

Market exploration: robotic and autonomous systems (platooning)

Summary

The Defence and Security Accelerator (DASA) is scoping the potential for funding opportunities to develop the use of autonomy for logistic convoy operations.

On behalf of the United Kingdom (UK) Ministry of Defence (MOD), we want to better understand the current market capability of robotic and autonomous systems that potentially require further investment or experimentation by MOD. We are interested in both early technology and mature systems with the potential for integration onto military vehicles.

We are keen to explore the area further and better understand the operational limitations of different technological approaches.

This information will provide us with knowledge on the maturity of the solutions that currently exist, novel solutions in development and areas that potentially require further investment by MOD.

This request for information is not a commitment to subsequently launch a formal DASA competition.

Background

Robotic and Autonomous Systems (RAS) are expected to offer MOD increased efficiency and operational effectiveness. In the field of logistics, we are looking to operate with greater tempo, mobility and agility, but with reduced soldier burden by employing RAS technologies. In particular we are seeking to understand the capability provided by RAS such as Artificial Intelligence (AI) enhanced autonomous distribution systems and to understand current early technology and mature solutions in this space. This includes autonomy enabled logistics convoys where RAS allows 'intelligent trailers' or driverless trucks to be linked together, thereby reducing personnel and fuel requirements, and more mature technology that might allow fully autonomous logistic distribution.

We are keen to explore two key areas:

- Autonomous driving and navigation technologies: defence and security continues to evolve from the industrial to the information age. These systems would increase resilience and duration of the deployed force, reduce reliance on and thereby vulnerabilities associated with rear-based supply chains, reduce logistic demand by increasing velocity of material delivery, reduce stock holdings and allow soldiers in support roles to be threat facing rather than sustainment focused. We are keen

to understand how this might be achieved.

- Leader-follower autonomy: While we are keen to understand the range of solutions, leader-follower self-driving vehicles, a capability commonly known as 'platooning', appears to be one of the more mature solutions that allows a significant increase in material lift output, whilst concurrently allowing workforce reapportionment (and reduced risk). This is essentially a modern-day interpretation of a World War I wagon-train where, a 'leader' vehicle driven by a person would 'guide' several self-driving autonomous 'follower' vehicles. These automotive-trains, which are essentially linked 'intelligent trailers, would become more autonomous as the technology matures. Note however that we are keen to understand other solutions that might provide the same or greater advantages.

Figure 1

Within these key areas, we are looking to understand current levels of autonomy, the complexity of tasks the system can undertake, and the capability to operate in contested environments:

Levels of autonomy, including:

- level of human interaction (such as leader-follower, fully autonomous, regular vs occasional human intervention)
- dependency on external information (such as network, Global Navigation Satellite Systems (GNSS) and fore-knowledge/imagery of route)
- number of unmanned trucks in convoy, or ability to operate independently
- response time
- accuracy of tracking and spacing (flexibility)

Complexity of tasks, including:

- basic manoeuvres (forwards, stopping, cornering)
- complex manoeuvres (reversing, trailers, sharp turns, deploy, reform convoy)
- complex environment (dirt tracks/cross country/public highways/urban environments)
- detection and avoidance of obstacles (simple and complex obstacles, above ground and holes, static/moving traffic, urban terrain)
- operation in low light and adverse weather conditions

Capability to operate in contested environments, including:

- reduced band-width comms or no comms
- spoofed GNSS/no GNSS
- threat action (for example, traffic, detection and response to threat action)
- countermeasures resistance
- managed signature (active vs passive sensors)

What we want

The UK MOD would like to see a range of systems to fully explore this area.

Where the technology is a mature (or maturing) system, we are keen to understand its capability against the following requirements:

- system is of sufficient maturity to enable hands-on experimentation by Soldiers
- system is safe and suitable for use within supplier defined limits
- system can demonstrate at least 3 truck convoy with only lead truck driven (lead truck may also be autonomous)
- system can operate at tactically useful speed
- autonomy can be integrated onto military platforms (such as MAN SV and Land Rover, noting suppliers may offer other platforms), and the level of modification required for such integration
- system does not affect manual driving capability of vehicles

In addition, we are also interested in whether the system has the capability or has the potential to meet any of the following:

- system may be capable of being fitted as an applique capability
- users should be able to move and control the vehicle remotely from another location (such as other vehicles in the convoy, dismounted or operations room).

What we don't want

We are not interested in very low maturity solutions or solutions that could not be developed to meet the desired standard.

This is not a competition and therefore we are not asking for costed proposals at this stage. This is a market engagement request for information exercise and we do not commit to subsequently launch a formal DASA competition.

How to submit a Capability Submission Form

Responses to this market exploration must be submitted via the [DASA submission service](#), for which you will be required to register.

There are 6 questions relating to your capability, where we are seeking to understand what and how much further development is required for a complete solution to all requirements, or whether a combination of separate solutions is required. The information you provide will assist in developing a statement of requirements for potential future activities. You will not be held to deliver to any of the timescales or cost estimates that you may give.

Submissions must be submitted by midday BST on Tuesday 29 September 2020.

Please only provide details of one product/capability per form. If you have a

number of potential solutions, then please submit multiple forms. If you have any questions, then please email accelerator@dstl.gov.uk with 'Robotic and Autonomous Systems' in the subject line.

How we use your information

Information you provide to us in a Capability Submission, that is not already available to us from other sources, will be handled in-confidence. By submitting a Capability Submission Form you are giving us permission to keep and use the information for our internal purposes, and to provide the information onwards, in-confidence, within UK Government. The Defence and Security Accelerator will not use or disclose the information for any other purpose, without first requesting permission to do so.