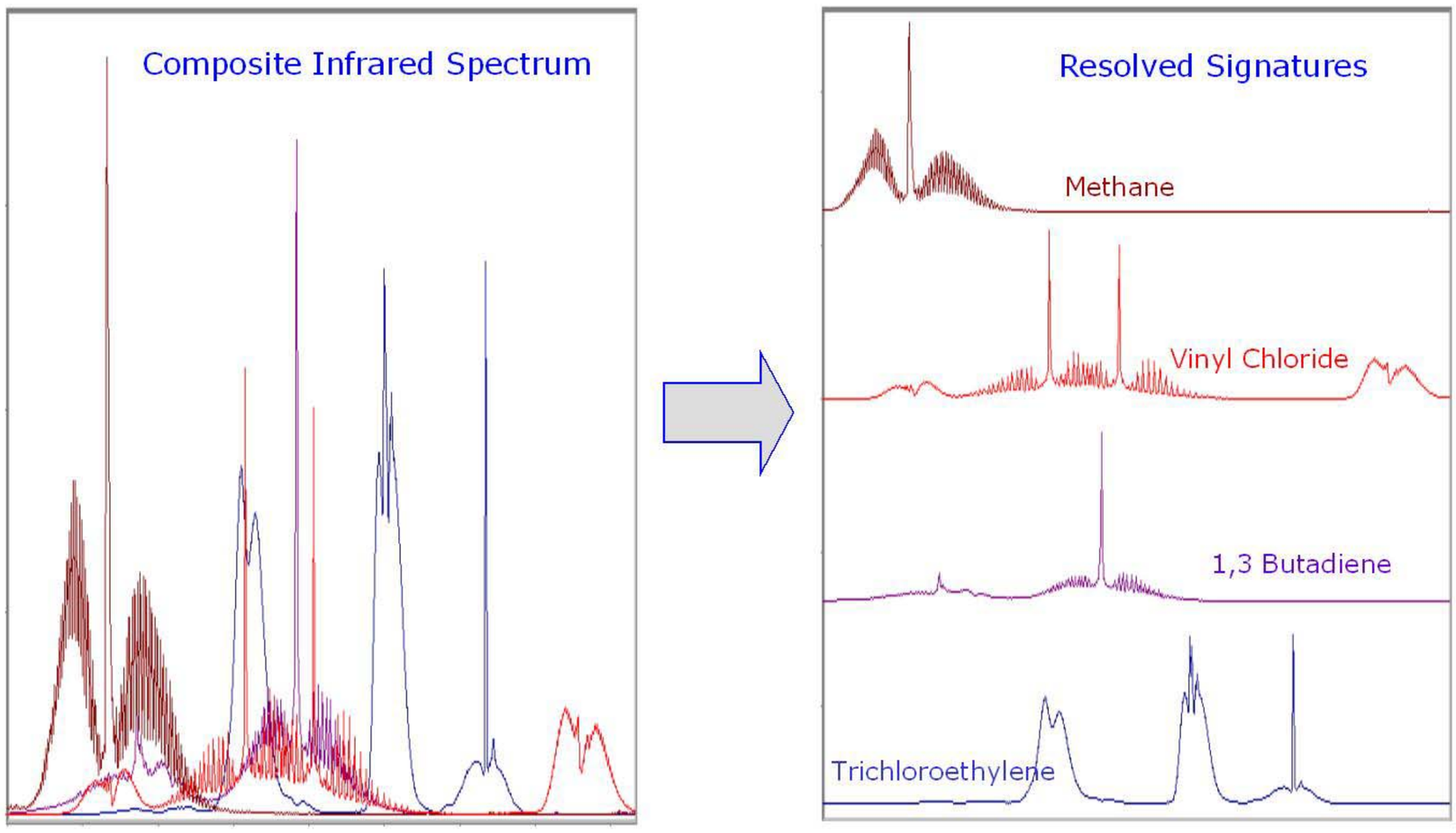
FTIR Pollutant Measurement

Instrument:

Open-path Fourier Transform Infrared (OP-FTIR)

- Determines Path-Averaged Pollutant Concentration
- Provides Chemical Identification of Many Species
  - Special Homeland Security and Emergency Response Applications

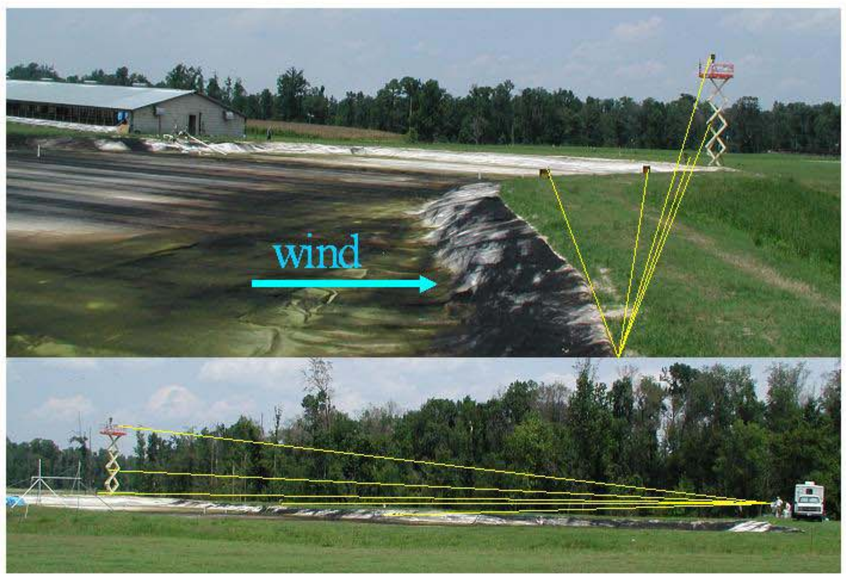
Identification of Airborne Pollutants



Applications: *Fugitive Emissions from Area Sources*

Landfills

Concentrated Animal Feeding Operations



Manufacturers

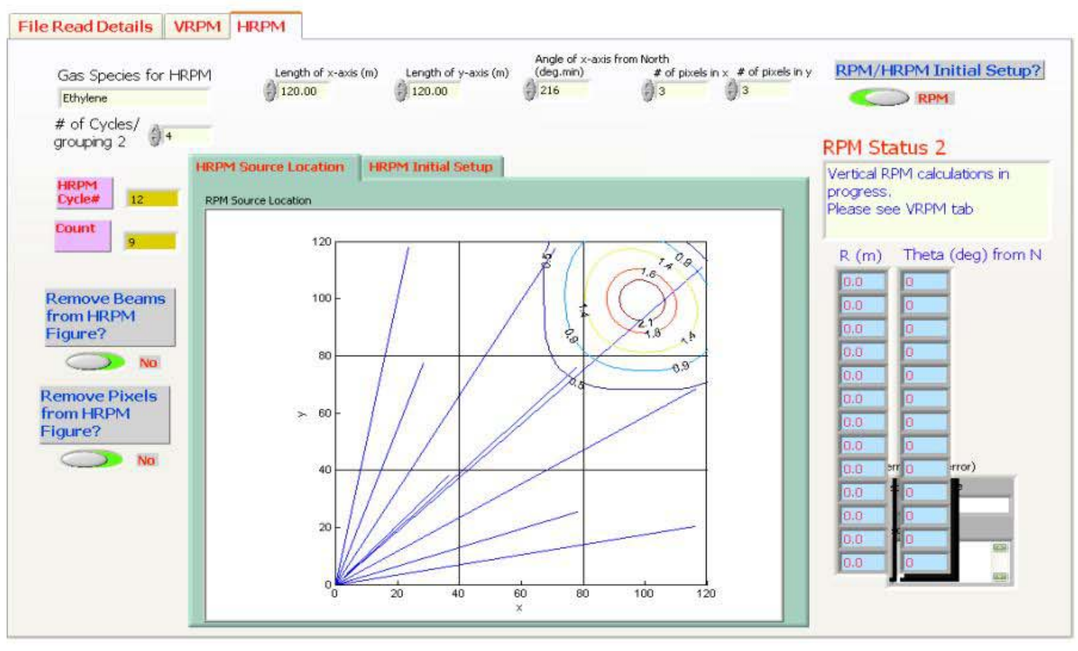
Industrial Monitoring and Control Corp.
MIDAC Corporation
Unisearch Associates Inc.
Bruker Daltonics GmbH

RPM Emission Flux Determination

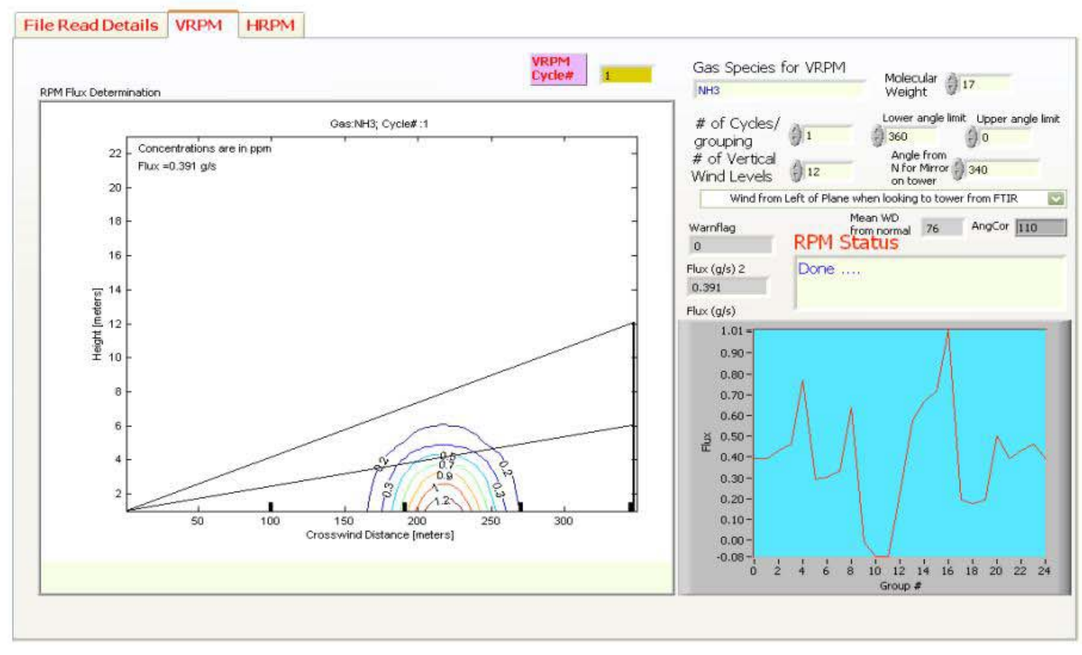
Analysis : *Radial Plume Mapping (RPM) Software*

- Calculates Emission Flux from FTIR and TDL Data
- Can Provide Real-time Information

Emission Hotspot Detection



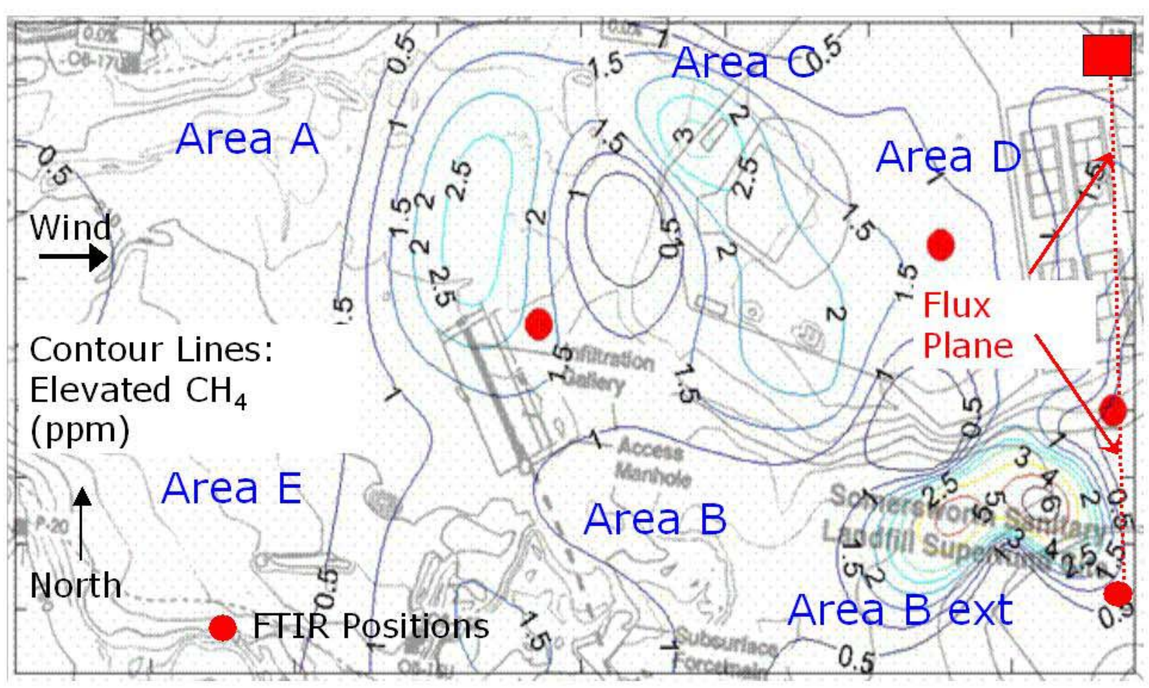
Mass Flux Quantification



Application: *Region 1 Facility Characterization*

Methane Surface Scan

Area	Methane Conc. (ppm)
A	2.7
B	1.8
Bext	6.4
C	3.1
D	1.9
E	1.9



Methane Concentration Contour Map

Methane Mass Emission Flux

Time Period (cycles)	Emission Flux (g/s)	Wind Speed (m/s)	Wind Direction (Deg.)	Correlation Factor
1 to 4	4.40	2.23	7.0	0.999
4 to 7	5.10	2.42	0.0	0.993
7 to 10	7.10	2.78	1.0	0.985
10 to 13	6.40	2.29	-20.0	0.997
Average (all runs)	**6.10**	**2.46**	**-5.0**	**0.994**
Standard Deviation	1.28	0.24	5.8	0.051

Manufacturers

- ARCADIS Inc.

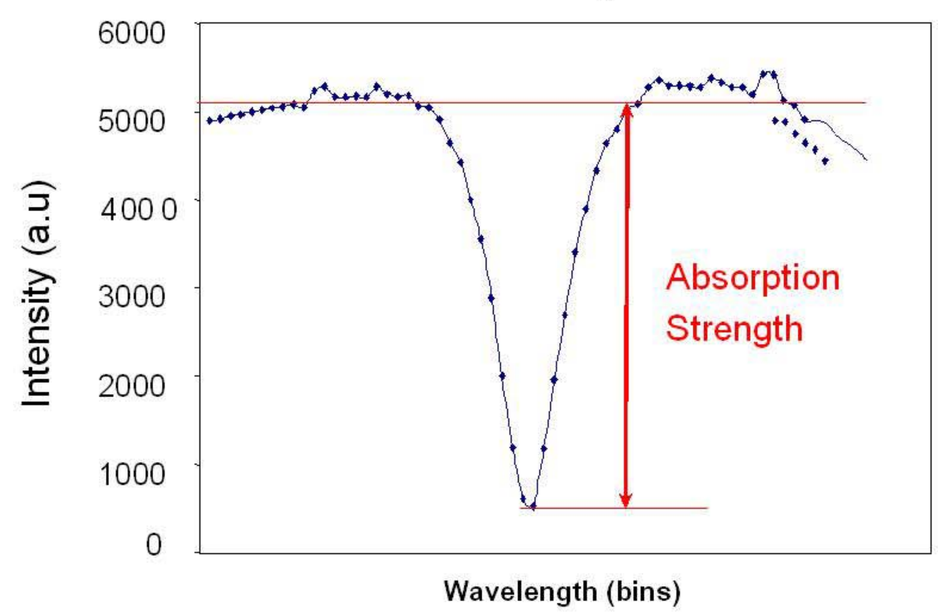
TDL Pollutant Measurement

Instrument : *Open-path Tunable Diode Laser (OP-TDL)*

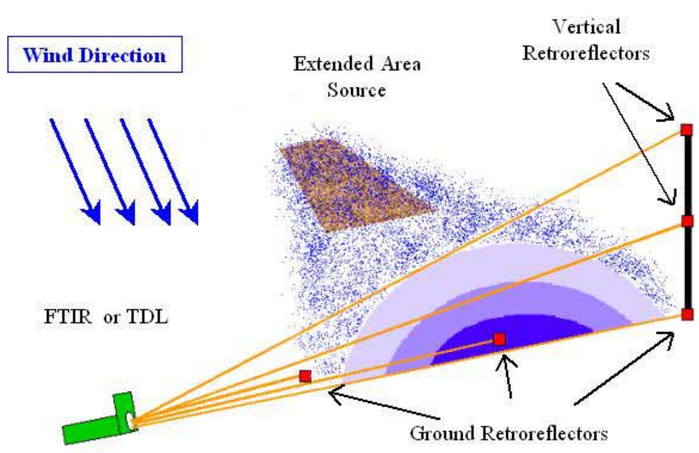
- Determines Open-Path Pollutant Concentration
- Fast, Dedicated Measurement of Several Species

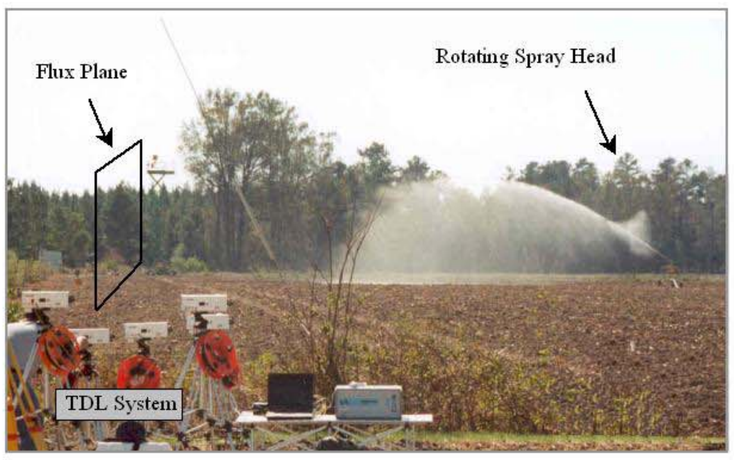
Multibeam TDL

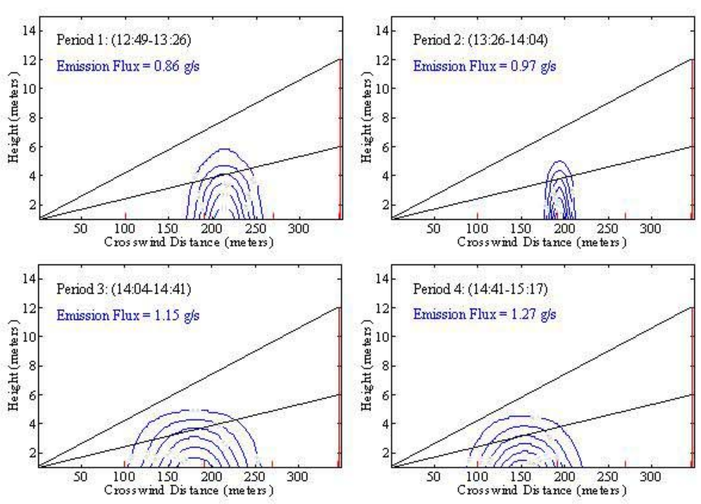
TDL Absorption



Application: *Ammonia Lagoon Spraying Operation*







Time Period	Emission Flux (g/s)	Wind Speed (m/s)	Wind Direction (Deg.)	Correlation Factor
1	0.86	4.64	45.5	0.979
2	0.97	4.40	47.2	0.983
3	1.15	4.08	46.8	0.989
4	1.27	4.34	35.3	0.990
Average	**1.06**	**4.37**	**43.72**	**0.985**
Standard Deviation	0.23	0.64	13.95	0.011

Detectable Species

Species	Detection Limit (ppbv) at 250 m, 1 sec
HF	0.25
HCl	4
HBr	100
HI	5
NH_3	10
H_2O	4
H_2S	40
CO	1000
CO_2	1000
O_2	4000
NO	200
NO_2	50
HCN	0.3
CH_4	4
C_2H_2	10
C_2H_4	10
C_2H_6	200
C_3H_8	200

Manufacturers

- Unisearch Associates Inc.
- Boreal Laser Inc.