

HORIBA MIRA



Autonomous systems boosting defence capability and UK prosperity

“The Defence and Security Accelerator (DASA) finds and funds exploitable innovations for defence and security to keep the UK safe and prosperous.” Lucy Mason, Head of DASA.

Working closely with our MOD partner, the Defence Science and Technology Laboratory (Dstl) and our industry partner, HORIBA MIRA; this case study demonstrates how we are collaboratively driving these principles.

Summary

Over £3 million of investment and support from DASA and Dstl has enabled HORIBA MIRA to make significant technical progress towards the realisation of autonomous systems for Defence and Security applications. They have been able to pursue higher risk/higher reward technology developments which are delivering results, securing advantage for UK MOD and wider UK prosperity.

HORIBA MIRA has worked with and demonstrated to many end users from UK MOD, UK Armed Forces, the Home Office and Office for Security & Counter Terrorism (OSCT). This exposure has helped to steer and focus the technology development and propel them to a point where some of the technology can now be fully evaluated by Front Line Commands.

About HORIBA MIRA

HORIBA MIRA is a global provider of pioneering engineering, research and test services to the automotive, and defence sectors. HORIBA MIRA is experienced in providing defence solutions having previously won a MOD contract to supply Improvised Explosive Device (IED) detection unmanned ground vehicles (UGVs) to the British military in Afghanistan.

“The rapid turnaround of projects by DASA has resulted in much faster technology development and combined with the high level of competition in the programmes has significantly accelerated progress. This means that new technology is moving from concept and into the hands of potential users much more rapidly than before.” Mark Carter, Head of the Defence Solutions Group, HORIBA MIRA.



Case Study

About the DASA funded projects

Here we showcase examples of HORIBA MIRA projects. The funding was provided by cross government budgets, under the DASA themed competitions: 'Autonomy & Big Data'; 'Autonomous Hazardous Scene Assessment' and 'Autonomous Last Mile Resupply'.

ATLAS – UK Defence Solutions Centre & Defence Growth Partnership budget

ATLAS is a novel vision-based navigation, localisation and perception technology. It uses Artificial Intelligence (AI), Computer Vision and Deep Learning Convolutional Neural Networks to enable UGVs to operate effectively in complicated environments, without reliance on satellite navigation systems. Current autonomous systems rely heavily on satellite navigation, but the signals are vulnerable to interference and blocking or masking by trees and buildings. ATLAS has been developed to ensure UGVs and Autonomous Vehicles can still operate without reliance on external systems, therefore providing a whole new level of autonomy capability to the Defence industry. The funding for the third phase of the project will allow HORIBA MIRA to further develop the capability, create a number of advanced pre-production prototypes and integrate onto some key Army platforms.



Artificial Intelligence training: MOD Science & Technology budget

The training of AI is challenging in the Defence context due to the lack of relevant training imagery. Where imagery exists, it is a very slow labour-intensive process to label it manually. Training sets in the order of 1 million images can be required. HORIBA MIRA has devised a novel approach to automatically generate training data sets. The first phase of the project showed that not only could neural networks be trained by simulation, but they could be trained to recognise objects in real imagery that they had only ever seen in simulation. Working with Front Line Commands in Phase 2 of the project is enabling evaluation of the technology in real time.

Follow us:



Contact us: accelerator@dstl.gov.uk



Defence and Security
Accelerator

Case Study

Autonomous Hazardous Scene Assessment (AHSA): MOD Science & Technology budget & Home Office funding, a programme managed by Dstl

One of four projects funded under AHSA, the MIRA AHSA robot can provide vital support at a hazardous scene to emergency services First Responders or Military chemical, biological, radiological, nuclear (CBRN) specialists. The robot is capable of climbing stairs and going through doorways and can be operated by a single person. AI and convolutional neural networks enable the robot to perceive differing environments and detect objects of interest to the user. The robot can autonomously explore, map and survey a scene and also automatically determine a cordon around the scene if required. The robot is designed to be low cost so that it could be more widely deployed than existing robots and potentially disposable if it gets significantly contaminated. The use of autonomy and AI with robots is a fast-moving emerging area and the research being undertaken in the Dstl Minerva programme is at the forefront of that research.



Autonomous Last Mile Re-Supply (ALMRS): MOD Science & Technology budget, DFID & UKRI, a programme managed by Dstl

Under Phase 2 of ALMRS, VIKING is one of five systems being developed. It is an all-terrain, multirole UGV platform capable of delivering up to 600kg of supplies over 200km. The 6x6 Diesel/Electric hybrid is integrated with advanced AI-based autonomous systems, including GPS denied navigation, advanced terrain perception and object recognition. The enabling information management systems has been provided and developed with Frazer-Nash. A cross industry and government collaboration

project, this state of the art unmanned vehicle and autonomy system is entirely designed and built in the UK. Dstl has facilitated the integration of novel AI concepts onto the vehicle to develop the system in very short timescales and focused development to maximise exploitation potential.

Follow us:



Contact us: accelerator@dstl.gov.uk



Defence and Security
Accelerator

Case Study

DASA Added Value

- Providing access to end-users, enabling mutual innovation understanding through demonstrations and trials;
- Creating an innovative environment in which to test higher risk/higher reward technology developments;
- Enabling the transition of the technology from DASA to Defence Equipment and Support (DE&S), bridging the gap between research and procurement;
- Facilitated HORIBA MIRA in the innovation and transfer of their autonomy and AI skills from the larger vehicle research to smaller robots;
- DASA investment has increased HORIBA MIRA confidence in the future of the defence market which has led directly to the recruitment of high end technology jobs and investment in new equipment;
- The funded projects have resulted in a significant interest from overseas customers and created export potential.



Follow us:



Contact us: accelerator@dstl.gov.uk



Defence and Security
Accelerator