The National Aeronautics and Space Administration (NASA) seeks partners interested in the commercial application of an Infrared Camera System for Visualization of IR-Absorbing Gas Leaks. Visualization of leaking gaseous commodities is important for the success of the space program. The loss of the commodity not only is wasteful, but likely causes a significant safety risk, whether the gas is flammable or asphyxiating. Many gases used around the launch pads at Kennedy Space Center are not invisible. However, aside from monatomic and diatomic gases, most gases have significant, unique, absorption bands in the infrared (IR) spectrum. The invention is a method for using an infrared camera to accurately visualize gas leaks and and combines hardware additions to an IR camera and software signal processing algorithms. NASA scientists using uncooled IR cameras have developed methods that show improved sensitivity and contrast of IR-absorbing gases in the field, where detection of gas leaks is critical.

BENEFITS

- Offers real-time leak detection
- Displays increased sensitivity and contrast of IR-absorbing gases
- Uses small, uncooled, inexpensive IR cameras
- Has potential for real-time visualization of leaks
- Uses inexpensive components
Technology Details

The objective of the present invention is to enable the sensitive detection and visualization of IR-absorbing gases in the field for leak detection and location. One of the key challenges is that rapid variations in the IR radiation from changes in temperature, absorption by normally present gases (such as water vapor), and other sources of radiation (reflection of Sun, lamps, fires, etc.) can grossly interfere with the visualization of the IR absorption in the presence of a specific IR-absorbing gas leak. Attempts to use standard IR cameras, even with filters that limit the wavelengths of radiation observed, have failed to detect even substantial leaks of gases in the field. The key concept of this invention is to subtract or cancel out variations in the background radiation to allow the IR absorption of the gas leak to stand out from the background. A gas filter uses the gas of interest to absorb all of the signal from the field leak. This concept is adapted from early nondispersive IR (NDIR) spectrometers and is used to enhance leak visualization instead of gas concentrations in a gas cell. Just as NDIR spectrometers have migrated to thin-film IR filter systems, it is possible to do the same here with IR filters. Signal processing with and without a suitable filter to cancel out field variations in IR radiation was used to enhance the performance of the invention.

Partnership Opportunities

NASA has acquired copyrights to the Infrared Camera System for Visualization of IR-Absorbing Gas Leaks and is seeking partners to commercialize the technology. All NASA licenses are individually negotiated with the prospective licensee, and each license contains terms concerning commercialization (practical application), license duration, royalties, and periodic reporting. NASA licenses may be exclusive, partially exclusive, or nonexclusive. If your company is interested in the new Infrared Camera System for Visualization of IR-Absorbing Gas Leaks, or if you desire additional information, please reference Case Number KSC-13207 and contact:

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APPLICATIONS

- Industries storing, transporting, or dispensing gaseous or vapor-forming liquid commodities that absorb in the infrared
- Methane detectors for locating natural gas leaks on gas pipelines and processing plants
- Fugitive emissions in oil refineries and other chemical processing plants
- Air-conditioning companies
- Automotive industry: freon leak detection in automobile air conditioning
- Liquid-propane production plants/distribution
- Chemical plants

TECHNOLOGY STATUS

☐ Patent pending
☐ U.S. patent
☑ Copyrighted
☑ Available to license
☐ Available for no-cost transfer
☐ Seeking industry partner for further codevelopment