An Integrated Chemical, Biological, Radiological Agent Monitoring Solution

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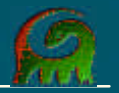


Outline

- Previous support
- The team
- Biological agent monitoring
- Biological agent analysis
- Radiological agent monitoring
- Chemical agent monitoring
- Summary and Questions

Previous Support

- Los Alamos National Laboratory
- U. S. Environmental Protection Agency
- DoD Environmental Security Technology Certification Program (ESTCP)
- U. S. Air Force Research Laboratory

The Team

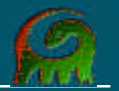
- ARCADIS
- R&P
- STL
- UNISEARCH
- ManTech

Biological Agent Monitoring

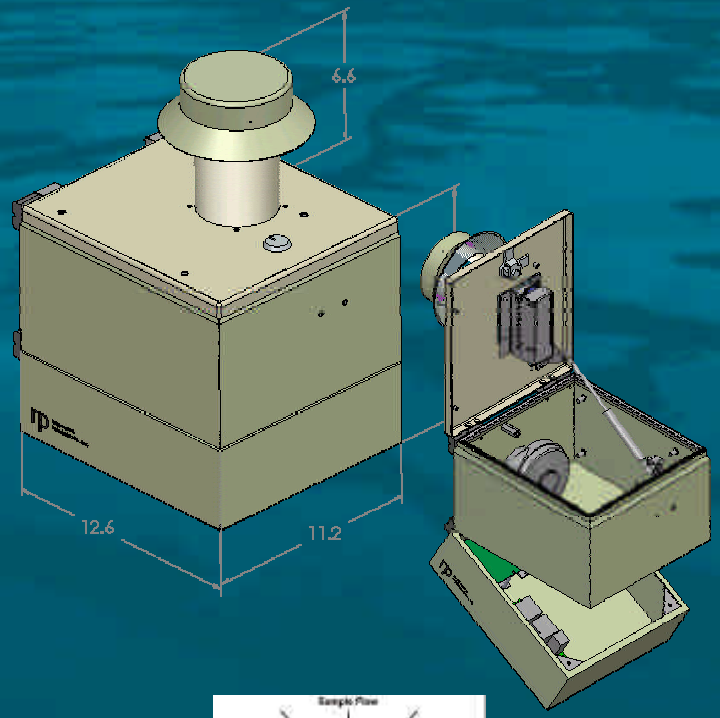
- R&P Instrumentation - Basis for Salt Lake City Winter Olympics Bio-aerosol Monitoring System
- Proven Existing Environmental Monitoring Technology Transferred to Meet New Requirement

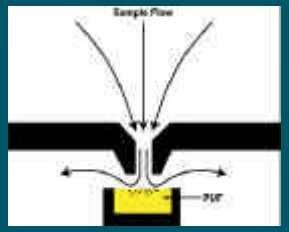
Bioaerosol Sampler Development

- Apply Lessons Learned
  - Indoor/Outdoor Applications
  - Small Size (Foot Cubed) – Low Noise
  - High Collection Efficiency/Flow Rate
  - Concentrated Sample – Inert Collection Substrate
  - Traceability
  - Flexible Communication
  - Simple Operation – Tamper Resistant
  - Flexible Power Sources
  - Real-time Radiological/Particulate Monitor



Concept to Hardware





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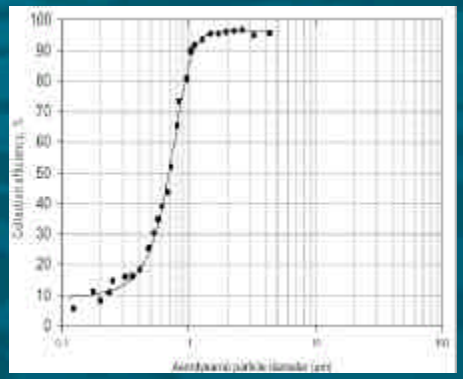
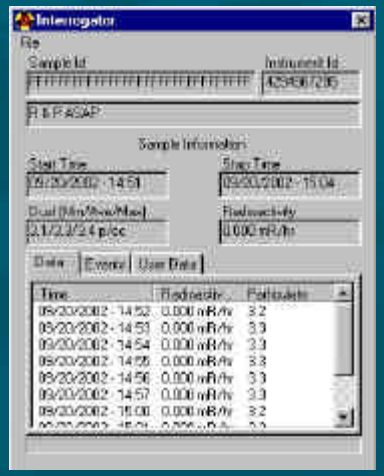
Bioaerosol Sampler Features

- Patented Airborne Sample Analysis Platform ASAP™ System
- Computerized Date-Time-Loc Stamp
- Low Noise/High Flow Rate (200 l/min)
- Remote Communications
- Operating Data and Sensor Data Automatically Recorded to One-Time Write Only Electronic Chip

Bioaerosol Sampler (concluded)

- iBASS (Integrated Bio Aerosol Smart Sample)
  - Polyurethane foam (PUF) collection media
  - Memory button (over-write protected)
  - Approximately 95% collection efficiency for particles between 1 and 10 microns
- Integrated Radiological Monitor
- Particle concentration sensor for aerosols more than 1 micron diameter





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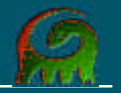
Bioaerosol Analysis

- PCR Using Idaho Technologies R.A.P.I.D. Analyzer
- Anthrax Genetic Material Successfully Retrieved and Detected from PUF Collection Substrate
- No False Positives
- Anthrax, Tularemia, Plague and Brucellosis Mixture Successfully Retrieved, Separated and Detected from PUF Substrate

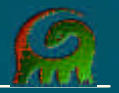


Laboratory Analysis

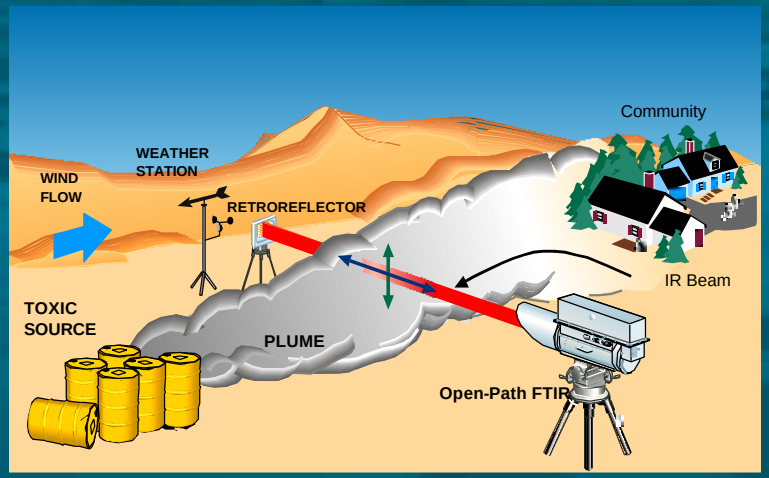
- SOPs for Analytical, Reporting and Sample Handling are Completed
- Analysis Time 1 – 2 Hours On-Site (24 to 48 Hours at Off-Site Lab)

Optical Remote Sensing (ORS) for Chemical Releases

- Spectroscopic Methods
  - Open Path Fourier Transform Infrared (OP-FTIR)
  - Differential Optical Absorption Spectroscopy (DOAS)
- Laser Based Techniques
  - Tunable Diode Laser Absorption Spectroscopy (TDLAS)
  - Differential Absorption Lidar (DIAL)



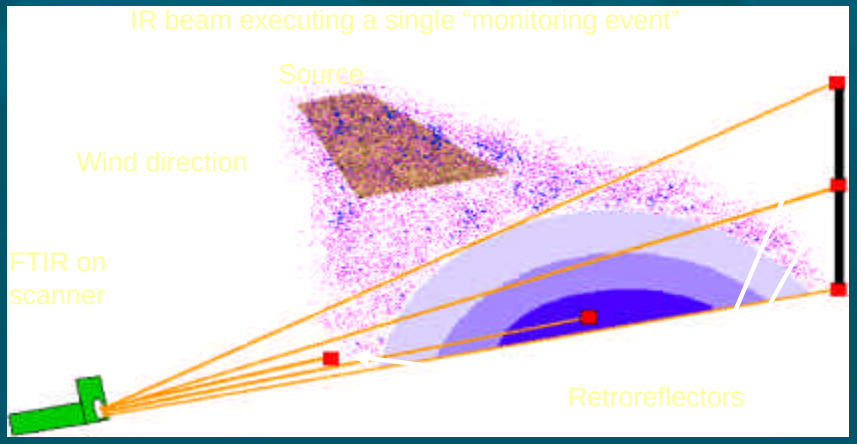
Chemical Monitoring



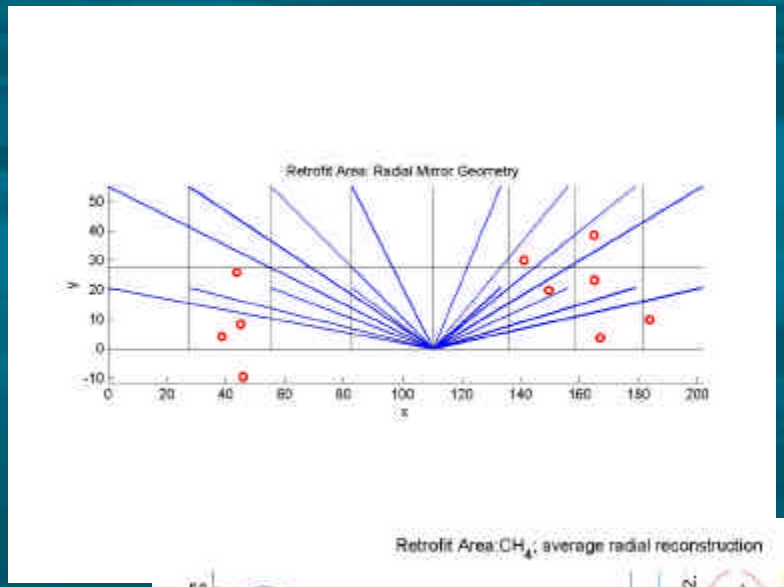
- Automatic, Real-Time
- Indoor/Outdoor Optical Remote Sensing (ORS) to 1 km Path Length
- Open Air and Emergency Response
- Broad Range of Chemicals
- Compact/Versatile Instrument Design
- On-Site or Remote Data Processing

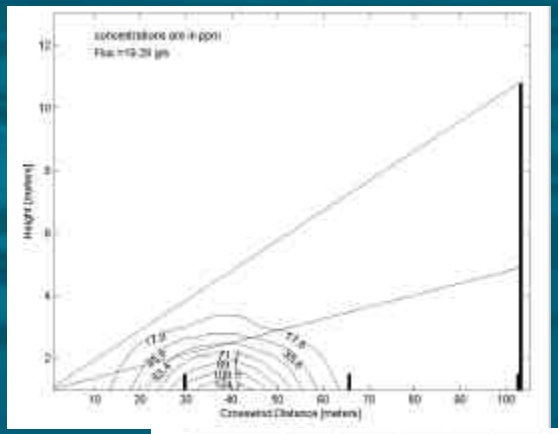
ORS Plume Imaging

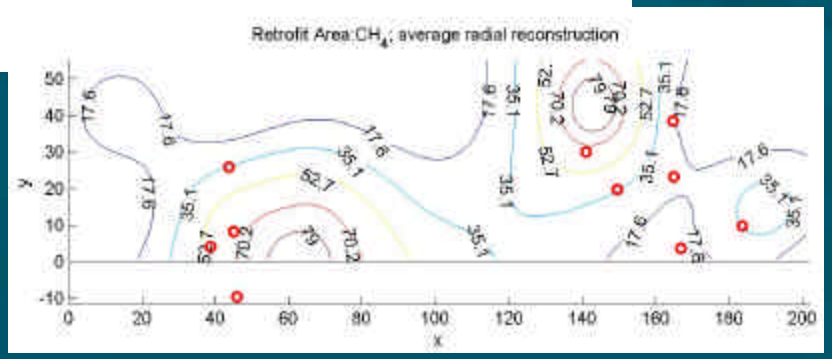
- Near Real-Time Spatial Resolution
- Multiple Beams to Determine Vertical and Horizontal Gradients
- Optimization Algorithms to Reconstruct the Mass Equivalent Plume
- No Need for Tracer Release or Inverse Dispersion Modeling
- Plane-integrated Concentration x Wind Speed = Emission Flux

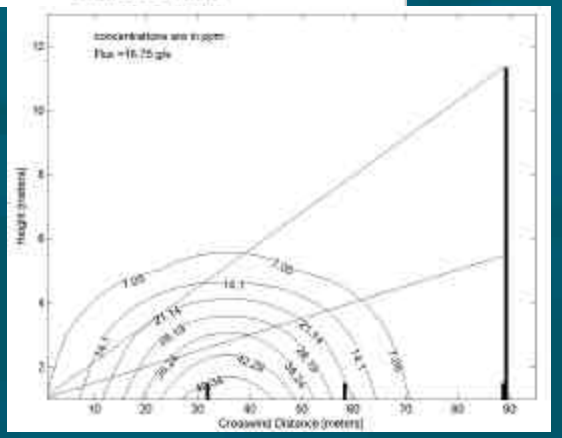


Landfill Methane Emissions









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Summary

- Demonstrated/Accepted Environmental Monitoring Techniques Adapted for Homeland Security Applications
- New Generation of Instrumentation Enhanced with Flexible Communication/Data Management Options
- Search for Real-Time Biological Sensor Continues
- Alternative FTIR Interferometers Being Evaluated
- Uniquely Experienced Team of Collaborators

ARCADIS UNISEARCH ASSOCIATES INC SEVERN TRENT STL MANTECH

Questions?

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