

GasComm® Analytic Safety Monitoring System for PE Pipe Distribution Networks

Description: The purpose of this project is to design and build a low cost, battery powered and wireless remote monitoring system to measure multiple real time parameters in previously unmonitored areas of the PE natural gas distribution network. This data, including alarm events, is made available to existing utility RTU's via a GasComm® Control Module or transmitted via secure cellular telemetry to the cloud server of choice.

Status: Following specification development, design and development tasks are in progress.

BENEFITS

The commercialized Enetics GasComm® unit for steel pipes is confirming the ability of this technology to monitor live pipelines in real time. Plastic pipe is the most prominent material used for distribution pipe applications, therefore adapting GasComm® technology for plastic pipe is beneficial to the utilities. With a successful operation of the GasComm® unit for both steel and plastic pipes, the product would expand live gas pipe monitoring technology. The GasComm® unit for PE would also include the Class 1/Division 1/Zone 0 Intrinsic Safety certifications and adhere to ASME pressure boundary requirements.

BACKGROUND

In 2018, eight funders installed (14) GasComm® Beta level systems into a variety of locations in steel pipe distribution systems for a one-year trial period. The single instrument GasComm® node was tapped into live networks, sampling and recording flow, pressure, temperature, water content, and vibration data within these networks. Data was wirelessly transmitted using cellular telemetry to a secure webserver for monitoring, alarm status, and overall performance analysis.

During this Beta field testing program, there were several lessons learned on the physical steps of installation and challenges found with the electronic hardware and software during the installation. The progress gained and experience shared by Member utility personnel during the **2020 NYSEARCH Technology Brief**

Beta testing phase proved invaluable to the development team at Enetics. All lessons learned are being implemented in the expansion of GasComm® technology to include plastic pipe operation.

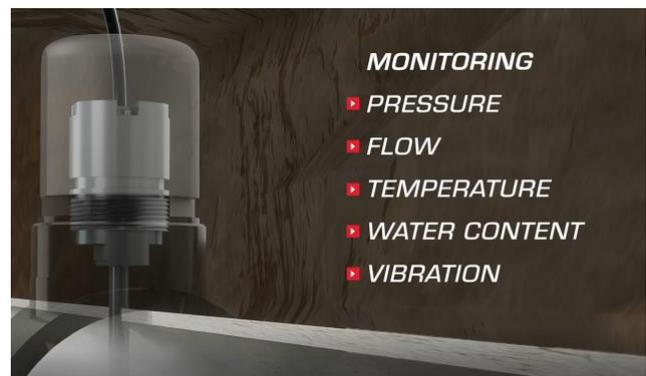


Figure 1: GasComm® Instrument Node

Although GasComm® was developed primarily as an affordable method of monitoring multi-variable status at remote, non-instrumented sites, members also showed interest in allowing existing utility-owned Remote Terminal Units (RTU's) to obtain the GasComm® data.

The ability to use GasComm®'s multi-attribute measurement capability at existing SCADA sites is beneficial to the utilities. Most SCADA sites are already equipped with RTU's, and the ability for GasComm® to directly interface to these RTU's is highly desirable. A dedicated GasComm® Control Module (GCM) is currently in development. The

GCM, powered externally at the SCADA site, can be polled asynchronously by existing utility RTU's using RS485 Modbus protocol, thus making GasComm® pressure, flow, temperature, water content and vibration data available to the utility SCADA system using pre-existing utility security protocols.

TECHNICAL APPROACH

NYSEARCH is designing, developing, and testing products and methods for real-time sensing and alarming in the gas distribution pipeline system for both steel and plastic pipes. Acquiring and analyzing data from various field points in live pipeline conditions are important means to proactively address safety, maintenance, and operational status issues. Additional data enables NYSEARCH members to increase system stability and operational safety methodically and proactively.

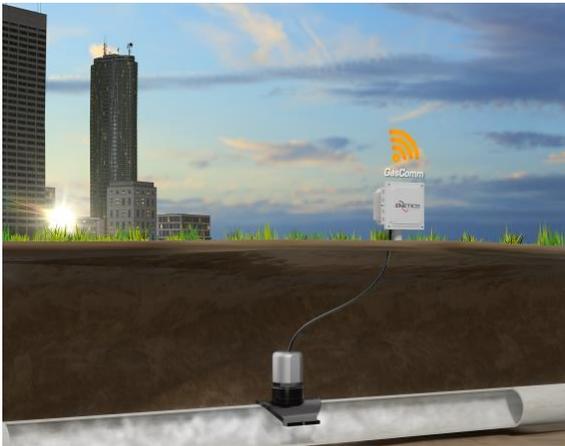


Figure 2: GasComm® Remote Buried Installation

GasComm® is designed to be strategically installed at remote points throughout the distribution system where power is not available and control functions are not required. The data acquired from these points can be used for alarming, asset condition assessment, trending, modeling, improved manpower deployment, and reporting.

The GasComm® instrument is placed into a live, pressurized steel or plastic gas pipe with common hot tap methods and toolsets. In the case of PE piping, a saddle joint is placed onto the plastic pipe and secured using the electrofusion joint process

prior to the hot tapping exercise. Either method requires no gas shutoff or customer interruptions and is preferred for existing gas network monitoring.

The GCM will provide control and sequencing for the GasComm® sensor node in addition to Modbus RTU protocol polling communication for existing utility RTUs. This option provides utilities a simple way to incorporate GasComm® data into their existing SCADA data flow without extensive software modifications or hardware updates.

The GCM is housed in a rugged NEMA6/IP67 enclosure and can be installed in the site cabinet, buried, pole mounted, or, for the Class1 Division1 version, installation directly in the hazardous zone. Enetics will offer the necessary intrinsic safety barriers necessary for compliance.

PROGRAM STATUS

The hardware design and tooling requirements for the PE version of GasComm® have been updated and 3D prototypes have been printed. Lab and pressure testing for the 3D prototype are being conducted. Completion of the Intrinsic Safety certification process for the PE pipe design is in progress and expected to be completed in the near term.

The GCM is under development. Field test planning is underway.

Highlights

- GasComm® technology is being extended to include PE pipeline operation.
- GasComm® Control Module (GCM) development is underway to allow GasComm® communication with existing utility RTU's

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