

U. S. Department of Transportation
Pipeline and Hazardous Materials
Safety Administration



Direct Assessment Research
Government/Industry Pipeline R&D Forum

www.phmsa.dot.gov



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First and Foremost

- **We appreciate the industry support for PHMSA R&D Programs**
- **Collaboration is critical with dwindling resources**
- **Reporting of research facilitates positive stakeholder rapport**

Thanks

Strategies & Goals

	<u>Program Elements</u>	<u>Program Element Goals</u>
1.	Damage Prevention	Reducing the number of incidents and accidents resulting from excavation damage and outside force
2.	Pipeline Assessment and Leak Detection	Identifying and locating critical pipeline defects using inline inspection, direct assessment and leak detection
3.	Defect Characterization and Mitigation	Improving the capability to characterize the severity of defects in pipeline systems and to mitigate them before they lead to incidents or accidents
4.	Improved Design, Construction, and Materials	Improving the integrity of pipeline facilities through enhanced materials, and techniques for design and construction
5.	Systems for Pipeline Mapping and Information Management	Enhancing the ability to prevent and respond to incidents and accidents through management of information related to pipeline location (mapping) and threats definition
6.	Enhanced Operation Controls and Human Factors Management	Improving the safety of pipeline operations through enhanced controls and human factors management
7.	Risk Management & Communications	Reducing the probability of incidents and accidents, and mitigating the consequences of hazards to pipelines
8.	Safety Issues for Emerging Technologies	Identifying and assessing emerging pipeline system technologies for opportunities to enhancing their safety

Direct Assessment Research (Completed Projects)

#	Goal	Pipeline Type	Location	Project ID	Contractor	Project Title	PHMSA	Co-Share	Pct Cmpl
1.	Safety	HazLiq GasTrans Dist-Steel	Onshore Offshore	DTRS56-02-T-0007	PetroChem Inspection Services	<i>"Enhancement of the Long-Range Ultrasonic method for the Detection of Degradation in Buried, Unpiggable Pipelines"</i>	\$655,564	\$633,325	100
2.	Safety	GasTrans Dist-Steel	Onshore	DTRS56-03-T-0001	Southwest Research Institute	<i>"Internal Corrosion Direct Assessment (ICDA) of Gas Transmission, Gathering, and Storage Systems"</i>	\$191,000	\$313,000	100
3.	Safety	HazLiq GasTrans Dist-Steel	Onshore	DTRS56-03-T-0003	Battelle Memorial Institute	<i>"Improvements to the External Corrosion Direct Assessment Methodology by Incorporating Soils Data"</i>	\$201,000	\$201,000	100
4.	Safety	HazLiq GasTrans Dist-Steel	Onshore Offshore	DTRS56-03-T-0013	Southwest Research Institute	<i>"High-power, Long-range, Guided-wave Inspection of Pipelines"</i>	\$272,420	\$332,935	100
5.	Safety	HazLiq GasTrans Dist-Steel	Onshore	DTRS56-04-X-0025	National Institute of Standards and Technology (NIST)	<i>"Task Order #1: External Corrosion of Line Pipe Steels"</i>	\$500,000	\$0	100
6.	Safety	HazLiq GasTrans Dist-Steel	Onshore	DTRS56-04-T-0002	Southwest Research Institute	<i>"Determining Integrity Reassessment Intervals Through Corrosion Rate Modeling And Monitoring"</i>	\$350,000	\$350,000	100
7.	Safety	HazLiq GasTrans Dist-Steel	Onshore	DTRS56-05-T-0002	Northeast Gas Association	<i>"Validation and enhancement of long range guided wave ultrasonic testing: A key technology for DA of buried pipelines"</i>	\$531,331	\$622,750	100

Direct Assessment Research

(Completed Projects)

#	Goal	Pipeline Type	Location	Project ID	Contractor	Project Title	PHMSA	Co-Share	Pct Cmpl
8.	Safety	HazLiq GasTrans Dist-Steel	Onshore	DTRS56-05-T-0003	Battelle Memorial Institute	<i>"Applying External Corrosion Direct Assessment (ECDA) to Difficult to Inspect Areas"</i>	\$201,000	\$114,000	100
9.	Safety	HazLiq GasTrans Dist-Steel	Onshore	DTRS56-05-T-0004	CC Technologies, Inc.	<i>"Evaluation and Validation of Aboveground Techniques for Coating Condition Assessment"</i>	\$130,988	\$621,000	100
10	Safety	HazLiq	Onshore	DTRS56-05-T-0005	CC Technologies, Inc.	<i>"Development of ICDA for Liquid Petroleum Pipelines"</i>	\$182,636	\$315,114	100
11	Safety	HazLiq GasTrans	Onshore Offshore	DTPH56-06-T-000008	Acellent Technologies, Inc.	<i>"Real-time Active Pipeline Integrity Detection (RAPID) system for Direct Assessment of Corrosion in Pipelines"</i>	\$67,202	\$67,816	100

Direct Assessment Research (Ongoing Projects)

#	Goal	Pipeline Type	Location	Project ID	Contractor	Project Title	PHMSA	Co-Share	Pct Cmpl
12.	Safety	GasTrans	Onshore	DTPH56-05-T-0002	Electricore, Inc.	<i>"Direct Assessment for Internal Corrosion in the Presence of Wet Gas"</i>	\$118,213	\$14,000	90
13.	Safety	HazLiq GasTrans	Onshore	DTPH56-06-T-000009	EMAT Ultrasonics Inc.	<i>"Enhancing Direct Assessment with Remote Inspection through Coatings and Buried Regions"</i>	\$222,170	\$255,262	80
14.	Environmental Stewardship	GasTrans Dist-Steel	Onshore	DTPH56-06-T-000010	CC Technologies, Inc.	<i>"Internal Corrosion Direct Assessment Detection of Water"</i>	\$352,000	\$350,000	53
15.	Safety	HazLiq GasTrans	Onshore	DTPH56-06-T-000011	CC Technologies, Inc.	<i>"Guidelines for Interpretation of Close Interval Surveys for ECDA"</i>	\$189,800	\$300,000	53
16.	Safety	HazLiq GasTrans	Onshore	DTPH56-06-T-000012	CC Technologies, Inc.	<i>"ECDA for Unique Threats to Underground Pipelines"</i>	\$279,780	\$300,000	53
17.	Safety	HazLiq GasTrans	Onshore	DTPH56-06-T-000013	Pipeline Research Council International	<i>"Guidelines for the Identification of SCC Sites and the Estimation of Re-Inspection Intervals for SCCDA"</i>	\$225,000	\$235,000	32
18.	Safety	HazLiq GasTrans Dist-Steel	Onshore	DTPH56-06-T-000001	Gas Technology Institute	<i>"Demonstration of ECDA Applicability and Reliability for Demanding Situations"</i>	\$269,500	\$388,000	28



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Direct Assessment for Internal Corrosion in the Presence of Wet Gas

Main Objective

This R&D project will investigate the current perspective of the Government and pipeline operators on the practices, techniques, and technologies that can reduce the threat of third-party mechanical damage, and to codify those findings into an ASME Standard.

Task

This project will examine existing & emerging mechanical damage prevention practice to provide:

1. Report detailing the technology options for a new ASME pipeline integrity standard addressing mechanical damage
2. Summary of 2 near-commercial damage prevention technologies
 - Acoustical Monitoring
 - Detection of short circuits on pipelines due to equipment contact



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ECDA for Unique Threats to Underground Pipelines

Main Objectives

ECDA process doesn't address all threats.

- 1) Complement ECDA protocol by assessment of threats posed by alternating current & excessive cathodic protection
- 2) Establish limitations of ECDA indirect assessment techniques under stray current conditions.

Task

ECDA in accordance with NACE RP0502-02 relies on above ground DA techniques to prioritize locations at risk for corrosion. Research will result in 3 sets of guidelines that will:

- 1) Describe the proposed procedures & explain the meaning of the measurements,
- 2) Provide instructions regarding indirect assessment to assess the pipeline integrity threats of AC corrosion & CP overprotection
- 3) Address use and limitations of common above-ground ECDA techniques in presence of stray current activity.



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Direct Assessment Research “Generating Innovation”

- **Technology Improvements**
 - **Enhanced guided wave ultrasonics**
 - **Sensors to remotely assess conditions and integration into DA process**
 - **Validating DA methods and benchmarking technology through demonstrations and field trials**
- **Standard Practice/Process Improvements**
 - **Closely working with industry and SDOs to standardize DA processes and expand its effective application for:**
 - *External Corrosion Direct Assessment (ECDA)*
 - *Internal Corrosion Direct Assessment (ICDA)*
 - » Dry gas, Wet Gas & Liquid
 - *Stress Corrosion Cracking Direct Assessment (SCCDA)*



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Guided Wave Ultrasonics Demonstration

- **Organized with NGA/NYSEARCH & Industry**
- **Held July 12-13, 2006 at the NGA/NYSEARCH test bed**
- **Goals:**
 - **Understand application specifics of GUT on cased crossings**
 - **Raise PHMSA & Industry confidence of GUT**
 - **Revise PHMSA GUT checklist tied to Gas IMP**
- **Expected Impacts:**
 - **Public report documenting the demo**
 - **Raise knowledge and confidence in GUT**
 - **Issue revise GUT checklist tied to Gas IMP**

<http://primis.phmsa.dot.gov/rd/techdemo.htm>



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Next Steps

- **Identify affected consensus standards from completed work**
- **Contact relevant SDOs and quantify if research was used to revise standard(s)**
- **Monitor technology demonstrations that are part of the work scope**
- **Organize and hold separate tech demos if necessary**
- **Report all impacts on R&D website**

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



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Future PHMSA Research Funding Open to the public

February 15, 2007

US DOT Small Business Innovation Research (SBIR)

Innovative Safety, Reliability and Inspection Technologies for PHMSA

1. Nanotechnology tools for Internal Corrosion of Pipelines.
2. Development of Risk Protocol for LNG Facilities
3. Design Optimization for Soft Crack Arrestors

<http://www.volpe.dot.gov/sbir/index.html>



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SBIR AWARDS

Since FY 2002

DTRS57-04-C-10002	Physical Sciences Inc.	\$99,910	Oct 2002	100
DTRS57-04-C-10012	Prime Research	\$99,706	Oct 2002	100
DTRS57-04-C-10016	Midé Technology Corp.	\$100,000	Oct 2002	100
DTRS57-04-C-10046	AECsoft USA, Inc.	\$95,000	Sep 2004	100
DTRS57-04-C-10053	Intelligent Automation, Inc.	\$100,000	Sep 2004	100
DTRS57-05-C-10110	Physical Sciences Inc.	\$748,308	Jun 2005	77
DTR57-06-C-10004	Intelligent Automation, Inc.	\$100,000	Nov 2005	100
DTRT57-06-C-10005	FBS, Inc.	\$97,366	Nov 2005	100
DTRT57-07-C-10004	HD Laboratories, Inc.	\$99,305	Nov 2006	26
DTRT57-07-C-10005	JENTEK Sensors Inc.	\$100,000	Dec 2006	24
DTRT57-07-C-10006	Solers Inc	\$99,992	Nov 2006	26

Since FY02 total PHMSA SBIR funding **\$1,739,587**

<http://www.volpe.dot.gov/sbir/index.html>



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Again

Thanks

Questions?