

Live CCTV Pipeline Inspection Pioneering Technology for Today's Robotics Programs

**Government and Industry Pipeline R&D Forum
February 7-8, 2007
New Orleans, LA**

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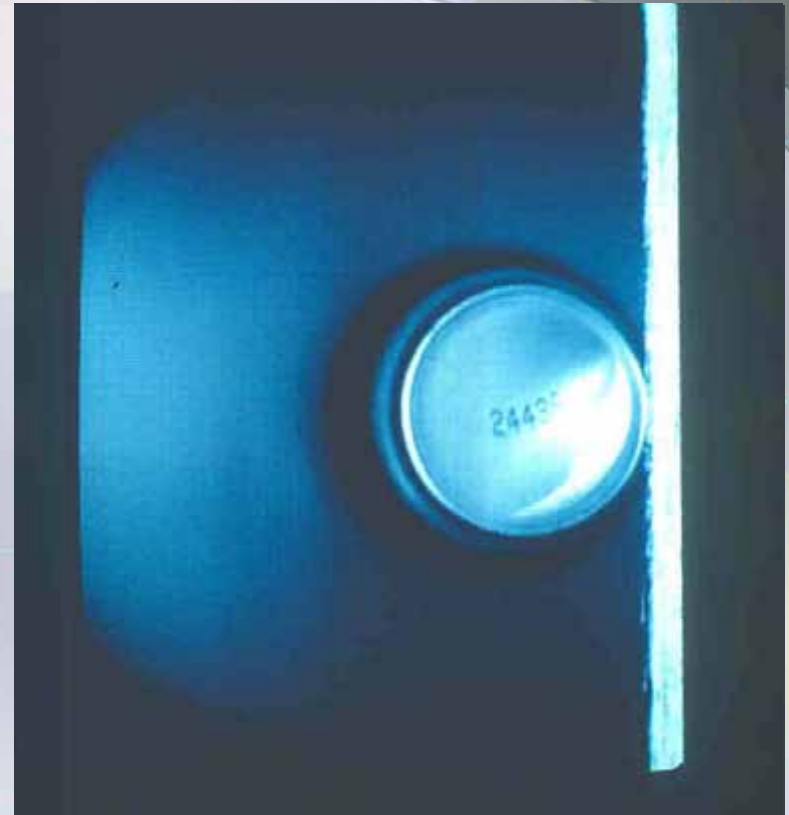
PSE&G Background

- **Best technology at the time**
 - **GTI**
 - **NYSEARCH**
- **1992 CCTV equipment purchased**
 - **First generation**
 - **“Live” low pressure gas mains**



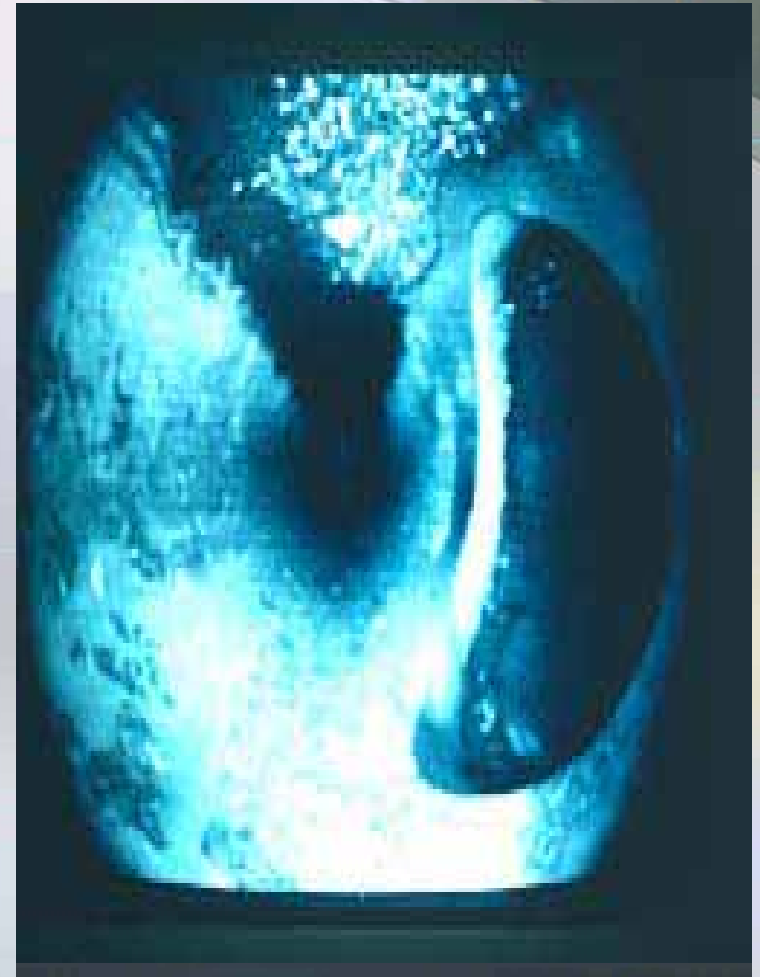
Applications

- **Water infiltration**
 - **Broken mains**
 - **Leaking service tees**
- **Poor Pressure**



Applications

- **Job Planning/Pre-Survey**
 - **Verify facility information**
 - **Determine main condition**
 - **Locate fittings**
 - **Insert work**
 - **Update map records**



PSE&G Second Generation System - 2003

- **Improved picture quality**
- **Color images**
- **No-Blo capabilities**
- **HP inspections**
- **Power driven**



Gate Valve Operation – 60 psig



PSE&G Usage

Year	Footage Inspected
1991-1996	60,000
1997	15,602
1998	14,809
1999	12,199
2000	16,639
2001	10,996 *
2002	12,605
2003	36,754 *
2004	33,663 *
2005	28,158
2006 YTD	20,343
Total	261,768

*Includes electrical duct inspections.

PSE&G leads the nation in this activity.

Benefits

- **\$250,000 annual O&M cost savings**
- **\$3.5M+ savings to date**
- **Visual means eliminating suspect mains**
- **Improved customer relations**
- **Reduced multiple excavations**
- **Reduced capital replacement costs**

Benefits

- **Enhanced safety**
- **Reduced fluid disposal costs**
- **Prehabilitation Survey –
Trenchless Technology**
 - **Fittings**
 - **Protrusions/obstructions**
 - **Cleanliness**

Pioneering Technology

- **Industry involvement**
- **\$1 million investment**
- **Long range visual inspection**
 - **Large diameter**
 - **HP**
- **Transmission**
 - **Visual**
 - **NDE**
 - **Unpiggable**

Pioneering Technology

- **Platform for robotics R&D**
 - **Inspection**
 - **Maintenance**
 - **Repair**
 - **Sensor Technology**

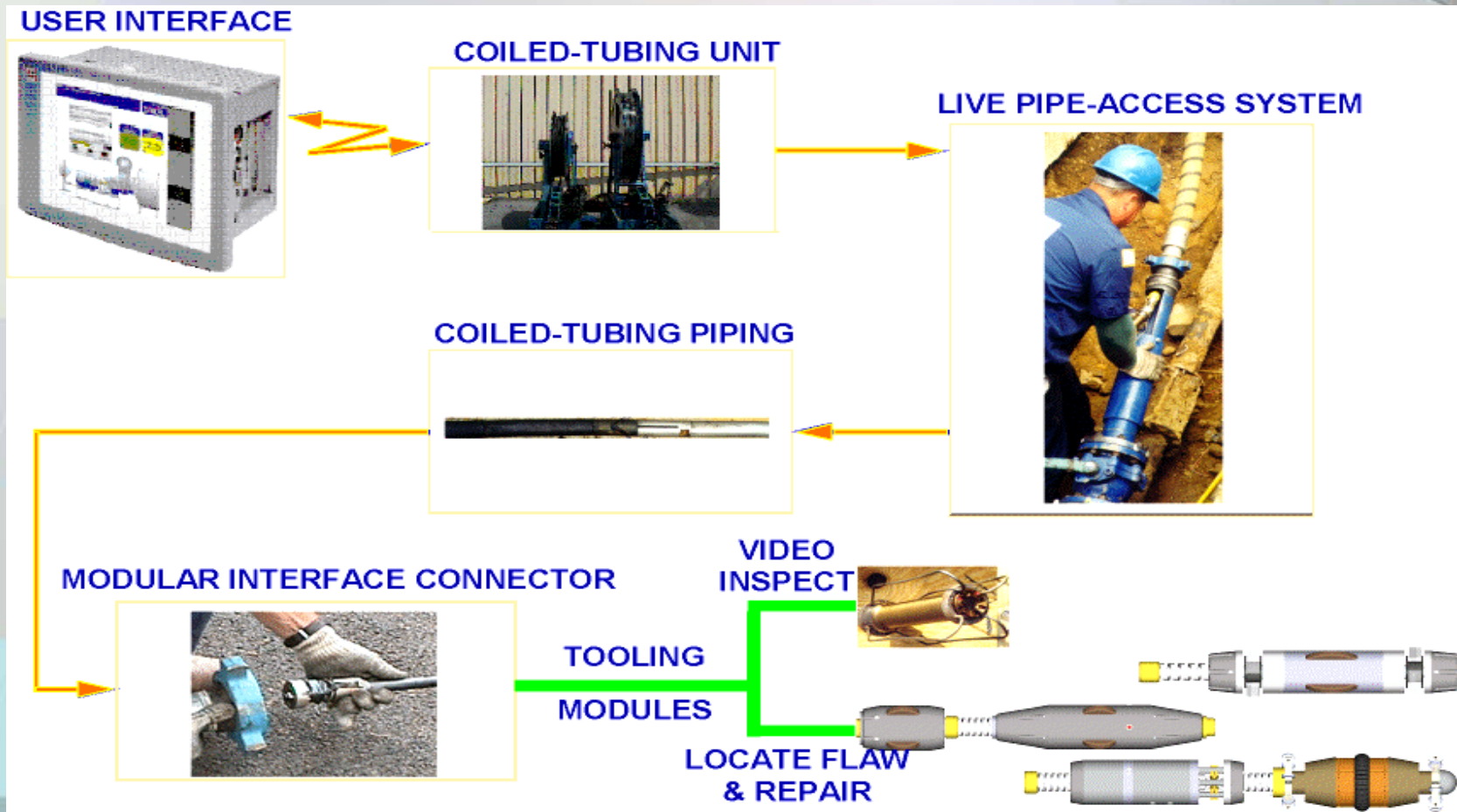
Ongoing Gas Industry Programs

- Pipeline periscope
- Variable geometry crawler (VGC)
- Explorer I
 - Piggable
 - ✓ Explorer II
 - Unpiggable
 - ✓ Tigre
- Transmission mains



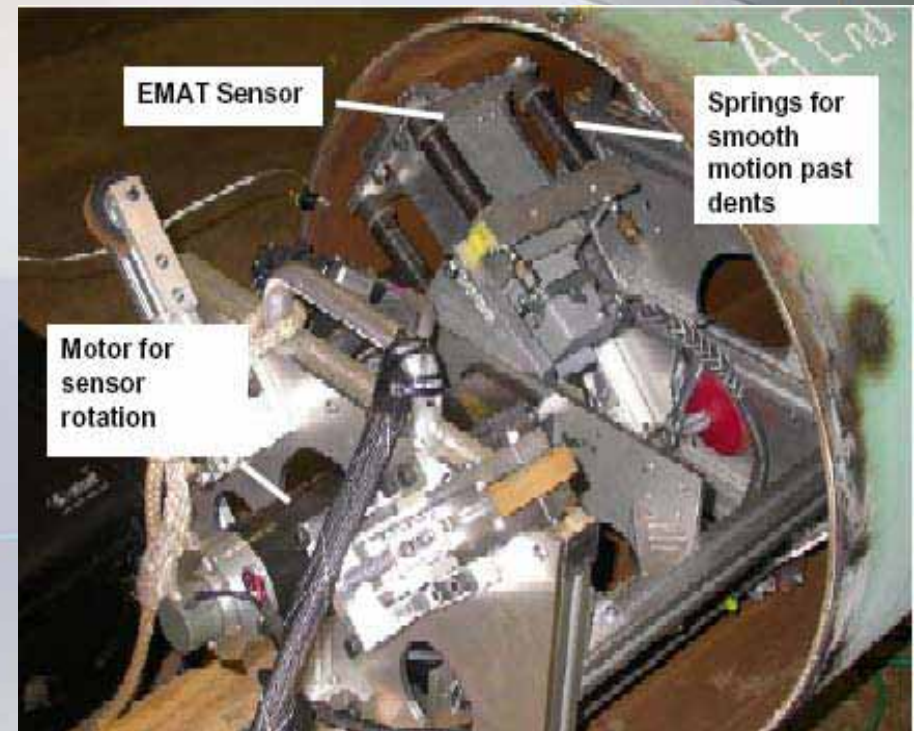
Ongoing Gas Industry Programs

- **Inspection/repair**



Ongoing Sensor Programs

- **RFEC**
 - **GTI**
 - **Southwest Research**
- **Rotating Magnet - Battelle**
- **Ultrasonic - PNNL**



Ongoing Sensor Programs

- **MFL**

- **GTI**



- **NYSEARCH**

Benefits of Ongoing Programs

- **Benefits of traditional cameras**
- **Range in excess of 1,000-5,000 ft.**
- **Tetherless; wireless communication**
- **Can negotiate bends and tees; vertical segments**
- **Reduced number of excavations**
- **Increased safety**
- **Lower inspection costs**
- **Modular design allows expansion of capabilities**
- **Compliance**

Questions & Answers