Terahertz-Wave Applications

-Pioneering undeveloped electromagnetic waves- 2. Application to security and safety

Motivation

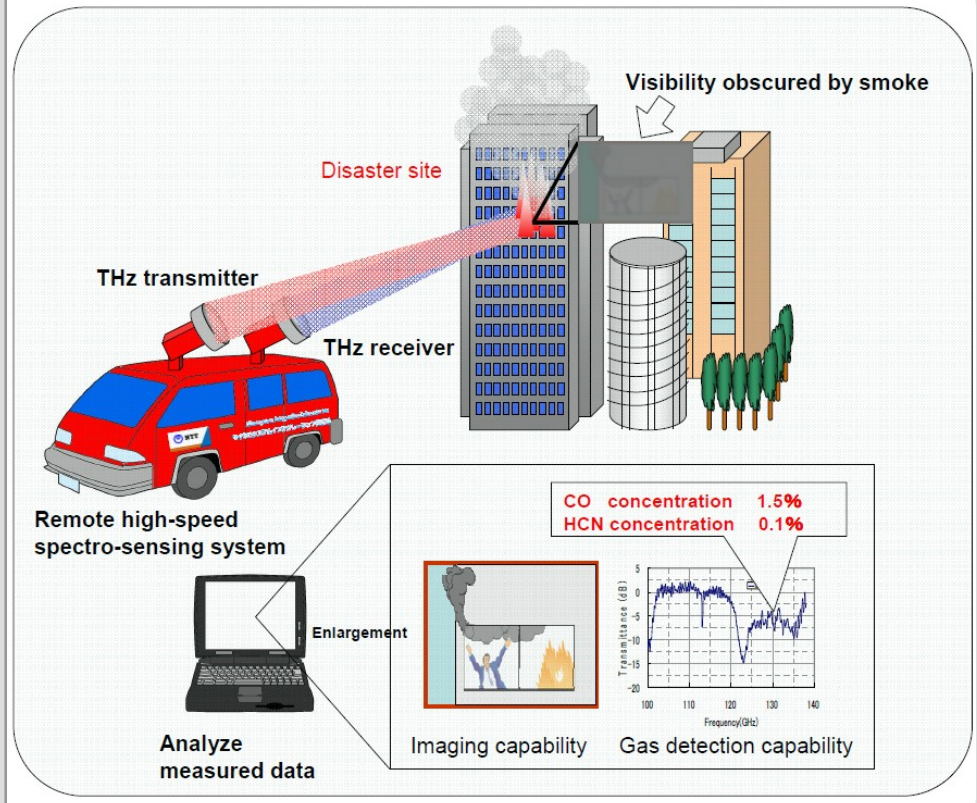
Terahertz (THz) waves occupy the region between light waves and millimeter waves, and share some of the useful properties of both, namely the high spatial resolution of light waves and the ability of millimeter waves to penetrate a wide variety of non-metallic materials. Many molecules also have characteristic absorption lines that can be used for material identification.

Originality

Our goal is to develop technologies for generating, modulating, transmitting, and detecting THz waves. So far, the electromagnetic waves in this region have been little exploited, and no powerful terahertz signal generators or sensitive detectors have been developed. By exploiting advances in ultra-fast optoelectronic technology, we have made great progress in developing a compact portable THz wave generator / detector.

Impact

A compact portable THz wave generator / detector offers us a way of detecting things that are hidden from direct observation. For example, this capability might be used at disaster sites to determine if victims are present, to verify the state and extent of the disaster, and to detect from a remote distance whether toxic gas is present.



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