

**TECHNOLOGY BRIEF**  
(Approved for public release)

**Smart Pipeline Network – Pipe & Repair Sensor System**

Contract # DTRT57-12-C-10049

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Introduction:

This PHMSA SBIR focuses on the development of a *Pipe and Repair Sensor System*. When combined with the Seal Sensor System and Cased Pipe for Monitoring and Sensor System (separate projects), this technology will allow for a comprehensive Smart Pipeline Grid having integrated sensor networks that provide for continuous real-time monitoring of leaks and system health.

Background:

The Phase I and Phase II programs will develop an integrated pipe and repair sensor system having wide application in providing continuous real time leak detection of hazardous liquid and natural gas products that are transported within DOT regulated pipeline systems. During the initial Phase I feasibility evaluation the scope will be focused on a pipe and repair sensor system for liquid petroleum-based pipeline systems.

Summary of Work to Be Accomplished:

In Phase I and Phase II of this program, smart pipes and smart composite repair having integrated leak detection micro-sensors will be developed and adapted for pipeline use. Concepts and designs will be developed for a networked sensing system capable of sensing the pinpoint location of a leak or impending leak, as well as monitoring structural health. In Phase I, the scope will include the development of a Pipe and Repair Sensor System for use with petroleum-based liquids, with Phase II expanding the scope to include development of a system for use with natural gas.

Once developed, the oil and natural gas pipe/repair sensor network will be useful for pipeline operators to continuously monitor the health of the pipeline system and to detect leaks. Other commercial applications will include gasoline stations, oil storage facilities, methane plants, oil and gas transportation, and off-shore oil rigs.

Deliverables:

- 1 Technical Brief
- 2 Interim Progress Report 1
- 3 Interim Progress Report 2
- 4 Final Report

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