

Pipeline Safety Research Development & Technology Program



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

To Protect People and the Environment From the Risks of
Hazardous Materials Transportation



Pipeline Safety RD&T

Program Mission:

To sponsor research and development projects focused on providing near-term solutions that will improve the **safety**, reduce **environmental** impact, and enhance the **reliability** of the Nation's pipeline transportation system.

Key Points

- We employ a collaborative approach to address mutual challenges
- We help remove technical barriers on a given challenge
- We measure our research results/impacts
- We are transparent - <http://primis.phmsa.dot.gov/rd/>

Pipeline Safety Improvement Act of 2002 established our modern program



RD&T Program Objectives

Developing Technology	Strengthening Consensus Standards	Promoting Knowledge
Fostering the development of new technologies so that pipeline operators can improve safety performance and more effectively address regulatory requirements.	Targeting and feeding new knowledge into the process of keeping standards relevant to their purpose.	Generating and promoting general knowledge to decision makers.

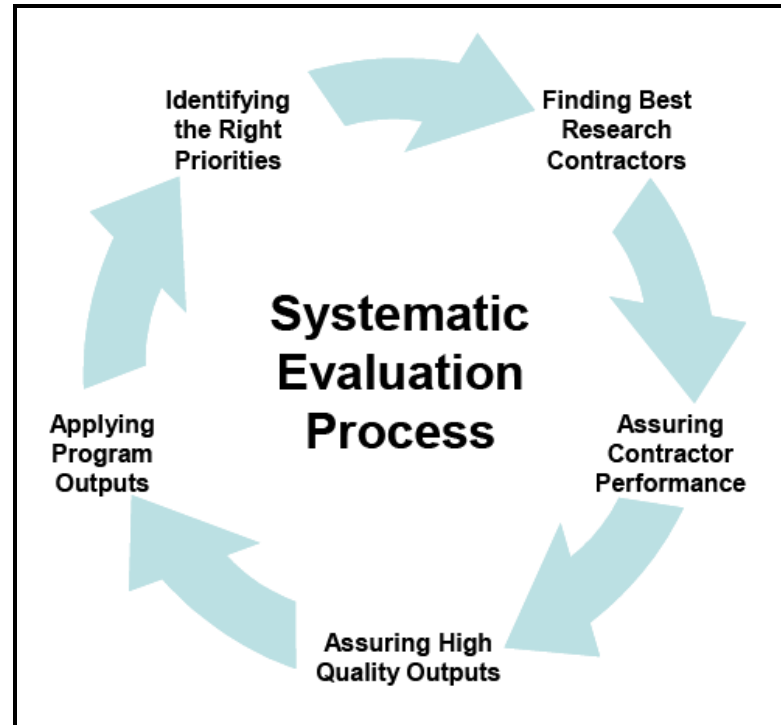
Authorizations vs. Appropriations

FY	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Authorization:	\$10M	\$10M	\$10M	\$10M	\$11.7M	\$11.7M	\$11.7M	\$11.7M	\$11.7M	\$6.92M	\$6.92M	\$6.92M	\$6.92M	\$6.92M
Appropriation:	\$4.8M	\$7.5M	\$7.8M	\$7.7M	\$7.7M	\$7.8M	\$6.9M	\$5.8M	\$6.9M	\$6.9M	\$6.9M	\$6.92M	\$12.3M	\$12.3M







Collaborative and Coordinated Program Process

1. **Stakeholder based, consensus driven** research agendas and roadmaps
2. **Interagency review** of competitive pre-award process to reduce duplication, leverage resources and secure best researchers
3. **Paperless** & secure 21st Century solution used to monitor, report and assure contract performance
4. **Post-award peer review** process executed annually
5. **Tech demonstrations** and full use of contract authority to commercialize, disseminate and promote results



Performance Metrics (since 2002)

Program Status: Technology Impacts

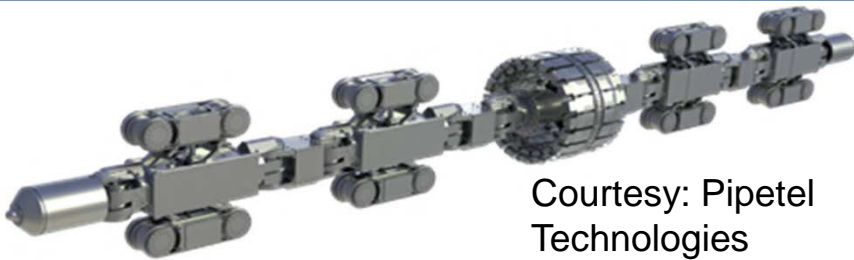
Technology Impact Metric	Metric	Meter
Technology Projects	81	
Technology Demonstrations	46	
Patent Applications (U.S. + Other)	22	
Commercialized Technologies ^A	25	
Commercialization Success Rate ^A	35%	

Programmatic Element & Technology Research Impact

Category	Technology Projects	Technology Demonstrations	Patent Applications (U.S. + Other)	Commercialized Technologies ^A	PHMSA (\$M)
Threat Prevention	13	8	3	4	\$ 4.39M
Leak Detection	11	4	1	3	\$ 7.13M
Anomaly Detection	33	22	14	13	\$21.24M
Anomaly Characterization	9	3		1	\$ 4.32M
Materials	2		2		\$ 0.99M
Welding	7	5		2	\$ 4.92M
Joining	3	2	1		\$ 1.35M
Alternative Fuels	3	2	1	2	\$ 1.09M
Footnotes:					
A. Note: The measurement of "Commercialized Technologies" only occurs on non-active or completed projects.					
Grand Totals:	81	46	22	25	\$45.47M



PHMSA RD&T SUCCESSES



Courtesy: Pipetel Technologies



Courtesy: CRC Evens



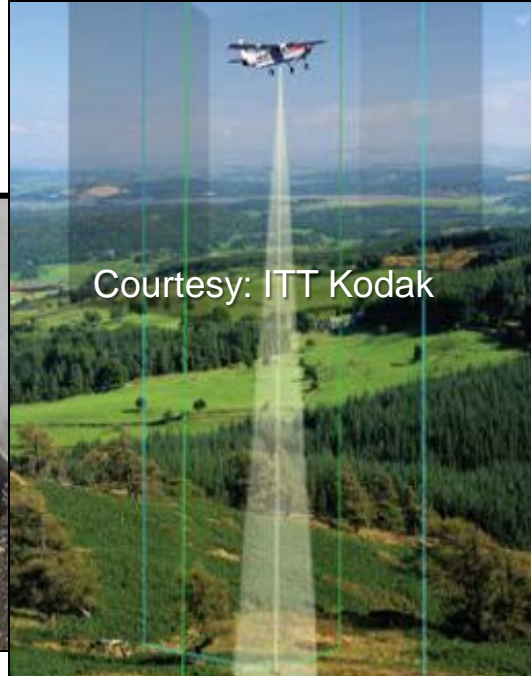
Courtesy: LASEN



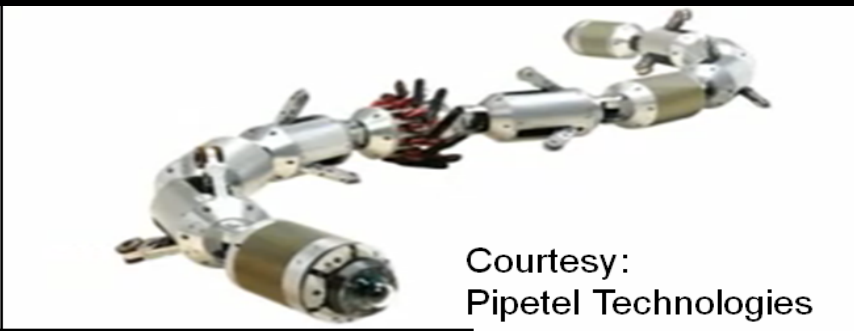
Courtesy: Baker Hughes



Guided Wave Ultrasonics



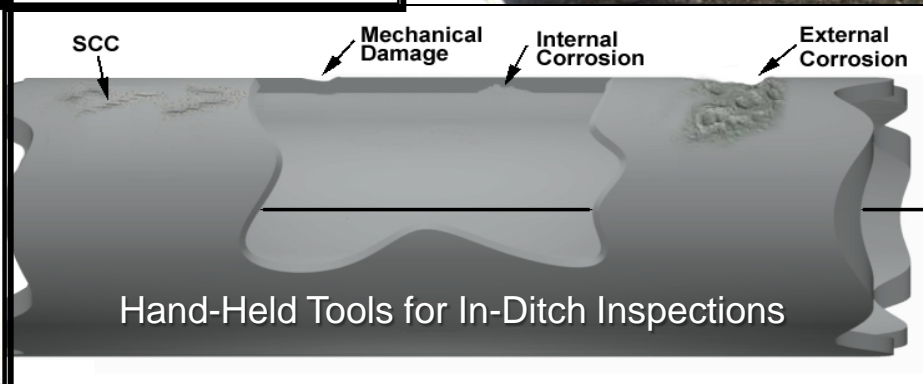
Courtesy: ITT Kodak



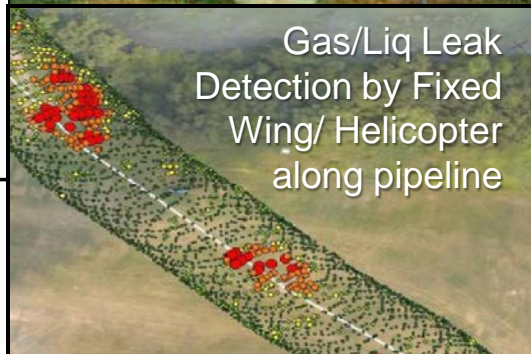
Courtesy: Pipetel Technologies



Courtesy: Pure Technologies Leak Detection



Hand-Held Tools for In-Ditch Inspections



Gas/Liq Leak Detection by Fixed Wing/ Helicopter along pipeline

Performance Metrics (since 2002)

Program Status: Promoting Knowledge

Knowledge Promotion Metric	Count	Meter
Final Reports Publicly Available	169	<div style="width: 100%; background-color: orange;"></div>
Conference or Journal Papers	109	<div style="width: 80%; background-color: orange;"></div>
Public Events	36	<div style="width: 30%; background-color: orange;"></div>
Patent Applications (U.S. + Other)	23	<div style="width: 20%; background-color: orange;"></div>
Annual Peer Reviews Held	10	<div style="width: 10%; background-color: orange;"></div>

Communicating Knowledge to Stakeholders

Event Type	Events Held	Stakeholders Reached
Blue Ribbon Panel	2	39
Gov/Industry R&D Forums	6	1225
Interagency Coordination Meetings	13	101
R&D Workshops/Conferences	14	2135
Safety Advisory Committees	1	30
Grand Totals:	36	3530

- Logic modeling used to determine best attainable/sustainable metrics

- Info is all publically available at:

<https://primis.phmsa.dot.gov/rd/performance.htm>

Website Usage

Website Usage Metric	Measure
Total Number of Hits	18,166,377
Average Number of Hits/Month	122,745
Files Downloaded (since 1/01/2008)	1,166,766



2015 Research Areas & Awards

- Pipeline R&D Public Forum: August 2014
 - Generated national research agenda
 - Identified Key Focus Areas: Damage Prevention, Anomaly Detection & Characterization, Materials, Risk Models, LNG
- Received 81 white papers & 38 proposals
- Approx. \$12M new awards around Sept. 2015



Small Business Innovative Research (SBIR)

- Congressionally established to:
 - Stimulate technological innovation by utilizing small business to meet federal research and development needs
 - Encourage participation by minority and disadvantaged businesses in technological innovation
- Administered through DOT Volpe Center
- Modal R&D programs support via an annual tax
- Pipeline Safety Program participation since 2002:
 - 25 Phase I grants: \$3M
 - 4 Phase II grants: \$2.9M
- Funding amounts have changed over the years:
 - Phase I: Now up to \$150k, 6 months
 - Phase II: Now up to \$1M, 2 years



Competitive Academic Agreement Program (CAAP) Objectives

1. **Spur innovation** through enabling an academic research focus on high risk and high pay-off solutions for the many pipeline safety challenges
 - Intended to potentially deliver desired solutions that can be a “hand-off” to further investigations in this or PHMSA’s core research program
2. Expose **students** to subject matter common to pipeline safety challenges and illustrating how their engineering or technical discipline is highly desired and needed in the pipeline field



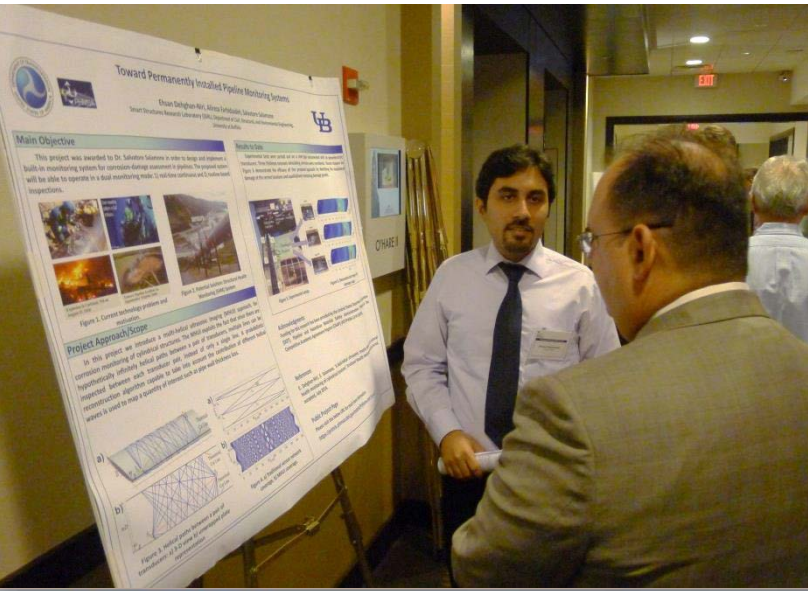
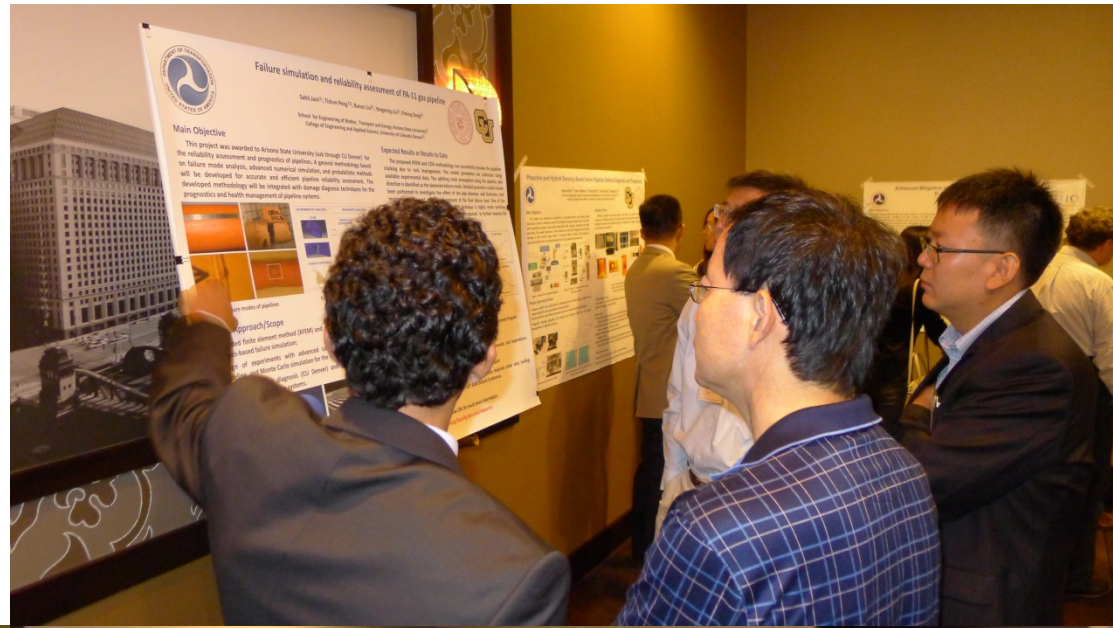
CAAP

- Early FY 2013 – Discussion to evolve research program to more basic investigations and ways to address workforce planning challenges
- FY13: 8 awards, \$814k total
- FY14: 7 awards, \$699k total
- FY15: CAAP Expansion
 - Budget increased to \$2M
 - Projects: \$100k / 2 year → \$300k / 3 year
 - Received 37 applications, to be awarded soon



2014 R&D Forum: CAAP Poster Session

8 Poster Papers presented to Pipeline Industry & Industry Researchers by: Texas A&M, U. Tulsa, U. Buffalo, U. Colorado Denver/Arizona State, ND State, Columbia U., Iowa State, Ohio U.



CAAP Performance

- FY13 & FY14: 45 Applications → 15 Awards
 - \$1.5M PHMSA + \$745k Resource Sharing
 - 73 students
- 2 internships

Annual Announcement	# Awards	PHMSA	Resource Sharing	# U-Grad Students	# Grad Students	# PhD Students	Total # Students
CAAP-1-13	8	\$814K	\$353K	21	18	13	52
CAAP-2-14	7	\$699K	\$391K	2	10	9	21
Grand Totals:	15	\$1,513K	\$745K	23	28	22	73



Thank You!/Program Contacts

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PHMSA RD&T Providing/Supporting:

