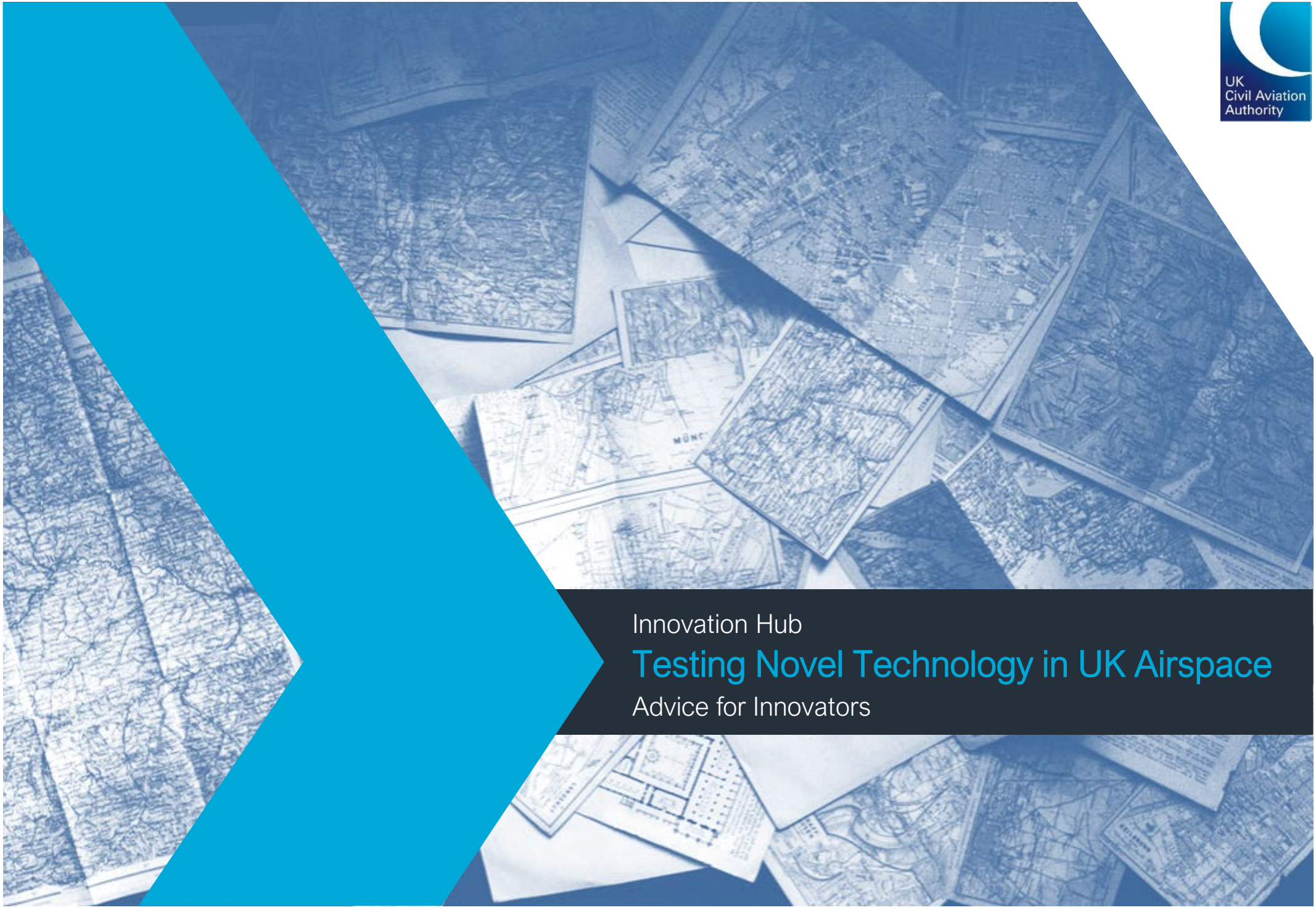


UK Civil Aviation Authority

Innovation Hub

Testing Novel Technology in UK Airspace

Advice for Innovators

Overview

The purpose of this guide is to provide an introduction to the fundamentals of airspace, and to the processes for requesting your own airspace for innovation.

Airspace in the UK is comprised of a number of airspace structures as described on page 3. Within each structure certain rules apply, including rules that control how aircraft access and operate in the airspace.

There are lots of different stakeholders that interact with the structures of UK airspace. Sometimes it is necessary to test a new design or procedure. This can be delivered through an Airspace Trial, which is introduced on page 4.

Testing innovations in protected or representative environments is critical for gathering evidence to support development. Page 5 explains where you should start.

In the first instance, you should check whether existing airspace structures can be used, and page 6 shows you how to find that information.

If the location, rules or restrictions of an existing airspace structure do not suit the requirements for testing, a new airspace structure may be needed. Page 7 describes the overall approach to changing airspace design.

For the CAA to determine the best potential airspace options for your innovation activity, there is some important information that you must provide, as outlined on page 8.

For you as an innovator, this process will consider whether an airspace structure could be introduced that suits your needs for tests and trials. Page 9 gives some examples of possible outcomes of the Airspace Trial process.

There are a number of benefits and considerations to following this process, and these are outlined on page 10.

Fundamentals of Airspace

Airspace in the UK is comprised of a number of airspace structures. Within each structure certain rules apply, including rules that control how aircraft access and operate in the airspace.

The UK's airspace has been designed and redesigned over a number of decades to meet various operational needs, such as increases in aircraft traffic, aircraft performance and changes in environmental legislation.

Airspace structures are set up as either permanent or temporary. A permanent structure has no expiry date, whereas a temporary structure does. In both cases, an airspace structure is active during times when the rules apply.

The International Civil Aviation Organization (ICAO) sets out 7 different classifications of airspace, each with their own predefined rules.

These are labelled as A to G, and are either controlled or uncontrolled. Class A to E is controlled, and Class G is uncontrolled. In the UK, classes B and F are not currently applied.

Types of Airspace

As well as its classification, airspace is also defined by its type depending on where it is and the function it provides.

Control Zones – a Controlled Airspace extending upwards from the surface of the earth to a specified upper limit

Control Areas – these are above control zones and offer protection for aircraft entering and leaving aerodromes like Heathrow and Gatwick.

Airways – the "motorways of the sky", providing connections between control areas and across national boundaries.

Prohibited, Restricted and Danger Areas – it is also necessary to warn or restrict aircraft from certain areas for safety reasons.

Temporary Danger Areas (TDA)

The TDA is a type of temporary airspace. Temporary airspace arrangements will usually apply for a period of no longer than 90 days.

Introduction to Airspace Trials

There are many different stakeholders that interact with the structures of UK airspace. Sometimes it is necessary to test a new design or procedure. This can be delivered through an Airspace Trial.

The requests for a trial should be in accordance with the trial procedure as published in CAA publication CAP1616 'Airspace Change'. The audience of this policy and guidance document includes aerodromes, air navigation service providers, aircraft operators and many more.

The CAP1616 document guides you through the process of conducting an airspace change, and should be read in conjunction with relevant policy and legislation. This Innovation Hub document has been created to provide additional clarity for you as an Innovator.

Airspace Trial Definition

A trial of airspace design for the purposes of investigating the feasibility of, or validating proposals for, innovative airspace design, technology or air traffic control operational procedures.

– Civil Aviation Authority (Air Navigation) Directions 2017

Examples of an Airspace Trial

- Evaluating **procedural changes**, such as aircraft approach paths into aerodromes
- Changes to the **geometry** of an existing airspace structure
- Evaluating changes to **date or time** conditions on aircraft movements
- Testing **novel technology**, systems, or aircraft types, or evaluating new test sites.

This document is primarily targeted at Innovators who are looking to conduct technology testing that would require segregated airspace. This usually includes unmanned aircraft systems, but may extend to other applications.

Using UK Airspace for Innovation

Testing innovations in protected or representative environments is critical for gathering evidence to support development.

As an innovator wanting to evaluate innovations through specific test and trial operations, you may need access to various types of airspace structures to ensure your novel operations do not pose any threat to other airspace users, as well as considering environmental impacts on local communities, such as noise and emissions.

This usually results in a requirement for airspace that is segregated from other airspace users. There are two options available. The rest of this document provides guidance for both options.

Option 1 Use an Existing Airspace Structure

In the first instance, you should check whether existing airspace structures can be used.

For example, there may be existing Danger Areas across the UK that could fulfil the requirement for segregated airspace.

These structures are normally established for specific activities, including military training. Each structure is managed by a designated Sponsor.

Many of these structures have complex operating arrangements or established rules which may affect their suitability, or the ability to access them. The innovator will need to contact the relevant sponsor to determine whether it would be possible to use the airspace.

Existing structures are listed within the Aeronautical Information Publication (AIP) under section ENR5.1 "Prohibited, Restricted and Danger Areas", together with contact details of the relevant sponsor.

You can also get more detail from the CAA Airspace Regulation team.

What is the "AIP"?

The UK AIP (Aeronautical Information Publication) contains information that is relevant to air navigation. It provides details of UK airspace structures both permanent and temporary, including prohibited, restricted and danger areas.

The AIP is updated every 28 days, but certain information is also published in between updates by way of Aeronautical Information Circulars (AIC). These are available from the Aeronautical Information Service (AIS).

NATS manages the AIS and produces the UK's AIP as part of their regulated service, under licence from the CAA.

Alternatively, some aerodromes across the UK are willing to provide access to their Aerodrome Traffic Zone (ATZ) or Controlled Airspace (CAS) for the purpose of testing.

Due to their nature, ATZs would not normally satisfy segregation requirements for BVLOS UAS operations. If the intended operation requires an exemption from the Air Navigation Order, before planning to use an ATZ for testing, the innovator should contact the CAA UAS team for guidance as to whether the ATZ would be suitable.

Option 2 Create Something New

If the location, rules or restrictions of an existing structure do not suit the requirements for testing, a new airspace structure may be needed.

The method for creating or amending airspace structures is given in the CAA's publication CAP1616 'Airspace Design'. This provides guidance on the regulatory processes for changing airspace design, as well as outlining community engagement requirements. It also sets out how airspace change requests are reviewed and implemented.

Before entering into this process, the CAA Innovation Hub can help you with **initial support** on the airspace design, and explore whether a permanent, temporary, or trial airspace might be required*.

To start the process, you should have a clear understanding of your needs. More guidance on this is provided on page 8.

Innovators should research the right airspace for their needs. CAA Innovation Hub* is also able to provide non-regulatory advice.

You will use this online form to articulate your airspace needs relating to the issue or opportunity** that you have identified.

The CAA's Airspace Regulation team will assess your application, assign an officer and arrange the first meeting. After this, you will have an understanding of the process and timelines required.

Permanent
A permanent change to the published airspace design. Not normally appropriate for technology development or demonstration, but may be suitable for a permanent test site, for example.

Temporary
A temporary change to the existing published airspace design. Used to meet a need for a specific event or operation for a short period of time. Maximum duration 90 days, cannot be repeated.

Trial
A change of airspace design for the purpose of investigating innovative technology. Limited to 6 months, but can be extended.

** To avoid regulatory capture, advice provided by the Innovation Hub has no regulatory standing. Your application will be assessed by the CAA's Airspace Regulation team.*

*** For example, the need for segregation from other aircraft to enable the testing of a UAS equipped with novel technology*

Writing a Statement of Need

For the CAA to determine the potential airspace options for your innovation activity, there is some important information that you must provide.

Rather than specifying the type of airspace you think you need (for example, "I need a TDA"), the CAA Airspace experts will need to understand how, where, when and for how long you want to operate. Depending on the location and planned activity there will also be a need to engage with local stakeholders, both aviation and non-aviation. Below offers some guidance about the sort of information you should include in your DAP1916 submission:

Statement of Need (DAP1916)

The Statement of Need is "Step 1" of any change to airspace design. When completing the DAP1916, you should clearly articulate the issue or opportunity that you have identified rather than describing the type of airspace change you think you might need.

Guidance on completing this form is in CAP1616, Appendix A.

To access the online form, go to https://publicapps.caa.co.uk/dap1916

Purpose & Outcomes

What do you expect to use the airspace for?

What is the purpose and expected outcomes of the trial?

Location & Geometry

What location do you wish to operate in?

What are the dimensions and geometry of the airspace you need?

Local Stakeholders

What stakeholders are local to your proposed testing area?

What aerodromes or other airspace structures exist in the area?

Timing & Duration

How long do you expect your test programme to last or is it expected to be permanent?

What times of day, days of the week, and time of year do you expect to operate?

Schedule & Progress

When do you expect to start your trial or operation?

Have you engaged with any local stakeholders already?

Airspace for Innovation

For you as an innovator, this process will consider whether an airspace structure could be introduced that suits your needs for tests and trials.

As described earlier, the Innovation Hub can support you with your proposal prior to the assessment meeting with Airspace Regulation, helping you to define your requirements.

It may be the case that, following this assessment, the CAA advise that no airspace change is necessary. Alternatively you may find that a permanent airspace change is a long-term solution, but an airspace trial will enable you to make progress in the short-term.

The specific process you will need to follow is dependent on the information you provide in the Statement of Need (DAP1916) and in your conversation with the CAA.

Airspace Trial Process Possible Outcomes

A No change to airspace deemed necessary

After assessing the Statement of Need and discussing the innovator's requirements in more detail, the CAA Airspace Regulation team may determine that no specific airspace changes are required. They may also suggest notifications are used such as the Notice to Airmen (NOTAM) in order to keep local airspace users advised of your innovation activity.

B Use of an existing airspace structure

While the CAA may agree that segregated airspace is necessary in which to conduct your activity, they may suggest that an existing airspace structure would better suit your specific requirements.

C New airspace structure required

The CAA agrees with your proposal that a new airspace structure is necessary. This could take the form of a Temporary Danger Area (TDA), for example, but by following the Airspace Trial process, an extended period up to 6 months can be justified. This could also lead to a permanent airspace change, if necessary for your operations, which would require a subsequent airspace change proposal.

The Benefits for Innovators

There are a number of benefits and considerations to using the Airspace Trial process.

As an innovator, the idea of another regulatory process to follow is perhaps daunting. However, this process has been developed to make sure that UK airspace is structured and managed in such a way that enables fair and equitable access, in line with the CAA's core principles.

Airspace Trial Timing Considerations

- Following the first assessment, you will be required to conduct a number of activities and assessments that will require your time and effort.
- You should plan to start this process early in your programme.
- Please bear in mind that there may be a waiting list.
- The CAA will scale the process according to satisfactory evidence being presented in your application.
- Once approved, an airspace change can take time to come into effect.

Can Enable a Longer Test Programme

Previous to the Airspace Trial process, the TDA was the go-to mechanism for providing airspace segregation, but is limited to 90 days and cannot be repeated. By following the Airspace Trials process and providing the appropriate justifications, you could have access to segregated airspace for longer periods, enabling a more thorough test programme.

Can Enable Your Long-Term Goals

For some a permanent airspace change is the most appropriate outcome – for example for someone looking to set up a permanent test site for other innovators. The Airspace Trial process may help you to build a case of evidence towards a permanent change at a later stage.

Can Enable a Proportionate Approach

The level of stakeholder engagement and consultation expected by the CAA Airspace Regulation will be proportionate to the impacts and risks on local aviation and non-aviation stakeholders. So if you need an Airspace Trial for 1 hour or 3 months, the process may be proportionate, as long as you provide evidence to support this.

Can Enable Regulatory Support

The CAA is committed to supporting innovators and making sure that airspace is used and managed according to our principles. The Airspace Trials process provides you with direct guidance and support with the process from the CAA in setting up your airspace.

Further Information

Further Information

The following provides some relevant information that may be helpful:

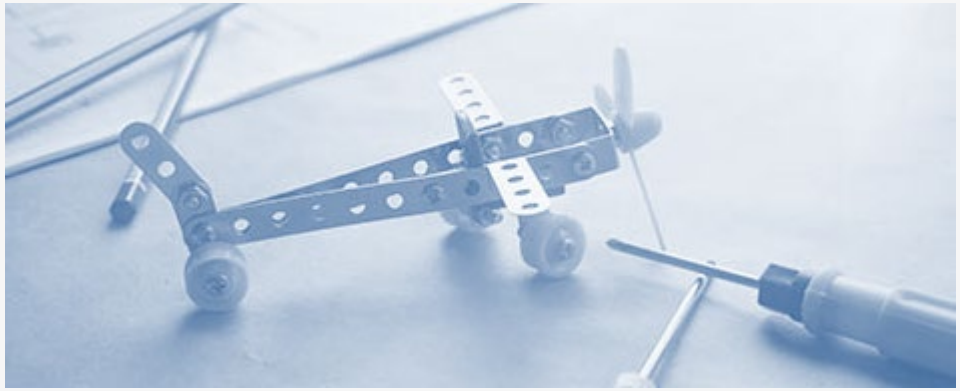
CAP1616 “Airspace Change: Guidance on the regulatory process for changing the notified airspace design and planned and permanent redistribution of air traffic, and on providing airspace information”
– caa.co.uk/CAP1616

DAP1916 “DAP1916: Intended Change to Notified Airspace Arrangements”
– caa.co.uk/DAP1916

UK Aeronautical Information Service, including the electronic Aeronautical Information Publication, NATS.
– nats-uk.ead-it.com/

CAA DAP Policy: SARG Danger Areas
– http://publicapps.caa.co.uk/modalapplication.aspx?catid=1&pagetype=65&appid=11&mode=detail&id=5410

Images source Unsplash. Maps photo (cover) by Andrew Neel. Drone & camera equipment photo by Aaron Burden. Airport photo by Skyler Smith.



About the Innovation Hub

For technology innovators across the world developing the aviation solutions of tomorrow, the CAA is an important partner, advisor and enabler to help them bring their innovations to the market.

Our job is to help technology innovators working on drones, air taxis and other new aviation concepts, take their ideas to market in a safe, secure and sustainable way.

To do that we have to work collaboratively so that we can get regulation moving ahead of time to support their innovations, instead of holding them back.

Visit the CAA Innovation Gateway
– caa.co.uk/innovation