



# Advanced VOC Monitoring & Leak Detection

*Leveraging Picarro CRDS Systems*

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# WHO ARE WE?

- **Over 25 years as a leading provider of solutions** to measure hazardous air pollutants and monitor greenhouse gas across **many applications** including **energy and chemical** markets.
- Over 45 patents owned by Picarro or exclusively licensed from Stanford University
- ISO 9001:2015 Certified Corporate Headquarters, including R & D, Engineering and Manufacturing/Operations in Santa Clara, California
- Worldwide presence with 6 offices & 50 partners globally
- 400+ employees including 70+ STEM PhDs
- **~6,000 Picarro systems in 100+ countries world-wide**
- Environmental Systems team focused on delivering robust solutions for CEMS, Fenceline, Indoor Air Quality, & Leak Detection



# PICARRO MONITORING SOLUTION OVERVIEW

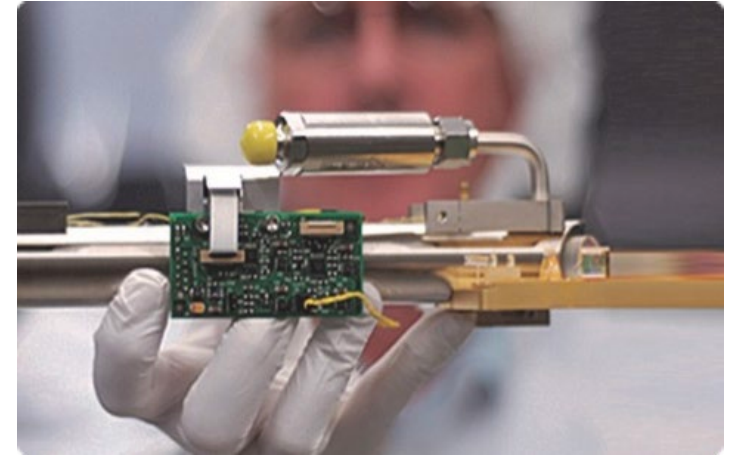
MULTIPOINT      CEMS      FENCELINE      MOBILE



COMPREHENSIVE EMISSIONS MONITORING SOLUTIONS & SERVICES

# CAVITY RING-DOWN SPECTROSCOPY (CRDS)

- Utilizing the unique infrared absorption spectrum of gas-phase molecules with long effective path length
- Measurement of decay rate (time-based), rather than absolute absorbance results in self referencing, low drift measurements
- Continuous extractive design with small cavity (~35 cc) allows for extremely fast response to rapidly changing concentrations
- EPA Method 301 Validation, PS-19, OTM-47
- Broadband systems provide precise analysis of multiple compounds in real-time, with automated Data Quality Indicators (DQI)
- Compatible with key air toxics including Ethylene Oxide, chloroprene, benzene, 1,3-butadiene, ethylene dichloride, & vinyl chloride in addition to GHG's and 400+ other compounds.





# FENCELINE MONITORING & LEAK DETECTION



## Data Acquisition System (DAS)

- Continuously Monitor Real-Time Fence Line Data
- Automated Calibrations & System Health Checks
- Local HMI, Remote Access, Audit Trails, Data Redundancy
- Exceedance Notification & Compliance Reporting

## Advanced Cavity Ring-Down Spectroscopy (CRDS)

- ppt-ppb Detection Limits
- < 2 Second Measurement Rate
- Data Quality Indicator (DQI)
- Interference Free Operation

## Comprehensive Emissions Monitoring Solution

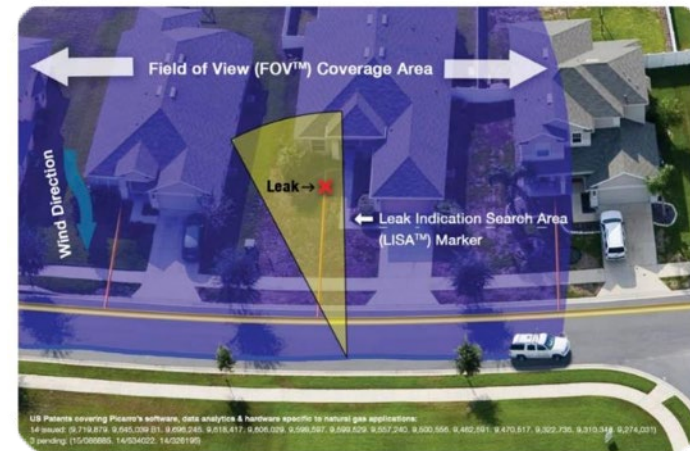
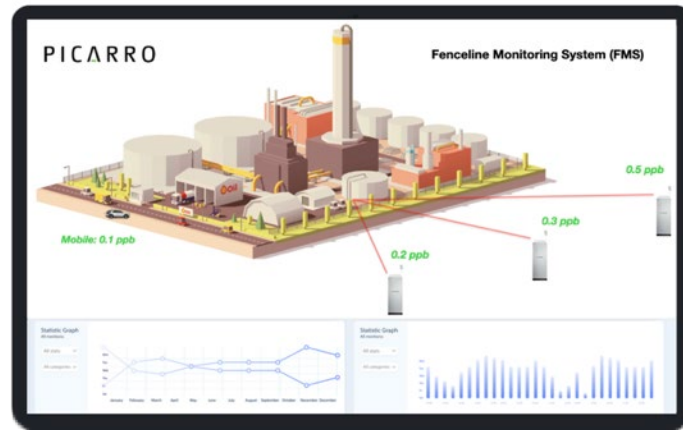
- Dynamic Monitoring with Dual System Integration
- Data Driven Decision Making & Process Visibility
- Real-Time Monitoring for Enhanced Regulatory Compliance
- End-to-End Solution for Emissions Management

# LEAK DETECTION ANALYTICS

Stationary Fenceline Monitoring Systems provide real-time notification of emissions events while also supporting leak source triangulation and average basis compliance reporting.

Mobile Monitoring Systems may be deployed for emergency response, community surveys, or corrective actions in accordance with fenceline monitoring plans.

Advanced geospatial mapping tools can dynamically track and analyze air pollutants, providing precise identification of emission sources & compliance limit tracking.



# CASE STUDY: ETHYLENE OXIDE CHEMICAL PLANT

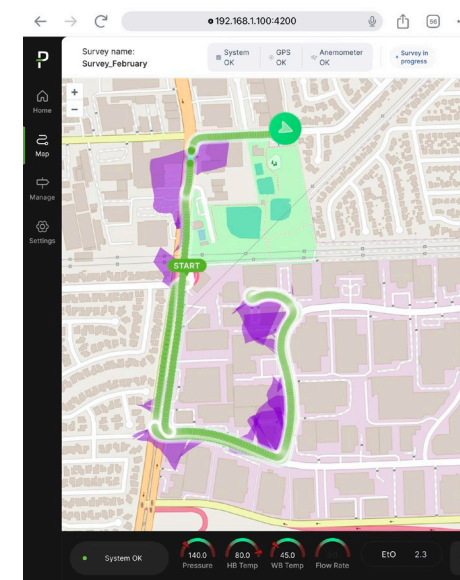
## Background

- US Based Production & Packaging Facility
- MON Rule, Title V Facility, Ethylene Oxide & other VOC's
- Complex Chemical Blending & Packaging Process w/many sources
- Nearby Industrial Facilities & Potential EtO Sources

## Challenges

- Ethylene Oxide (EtO) concentrations exceed limits at facility fenceline with implications for the nearby community
- EPA enforcement action and limited compliance timeline
- Traditional LDAR and passive test methods were not successful in locating fugitive sources in the facility's complex process

## Solution



- Picarro contracted to conduct mobile fenceline & community monitoring of Ethylene Oxide.
- Leveraging EtO-specific CRDS systems in a mobile platform, a facility-wide analysis of emissions were measured and modeled.
- Picarro staff were able to triangulate the primary source attributed with excess fenceline concentrations leading to a fast resolution.

# Thank you

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