



# Pipeline and Hazardous Materials Safety Administration Office of Pipeline Safety

**PHMSA's Research and Development Forum  
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U.S. Department of Transportation  
Pipeline and Hazardous Materials  
Safety Administration

**PHMSA: Your Safety is Our Mission**



# Past Pipeline Leak Detection Research

Project	Contractor	Goals
Improve Pipeline Leak Estimation	BMT Fleet Technology Limited	Validate and enhance existing leak rate estimation models by measuring and simulate leak rates on liquid pipeline systems.
Develop Remote Sensing and Leak Detection Platform that can Deploy Multiple Sensor Types	Pipeline Research Council International	Develop and validate a complete automated multi-threat ROW monitoring and surveillance system operating on a long-range, long-endurance, beyond visual line of sight, unmanned aircraft.
Improving the Reliability, Detection, and Accuracy Capabilities of Existing Leak Detection Systems (CPMs) Using Machine Learning	Pipeline Research Council International	Develop a machine learning algorithm to enhance the ability of computational pipeline monitoring (CPM) systems to identify leaks.
Validation of Remote Sensing and Leak Detection Technologies Under Realistic and Differing Conditions	Operations Technology Development NFP	Validate the leak detection capabilities of existing drone-based remote leak detection technologies
Unmanned Aerial Systems for Pipeline Inspection, Monitoring, and Landscape Analysis	West Virginia University	Evaluate the use of Unmanned Aerial Systems (UASs) and various mounted sensors to aid in the inspection, monitoring and analysis of pipeline corridors.



# Ongoing Pipeline Leak Detection Research

Currently 6 active projects related to Leak Detection with a total of \$2.6 million in PHMSA funding and an additional \$2 million in cost sharing.

Project	Contractor	Goals
An Autonomous Unmanned Aerial System Inspection Platform for High-Efficiency 3D Pipeline/Route Modeling/Change-Detection and Gas Leak Detection-Localization	University of Nebraska	To enhance the quality and efficiency of UAS pipeline and route inspections, and to evaluate and enhance the performance of OGI (optical gas imaging) pipeline leak detection-localization
Pre-Commercial Development and Field Testing of a Portable Mercaptan Sensing Device for Gas Industry Applications	Northeast Gas Association	Develop and validate portable technology that measures the concentration of mercaptans in gas industry field applications.
Advancing Hydrogen Leak Detection and Quantification Technologies Compatible with Hydrogen Blends	Gas Technology Institute	Investigate the impact of hydrogen injection on leakage dynamics and on existing leak detection equipment
Accelerating Pipeline Leak Detection Quantification Solutions Through Transparent and Rigorous Scientific Validation	Colorado State University	Investigate and document existing technology service provider leak detection and quantification (LDAQ) methodologies and their applicability to complex pipeline environments.
Innovative Leak Detection Methods for Gas and Liquid Pipelines	Pipeline Research Council International	Develop improved algorithms to better estimate pipeline inventories short of full pipeline transient modeling applications. Develop a new algorithm for enhanced zone balancing calculations. Develop pattern identification methods to identify how corrected zone balances shift based on changes in system flow. Develop recommended practices to troubleshoot facilities with high error probabilities.
Field Validation Demonstrations to Advance Pipeline Leak Detection Beyond Current Capabilities	Siemens Energy Inc	Develop and test spontaneous leak detection system capable of pinpointing ruptures via detection and evaluation of pressure waves.

