

# Beyond Visual Line of Sight (BVLOS) operations of unmanned aircraft systems (UAS) in unsegregated airspace



## Sandbox brief

### Background

In April, the CAA launched the Innovation Hub to help innovators bring their new aviation and travel products and services to market.

The Regulatory Sandbox enables innovators to increase the regulatory readiness of innovative solutions that do not fit within the scope of existing regulations, permissions and exemptions. Firstly, it provides a platform for innovators to discuss the CAA's potential requirements with regards to innovative solutions and to seek guidance on how the industry can:

- meet the highest safety standards
- provide choice and value for money to consumers when they fly
- effectively manage environmental impact and
- effectively manage security risks.

Secondly, it enables innovators to trial their solutions with the guidance of the CAA in order to explore options, demonstrate how these solutions mitigate any risks introduced by an innovative concept, and gather the evidence necessary to maximise the chance of regulatory approval for operations in a 'commercial' environment.

We have onboarded a number of participants to date in our Regulatory Sandbox. As we make progress with these projects, we will have the capacity to onboard an additional one or two organisations in September. The information we have gathered through the Regulatory Sandbox so far has enabled us to adopt a more specific 'challenge led' approach. As such, we want to explore the challenges associated with BVLOS operations of UAS in unsegregated airspace and we would like to invite organisations who have an interest and the appropriate level of technological maturity to address this specific challenge.

**Note:** The CAA is closely involved with the UK Pathfinder Programme which shares the same aspirations for unlocking unsegregated BVLOS operations and a common understanding of the regulatory questions presented in this brief. Organisations are encouraged to engage with the UK Pathfinder Programme, including its regular community events.

**We are looking for organisations that want to work towards operating Unmanned Aircraft Systems (UAS) Beyond Visual Line of Sight (BVLOS) in unsegregated airspace**

UAS technology is rapidly advancing and the range of use cases for UAS is growing, from drone deliveries, through Search & Rescue operations, to inspection of assets and infrastructures. However, gaining regulatory approval for BVLOS operations of UAS in unsegregated airspace remains a challenge. Many organisations have approached us to discuss this specifically.

Several 'regulatory questions' must be addressed in order to improve knowledge in the ecosystem and to enable the development of appropriate regulatory frameworks with associated approval mechanisms. For example (non-exhaustive):

### **Detect and Avoid (DAA) Capabilities:**

- What kind of DAA capabilities should be demonstrated?
- What are the requirements of DAA systems for safe BVLOS operations?

### **Robust RF Spectrum requirements:**

- What are the threats to command and control links?
- What alternative spectrums or methods could improve robustness?
- What practical and economical methods exist for extending command and control links for BVLOS operations?

### **Navigation and Surveillance:**

- What methods exist or can be developed for navigation and positioning as alternatives to GPS and GNSS?
- Are current radio positioning services (cellular comms) sufficiently resilient and robust?

### **Data sharing:**

- What kind of information should the operator be provided with during autonomous BVLOS operations in unsegregated airspace?

### **Procedures:**

- What are the operating procedures with regards to avoiding collisions (air and ground)?
- What emergency procedures should be considered?
- What are the failure modes, redundancies and contingency procedures?

### **UTM:**

- What are the minimum requirements for UTM integration?

### **Environmental impact:**

- What is the overall environmental impact?
- What are the noise implications?
- What are the visual blight considerations?

## **Societal impact:**

- What is the public perception of UAS activities?
- What is the level of understanding of the different applications of UAS?

We are actively exploring these questions through the work we are doing with our current Sandbox participants. We are keen to accelerate our learnings and gain additional knowledge that we can share with all innovators. We are therefore looking for additional organisations willing to work with us to explore the viability of their solutions for BVLOS operations of UAS in unsegregated airspace.

## **What we are looking for**

We are looking for individual organisations or consortia that wish to conduct BVLOS operations of UAS in unsegregated airspace and that can demonstrate to our satisfaction that they:

- Understand the current core regulatory requirements with regards to conducting commercial operations
- Have a technical solution for conducting BVLOS operations in unsegregated airspace which address some or all of the 'regulatory questions'
- Have reached a level of technology readiness sufficient for commencing trials in a Sandbox environment and
- Can demonstrate sufficient corporate commitment to support the sandbox activities.

We expect applicants to demonstrate the above expectations through a proposed concept of operations (CONOPS) for the BVLOS operations in unsegregated airspace they want to undertake. The CONOPS must include a brief description of:

- The BVLOS operations you intend to conduct in unsegregated airspace. This includes information on the nature of the operations, the timelines for starting these operations, the duration of the operations, the frequency of the operations, etc.
- The proposed airspace(s) within which BVLOS operations are to be conducted
- The proposed technical capabilities
- The proposed technical mitigations to ensure safe BVLOS operations in unsegregated airspace, such as DAA systems
- The proposed ground site(s) and airspace for conducting trials in a safe environment;
- The size and level of the team and corporate commitment and readiness of the applicant to undertake the sandbox activity within the timescales and
- Any relevant trials in a regulated environment you may have already conducted or may be currently conducting.

We will triage all the applications against the criteria above. Then, we will prioritise the lead applications to match our available resources. Our decision on sandbox applicants will be final.

## What you will get from us

The organisation(s) which enter the CAA Regulatory Sandbox will receive the support from a dedicated case officer who will:

- Review thoroughly their proposed CONOPS and identify the particular regulatory challenges that need to be addressed in order to unlock the proposed BVLOS operations in unsegregated airspace
- Provide guidance to develop a trial plan for demonstrating the viability of their solution for BVLOS operations in unsegregated airspace and for gathering the evidence that will support the submission of an operational safety case. These trials may require airspace segregation in the first instance as part of an iterative trial plan. The processes for requesting this will be clearly signposted. Note that the innovation team will not provide regulatory approvals. These will be assessed independently by our regulatory teams and their decision about whether or not to grant a permission will be final.

## How to Apply

In order to apply, you will need to:

1. Complete our [online submission form](#).
2. Attach to the submission form your proposed concept of operations (CONOPS) for the BVLOS operations in unsegregated airspace you want to undertake.
3. The successful applicants will be required to conclude a [memorandum of understanding \(MoU\)](#) and [non-disclosure agreement \(NDA\)](#) with the CAA. Please review the provisions of these documents as there will be no scope to negotiate them.

If you have any questions about the application process, please contact us through our email address: [innovation@caa.co.uk](mailto:innovation@caa.co.uk).

## Key Timelines

We will review the incoming proposals until Friday 30 August 2019. If we have any questions about your proposal, we will get in contact with you via email or phone.

We will aim to announce the selected organisations week commencing Monday 2 September.

We will not be able to provide feedback on unsuccessful applications.