

STYX: STAND-OFF DETECTION OF HYBRID THREATS CONTAINING EXPLOSIVES

The project STYX aims at developing and test systems for detecting and identifying explosive threats, such as Improvised Explosive Devices (IEDs), fast and from a stand-off distance. Recently, an increased awareness of threats from "grey zone" hybrid warfare has emerged, these threats include the use of IEDs by military or para-military/adversary networks, which can both reside and operate cross border. Such IED threats are a significant challenge for Member States Armed Forces and will be a cause of hazard for civilians. They also have the potential to severely disrupt both military and civilian logistic support, damage critical infrastructures (e.g. military bases, government buildings, air bases/airports, harbours, power plants, chemical industry, oil/fuel depots, ...) and affect strategic lines of communication (e.g. bridges, roads, railways, ferries, ...). In this way, these "grey zone" hybrid threats will be more complex than route clearance threats that Armed Forces have encountered in previous military operations (e.g. Afghanistan or Iraq). Key capabilities, to ensure an enhanced Force Protection, require fast, accurate and safe techniques to detect, identify and defeat/neutralize explosive threat devices. Therefore, the aim of the project is to identify new sensors for fast stand-off detection of existing and new types of explosives embedded in IEDs and other explosive threats. Such sensors should be able not only to detect the explosive but also to identify it, in order to minimize false positive alarms. Stand-off sensors for both trace and bulk explosives will be considered.

Objectives

The key point of this project is to develop and test sensors for stand-off detection of explosives, and to develop scenarios and test procedures relevant for explosives within a hybrid threat.

The sensors which are being developed within the project are stand-off detection systems, which are able to detect and identify existing and new types of explosives on-site. This means that sensors should be chemically specific (i.e. measuring a spectral property of the explosive) which will ensure higher detection probability and less false positive alarms. The specific scenarios that will be addressed during the project will stipulate the required speed, accuracy and stand-off distance.

Following a scenarios definition, a state-of-the-art survey will be performed to achieve a common understanding of the existing technological gaps to be addressed in the project and beyond. Accordingly, the most promising technologies will be identified and be further investigated and developed. The new detection technologies included in STYX could be Raman, SWIR/SORS or SERS sensors, Radar, MIRS, THz, and NQR.

One of the key goals of STYX is to define and perform realistic testing and evaluation of the systems, using the operational and performance requirements derived from the identified hybrid warfare scenarios. Through the test procedures, testing and evaluation it will be possible to evaluate the technical performance of explosives detection devices in an objective and standardised manner, and it will provide reliable information on equipment performance against adopted technical standards. It will also provide general guidelines for the design and implementation of a test protocol to apply with stand-off sensors during laboratory tests and field trials.

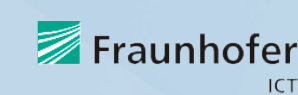
The sensors will be applied to specified hybrid warfare scenarios, which address at least the following threats:

- Autonomous platforms with explosive payload (Air, ground and naval/maritime)
- Vehicle or person borne explosive devices
- Left behind explosive devices

Participating Members



Consortia/Organization



Work Strands

The project is planned to start after the summer 2021, and is going to be running during 2021-2025.

The work on sensor systems and evaluation material will build on previous work by the respective partner, but new challenges with respect to sensitivity, technology, scenarios etc. will be addressed within the project.

Way Ahead

The STYX project will be a starting point for research and development of novel stand-off detection sensors for explosives applied to hybrid warfare scenarios, aiming to reach TRL 5-6. It will strengthen the European knowledge base for future advanced stand-off detection equipment, materials and their applications.

At the end of the project, both technological system development as well as the work done in testing and evaluation, will contribute to the long term goal of increasing the overall capability to tackle explosives used in hybrid warfare.

Link to TBBs, other CapTechs, and other links

There are possible future links to the Cat B Programme – IED Detection Programme, and in particular the Cat B Project – International contribution to Smart Future Counter IED Field Lab (SF C-IED FL)

The project TBB17A01 belongs to OSRA TBB17 – IED Detection and Defeat Technologies.

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