

Chemical Agent Detection and Identification System

2002 R&D 100 Award Winner Inexpensive, self-contained, “pocket pager-sized” system instantly identifies airborne chemicals

APPLICATIONS

- “Wearable” sensors and alarms for first responders and other personnel
- Stationary detection networks for wide-area indoor/outdoor monitoring
- Detecting chemical releases and leaks in urban, industrial, transportation, agricultural, and other environments
- Self-contained chemical sensing component for integration into other devices
- Automotive and industrial emissions testing

BENEFITS

- User-configurable for a wide range of applications
- Small, self-contained system easily integrates into existing devices
- Onboard signal processing for near-real-time instant identification and alert
- Manufacturing costs of about \$10 U.S. enables large-scale usage
- Wireless modem option allows remote updates to software

An “electronic nose” developed by Argonne National Laboratory is a unique, self-contained, intelligent chemical sensing system with a wide range of detection and identification applications. Argonne’s system is versatile, low-cost, and interoperable with most electronics, which

The Smart Sensor Developer Kit consists of a dime-sized sensing element and onboard signal processing, and analysis capabilities in a system smaller than a pocket pager.



allows instrument developers to easily incorporate its high-end chemical sensing capabilities into their own devices. These rugged ceramic-metallic sensors detect airborne chemicals even at low parts-per-million levels by employing neural processing and nanoparticle thin-films to generate unique signatures for each chemical.

The technology has been successfully demonstrated in many applications, including monitoring vehicle emissions and troop exposures for the U.S. government, “intelligent” fire detection and toxic chemical identification for the U.S. Navy, and metabolic and industrial gas monitoring for industry.

Argonne’s measurement and analysis software can be used with common single-chip microcontrollers, such as the ones used in low-end wireless pagers and smoke detectors. The system is comprised of two

LINKS TO ONLINE INFORMATION

http://www.anl.gov/techtransfer/docs/Smart_Sensor.doc

http://www.anl.gov/techtransfer/pdf/Smart_Sensor_Developer_Kit.pdf

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separate components, a dime-sized *sensing element* and the *measurement/analysis software* – either or both can be easily incorporated into existing analytical devices.

Capabilities:

- In Countering Terrorism, can detect chemical signature and identify hazard in public areas.
- As a Universal Gas Detection device, can detect chemicals and identify it from a prohibited chemical family.
- For Intelligent Fire Detection, can identify signature, location and type of fire.
- To promote Industrial Safety, can identify chemical signature and the type of system leak.
- For Environmental Monitoring, can monitor a well for a toxic chemical signature.
- As a Pest Control, can identify vapor signature and locate hidden termite colony.

ABOUT ARGONNE TECHNOLOGY TRANSFER

Argonne National Laboratory is committed to developing and transferring new technologies that meet industry's goals of improving energy efficiency, reducing wastes and pollution, lowering production costs, and improving productivity. Argonne's industrial research program, comprised of leading-edge materials research, cost-saving modeling, and unique testing and analysis facilities, is providing solutions to the challenges that face U.S. manufacturing and processing industries.

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