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Ultralight device analyzes gases immediately

Flying SnifferSTAR may aid civilians and US military

ALBUQUERQUE, N.M. — A half-ounce ‘sniffer’ intended to ride on small aerial drones to detect possible gas attacks on cities and military bases has been created by researchers at Sandia National Laboratories in partnership with Lockheed Martin Corporation.

The patented device, which detects nerve gases and blister agents, operates on only half a watt of electrical power, says Sandia researcher Doug Adkins. While other gas monitors exist, “this is small, lightweight, low power, and offers rapid analysis,” says Adkins. “Rapid analysis currently is not possible with any other package near this size.”

Immediate analysis is critical in warning an endangered population of an attack or in surveying sites after alleged incidents.

Discussions are underway with a US company that produces drone aircraft to include the device among sensors designed to detect biological and radiological threats.

The device also has possibilities for use in or near the ventilation systems of buildings, or, with addition of a small pump, on posts surrounding military bases.

How it works

Called SnifferSTAR, the invention consists of a series of tiny sensors on a platform about the size of a pat of butter, atop a microprocessor board smaller than a credit card. The forward motion of the vehicle forces air through the device.

Material in the sampled air is absorbed and concentrated. It is then thermally released (desorbed) to pass over thin stripes of coating materials, to which it temporarily sticks.

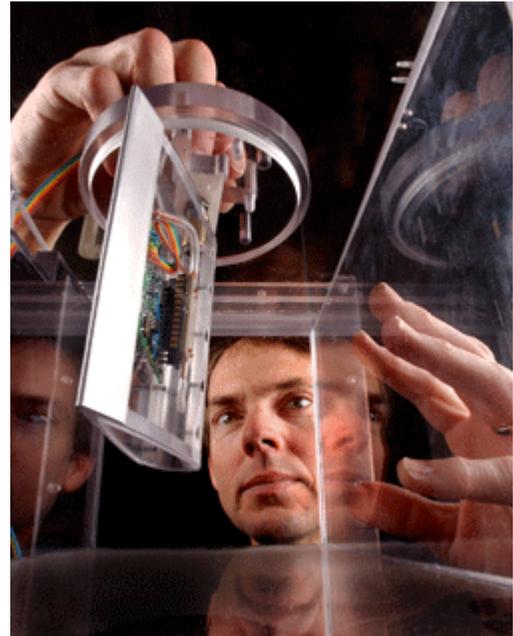
The coating stripes are located on a quartz surface that vibrates at pre-set frequencies when minute amounts of electricity pass through it. The mass of incoming stuck particles changes the frequencies of the vibrations of each stripe.

The altered frequency data are passed to a processing unit on the SnifferStar module. The data are then relayed to a processor on the drone or radio-linked to a main data processor on the ground. The information is automatically compared against a library of the patterns created by a range of gases.

“We have very few false positives,” says Doug. “The device ignores most common interferences.”

The sampling process is repeated every 20 seconds, with 15 seconds intake and five seconds for analysis. The inrush of air then clears the device sensors for the next reading.

Research on the device was funded by Lockheed Martin’s Shared Vision Program.



TELL ME WHAT YOU KNOW — Sandia researcher Doug Adkins observes the wind tunnel performance of SnifferSTAR, a device intended to fly on drones and immediately detect airborne blister agents and nerve gases. (Photo by Randy Montoya)