

Security Technology Research Innovation Grants Programme (S-TRIG) 2020-21

Cohort Brochure

The Future Aviation Security Solutions (FASS) Programme (jointly run by the Department for Transport and the Home Office) is delighted to be supporting 18 research and feasibility projects through the 2020/21 S-TRIG Programme, which has been developed to tackle some of the future challenges that could arise within national security in the UK.

This funding will form a steppingstone towards the further development of innovative concepts and provide a strong basis for additional funding opportunities through other government innovation initiatives. It will also provide an evidence base which could be used when seeking industry or private venture capitalist funding.

The organisations listed in this brochure are conducting highly innovative 3-month research projects, exploring the feasibility of new technology within the following sectors:

- Aviation security
- Border detection and security
- Detection of contraband entering prisons
- Protection of infrastructure and crowded places
- Counter-drones



www.camor.co.uk



www.cranfield.ac.uk/Themes/Aerospace



www.createc.co.uk



www.dur.ac.uk



www.dynamical.com



www.haloxray.com



www.iconal.com



www.metrasens.com



www.rinicom.com



www.overview.co.uk



www.strath.ac.uk/research/subjects/mechanicalaerospaceengineering/aerospace/



www.synbiosys.co



www.uws.ac.uk/home



Security-Technology
RESEARCH INNOVATION GRANTS
HMG

Camor		Online Immersive Platform for the Provision of Security Training	Camor's project will undergo the development of a bespoke immersive 3D training platform to provide General Security Awareness Training (GSAT) for the aviation industry.
Cranfield University		Drone Classification for Airport Protection: Explainable Deep Learning to Identify Missing Training Data for Improved Accuracy	Aerial drones present a constant low-cost threat to airports and other critical infrastructures. Cranfield University's project aims to improve the image classification accuracy of aerial drones for airport protection by identifying the missing data needed for training.
		Academic Research and Evaluation Network Networked Area (ARENA)	Project ARENA will investigate the feasibility of creating a large-scale, integrated security test environment at Cranfield University, to explore issues around the development of emerging protective security/sensing and surveillance technologies and their networking.
Createc		Improving Aviation Security at Airports by Integrating Multi-modal Crowd Observation Technologies	This project is a feasibility study into the integration of different people and vehicle observation technologies to manage passenger flow through the entire airport footprint.
Durham University		Tracking Drones Across Different Platforms with Machine Vision	In this project, Durham University will research and develop a camera-based counter-drone prototype that identifies, tracks, profiles, and reidentifies drones across different platforms such as CCTV, smart-phones and drone-mounted cameras.
		Towards ECAC C3 Using Deep Learning Enabled Multi-view X-ray (TEC-DLEMIX)	Durham University's second project, 'TEC-DLEMIX' will be exploring the use of recent advances in machine learning algorithms as an enabler to the realisation of an ECAC C3 capability in low-cost multi-view X-ray security screening systems.
Dynamical Systems Research		Drone Detect	Project DRONE DETECT is a feasibility study centred on using fixed-location long-range 3D LiDAR sensors along the perimeter of an airfield to detect drone proximity to the airfield itself, aerial perimeter breaches and exact real-time drone location.
Halo X-ray Technologies		Scatter Enhanced Explosive Detection (SEED)	SEED involves the development of a bespoke 3D dual-energy explosive detection algorithm, enhanced by the inclusion of x-ray diffraction. The project seeks to develop novel automatic explosive detection algorithms based on new data.
Iconal Technologies		Gait analysis for identification of anomalous carried bags	Crowded places, such as museums, concert halls, sporting events and shopping centres are at risk from mass casualty attacks, such as the one at the Manchester Arena. In the first of Iconal's projects, they propose using video analysis techniques to identify anomalous bags being carried into crowded places. Individuals who are identified as carrying anomalous bags can then be channelled to further screening, either by an additional technology or manual search by security staff.
		Multi-sensor approach for rapid non-contact contraband screening	Iconal's second project aims to investigate the possibility of using a combination of sensing technologies to detect concealed contraband items (e.g. narcotics, currency) carried on the body of a person. The physical properties of some of these items might enable them to be detected in a non-contact, quick, covert and safe manner even when concealed under clothing.
		Development of Home-made Explosive Simulants	This project aims to investigate and develop simulants for home-made explosives to facilitate the development and evaluation of detection systems in the security community.

Metrasens		Invisible magnetic profiling of free-flowing crowded areas for detecting mass casualty weapons.	Metrasens is conducting a feasibility study of data-fusing underfloor magnetic sensor arrays with overhead IR/visible imaging arrays to detect long guns and IEDs in busy public areas which can detect Weapons of Mass Casualty (WMC, i.e. rifles, bombs) in a crowded area without any constraints on the crowd.
Overview Limited		Next generation laser-light to counter airborne (UAS) and ground threats against critical infrastructure.	Overview are looking at investigation into the application and benefits, across all five challenge areas, of emerging disruptive high-power, eye-safe, laser illumination technology to counter Unmanned Aerial Systems (UAS) and ground threats against critical infrastructure by enhancing the performance of autonomous, AI-driven, agile sensors.
Rinicom Limited		ARTIFACT	In the ARTIFACT project, Rinicom would like to develop and test a proof of concept ultra-wideband see-through radar enhanced by proprietary Artificial Intelligence (AI) algorithms. This technology will be able to detect and classify dangerous and prohibited items in rucksacks and handbags from the required operational distance in real-time and without a physical stop and search.
Rinicom Intelligent Solutions		AI-enhanced optical system for detection, tracking and classification of drone payloads (DRONEALARM)	Rinicom Intelligent Solutions Ltd (a spin out from Rinicom with specific counter UAV expertise) is undertaking project 'DRONE ALARM'. The company will develop and test a prototype of a novel AI module for the classification of payloads on UAVs identified as "un-cooperative" by the legacy counter systems manufactured by the Company and its strategic partners.
Synbiosys		Futureproofed, high speed C-UAV ballistic net	Synbiosys is designing and developing a tethered launch system for their prototype C-UAV high speed ballistic net. Their patent-pending high-speed ballistic net is designed to be cheap, robust and retrofittable onto counter-drone systems. It can stop a target drone's propellers, thus capturing and neutralising the threat.
University of Strathclyde		Drone Classification Range Extension using AI	The University of Strathclyde is examining the use of AI to extend the range at which a radar sensor can discriminate drones from other targets such as birds or ground vehicles. This project is aimed at assessing the potential of Artificial Intelligence to enhance the range at which UAV classification based on radar can be achieved.
University of the West of Scotland		Development of a novel wide-angle Compton camera for the real-time detection of radioactive sources	UWS will develop the novel design of a Compton camera to detect and monitor the illegal smuggling of radioactive material into the country. The device will enable UK Border Force personnel to passively inspect people, vehicles and cargo, detecting concealed sources of ionising radiation.



For more information about the S-TRIG Programme, please visit:
<https://cp.catapult.org.uk/opportunities/s-trig-programme/>

