

A decorative graphic consisting of a thin yellow circle. A thick black bracket is on the left side, and a thick yellow bracket is on the right side. A horizontal bar with a green-to-white gradient is positioned across the middle of the circle, containing the title text.

# Leak Detection Technologies

Pipeline R&D Forum

June 24, 2009

Crystal City, VA

**NYSEARCH**

 **Northeast**  
GAS ASSOCIATION

# [ Topics ]

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- Leak Detection (surveys)
  - Handheld RMLD
  - Mobile RMLD
- Leak Pinpointing
  - PFT Analyzer
- Gas/Odorant Detection
  - Smart Nose Mercapton Sensor

# Leak Detection Background

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- Leak detection and repair is critical to natural gas industry
- Most common technology used to detect leaks is FID (Distribution systems)
- Significant dollars & time spent to detect and repair leaks
- Industry needs...
  - Tool/methods to quickly locate & mitigate leaks
  - Assure pipeline safety and maintain integrity

# Leak Detection Technology Improvements

## Gas Sample Detection

- In-the-plume technologies
- Past & present – FID
- Recent advances- use of light absorption spectroscopy (LAS)
  - Light wave changes due to methane absorption

## Remote Leak Detection

- Dramatically reduce leak investigation activity
- Potential safety Improvements – find leaks more quickly
- Technologies (E.g.):
  - TDLAS- light absorption
  - GFCR–solar radiation
  - Thermal imaging
  - IR cameras, etc

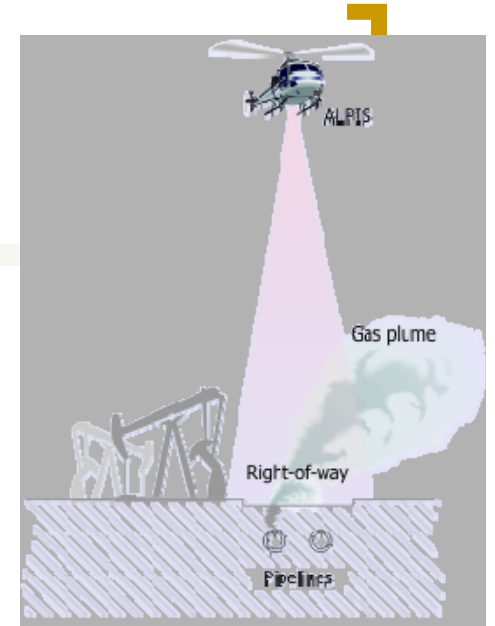
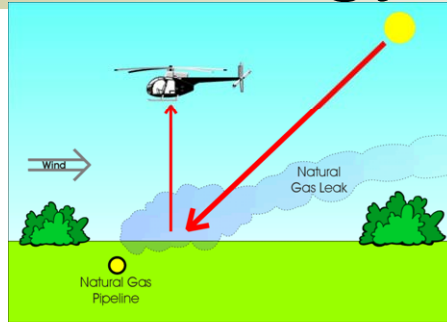
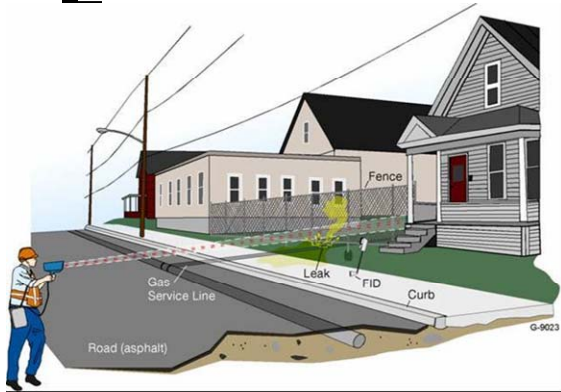
# Remote Leak Detection

Can Improve pipeline safety & reduce operating costs

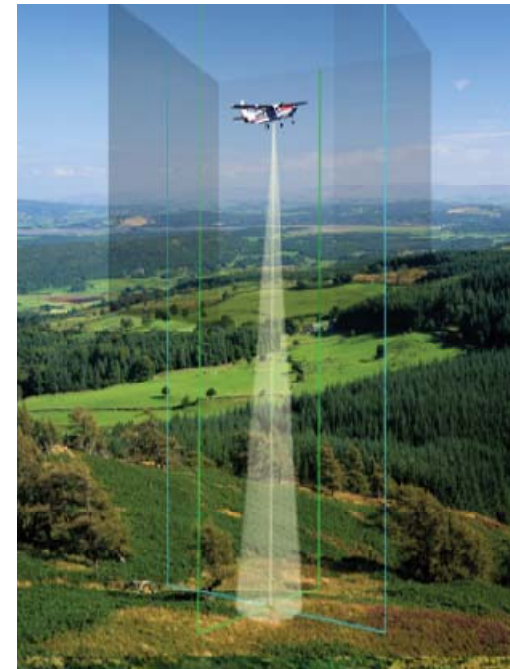
- Key is to select the right or best technology for that fits - environment and system
  - Airborne (fixed wing or helicopter)
  - Mobile (van, truck, etc.)
  - Walking



# Remote Leak Detection- On-going Technology Scan



GasFindIR  
HSX



# Remote Leak Detectors NYSEARCH Projects

## Handheld RMLD – commercial

- Advantages
  - Remote walking survey – mains and services
  - Hard to reach areas (backyard mains, fences)
  - Pipelines in bridges/overpasses
  - Remotely check inside buildings/confined spaces for presence of methane
- Productivity savings of 20% to 40% for most utilities

**Developer: Physical Sciences Inc.  
Commercializer: Heath Consultants**

# RMLD Goes Mobile

## Mobile RMLD –



- Objective
  - Survey distribution mains and services remotely from a moving vehicle
- Results: concerns with proper coverage, obstructions & small leaks
- Heath adapts technology for transmission/gathering pipelines
- Later PSI working with a partner applies RMLD technology for pipeline flyovers

**NYSEARCH, PSI, Heath & Gaz de France**



# Needs & Challenges

## Future - Leak Detection Technologies

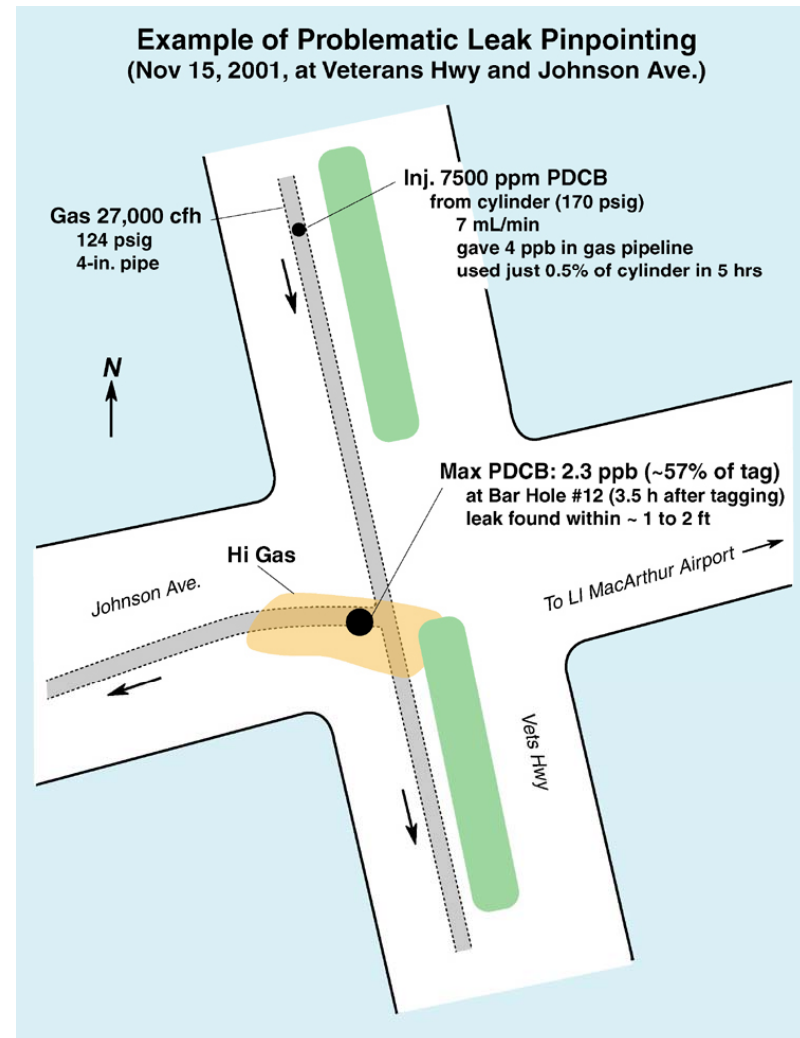
- Advances in remote leak detection technology can provide major benefits
  - Cost Savings & Pipeline Safety
- Distribution system –
  - A mobile system that can reliably detect leaks on mains & services in a single drive-by or flyover
  - A technology that can pinpoint exact location of leak on the pipe

# [ Leak Pinpointing using PFT ]

- Objective:
  - Reduce time and excavation work on difficult to locate leaks
  - Develop a Portable Tracer Gas Analyzer
- Technology:
  - Analysis of Perflourocarbon tracers that are injected into the pipeline – sensitivity to 0.5 ppb
- Benefits:
  - Improved safety
  - Reduce costs

# PFT Analysis - Approach

- Tagging- Introduce PFT into pipe gas stream
- barholes are made using a special sealing technique
- Portable Gas Analyzer samples air from barhole and determines PFT level
- Pinpoint leak at highest PFT reading



# Smart Nose-Mercaptan Sensor

- Objective
  - Develop a device to replace human nose to detect ppb levels of mercaptan in gas
  - Does not rely on the sniffing of gas by field personnel
- Concept
  - Develop device that provides
    - In-air leak detection
    - Low detection limits of 1-10 ppb
    - Portability
    - Low power and cost
- Nano Technology
  - Differential Spectroscopy Chromatography

