

ORACLE: Identification of Advanced, State-of-the-Art Technologies for Application in the Natural Gas Industry

BENEFITS

The identification of new state-of-the-art technologies, which could provide quantum rather than incremental leaps in improved operations, maintenance, and construction processes and procedures for the natural gas industry, can have a profound impact on the industry. While the evolutionary technologies being developed by NYSEARCH and other industry research consortia continue to provide significant results, the identification and development of new technologies, radically different from the ones used currently by utilities, could result in quantum leaps in improvements in operational efficiencies, safety and environmental impact.

BACKGROUND

NYSEARCH, since its inception, has been involved in the research, development and commercialization of numerous technologies, which over the years have contributed significantly to improved operations, increased safety, improved environmental compliance, as well as higher

natural gas loads through new end-use technologies.

Periodically NYSEARCH holds brainstorming sessions in an effort to identify those areas related to LDC operations that promise to provide the greatest potential for significant improvements. New areas of potentially high-return investment in R&D have been identified and include advanced materials, advanced sensors, and nanotechnology. Advanced materials could revolutionize the way the piping distribution is managed and provide new ways for dealing with real-life effects that affect the life and safety of the piping network, such as corrosion and pipe damage. Advanced sensors, advanced sensory devices and systems, and advanced diagnostics tools could result in improved monitoring and/or control of the distribution network and other utility operations, thus reducing O&M costs. Finally, nanotechnology could provide quantum leaps in many areas pertaining to utility operations.

Existing programs in the areas mentioned (except nanotechnology, which is new to the NYSEARCH portfolio) include advanced sensory systems for the mitigation of stray currents in gas transmission and distribution pipelines, state-of-the-art robotic devices for the inspection of gas distribution and transmission pipelines, distributed sensor networks for the monitoring of pipeline networks, and advanced systems for the underground mapping of utility facilities.

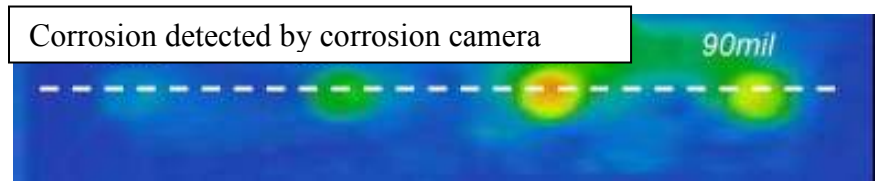
TECHNICAL APPROACH

NYSEARCH, the research, development, and demonstration organization within the Northeast Gas Association, has initiated the ORACLE effort, designed to generate for its members a continual flow of new technology concepts that, if successfully developed for gas applications, would provide the natural gas industry with quantum leap advances in gas operations and/or customer service. Through the dedicated efforts of a designated individual within the organization, new and emerging technologies will be identified

in the areas of *advanced sensors, sensory devices, detection technologies and new materials* and develop a framework for adopting them into the gas industry.

The individual dedicated to this effort monitors businesses, technologies and professions unrelated to the gas LDC industry for solution concepts. Technology-heavy disciplines and industries such as Telecommunications, Defense, Remote Sensing, Sensors, Optics, and Aerospace appear to be excellent solution concept candidates. Solution concepts are typically technologies, but may also be procedures and/or practices.

The ORACLE effort was initiated in 2004. Technology areas such as fiberoptics, microelectromechanical systems, micro-sensors, and non-intrusive detection have been identified and scanned for promising new concepts and technologies. Technologies



from the military, biomedical, aerospace, and telecommunications industries have been tracked and evaluated for application in the gas industry. These efforts have already resulted in the identification of a few technologies that are now being funded by NYSEARCH for development and adaptation to the natural gas industry. The program continues.

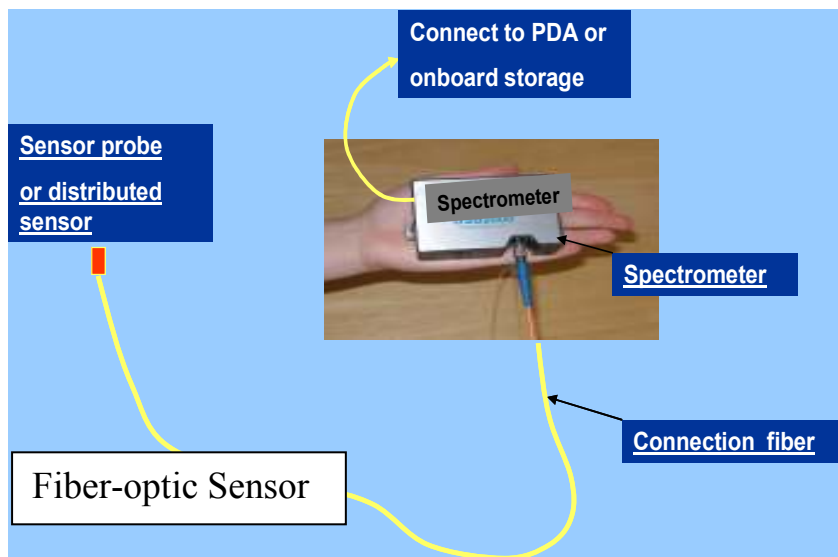
PROGRAM STATUS

Two examples of programs that were identified through the ORACLE program and currently underway are described below.

A fiber-optic sensor, developed for detecting moisture inside cement structures, has been adopted from the civil engineering field to applications for the detection of gas leaks from natural gas lines.

The detection device is based on fluorescence spectroscopy and does not sense natural gas directly. The monitoring device detects changes in oxygen levels or oxygen that is displaced by natural gas in a given environment. Polytechnic University, the developer of this technology, has successfully completed a “proof of concept” in an earlier phase and is presently developing three prototype devices for lab and field testing.

Another technology under development through the ORACLE effort is a corrosion camera. An infrared camera tuned to the emission spectra of corrosion products takes an image of a corroding surface and provides a visual representation of the state of the surface. The camera works even in the case of coated pipe. A prototype camera has been developed and successfully tested in the laboratory.



FOR ADDITIONAL INFORMATION

Daphne D’Zurko
 Executive Director,
 NYSEARCH
 Vice President, RD & d
 Northeast Gas Association
 1515 Broadway, 43rd Floor
 New York, NY 10036
 212-354-4790
 ddzurko@northeastgas.org