

# Handheld FT-IR Spectrometer for Chemical Agent Detection

Manning Applied Technology - Troy, ID



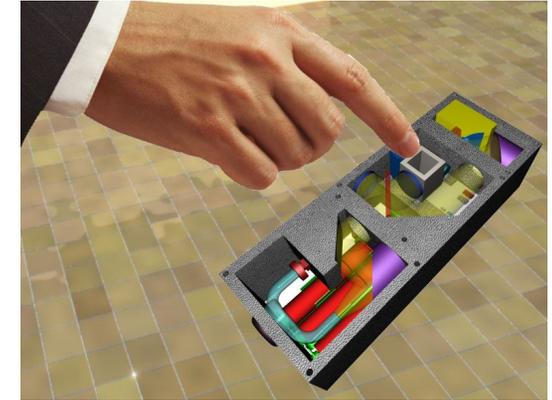
## Identification and Significance of Innovations:

### The innovations are:

- (1) Very compact, field-widened interferometer.
- (2) Photoacoustic detection with low-cost MEMS microphone.
- (3) Preconcentrator increases sensitivity 500x.
- (4) Digital signal processing (DSP).
- (5) Automatic and fixed optical alignment.

### The significance is:

- (1) Part-per-trillion sensitivity for chemical agents, explosive vapors and toxic organic vapors.
- (2) Widespread commercial application in portable and embedded measurements.
- (3) Unparalleled portability for in-situ applications.



## Technical Objectives:

- Small size and weight
- Low cost - \$1500 per unit
- Instrument durability
- Optimized power efficiency
- System characteristics
- Flexible, modular sampling interfaces

## Research Plan:

- Prototype design and construction
- Source module design, assembly and testing
- Modulator module design, assembly and testing
- Sampling module design, assembly and testing
- Detector module design, assembly and testing
- DSP module design considerations
- Power module design, assembly and testing

## DoD Applications:

Bioagent detection and identification  
Chemical agent detection and identification  
Personal desktop availability for engineers and scientists  
Embedded robotic capabilities

## Dual-use Applications:

Industrial safety and hygiene  
Rapid non-invasive inspection for improved quality control  
Field applications in biology, geology, and agriculture  
Conservative estimates of \$10 million per year market  
Cost-effectiveness insures capture of a significant market share.

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