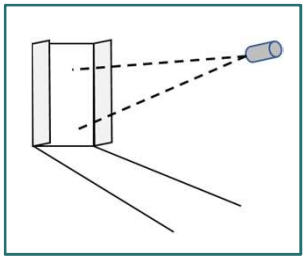
Centre for Applied Photonics

THz detection of explosives

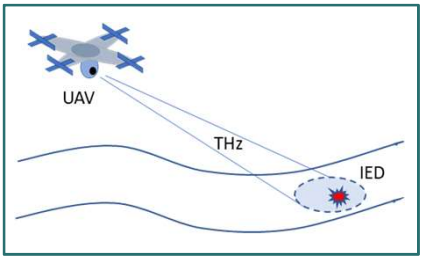
- Technology for stand-off detection of explosives and IEDs

Security



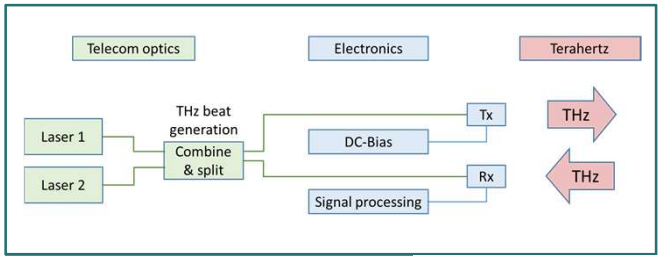
That THz spectroscopy can be used to detect and identify explosives has been known for some time now, but no commercial solutions are yet available...

Defence



Increasing the distance where explosive devices can be detected is the key challenge to address to be able to do stand-off detection of explosives at safe distances using terahertz (THz) radiation, which is one of our focus areas.

System-level design of THz solutions



One of our other related focus areas is system-level design of more complex continuous-wave THz systems using commercially available parts and devices to increase power and sensitivity.

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Value Proposition/USP

Terahertz radiation is non-ionizing and harmless to humans at low intensities, just like infrared light, but with higher frequencies (i.e. longer wavelengths). At the same time, common wrapping-materials like textiles, leather or plastics are semi-transparent in the THz frequency range. This makes THz technology useful for security screening at critical infrastructure like e.g. airports or metro stations. If the stand-off distance could be increased to safe distances, THz spectroscopy could potentially be used for detection of improvised explosive devices (IEDs) like those in heavy use in conflict-areas by e.g. Taliban or Islamic State. If made without metal, IEDs can be hard to detect at safe distances using conventional means.

Business Opportunity/Objective/Commercial Perspectives

We are developing a THz-based system for detection of explosives at safe distances. Our main focus is detection of IEDs, but the same technology could be implemented for e.g. security screening for explosives at civilian airports. What is the value of safety and lives saved? Most would agree that is high, but hard to put a number on! We develop technology to assist those that try to keep us safe…

Technology Description/Technology Summary

Our system is based on spectroscopic identification of explosives using continuous-wave terahertz spectroscopy. The key challenge to overcome to realize this is to increase the stand-off distance, while still maintaining a high enough signal-to-noise ration to be able to reliably detect and identify explosives. We try to address this by system-level design using commercially available components.

Development Phase/Current State

Our technology is currently at TRL 3, i.e. we have experimental proof-of-concept and have validated that we can detect and identify explosives using THz spectroscopy. We will spend the rest of 2019 and most of 2020 on boosting the stand-off distance from 5-10 meters to tens of meters. During 2021 we expect to be able to experimentally validate that we can reliably detect and identify explosives at tens of meters stand-off distance. After that we will need investors, partners or further funding to commercialize the technology and possible to develop a more compact system based on integrated hybrid electronic/photonic THz technology.

Key participants

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Seeking

- Funding/Investors
- Partner/Research Collaboration