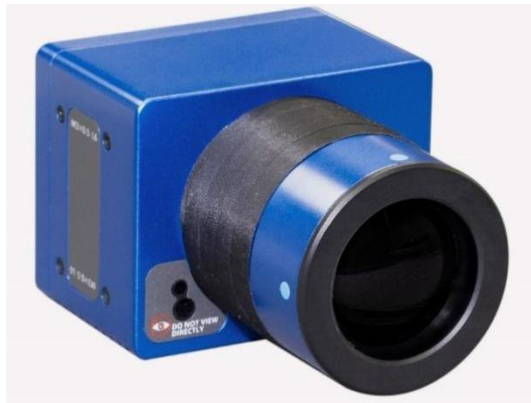


May 14, 2024  
JFE Steel Corporation  
Tokyo Gas Engineering Solutions Corporation  
Gastar Co., Ltd.

**JFE Steel, TGES and Gastar Develop Portable Carbon-monoxide Detector using Infrared Laser**  
Remote detection capability expected to improve safety and efficiency

JFE Steel Corporation, Tokyo Gas Engineering Solutions Corporation (TGES), and Gastar Co., Ltd. have jointly developed what is believed to be the world's first portable high-sensitivity remote gas detector for the instant detection of 100ppm-m carbon monoxide from a distance of up to 16 meters. The feasibility of mass-producing the device will now be studied with the goal of launching a commercial product by 2025.



Carbon monoxide detection laser

The new gas detection device, which uses a technology based on the infrared-absorption phenomenon, is currently being used by TGES in non-contact reflection-type methane detectors, which were developed in 2001 to detect city gas leaks and are now deployed in some 30 countries. The detector emits a beam of infrared light and then measures the intensity of the reflected light in a specific wavelength, with lower intensity indicating greater light absorption and therefore a higher presence of the target gas. The emitter and receiver face the same direction, so that emitted laser light is reflected diffusely off of walls and other surfaces and then returns to the receiver. The technology enables extremely high selectivity because the absorption wavelengths vary depending on the type of gas.

The new device is the world's first open-path system to use the 2.3 $\mu$ m band, which is ideal for carbon monoxide detection, enabling highly sensitive detection at distances up to 16 meters. The envisioned commercial detector is expected to improve safety and reduce the cost and time required to inspect various facilities.

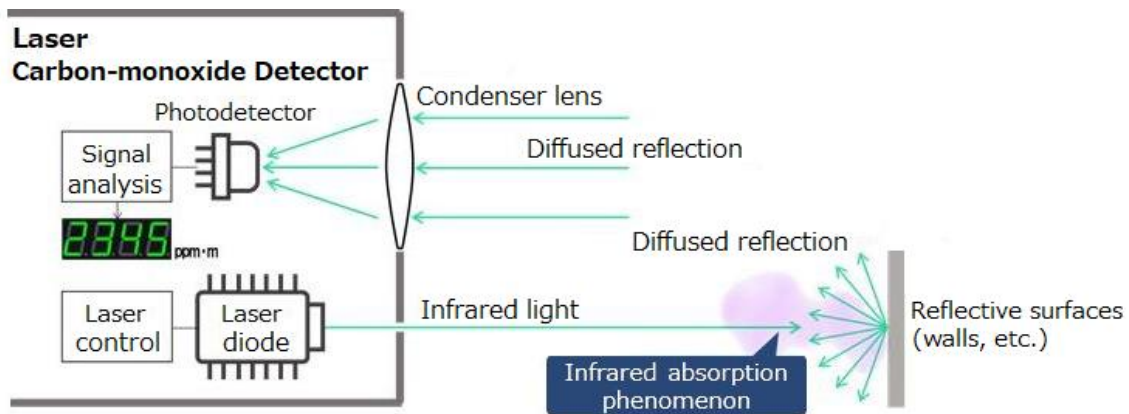
JFE Steel's will first test the current detector at its facilities to assess its field readiness, modification needs and ultimately its potential for installation in drones and mobile robots.

Roles of each company

JFE Steel	TGES	Gastar
<ul style="list-style-type: none"> <li>• Determine business needs</li> <li>• Testing &amp; evaluation</li> </ul>	<ul style="list-style-type: none"> <li>• Develop test-model specs</li> <li>• Coordinate development</li> </ul>	<ul style="list-style-type: none"> <li>• Produce test model</li> <li>• Test performance</li> </ul>

At steelworks, the use of certain types of gases requires the daily inspection of vast amounts of piping, even in difficult locations. Pipes carrying carbon monoxide must be inspected visually for corrosion and cracks, and also for leaks using pump-suction gas detectors attached to the end of a rod. The difficulty of performing such inspections efficiently has created a long-standing need for an accurate yet easy-to-use inspection method.

New Detection Laser System



Conventional vs. new detection system



Conventional inspection



Handheld laser detector



Drone-mounted laser detector