

Joint Industry/Government Pipeline R&D Forum

Detection and Assessment

James Merritt

**Office of Pipeline Safety
Research and Development
Projects Review**

December 11, 2003



The Office of Pipeline Safety research and development program

- OPS is sponsoring research and development projects focused on providing near-term solutions that will increase the safety, cleanliness, and reliability of the Nation's pipeline system



Three Major Project Areas

- Developing new technologies for leak detection and damage prevention
- Improving technologies for pipeline operation, monitoring, and control
- Improving pipeline materials.



Research & Development



■ Goals:

- ◆ Accelerate Delivery to Market of Technological Solutions to Pipeline Safety Problems
- ◆ Expand Stakeholder Involvement in R&D Planning
- ◆ Improve Availability of Research Results
- ◆ Better Serve Regulatory Needs – Near-term Focus
 - ◆ Damage Prevention and Leak Detection
 - ◆ Enhanced Pipeline Operations, Controls, and Monitoring
 - ◆ Improved Pipeline Material Performance
- ◆ R&D Web Site: <http://primis.rspa.dot.gov/rd>



Program Results Reported to Congress

- OPS will use a systematic process for evaluating the program's outcomes, using recognized best practices



Detection and Assessment

Airborne LIDAR Pipeline Inspection System (ALPIS) Mapping Tests

Contract #: DTRS56-01-X-0023 LaSen Corporation

COTR – Sam Hall

- The Airborne LIDAR Pipeline Inspection System (ALPIS) is an airborne remote sensing system for detecting leaks associated with natural gas and hazardous liquid pipelines. Data collected with ALPIS can be incorporated into a geographic information system (GIS) to create mapping databases.



Detection and Assessment Inspection of Unpiggable Pipelines

Contract #: DTRS56-02-T-0001 Southwest Research Institute
COTR – James Merritt

- The purpose of the research is to determine if an ILI using RFEC testing is adequate to inspect currently unpiggable pipelines. The tool developed under this research is expected to be able to detect corrosion and mechanical damage.



Detection and Assessment Mechanical Damage Inspection Using MFL Technology

Contract #: DTRS56-02-T-0002

COTR – Merritt

- This research will address mechanical damage ILI through the use of smaller/simpler MFL tools. A simplified multiple magnetization tool will be designed, a magnetizer and sensor will be developed, and ultimately the researches will collect and analyze pull rig and flow loop data.



Detection and Assessment

Feasibility of In-Line Stress Measurement by Continuous Barkhausen Method

Contract #: DTRS56-02-T-0003 Southwest Research Institute
COTR – Wade Nguyen

- This project will demonstrate the use of modified MFL ILI tools to inspect mechanical damage, cracks, wrinkles and corrosion.



Detection and Assessment

Baseline Study of Alternative In-Line Inspection Vehicles

Contract #: DTRS56-02-T-0004 Southwest Research Institute
COTR – Wade Nguyen

- The purpose of this research is to conduct a baseline study of alternative ILI vehicles that might be able to negotiate unpiggable pipelines.



Detection and Assessment

Enhancement of the Long-Range Ultrasonic method for the Detection of Degradation in Buried, Unpiggable Pipelines

Contract #: DTRS56-02-T-0007 PetroChem Inspection Services
COTR – Beth Callsen

- The purpose of this research is to develop better technologies for detecting degradation in buried, unpiggable, pipelines.



Detection and Assessment

Improved Inspection and Assessment Methods for Pipeline Girth Welds and Repair Welds

Contract #: DTRS56-03-T-0012 Engineering Mechanics Corporation
COTR – Gery Bauman

- Determine limits of automated ultrasonic testing for cross-country gas transmission pipelines.



Detection and Assessment High-power, Long-range, Guided- wave Inspection of Pipelines

Contract #: DTRS56-02-T-0013 Southwest Research Institute
COTR – James Merritt

- The proposed project is aimed at producing a high-amplitude guided wave that allows inspection of a significantly longer length of pipeline than is presently achievable, based on the magneto-strictive sensor (MsS) guided-wave technology.



Detection and Assessment Corrosion Assessment Criteria: Rationalizing Their Use Applied to Early vs Modern Pipelines

Contract #: DTRS56-02-T-0014

Battelle Corporation

COTR – James Merritt

- Develop quantitative measures that determine which of the current corrosion assessment criteria are valid to assess corrosion defect severity and determine failure pressure.



Detection and Assessment Internal Corrosion Direct Assessment of Gas Transmission, Gathering, & Storage Systems

Contract #: DTRS56-03-T-0001 Southwest Research Institute
COTR – James Merritt

- The proposed project seeks to develop and validate a method to assess the integrity of pipelines with respect to internal corrosion by identifying and prioritizing locations of corrosion damage.



Detection and Assessment

Assessment & Validation of TFI- Identified Anomalies Criteria for Repair and Available Repair Methods

Contract #: DTRS56-03-T-0002 CC Technologies Laboratories, Inc.
COTR – Zach Barrett

- The objectives of this project are:
 - 1) compile & evaluate unique properties of early generation pipeline weld seams,
 - 2) compile a catalog of defect types, and
 - 3) develop methods for evaluating seam weld defects to determine whether pipeline integrity has been compromised.



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Metal-Loss Detection System for Non-Piggable Pipelines

Contract #: DTRS56-03-T-0006 FINO AG

COTR – Joe Mataich

- The technology uses the skin effect & the difference between magnetic fields at low & high frequency.
- Low frequency current will distribute itself and travel throughout the entire cross section of the pipe.
- High frequency current travels along the outer surface of the pipe (Skin effect).



Detection and Assessment

Infrasonic Frequency Seismic Sensor System for Pipeline Integrity Management

Contract #: DTRS57-04-C-10002 Physical Sciences, Inc (SBIR)
COTR – James Merritt

- Technology to proactively detect & warn of unauthorized activity near underground gas pipelines before damage occurs.
- Develop an infrasonic gas pipeline evaluation network using low frequency seismic/acoustic (0.1 to 100 Hz) sensor



Detection and Assessment

Intrinsic Distributed Fiber Optic Leak Detection

Contract #: TBD Prime Research, LC (SBIR)
COTR – James Merritt

- Adapt newly developed fiber optic sensor technology to provide an inherently reliable method to acoustically detect leaks in pipelines with high precision & low false alarm rates in real time.



Detection and Assessment

Piezo Structural Acoustic Pipeline Leak Detection System

Contract #: TBD Mide Technology Corporation (SBIR)

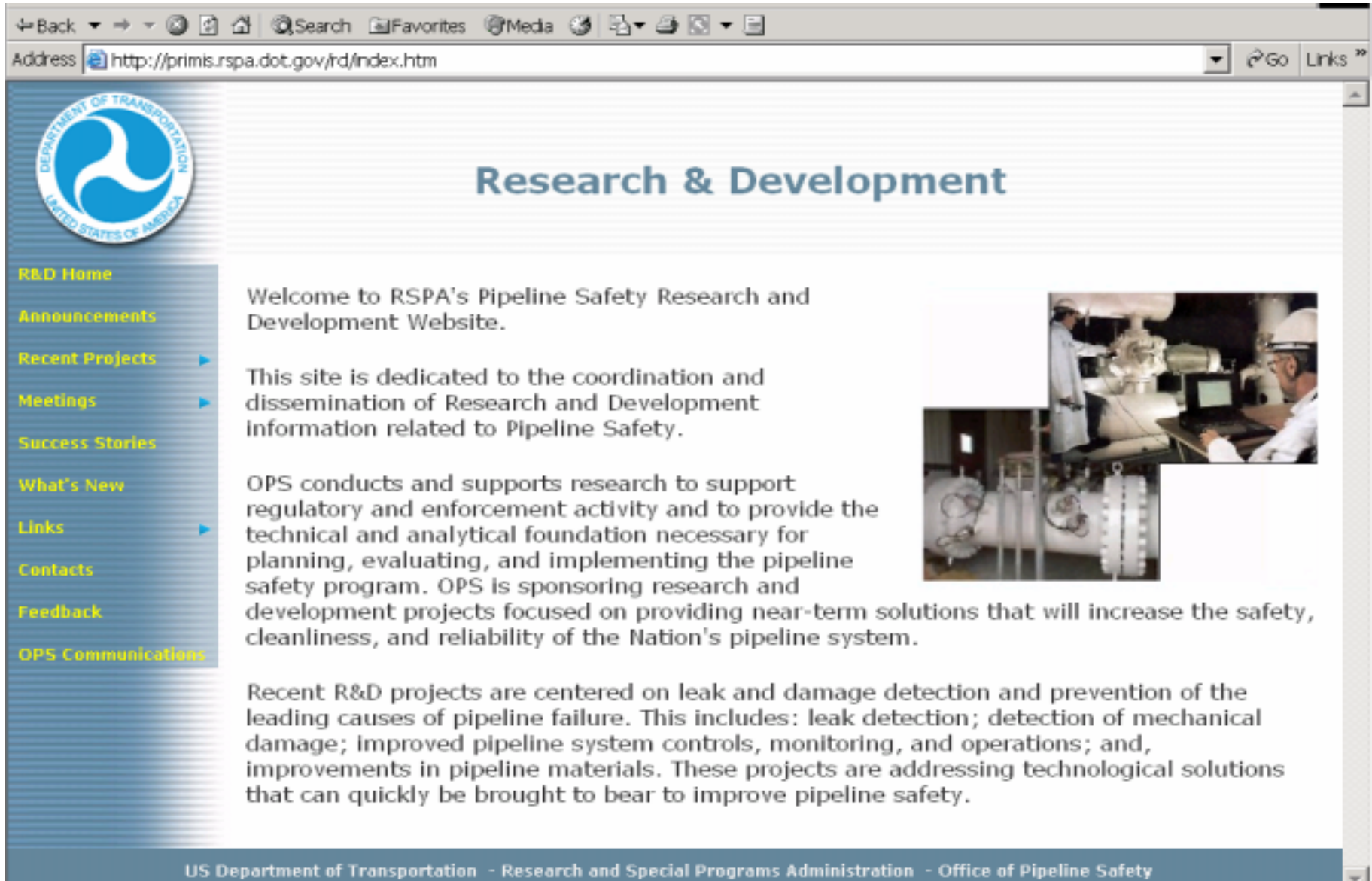
COTR – James Merritt

- Develop the use of piezoelectric materials to sense leaks,
- Design a low power event recorder to store detected leaks and,
- Demonstrate an innovative low-power/self powered acoustic data transmission monitor system can report leaks & their location.




R&D Web Site

<http://primis.rspa.dot.gov/rd>



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Address <http://primis.rspa.dot.gov/rd/index.htm> Go Links



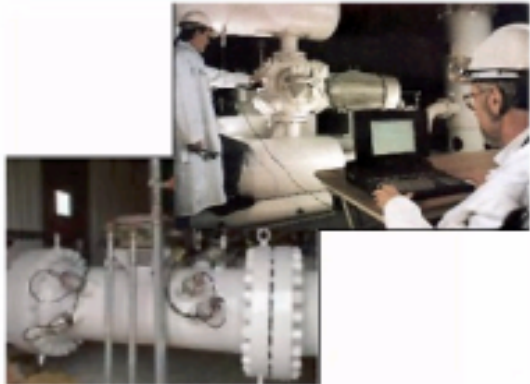
Research & Development

Welcome to RSPA's Pipeline Safety Research and Development Website.

This site is dedicated to the coordination and dissemination of Research and Development information related to Pipeline Safety.

OPS conducts and supports research to support regulatory and enforcement activity and to provide the technical and analytical foundation necessary for planning, evaluating, and implementing the pipeline safety program. OPS is sponsoring research and development projects focused on providing near-term solutions that will increase the safety, cleanliness, and reliability of the Nation's pipeline system.

Recent R&D projects are centered on leak and damage detection and prevention of the leading causes of pipeline failure. This includes: leak detection; detection of mechanical damage; improved pipeline system controls, monitoring, and operations; and, improvements in pipeline materials. These projects are addressing technological solutions that can quickly be brought to bear to improve pipeline safety.



US Department of Transportation - Research and Special Programs Administration - Office of Pipeline Safety

Thank You!

For more information, please contact

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Or

