## Context

All the samples collected on Belgian territory related to energetic materials are sent to FLAX for identification (and quantification id needed). Although analytical tools are present for identification of the most common military, civilian and homemade explosives, it remains sometimes difficult to identify all the compounds in the mixtures, certainly in trace samples. Specifically, the presence of metals such as aluminum is sometimes hard to detect. Aluminum can be present in flash powders which are often used as cheap charges in Improvised Explosive Devices (IED). In this study, we address the need for a passive, stand-off (contactless), automated detection technique based on spectroradiometry for the detection of explosives (bulk and traces).

## Objective

- Create high resolution annotated spatio-spectral-temporal data sets of energetic materials (bulk, mixtures and traces), under different parameter settings.
- Apply different target-detection/classification algorithms (both canonical and Machine Learning based) on these data.
- Analyze the performance of these algorithms through ROC curves and Precision-Recall Curves.
- Create a road-map towards the novel use of HSI as a passive, stand-off, real time, wide area detection technique for explosives.

# DFR DAP/25-13: SpectrEx

Land-mine, trace explosives, infrared

## Methodology

Through real observations and analysis of the performance of detection algorithms, develop a large database of HSI measurements that allows the identification and/or development of the best detection algorithms for a wide variety of explosives (both bulk and trace)

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