

Sensitive bomb detector to rove in search of danger

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Credit: AI-generated image ([disclaimer](#))

European researchers have developed and tested a light-weight device capable of detecting extremely minute quantities of explosives from up to 20 metres away, providing an invaluable law-enforcement tool in the fight against bomb attacks.

The EU-funded OPTIX ('Optical Technologies for the Identification of Explosives') team uses advanced [optical technologies](#) that can be mounted on a compact remote vehicle and then used to detect quantities of less than 1 mg of explosives. According to reports, no other research organisation or company has achieved this degree of sensitivity.

Society needs to be safe to thrive. Terrorism - as painfully highlighted by the tragic events in Madrid (2004), London (2005) and Boston (2013) - is a real threat to Europe and the world. Attacks using Improvised [Explosive Devices](#) (IEDs) appear in the news every other day - more than 60 % of terrorist attacks are carried out by the use of such explosive devices.

'Security forces demand [new tools](#) to fight against this threat,' notes the team on their website, 'and very specifically tools capable of detecting explosives at stand-off distances.'

Detecting traces of explosives at a distance of up to 20 metres can help to boost security across a wide range of scenarios, suggests Alberto Calvo, Security Director at Indra in Spain, which led the project. 'Not only would security be enhanced, but the inconvenience for citizens would be reduced significantly through the use of a non-invasive and non-hazardous explosive detection system,' he believes.

Thanks to lasers that can precisely identify the atomic and molecular structure of explosives, the OPTIX device can rapidly and remotely scan all objects in its [field of vision](#), such as a vehicle, piece of luggage or any opaque container, and pick up trace residue. It is virtually impossible to handle explosives and transport them without leaving a trace: residue sticks to the surface of the objects that transport them, as well as the hands of the people who handle them and whatever they touch.

To make the system portable, the team plans to integrate it into a

wheeled platform, which could eventually resemble a bulked-up Mars Rover. As demonstrated in a video of the prototype, this platform will move along a car park or a street, for example, scanning surfaces for traces of explosives. A law-enforcement officer will control the roving vehicle remotely and monitor the data collected from the optic sensors in real time.

The OPTIX consortium, which received EUR 2.4 million in EU-funding, is one of many security projects backed by the European Commission to improve the safety and quality of life of European citizens. By the end of 2013, EU funding programmes will have financed more than 250 security research projects with more than 1,500 participants from 45 countries. Funding for security research will continue to be supported under the EU's forthcoming multi-themed, multi-annual research programme Horizon 2020 (2014-2020).

In addition to the lead partner Indra, the project involved a balanced set of industrial, technology and academic partners, including: the Swedish Defence Research Agency; SMEs Ekspla (LT) and Avantes (NL); technical universities Clausthal and Dortmund (DE), and Vienna (AT), and the University of Málaga (ES); as well as the Guardia Civil's TEDAX unit (Spanish Police, Explosives Disposal Unit, Valdemoro, Madrid) as a first-level user and institutional partner.

The security industry has one of the highest potentials for growth and employment in the EU, according to the European Commission. Already in 2011, the security sector employed some 180,000 people, with an annual turnover of EUR 30 billion. Advances such as those by OPTIX place Europe in an even stronger position.

The OPTIX prototype has already been successfully tested in laboratory and outdoor environments, simulating real-life situations and in various weather conditions. The team plans to increase the sensitivity, precision

and robustness of the system before making it available to European police and [security](#) forces. Commercialisation of the system is also a very real option, according to the OPTIX team, with multiple applications being considered, including the field of forensic investigations.

More information: OPTIX www.fp7-optix.eu/
OPTIX animated demonstration vimeo.com/48946352

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