

Mobile Instrumentation for Analyzing Chemical Warfare Agents and Volatile Organic Compounds

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Identification of need

- Rapid characterization of unknown atmospheres – monitoring, sampling, ID of unknowns
- Decontamination assessment
 - When is the area safe for personnel to return?
 - how clean is necessary for various levels of personnel?

Handheld Monitors

Pros

- small
- fast
- inexpensive
- easy to operate

Cons

- one class of compounds at a time.
- Lack sensitivity
- Cannot track a plume

Current Allowable Exposure Levels, mg/m³

	GB	VX	HD
IDLH*	0.2 (34 ppb)	0.02 (3.4 ppb)	0.2 (34 ppb)
TWA**	0.0001 (17 ppt)	0.00001 (0.9 ppt)	0.003 (4.5 ppb)

*maximum concentration from which one could escape within 30 min. without a respirator with no escape-impairing symptoms or irreversible health effects

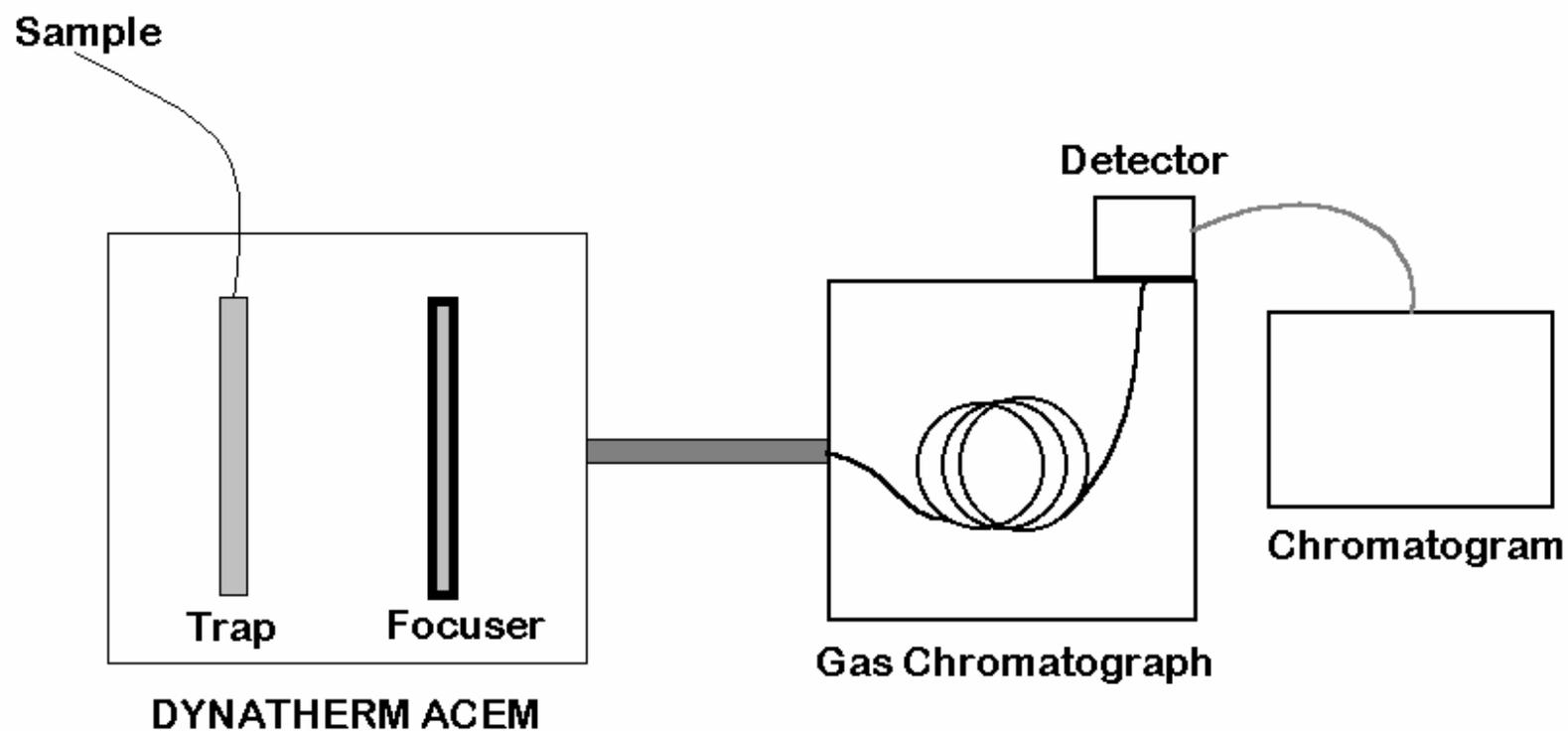
**the airborne concentration to which unprotected workers may be repeatedly exposed for 8 hr/day, 5 days/wik, for a working lifetime without adverse health effects.

Comparison of Sensitivity of Several Technologies used in Portable Hand Held Monitors

Technology	G Agents	VX	H
IMS Ion Mobility Spectroscopy	0.1 mg/m ³	0.04 mg/m ³	2 mg/m ³
SAW Surface Acoustic Wave	0.1 mg/m ³	0.04 mg/m ³	2 mg/m ³
Flame Spectrophotometer	5 ug/m ³		400 ug/m ³

response times range from 10 – 120 seconds

Configuration of the monitor



Sensitivity of Dynatherm Solid Sorbent Samplers with GC/Flame Photometric Detection

	GB	VX	HD
TWA mg/m ³	0.0001 (17 ppt)	0.00001 (0.9 ppt)	0.003 (4.5 ppb)
Response Time (min.)	4	5	4

Mobile Lab Configurations

- **RTAPs** – Real Time Analytical Platforms
- **Flyaways** – mobilized in Iraq, Olympic Games, international high security venues
- **Vans** – National Guard, US Marines CBIRF
- **Plate Mounted**, transportable

Operations at Spring Valley



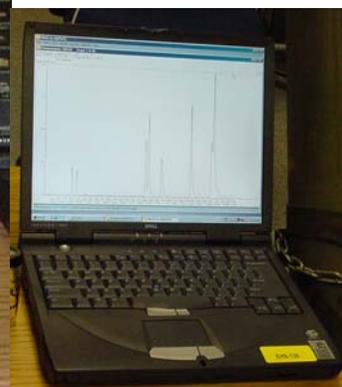
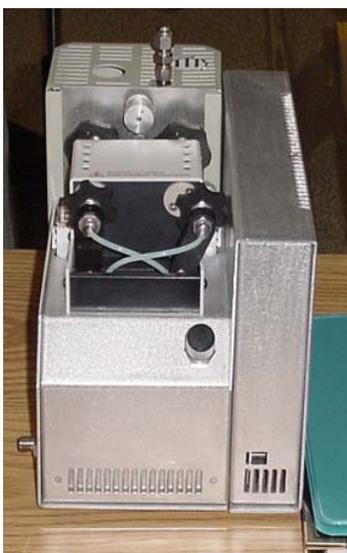
Exterior, Chem-Bio Mobile Van



Interior, Chem Bio Mobile Van



9300 Sampler and Hapsite Portable GC/MS

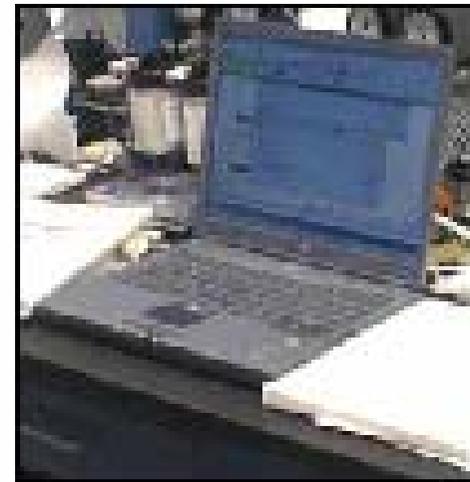


National Guard Civil Support Team Vans with Hapsite GC/MS



A/DAM

Agilent Dynatherm Agent Monitor



Research Laboratories

- US Army SBCCOM, Research and Technology Directorate
 - Toxicology Environmental Chambers
 - CB Filtration
- US ARMY Dugway Proving Ground
- ITT Research Institute, Southern Research Institute, Battelle

Defense Dept Clients

- **US Army SBCCOM**
 - Chemical Stockpile Depot Monitoring Activities
 - Forensic Analytical Laboratory
 - Technical Escort Unit
- **US Army PMCD**, Program Manager for Chemical Demilitarization
- **US Army 520th TAML**, Theater Army Medical Laboratory
- **US Marines CBIRF**, Chem Bio Incident Response Force

Projects Under Development

- Johns Hopkins University / Applied Research Laboratory
 - Dynatherm samplers + TOF MS
 - Project for US Postal Service and several classified clients
- US Marines CBIS
 - Chem Bio Individual Samplers
 - Proof of Concept completed

Resources

- Instrumentation: [CDS Analytical Inc. www.cdsanalytical.com](http://www.cdsanalytical.com)
 - [Agilent Technologies Inc. www.chem.agilent.com](http://www.chem.agilent.com)
 - [Inficon Inc. www.inficon.com/products/hapsite](http://www.inficon.com/products/hapsite)
- Mobile laboratories:
 - [ENG Mobile Systems, Inc. www.e-n-g.com](http://www.e-n-g.com)
- Training Programs
 - [EAI Corporation www.eaicorp.com](http://www.eaicorp.com)
 - [US Army ECBC CBARR](#)
 - Edgewood Chemical Biological Center, Chemical Biological Applications & Risk Reduction Business Unit
www.sbccom.army.mil