

Microhound™

Motivation

Sandia National Laboratories has developed the MicroHound™, a fast, handheld system for the trace detection of explosives. This lightweight (about 12 pounds) system can detect both explosives vapor and particulate. The development of the MicroHound™ was a quest to combine, in a single platform, a miniaturized sampling and preconcentration system with multiple, highly sensitive chemical microsensors that can detect nanogram amounts of explosives. The long-term goals of the project are to reduce the size, weight, and cost of a portable trace explosives detection system and use a multi-sensor platform to improve functionality. The sampling and preconcentration technology used in the MicroHound™ was originally developed and patented by Sandia for a personnel explosives detection portal. Ultimately, commercial versions of the MicroHound will be produced at a comparatively low cost (about \$10K to \$12K per mass-produced unit vs. \$20K to \$30K for current commercial handheld systems).

Features

- Trace explosives detection for common high explosives—detects sub-fingerprint quantities of explosive residue
- Hand-portable
- Integrated sampling, preconcentration, and detection subsystems into a single system package
- Multi-microsensor capabilities
- Multi-stage preconcentration



Figure 1. Sandia National Laboratories MicroHound™.

Operation

The MicroHound™ can operate in two modes:

- Contactless vapor mode, which “sniffs” the air surrounding a suspicious item, or
- Swipe mode, which removes particulate from the surface of a suspicious item.

In vapor mode, the sampling unit draws in a large volume of air and collects heavy organic compounds from the air stream onto a filter. In swipe mode, the operator swipes a suspicious object’s surface and places the filter in a holder. For both modes, the system then vaporizes these compounds into a concentrated sample that is delivered to an ion mobility spectrometer (IMS) detector. If explosives are found, the unit displays an alarm to the operator.



Figure 2. The MicroHound™ detects explosive with high and low vapor pressures.

Applications

The MicroHound™ is designed for use by the responder community to examine suspicious packages or as a tool for screening at checkpoints. A low-cost, light, effective tool would enable its use in more areas, such as courtrooms and schools, as well as in high-security, high-risk facilities and locations.

Availability

The MicroHound™ is currently in the engineering prototype stage and is undergoing field evaluations and continuing development of advanced capabilities. Sandia will be exploring commercialization opportunities for this technology.

For additional information or questions, please email us at Microsystems_App@sandia.gov.