

Jet-Actuated Sensors for Sensitive and Faster Gas Detection (#3584)

A synthetic jet actuator capable of increasing the flow and mixing of samples at the surface of a chemical gas sensor

Georgia Tech inventors have created a synthetic jet actuator capable of increasing the flow and mixing of samples at the surface of a chemical gas sensor. The jet action helps to overcome the diffusion-limited mass transfer that often occurs in chemical gas sensors, resulting in a faster response time and increased sensitivity by the sensor. The novel system is non-intrusive and can enable gas or liquid sampling of flowing and static samples. Diaphragm pumps have been used to attempt to achieve these benefits offered by this invention, but they require more moving parts and are not as conducive to miniaturization as this novel system. Furthermore, this invention enables the user to flush and clean the sensor for calibration purposes. Finally, this system can be integrated with filtrations systems to allow sampling of the environment upstream and downstream of the filter, which enables monitoring and assessment of filter function.

Benefits/Advantages

- **Sensitive** — results in faster electronic sniffing
- **Versatile** — capable of sampling gases and liquids that are static or flowing
- **Advanced system** — enables cleaning and calibration of the sensor
- **Smaller sized system** — eliminates the need for diaphragm pumps
- **Monitoring** — monitor the function of filters

Potential Commercial Applications

- Monitoring HVAC systems
- Smoke and/or carbon monoxide detector in enclosed spaces
- Monitor gases and/or fluids in medical applications
- Water treatment systems
- Quality control for the manufacturing, treatment, or use of the fluids

Background/Context for This Invention

Favorable fluid dynamics are essential for successful electronic sniffing using a chemical gas sensor. To enable rapid detection with this type of sensor, a sample of gas or fluid must be presented to the sensing mechanism in a timely fashion at a concentration above the sensor's limit of detection. Some fluidic sensors are limited because of reliance upon diffusion for movement and presentation of the sample to the

sensor. It has been shown that simple agitation of the ambient gas proximal to the sensor can increase the flow of sample material and the response time for this kind of sensing system.

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More Information

U.S. Patent Issued - [8336402](#)

Publications

For more information about this technology, please visit:

<https://licensing.research.gatech.edu/technology/jet-actuated-sensors-sensitive-and-faster-gas-detection>

Images:

The automated sequential delivery of multiple fluids. A varying number of delay gates imprinted in the branches are shown in the figure.

COVID-19 and flu saliva test on paper: (A) The automatic sequential delivery of multiple reagents required for virus test; (B) Water pouring into the device triggers the virus assay, allowing the presence of SARS-CoV-2 and influenza A & B viruses to be visually identified by the color changes in the corresponding detection spot

