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

**Smart Pipeline Network - Seal Sensor System**

Contract # DTRT57-12-C-10050

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Introduction:

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

Background:

The objective of this program is to develop an integrated pipeline seal sensor system having wide application in providing continuous real time leak detection of DOT regulated pipeline systems. This will include research and development into networkable smart seals or sensor boots that provide means for detecting leakage of fittings typically found within pipeline pumping station.

Summary of Work to Be Accomplished:

In Phase I and Phase II of this program, sensor-seals having both sealing and force sensing functionality, as well, as smart-seals having integrated leak detection micro-sensors will be further developed and adapted for pipeline use. Concepts and designs will be developed for a networked seal sensing system capable of sensing the pinpoint location of a leak or impending leak, as well as sensing state of the seals. In Phase I, the scope will include the development of a Seal 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.

During this program a network topography and control architecture will be developed that provides for (non-centralized) distributed intelligent control without a single point of failure vulnerability. Expertise in local area processor-based networks and TCP/IP web-based networking will be used to develop system concepts for a wide area Smart Pipeline Network supported by the existing internet infrastructure.

Deliverables:
1 Technical Brief
2 Interim Progress Report 1
3 Interim Progress Report 2
4 Final Report

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