DEFRA NGCAT: TWS

Threat Warning Sensor

Context

Currently automatic threat warning sensors have high SWaP-C and are burdened with a large amount of false alerts, severely impacting operational reliability. Recent advances in instrumental and computational technology have opened the way to the development a high-accuracy generic real-time threat warning system, possibly for airborne mounting. High performance hyperspectral sensors and state-of-the-art machine learning algorithms will be used develop such a sensor system with lowest SWaP-C and highest accuracy attainable.

Objective

- Investigate performance of combined MWIR and LWIR imaging spectroscopy sensors to detect and categorize spectral signatures,
- Compare traditional vs. AI driven sensor processing algorithms
- Build spectral imaging signature library structure and populate it with at least 25 sources of exhaust energy
- Define the MWIR/LWIR imaging spectroscopy LRU (SWaP-C) that can be ported to an airborne platform
- Determine spill-over use cases, not in the least in the dual-use domain

Methodology

Team TWS will interleave a series of test and measuring campaigns (populating a Spectroscopic Imaging library of spectral signatures) with software development iterations. In parallel, the progressive insights in the test results will lead to the identification of the minimal spectral bands to obtain a pre-defined PoD threshold for a set of airborne TWS target classes. As such the airborne TWS LRU definition can take shape.

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