leak detection testing completed in Southwest Gas territory in July. This project focuses on evaluating improvements to walking leak survey effectiveness.

The table below presents Final Reports recently released to NYSEARCH funders:

Project Number	Project Name	Month Issued/Project Manager
M2018-001 Phase II Task II	Reducing Methane Emissions at Threaded Connections – Sampling Program	April 2022 / Gautam Kakaiya -> Ahra Kwon
M2021-010	LDC-Focused Gap Analysis and State-of-the-Art Study on Decarbonization	August 2022 / Ahra Kwon
M2018-011 Ph II	Scaling of Microbial Power-to-Gas Conversion for Long Term Operation	August 2022 / Ahra Kwon
M2017-002 Ph III	Explorer Automation	August 2022 / Suzanne Hartwell