



**ECOLOGY  
SECURITY  
SAFETY**

FT-IR OPEN PATH SPECTROMETER

**D-fenceline™ & OPS**

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Real-Time Monitoring System for Fugitive Emissions Management

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# Reliable Air Monitoring

Atmosfir Optics Ltd. and Bruker Optics have come together to provide a complete, fully automated, and reliable fence-line monitoring system. Combining Bruker's Open Path FT-IR technology with Atmosfir's data analysis and management algorithms yields the world's most versatile, sensitive, and cost-effective fence-line technology: the D-fenceline™ monitoring and air quality management system.



The D-fenceline™ fugitive gas monitoring system is an Open Path FT-IR solution with an intuitive user interface and clear data presentation. While simplifying the user experience, the resulting real-time information delivered by D-fenceline™ is reliable and fully validated, with unprecedented sensitivity. Controlled through a cloud computing-based user interface, D-fenceline™ allows continuous accessibility of the system to the operator. Automated real time spectral validation and proven spatial analysis guarantees that the D-fenceline™ will provide clients with a monitoring solution that is a significant improvement over previous generation fence-line monitoring technologies.



Recent regulatory developments in the US, both the federal "Risk and Technology Review" rule and the California Bay Area "Emissions Tracking" rule, have identified and required open path fence-line monitoring as a critical building block of air monitoring around petrochemical facilities. Furthermore, other global regulations have required open path fence-line monitoring around industrial chemical facilities. These regulations differentiate between community monitoring and fenceline monitoring. While conventional "fixed point" air monitoring measurement methods are standard for communities surrounding the potential chemical source, open path technologies are rapidly becoming visible at the fenceline of industrial sites to yield a more complete picture of facility emissions.

# The significant benefits of using the real-time D-fenceline™ system include these four key elements of fenceline monitoring:

## When

Within minutes the leakage is detected. This provides a much more effective plume capture of sources both within and external to the industrial facility in real time.

## What

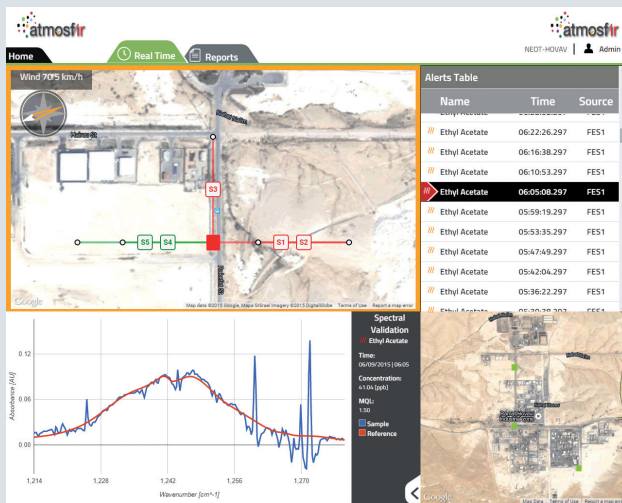
Simultaneous detection and identification of dozens of emitted materials with absolute certainty, simplified by using proprietary spectral validation feature FT-IR technology with Atmosfir's spectral analysis algorithm.

## Where

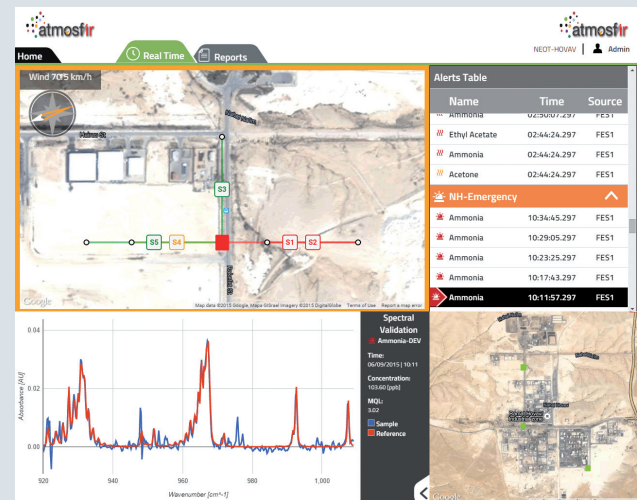
Combining continuous Open Path monitoring data with updated meteorological data allows for rapid determination of where the emissions are originating. The speciation feature of D-fenceline™ delivers critical information to evaluate the source of emissions. This data supports an affirmative defense about the contribution of off-facility sources to fence-line concentrations.

## How much

The resulting data provides information directly relating the magnitude and severity of the leak or emission event.



The D-fenceline™ air monitoring system deployment results in reduced facility downtime and emphasizes the safety of employees and the neighboring community. Efficiently locating emissions allows producers to reduce environmental impact and penalties. The resulting financial benefits for the properly monitored facility via reduced insurance costs, raw material loss prevention programs and through securing routine and continuous production translates to a more efficient and profitable operation.



The flexibility of the D-fenceline™ platform allows for the development of monitoring tools that are tailored to the specifications of each client. Each situation may merit a different list of compounds that are essential for the client to monitor, different action levels and thresholds, and different time intervals of monitoring reports. The experience and advanced vision of the Bruker and Atmosfir team delivers the most versatile and complete solution available on the market.

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## Current Programs in Place include:

**1** Air quality measurement at the fence-line.

**2** Source identification of odorous.

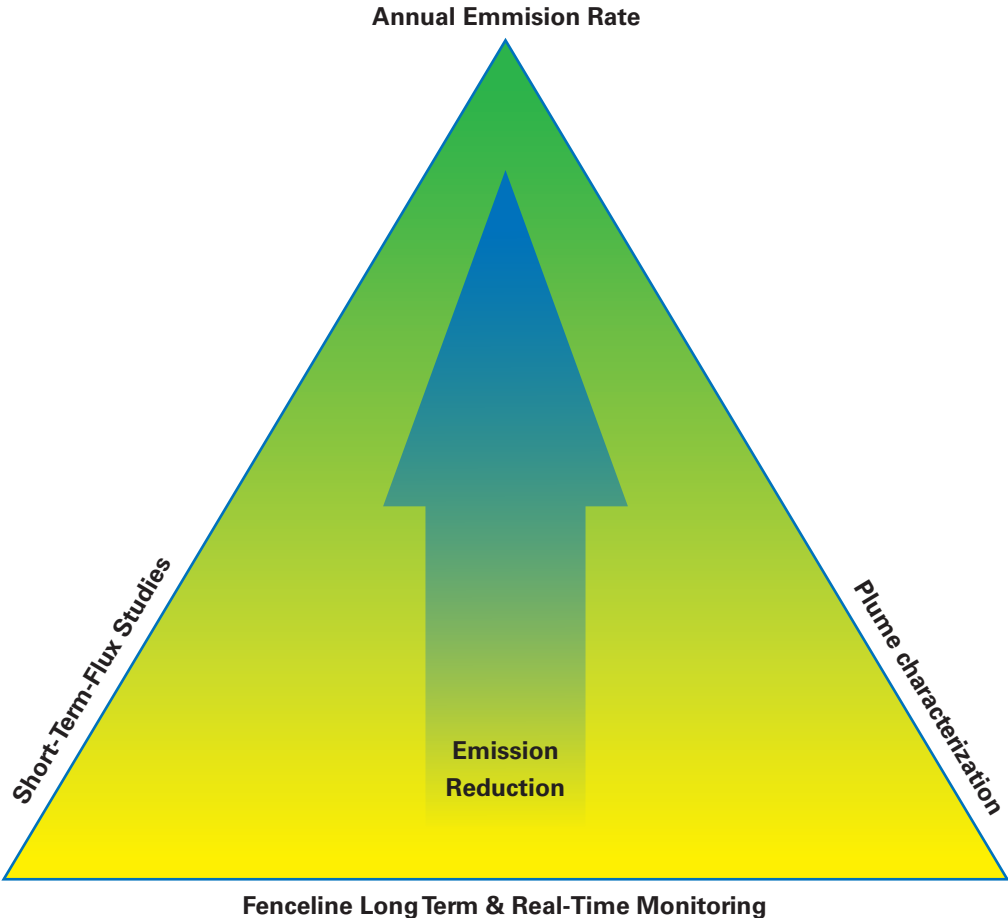
**3** Monitoring data delivery for emergency responses to acute chemical leaks.



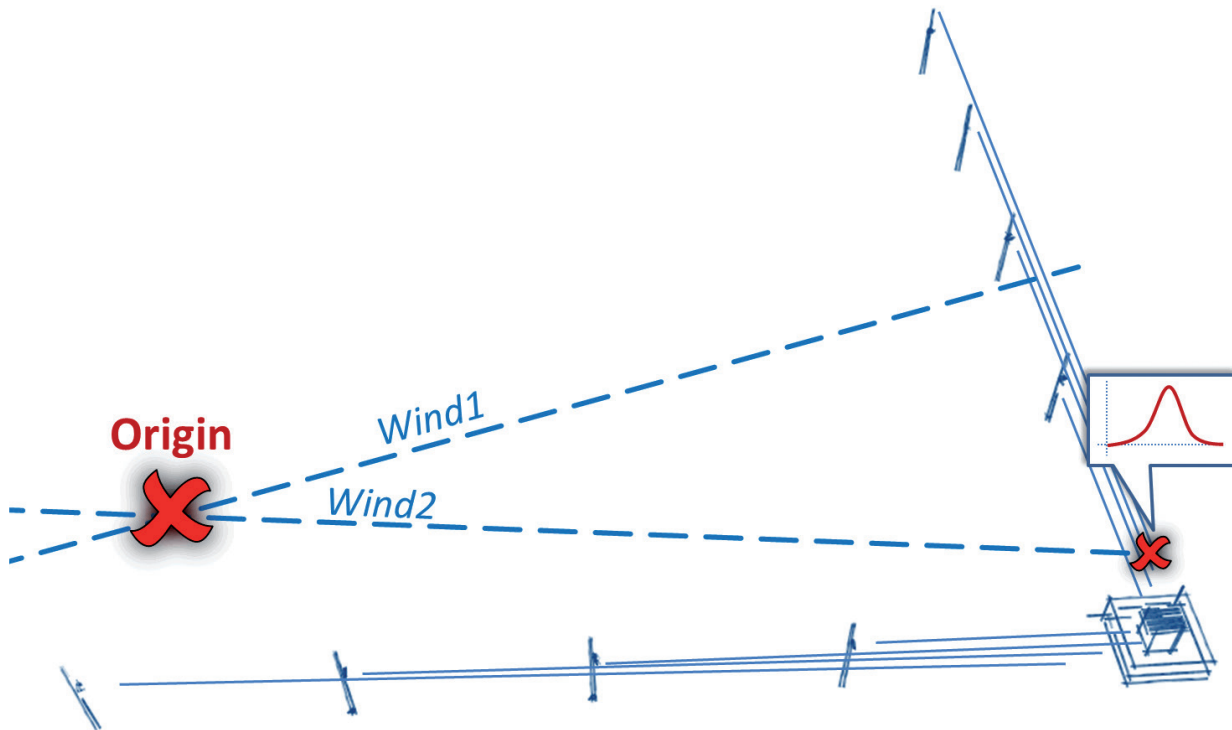
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# The True Way to Emission Reduction

Only the sum of short-term-flux studies, plume characterization, long term observation and real-time fence-line monitoring can result in a truly sustainable reduction of emissions and accurate estimate of an annual emission rates.

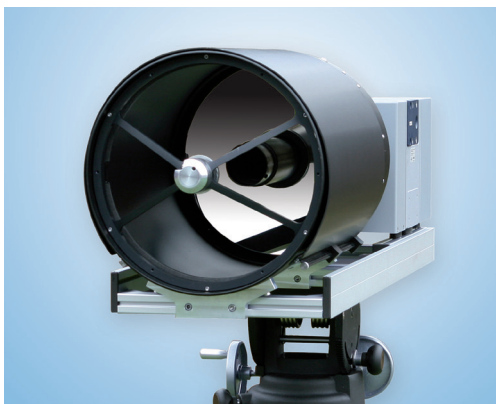


# Leakage Localization and Visualization



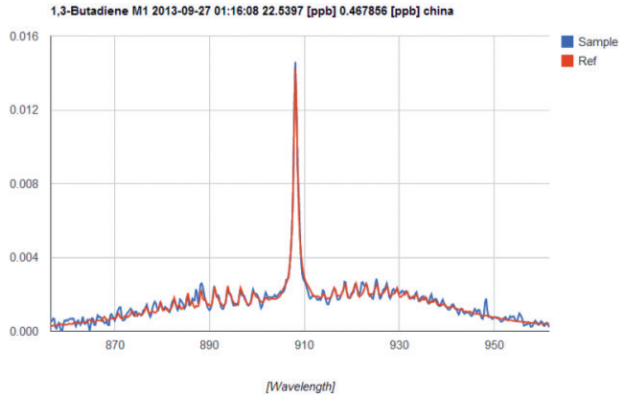
Leakages can be precisely located using the fully automated D-fenceline™ monitoring solution from Bruker and Atmosfir. The Open Path FT-IR spectrometer mounted on a pan-and-tilt head records spectral information of various compounds in parallel along two directions each separated in individual sections. Identification of the compounds for each measurement column is realized in real-time. With detailed consideration of the wind speed and direction, the sources of the identified compounds are derived.

The results presented to the operator are visualized showing an overlay of chemical and the topological site information.

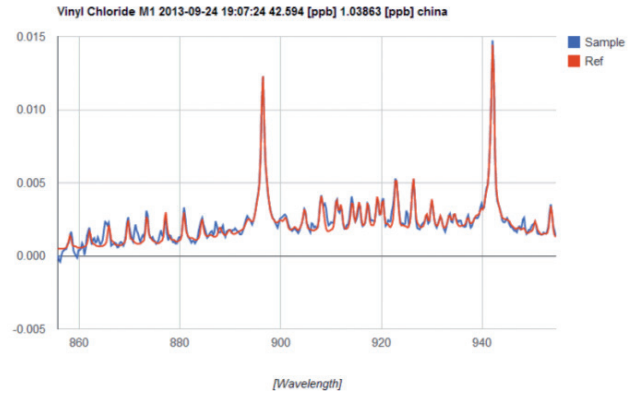


The Bruker FT-IR open path spectrometer OPS is a compact, versatile and rugged air monitoring system, designed to detect and simultaneously measure a wide range of compounds. In combination with the most sophisticated data evaluation software solution in the environmental market from Atmosfir the performance results in an unmatched sensitivity.

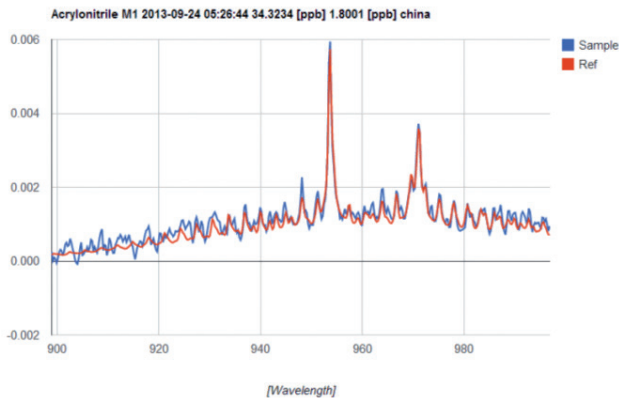
# Unmatched Sensitivity



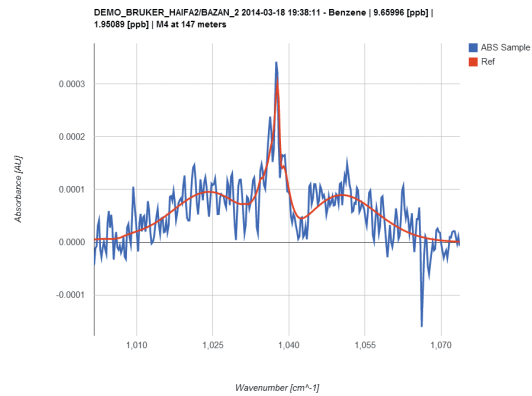
1,3-Butadiene 22.5 ppb ± 0.47 ppb



Vinyl Chloride 42.6 ppb ± 1.04 ppb



Acrylonitrile 34.3 ppb ± 1.80 ppb



Benzene 9.8 ppb ± 2.9 ppb

## Typical System's Sensitivity (200 - 400 meters Pathlength)

Compound	Quantification Limit [ppb] (5 min average)	Quantification Limit [ppb] (1 h average)
1,3-Butadiene	1	0,3
Acrylonitrile	2	0,7
Ammonia	0,5	0,2
Benzene	3	0,5*
Carbon Tetrachloride	0,5	0,2
Ethylbenzene	20	7
Ethylene	1	0,3
Methane**	5	2
Methylene Chloride	1	0,3
m-Xylene	3	1
Nitrogen Dioxide	5	2
o-Xylene	3	1
Propylene	1	0,3
p-Xylene	3	1
Sulfur Dioxide	5	2
Toluene	5	2
Total-Alkanes	2	0,7
Vinyl Chloride	1	0,3

\* Single Path Data collection

\*\* Above atmospheric background



Bruker Optics is the leading manufacturer and worldwide supplier of Fourier Transform Infrared, Near Infrared and Raman spectrometers for various industries and applications. For years, Bruker has set new standards on the market when it comes to precision and efficiency, ease of operation, consulting and analytical services.

Bruker's competence is present where our customers need it - from the very first contact. Our application specialists are scientists and engineers who know open path FT-IR spectrometers as well as understanding the customer's applications.

With service centers all over Europe, North and South America, Asia and Oceania an efficient global technical support is guaranteed. This includes professional instructions regarding your application as well as qualified and fast after sales service and, if desired, remote diagnostics.



Atmosfir is an innovative, advanced air monitoring technology company focused on providing clients with the best air monitoring solutions. Atmosfir is a technology-oriented company, with unique and valuable intellectual properties and years of in-the-field experience.

Our leadership team includes some of the world's most recognized and respected air measurement scientists. For over fifteen years our experts have been actively involved in the development of U.S. EPA test methods and have been involved in designing and implementing numerous Optical Remote Sensing measurement campaigns.

Bruker Optics is continually improving its products and reserves the right to change specifications without notice.  
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