# Final stage De-Minimis assessment

Title: Airspace Modernisation – UK Airspace Design Service (UKADS)

Type of measure: Secondary

Department or agency: Department for Transport; Civil Aviation Authority

DMA number: **DfTDMA380d**

RPC Register Reference: N/A

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Date: 02/05/2025

Prior to measures being laid in Parliament you should prepare the final stage de-minimis assessment. All sections should be updated and finalised, including the scorecard and evidence base, quantifying impacts where appropriate and proportionate to do so.

## 1. Summary of proposal

Airspace modernisation is a critical part of the UK's Aviation strategy. The current model for airspace change is complex and inefficient. Individual change sponsors oversee the development of their own airspace designs as part of the airspace modernisation process. However, there is no suitable mechanism for ensuring coordination between airspace designs in interconnected "clusters". This results in each cluster of interconnected airports proceeding at the pace of their slowest member. This impact assessment relates to a policy designed to improve the processes and rules governing airspace modernisation.

There is a significant risk that the current model will lead to a co-ordination failure and progress stalling, or that designs will be sub-optimal from a network perspective. This is especially the case for airports in and around London where airspace changes have the potential to deliver the greatest benefits, but where the interdependencies are most complex.

The preferred option is to establish an initial model of a UK Airspace Design Service (UKADS) to deliver airspace change proposals (ACPs) within the London Terminal Control Area (TMA) region, and potentially any other ACPs deemed a short-term priority. The UKADS would initially be established within an existing third-party organisation. Other

ACPs, that are less at risk of delay, would continue to be delivered under current arrangements.

The **"initial UKADS"**, would have a tightly defined scope and would be established within an existing organisation. It is the establishment of this "initial UKADS" which is the preferred option considered within this impact assessment.

In the future, a transition to an **"end-state UKADS"** covering all UK ACPs is likely to be considered. Any such change would likely require primary legislation, as this organisation would be established on a statutory basis. The detail of this proposal would be subject to further consultation prior to implementation.

# 2. Strategic case for proposed regulation

## Background

### The structure of UK airspace[1]

All airspace around the world is divided into Flight Information Regions (FIRs). Each FIR is managed by a controlling authority that has responsibility for ensuring that air traffic services are provided to the aircraft flying within it. UK Airspace is divided into three FIRs: London, Scottish and Shanwick Oceanic. The Civil Aviation Authority (CAA) is the controlling authority for the UK, with NATS[2] providing air traffic services for them.

Airspace within an FIR is usually divided into pieces that vary in function, size and classification. Classifications determine the rules for flying within a piece of airspace and whether it is controlled or uncontrolled. Aircraft in controlled airspace must follow instructions from Air Traffic Controllers, while aircraft flying in uncontrolled airspace are responsible for their own separation and terrain clearance. Aircraft in uncontrolled airspace are not mandated to be in receipt of an air traffic service from an air navigation service provider (ANSP).

In the UK there are five classes of airspace: A, C, D, E and G. The classification of airspace within an FIR determines the flight rules that apply and the minimum air traffic services which are to be provided. Classes A, C, D and E are areas of controlled airspace, and G is uncontrolled airspace.

Controlled airspace is provided primarily to protect its users, mostly commercial airliners, and as such, aircraft which fly in controlled airspace must be equipped to a certain standard and their pilots must hold certain flying qualifications. Pilots must obtain clearance from Air Traffic Control (ATC) - delivered by NATS or another relevant ANSP, to operate within such airspace and they must follow ATC instructions.

In addition to being given a class, controlled airspace may further be defined by its 'type' depending on where it is and the function it provides:

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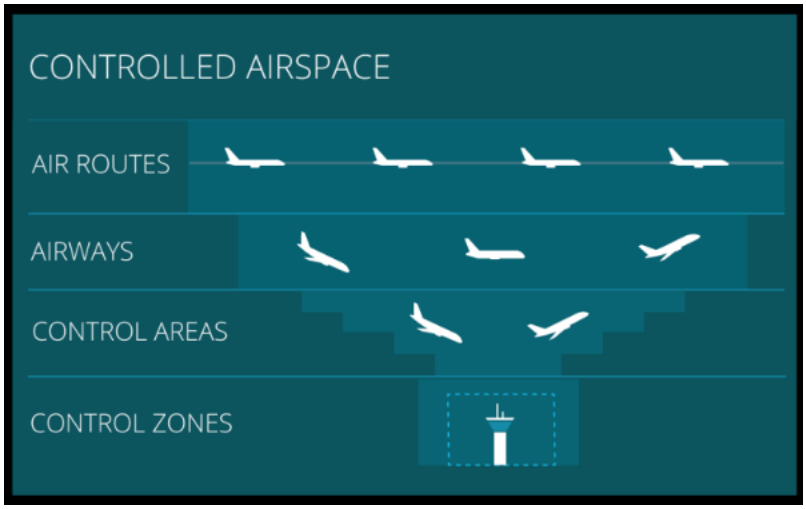
[1] This section summarises NATS' introduction to airspace, which provides further detail and is available at Introduction to Airspace - NATS

[2] Formerly 'National Air Traffic Services'

- **Control Zones** afford protection to aircraft in the vicinity of aerodromes; primarily for the purpose of commercial aircraft taking off or landing.
- **Control Areas** are situated above Control Zones and afford protection over a larger area to a specified upper altitude, usually for when an aircraft is in the latter descending or initial climbing phase of flight.
- **Terminal Control Areas**, also known as **Terminal Manoeuvring Areas** (TMAs), are normally established above the Control Areas of one or more major aerodromes. They are used to manage aircraft traffic during the approach and departure phases across multiple airports. The London Terminal Control Area is an example of this. It features some of the busiest airspace in the world, facilitating safe arrivals to and departures from airports including Heathrow, Gatwick and Stansted;
- **Airways** are corridors of airspace connecting Control Areas and link up with airways in other countries too. Airways usually have bases between 5,000 and 7,000 feet and extend upward to an altitude of 24,500 feet;
- **Upper Air Routes** sit above airways, usually from 25,000 to 46,000 feet. All airspace above 24,500 feet is Class C controlled airspace;
- **Restricted areas** prevent aircraft from entering specific areas due to safety to security purposes. To ensure efficient use of airspace, most Restricted areas can be deactivated when they are not in use.

**Figure 1 Diagram of controlled airspace**




Within controlled airspace, flight procedures, restrictions, routes, rules and policies may be established. For airports, these are most commonly Standard Instrument Departure (SID) and Standard Arrival (STAR) routes, which dictate how aircraft must depart from and arrive at airports, such as their precise routing, altitude and speed restrictions. Each airport may have a number of different SID and STAR routes, the use of which will depend on the destination of an individual flight, weather conditions, or in some cases the need to provide noise respite to communities. These routes have historically been dependent on ground based navigational aids, which help to direct aircraft.

## The Airspace Change Process

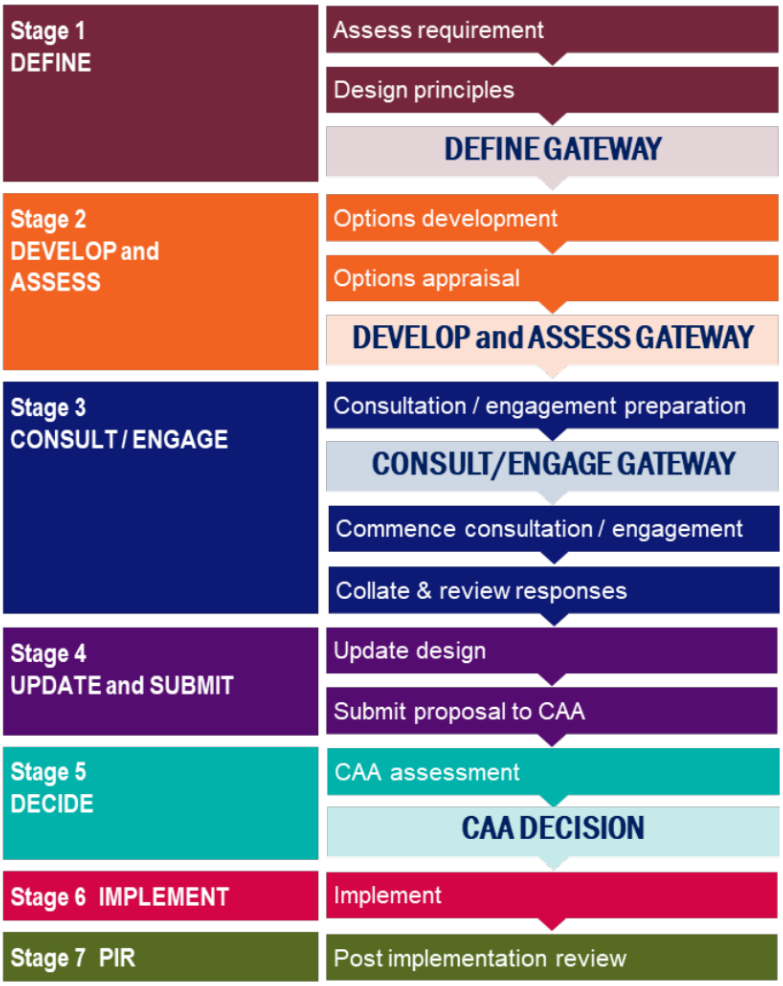
The needs of airspace users are constantly changing, and as such procedures are needed to allow for changes to structured airspace. The CAA is responsible for managing this process and deciding whether or not to approve individual Airspace Change Proposals (ACPs). In some cases, individuals or organisations may request that the decision on an ACP is 'called in' which, if approved, results in the decision being made by the Secretary of State for Transport (hereon referred to as the Secretary of State). Maintaining a high standard of safety is the CAA's primary duty when it makes airspace change decisions, in accordance with section 70(1) of the Transport Act 2000. Beyond this, section 70(2) requires the CAA to consider a number of factors, including safety, security and operational and environmental impacts, some of which may conflict with others.

Changes to airspace are proposed by an airspace change sponsor. An airspace change sponsor owns the ACP and is responsible for developing it, including taking into account feedback from relevant stakeholders. Anyone can sponsor an airspace change proposal – although it is usually an airport or an air navigation service provider (ANSP). An airport will typically sponsor a change to the airspace design in its immediate vicinity, while NATS (En Route) plc (NERL) (the air navigation service provider for en-route airspace[3]) will typically sponsor changes to airspace above 7000ft.

The airspace change process was reformed in 2018 in order to provide a clearer, more robust approach. Following a public consultation, the CAA published a further revised process in October 2023. This is set out in Civil Aviation Publication (CAP) 1616 and summarised below.

[3] En-route airspace is the volume of airspace outside terminal areas, where the climb, cruise and descent phases of flight take place and within which various types of air traffic services are provided

**Figure 2 The CAP 1616 Airspace Change Process**




The current process comprises seven stages, during which a change sponsor must demonstrate:

1. A need or opportunity for a change to airspace design
2. That relevant design principles have been established through effective engagement with those affected, and that design options have been informed by these design principles
3. That the impacts of those design options have been properly assessed
4. That, where relevant, they have facilitated meaningful consultation or engagement on proposed options and that feedback has been taken into account
5. That the final ACP submission to the CAA of the change to airspace design contains all relevant and necessary information
6. The precise requirements are dependent on the impact of the change, and special arrangements govern temporary changes or airspace trials.
7. The process contains a series of ‘Gateways’, at which the CAA decides whether or not an ACP has followed the correct process up to that point and can progress to the next stage. If rejected, a change sponsor will be required to rectify the shortcomings identified in the CAA’s decision before resubmitting to that gateway.

## Airspace Modernisation

Many of the ACPs currently being progressed are as a result of the UK's programme of airspace modernisation. The basic design of UK airspace has remained the same for decades, despite technological advances. This has resulted in increasingly inefficient flightpaths, delays and reduced resilience, which will only worsen as future demand grows.[4]

The UK's airspace modernisation plan exists within the context of a wider global programme. The International Civil Aviation Organization (ICAO) established the Global Air Navigation Plan (GANP) to provide strategic guidance and timescales for regional and national airspace modernisation programmes.

In 2017, the Secretary of State tasked the CAA with preparing and maintaining a coordinated strategy and plan for the use of UK airspace up to 2040. Under the direction of the Secretary of State, the CAA published a revised Airspace Modernisation Strategy in early 2023 that sets out strategic vision and objectives[5] and required delivery elements[6]. Of the nine interlinked delivery elements, categorised under two headings of aircraft-based navigation and airspace management, one key element is the redesign of terminal airspace.

To facilitate the redesign of terminal airspace, the Airspace Change Organising Group (ACOG) was formed in 2019. As part of its role to coordinate the national programme of airspace redesign, ACOG have been developing a 'masterplan' of all ACPs that are deemed strategically important. The latest iteration of the masterplan[7] identifies 20 airports[8] in scope, in four geographic groupings (clusters):

**Scottish Cluster**
Edinburgh, Glasgow.

**Western Cluster**
Bristol, Exeter.

**Manchester Cluster**
East Midlands, Leeds Bradford, Liverpool, Manchester.

**London Cluster**
Biggin Hill, Bournemouth, Farnborough, Gatwick, Heathrow, London City, Luton, Manston, RAF Northolt, Southampton, Southend, Stansted.

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4 Upgrading UK Airspace: Strategic Rationale. Department for Transport, 2017

5 CAP 1711 Part 1 Airspace Modernisation Strategy 2023-2040 (caa.co.uk) The vision of the AMS is to deliver quicker, quieter and cleaner journeys and more capacity for the benefit of those who use and are affected by UK airspace. Benefits to consumers include greater connectivity, faster journeys and greater resilience to disruption.

6 CAP 1711a Part 2 Airspace Modernisation Strategy 2023-2040 (caa.co.uk)

7 UK Airspace Change Masterplan Iteration 2 (caa.co.uk)

8 At the time of its publication, Iteration 2 of the masterplan identified 21 airports. The list used here reflects the masterplan as it stood in October 2024, making 20. For more information see https://www.caa.co.uk/commercial-industry/airspace/airspace-modernisation/airspace-change-masterplan/evolution-of-the-masterplan/

## Problem Under Consideration

The ACPs making up the masterplan, particularly in London and the South-East, are complex and highly interdependent with others in their cluster. Each element of airspace redesign is also fundamentally and inextricably interlinked – airport SIDs and STARs[9] must integrate with any terminal area control design, which must in turn align with upper airspace design. A delay to any individual ACP may therefore have implications stretching across wide portions of the network.

As of February 2025, the vast majority of the 20 airport-led ACPs identified above were at either Stage 2, the 'Develop and Assess' Gateway, or in the early part of Stage 3. Therefore, there remains a considerable amount of further development required in order to deliver the airspace changes.

Many of these ACPs have been subject to considerable delay. While there may be a range of reasons for these delays, that so many ACPs suffer delays suggests a potential systemic issue that may need to be rectified. It must be recognised that much of the planned airspace modernisation activity was due to occur during the height of the COVID-19 pandemic, which disrupted activity. £9.2m of government funding was provided during this period to ensure that progress on airspace modernisation was maintained and this enabled sponsors to continue with their programmes, which otherwise would have paused or ceased. An assessment of delays to pass the 'Develop and Assess' gateway is shown in Figure 3 below.

**Figure 3 State of ACPs making up the masterplan (as of February 2025)**

| Airport | Initial develop & assess gateway estimate (Stage 2) | Date develop & assess gateway passed (Stage 2) |
|---|---|---|
| Edinburgh | 28th February 2020 | 8th March 2023 |
| Glasgow | 24th June 2022 | 1st September 2022 |
| Bristol | 25th February 2022 | 3rd August 2022 |
| Exeter | 29th November 2019 | Not yet completed |
| Manchester | 29th May 2020 | 31st March 2023 |
| Liverpool | 30th November 2018 | 6th October 2023 |
| East Midlands | 29th May 2020 | 23rd November 2023 |
| Leeds Bradford | 28th October 2022 | Not yet completed |
| Heathrow | 30th June 2023 | 11th July 2024 |
| Gatwick | 29th July 2022 | 17th October 2023 |
| Stansted | 31st January 2020 | 13th April 2022 |
| Luton | 25th March 2022 | 1st April 2022 |
| London City | 20th December 2019 | 24th June 2022 |
| Southend | 31st July 2020 | 31st October 2024 |
| Southampton | 24th April 2020 | 3rd February 2023 |
| Bournemouth | 31st July 2020 | Not yet completed |
| Biggin Hill | 31st January 2020 | 8th March 2023 |
| RAF Northolt | 24th June 2022 | 29th November 2022 |
| Manston | 27th March 2020 | 3rd October 2022 |
| Farnborough | 23rd February 2024 | 8th November 2024 |

[9] Standard Instrument Departure and Standard Arrival Route – the published flight procedures followed by aircraft on an Instrument Flight Rules (IFR) flight plan immediately after take-off (SID) and just before reaching a destination airport (STAR); in other words designated routes linking the runway and the 'en route' phase of flight.

The numerous delays to masterplan ACPs are indicative of two significant issues with the current approach to airspace modernisation, which are explained in full below.

Issue 1: Co-ordinated development of ACPs

The current delivery model requires individual 'sponsors' (mainly airports and air navigation service providers) to design and propose airspace changes. Each sponsor attempts to optimise their usage of airspace within the constraints already set by existing airspace design, as and when their own needs change. Unlike other countries, including most of Western Europe, the US and Australia, in the UK no single organisation is responsible for creating a modern and coherent airspace design.

In contrast, the airspace modernisation programme requires the simultaneous redesign of airspace serving multiple airports. This offers the opportunity to develop airspace in such a way that network efficiency is maximised. However, to do so requires a high degree of co-ordination between all change sponsors – designs must take into consideration those of other change sponsors in order to ensure they are non-conflicting. This interdependence means that change sponsors within a cluster have to proceed through the CAP 1616 airspace change process in lock-step, and at the pace of the slowest sponsor. For example, an airport failing to proceed through a gateway can delay a whole cluster from advancing to the next stage of CAP 1616, as they must all proceed in step. To generate coherent airspace design across the whole network, it could require multiple iterative designs from individual sponsors to resolve confliction issues.

This could result in significant further delays to the programme, additional costs to develop ACPs, and / or sub-optimally designed airspace. Although no formal post-implementation review of the existing programme has taken place, stakeholder engagement suggests that there is a material risk to delays to published timelines in the absence of regulation. In particular the CAA's 2022 consultation on its Airspace Modernisation Strategy and two rounds of formal discussions with a range of stakeholders in September and December 2023 on scoping an alternative approach to airspace design, has only reinforced those concerns. There is a significant risk that the current model will lead to a co-ordination failure, leading to delays to desired masterplan timings. The risk of this occurring is particularly high for the London TMA region which is some of the most congested and complex airspace in the world. While ACOG has provided a benefit through coordination of some activities, it does not have the power or remit to produce a single and coherent design from the ground up to cruising altitude.

Issue 2: ACP Quality

While the immediate problem under consideration is the need to deliver the airspace changes necessary for airspace modernisation, there exists a wider potential problem with the development of ACPs by individual sponsors. Of the 20 ACPs above, a significant proportion failed to pass at least one of the gateways on their first attempt (though this does not mean they did not pass with further attempts), with failures to progress through gateways also noted in some ACPs that are unrelated to the masterplan.[10]

Airspace change is by its nature highly complex, and the relatively small number of ACPs that each individual airport undertakes reduces their incentive to have airspace design skills

[10] DfT analysis of CAA Airspace Change Portal.

in-house and limits the opportunities to gain practical experience of the CAP 1616 process. This is partially mitigated by sponsors' extensive use of external airspace design consultants. However, these consultants are relatively few in number, in high demand, and produce an inconsistent quality and style of outputs. As a result, despite the use of these specialist consultants, the quality of the ACP submissions to the CAA in recent years has been variable.

This is likely to be particularly relevant to other organisations such as windfarms, or new drone or spaceport operators, some of whom may be going through the process for the first time and therefore lack the required experience and expertise to sponsor ACPs.

This issue is expected to be even more prevalent in the future - the CAA's refreshed Airspace Modernisation Strategy published in January 2023 broadens its scope to include future airspace concepts such as an integrated airspace accommodating new types of airspace user (drones, electric vertical take-off and landing aircraft (e-VTOL), spacecraft) while improving access for General Aviation and military users, but there is no single entity to deliver those new concepts nor any agreed way to fund them.

The interlinked issues of co-ordination and quality create a significant risk that the modernisation of UK airspace may be delayed or may not occur to the fullest possible extent. This would lead to:

- The delayed realisation, or reduced realisation, of:
  - Efficiency (i.e. fuel) savings and consequential environmental benefits
  - Consumer benefits (greater connectivity, faster journeys and greater resilience to disruption)
  - Systemic benefits, e.g. greater additional capacity
  - Integration of new airspace users, potentially risking the delivery of government's Future of Flight strategy if new types of airspace user (such as drones, e-VTOL, spacecraft) cannot get access to modernised and integrated airspace
- The following potential disbenefits:
  - Constraints on General Aviation and military activities
  - Damage to the credibility of the UK Government and CAA
  - Significant delays for passengers and businesses - if UK airspace is not modernised, NATS (En Route) plc (NERL), the UK's licenced provider of en route air traffic control services, estimates that by 2040, delays at a national level may increase by more than 200% with the risk of one in five flights experiencing disruption.

## Rationale for Intervention

As outlined above, there are multiple airport sponsors for these airspace redesigns, with each airport incentivised to optimise their own airspace design. Airspace is an excludable resource, and if airports consider only costs and benefits that accrue to themselves airspace designs will not be socially optimal. The CAP 1616 process aims to mitigate against these externalities, e.g. by requiring the calculation of noise impacts to ensure that designs are robust. However, there remains an incentive to prioritise benefits to the airport sponsor, rather than opt for designs which may be more beneficial to the overall network.

In addition, there is a potential information failure when sponsors are progressing their ACPs through the CAP 1616 process. Individual sponsors are likely to have full information regarding the impacts of potential ACPs on their own activities, but are unlikely to have full information regarding the potential impact of other ACPs on their activities, nor of the impacts their ACPs may have on the activities of other sponsors.

The presence of **externalities** and **information failure** mean that a market failure is likely to occur in the absence of government intervention.

# 3. SMART objectives for intervention

The objective of the policy is to reduce the risk of a co-ordination failure within the masterplan and to improve the quality of ACPs, by ensuring that they are undertaken by sufficiently skilled and experienced entities.

The specific policy objective of this intervention is to ensure that ACPs, primarily those within the London region, are developed and implemented efficiently and effectively, resulting in the timely delivery of this key element of airspace modernisation. The DfT and CAA have a shared ambition to begin to address this risk by the end of 2025. By 2026, it is anticipated that existing ACP sponsors will have been engaged and relevant ACPs will have been merged to proceed through the CAP1616 regulatory process.

The extent to which the objective has been achieved will be measured by the successful implementation of ACPs, in keeping with the applicable airspace change masterplan timelines, and the achievement of any other specific goals identified by the co-sponsors in future.

The objective can be realistically achieved through the creation of a third-party entity to oversee and implement relevant ACPs. The objective can be achieved provided this entity is granted the resources to ensure high quality ACPs and the necessary authority to decide on and implement the most optimal set of ACPs from a network perspective.

Ensuring the timely completion of relevant ACPs is highly relevant to the CAA's Airspace Modernisation Strategy (AMS). The completions of these ACPs will help to achieve the redesign of terminal airspace around major airports, which is one of nine delivery elements that are part of the AMS. The airspace change masterplan sets out the timelines for the delivery of this priority, and while dates are still subject to change, it is expected that the multiple deployments of airspace changes in the London cluster will be realised in the 2030s.

The AMS sets out the DfT and the CAA's ambition to effectively deliver quicker, quieter and cleaner journeys and more capacity for the benefit of those who use and are affected by UK airspace, as well as the wider strategic objectives of airspace modernisation – enhancing aviation safety, enabling the integration of diverse users of airspace, simplifying airspace designs and improving efficiency, and applying environmental sustainability as an overarching principle through all airspace modernisation activities.

## Critical Success Factors

In addition to this objective, the following critical success factors (CSFs) have been identified and used to appraise the options in Figure 4:

- Strategic fit and business needs
- Potential Value for Money
- Supplier capacity and capability
- Potential affordability
- Potential achievability

### Economic Growth & Wider Government Objectives

By enabling the benefits of the AMS to be realised in a timely manner, this intervention will support the Government's mission to kickstart economic growth, facilitating a reduction in both airline operating costs (in the form of reduced fuel burn) and flight delays, and the Department's aim to deliver greener transport, facilitating reduced carbon emissions and noise per flight. Reduced operating costs and delays are likely to increase the attractiveness of the UK aviation sector, thereby potentially inducing greater levels of investment and consequent growth.

The establishment of the UKADS will not directly deliver increased capacity, as the volume of air traffic at specific airports may be limited by specific statutory planning caps or defined operating conditions. However, by making the process of airspace change quicker, more reliable, and better integrated it is likely that the UKADS will unlock additional capacity and enable the safer integration of new airspace users, thereby supporting economic growth.

## 4. Summary of long-list and alternatives

The DfT and the CAA initiated a project in 2023 to identify how a new single entity responsible for airspace design could better achieve the level of ambition set by the UK AMS. This included two rounds of workshops with a range of stakeholders in September and December 2023. These helped to shape proposals by gathering views about the challenges of airspace modernisation using the current model; sharing ideas for reform; and testing initial conclusions from the co-sponsors' UKADS policy thinking to date. The stakeholders included airports, air navigation service providers, airlines, local communities, General Aviation (GA), the military, new or rapidly developing users of airspace, and others with an interest in airspace design.

At the second workshop, the project team proposed a number of potential models along with preliminary conclusions on their viability. At the time, it was understood that NERL could be the organisation best placed to deliver progress at pace in the short-term, though concerns around transparency and conflicts of interest needed to be addressed. Other options might also be considered for the longer term, though some require primary legislation which would take time.

It was established at an early stage of this policy development process that, with the partial exception of 'do nothing', there were no viable non-regulatory options which would effectively address the problems identified.

### Option 2 – a new UKADS supported by primary legislation

Option 2 would entail the creation of the UKADS as a wholly new entity, such as a statutory corporation, with functions and services, accountability and charging structures specific to a

UKADS. It could include a bespoke charging mechanism, enforcement and any other powers needed specific to the UKADS through primary legislation.

This new entity could only be established through primary legislation and would therefore require a long and uncertain lead-in time to establish. As such, it would not be in place to deliver within the required timeframe to meet the policy objective of delivering airspace modernisation in the London cluster. As stated in Figure 3, almost all airports sponsoring ACPs in the London TMA region have now completed Stage 2 of the CAP 1616 airspace change process. Transferring the sponsoring of ACPs to the UKADS prior to the sponsor formally consulting on its design(s) at Stage 3 will maximise the impact of the UKADS and make a coherent design process across the individual ACPs easier to achieve. It also reduces the risk that work has to be substantially re-done or leads to stakeholder fatigue should consultation need to be revisited.

Due to the wider context of a lack of coordination over interdependent ACPs set out in section 2 of this document, it is unlikely that ACPs in the London cluster would be able to progress effectively and in a timely manner through the remaining stages of the CAP 1616 process with a UKADS established as a wholly new entity. In addition, the establishment of a UKADS as wholly new entity would require greater upfront DfT and CAA resource.

## Option 3 – a new UKADS as a new CAA directorate

Alternatively, Option 3 would see the UKADS created within the CAA. This operating model would require the Secretary of State to direct the CAA, through the Air Navigation Directions, to create the UKADS function within a new CAA directorate. The CAA would therefore have the function of both airspace designer and airspace decision-maker.

The principal concern was that this would place the CAA in the position of both designing airspace (as the UKADS) and then approving that design as regulator, therefore creating a perceived conflict of interest. In addition, it was thought unlikely that the CAA would be able to attract and retain appropriately skilled airspace designers to deliver the required UKADS function and in the required timeframe. In addition, earlier stakeholder engagement has identified a lack of support from both industry and community groups for this option. For these reasons, this option was discounted at the long-list stage.

Figure 4 below assesses each of the long-list options against the Critical Success Factors (CSFs) to demonstrate how the process moved from the long-list to a short-list.

**Figure 4 Options Framework Filter of Long-List Options**

**Option 0**

**Description**
Do nothing

**Strategic fit and business needs**
A continuation of the current arrangements would not eliminate the overarching co-ordination failure – Fails to meet CSFs

**Potential VfM**
Low benefits, low cost – Fails to meet CSFs

**Supplier capacity and capability**
The complexity of the ACP process and the specific skillset required means that the quality of ACPs is likely to remain low – Fails to meet CSFs

**Potential affordability**
No additional funding mechanism would be required – Meets CSFs

**Potential achievability**
Highly achievable – Meets CSFs

**Outcome**
Taken forward as "do nothing" – Meets CSFs

**Option 1**

**Description**
Establish a UKADS as a third-party entity

**Strategic fit and business needs**
Establishing UKADS as a third-party entity would enable ACPs to be progressed in a timely manner. The coordination failure that results from existing arrangements would be largely eliminated – Meets CSFs

**Potential VfM**
High benefits, low cost – Meets CSFs

**Supplier capacity and capability**
NERL have been engaged to ascertain feasibility of establishing UKADS within their existing structures. NERL, as the private provider of en-route air traffic services, is the only organisation in the UK that has the required level of resources and the design expertise to deliver the initial model of the UKADS at pace – Meets CSFs

**Potential affordability**
Funding mechanism would be operated on a "user pays" principle, wherein those who directly benefit from airspace modernisation will be expected to fund it – Meets CSFs

**Potential achievability**
Highly achievable based on existing resources – Meets CSFs

**Outcome**
Taken forward as Option 1 – Meets CSFs

**Option 2**

**Description**
Establish a UKADS through primary legislation

**Strategic fit and business needs**
Establishing UKADS through primary legislation would enable ACPs to be progressed in a timely manner. The coordination failure that results from existing arrangements would be largely eliminated – Meets CSFs

**Potential VfM**
High benefits, low cost – Meets CSFs

**Supplier capacity and capability**
Establishment of new entity would require greater upfront DfT/CAA resource – Meets CSFs but is less attractive

**Potential affordability**
Funding mechanism would be operated on a "user pays" principle, wherein those who directly benefit from airspace modernisation will be expected to fund it – Meets CSFs

**Potential achievability**
Unachievable in the short-term due to long lead-in time required for primary legislation – Fails to meet CSFs

**Outcome**
Discounted – Fails to meet CSFs

**Option 3**

**Description**
Establish UKADS as a new CAA directorate

**Strategic fit and business needs**
Establishing UKADS as a new CAA directorate would enable ACPs to be progressed in a timely manner.
The coordination failure that results from existing arrangements would be largely eliminated – Meets CSFs

**Potential VfM**
High benefits, low cost – Meets CSFs

**Supplier capacity and capability**
The CAA would be placed in the dual-position of designer and approver of airspace changes, potentially creating a perception of conflict of interest – Fails to meet CSFs

**Potential affordability**
Funding mechanism would be operated on a "user pays" principle, wherein those who directly benefit from airspace modernisation will be expected to fund it – Meets CSFs

**Potential achievability**
It is thought unlikely that the CAA would be able to attract and retain appropriately skilled airspace designers in the required timeframe. There is also a question as to whether this would be appropriate – Fails to meet CSFs

**Outcome**
Discounted – Fails to meet CSFs

### SaMBA and medium-sized business

Of the 20 airports featured in the latest masterplan, there is one micro firm, 10 medium sized firms, 8 large sized firms, and one Ministry of Defence run airport.[11] The reduction in costs for airports captured by early UKADS activity is therefore likely to accrue to larger organisations as these organisations are likely to be responsible for a larger number of more complex ACPs. Equally, the main identified familiarisation costs will fall predominantly on these larger organisations and will also be, to some extent, proportional to the size of the organisation.

However, on the specific issue of consultation and engagement requirements in accordance with the airspace change process, small, micro and medium-sized businesses will likely see a larger reduction in costs than larger airports, in proportion to what they were paying before. Where agreed, airports will be able to continue to be responsible for delivering some of the engagement required to support effective consultation on ACPs, and consequently bear some of these costs. Alternatively, the UKADS could carry out this work. Based on previous engagement, it is likely that smaller airports will generally be content to take a less active role, whereas larger airports may wish to remain more heavily involved (at greater financial cost to them). There is no scope for small, micro or medium-sized businesses to be exempt from the scope of the policy. In order to effectively fulfil its coordinating role, a UKADS, regardless of the manner in which it is established, would be required to undertake all ACPs within a given cluster. It would therefore not be appropriate, nor beneficial, to exclude the activities of small, micro or medium-sized businesses from the scope of the policy.

# 5. Description of shortlisted policy options carried forward

Two options have been shortlisted, Option 0 – do nothing and Option 1 – Establish a UKADS as a third-party entity.

## Option 0 – Do nothing

Under the “do nothing” option, individual change sponsors would remain responsible for progressing their own airspace changes. ACOG would continue to co-ordinate ACPs as required under the airspace masterplan, and the CAA would continue to oversee delivery of the Airspace Modernisation Strategy. But while ACOG can develop the masterplan through coordinating activities, it does not have powers to dictate to airports how and when to produce their designs, or to make trade-offs when airports create conflicting designs. If airports were to generate conflicting designs, there would be no formal mechanism for resolving this, other than relying on airports to voluntarily alter the designs, and the ACPs could fail.

The potential implications of this are discussed fully in the analytical portion of this document, but this is primarily expected to result in significant delays to the modernisation

[11] Airport list is based on the masterplan as at October 2024. Firm Categorisation of firms is based on latest available annual accounts from Companies House. Note that Manston is not currently an operating airport.

programme, increased costs for ACP sponsors, a redesign of lower airspace that provides a less efficient network, a risk to the Government's Future of Flight programme, or all of the above. Delays to the redesign of lower airspace would also have knock-on impacts for the redesign of upper airspace.

# 6. Description of preferred option and explanation of the logical change process whereby this achieves SMART objectives

## Option 1 – a new UKADS established as a third-party entity (preferred option)

In broad terms, the UKADS would be an organisation tasked with taking a centralised role in developing and progressing ACPs, ultimately replacing the current approach involving multiple airspace change sponsors. The UKADS would work closely with existing change sponsors, who would have a 'partner' role and retain responsibility for some aspects of ACPs.

In this light, the UKADS represents an application of a tried and tested method. Most other countries including most of Western Europe, the US and Australia have a centralised approach to airspace design, making the UK and outlier in making no single organisation responsible for creating a modern and coherent airspace design. Appendix B of the UKADS consultation set out the centralised approaches of France, the Netherlands and Norway in further detail.

The UKADS also represents a revision of the existing model, taking lessons learned from the challenges that ACOG faced, as set out in the previous section. In contrast to ACOG, the UKADS would have the powers to produce its own designs and make trade-offs where necessary between the conflicting preferences of airports.

Under Option 1, which is the preferred option, the UKADS would be created within a third-party entity, NATS (En Route) plc (NERL), the air navigation service provider for en-route airspace[12] and the typical sponsor of changes to upper airspace, through a licence condition to that effect. NERL has been chosen to deliver the initial UKADS due to its existing skills, capabilities, expertise and access to the relevant structures and systems to deliver integrated airspace design. DfT and the CAA have determined that NERL is the only suitable organisation and NERL has indicated willingness to undertake the role.

The creation of the UKADS would not fundamentally change the CAP1616 process that determines how ACPs must be progressed, nor would it change how airspace is managed on a day-to-day basis. The UKADS consultation identified that some changes to CAP1616 would be needed to enable the UKADS to function effectively, and that there were additional opportunities to go further to streamline and simplify the process. The CAA is considering how the initial model of the UKADS can deliver airspace change at pace using

[12] NERL operate as a monopoly provider under a licence issued under the Transport Act 2000 and are regulated by the CAA. NERL sit within NATS, a public private partnership between the Airline Group, which holds 42%, NATS staff who hold 5%, UK airport operator LHR Airports Limited with 4%, and the Government which holds 49% (the golden share).

the existing CAP1616 process and what additional guidance is required. The CAA is committed to producing a new guidance document later this year which will address some of the issues identified through consultation.

For any given ACP within UKADS' scope, it is proposed that the UKADS is accountable under CAP1616 as the change sponsor. Airports and ANSPs at the outset of the ACP would agree what level of input is required from them. The partnership arrangement would be key in establishing the relationship between the UKADS and the partner in an ACP, i.e. an airport or ANSP. Mandatory input from the partner is expected to include safety cases, where the airport can use their detailed operational knowledge to underpin assessments.

Airports and ANSPs may choose to deliver the engagement and consultation activities, retaining control over those areas that would most benefit from their local knowledge. This requirement would be optional, as the UKADS could complete this step without the airport or ANSP being involved. Figure 5 provides an overview of the anticipated breakdown of responsibilities under a UKADS led process, detailing which activities are expected to be delivered by the UKADS and which will remain the responsibility of the airport (or other ACP "partner").

**Figure 5 ACP workstreams and responsibilities under a UKADS led process**

1. Project Management
   *Responsible organisation:* UKADS
2. Airspace / IFP Design
   *Responsible organisation:* UKADS
3. Environmental Assessment
   *Responsible organisation:* UKADS
4. Engagement and consultation
   *Responsible organisation:* The airport (or other 'partner' for the ACP) may be responsible for certain aspects if agreed, with UKADS retaining overall accountability
5. Economic Assessment:
   *Responsible organisation:* UKADS
6. Safety Case assessment
   *Responsible organisation:* The airport (or other 'partner' for the ACP)
7. Aeronautical information
   *Responsible organisation:* UKADS
8. Implementation
   *Responsible organisation:* The airport (or other 'partner' for the ACP) through the designated airspace controlling authority responsible for the airspace in question.
9. Post Implementation Review
   *Responsible organisation:* UKADS

## Funding

Any approach to funding of the UKADS will be guided by the "user pays" principle, wherein those who benefit directly from airspace modernisation will be expected to fund it.

Following the establishment of a UKADS, it is anticipated that airlines will be charged in a more mechanistic manner so that NERL can recover the costs of undertaking the ACPs. For certain ACPs, it is likely that airports will wish or be willing to undertake stakeholder engagement and consultation activities. In these instances, it is expected that they would

pay some of the costs of these activities, although it is not yet known what proportion airports would pay. As is currently the case, it is highly likely that costs facing both airlines and airports will be passed through to consumers. This is likely to have minimal implications for consumers as it is understood that the costs of undertaking ACPs are already passed through, in large part, to consumers through the impact of airport charges on fares.

This charge will also be used to finance a UK Airspace Design Support Fund that would part-finance eligible UK ACPs not being undertaken by the UKADS, to ensure equitable treatment for airports outside the UKADS' geographic scope.

## Scope

In the short term, it would not be practical for the UKADS to take immediate responsibility for all ACPs, and the range of ACPs in scope would evolve over time. Potential options are considered below:

London TMA region ACPs only

ACPs within the London TMA region have been identified as being most at risk from suffering a co-ordination failure and being delayed as a result. Under this option, the UKADS would be established to progress these ACPs as a priority, with non-London change sponsors within the scope of the masterplan continuing to progress their own ACPs.

At this stage, this is deemed to be the likely scope for the initial UKADS. The analysis contained within this impact assessment is therefore predicated upon the assumption that the UKADS initially progresses ACPs within the London TMA region only.

London TMA region ACPs + ACPs identified as a priority

In addition to the London TMA region ACPs, under this option the UKADS would be responsible for progressing ACPs deemed as a priority, which could include those with urgent safety / security implications, or others considered a priority by DfT and the CAA.

This is deemed to be a possible, but in practice less likely, short-term scope for the UKADS. Analysis based on the assumption that the UKADS focuses on London TMA region and other priority ACPs therefore forms part of the subsequent sensitivity analysis.

Rollout to all ACPs

Under this option, the UKADS would be expected to eventually take over progression of all UK ACPs. As it would take several years for capacity within the UKADS to be sufficiently grown, the UKADS would be required to focus on selective ACPs in the short term.

This is deemed to be an unlikely scope for the UKADS in its initial form, though it could be the end-state model following further consultation and legislation, and the impacts of this scope are therefore not modelled within this impact assessment.

The logical change process through which the proposed intervention option will deliver the SMART objective is detailed below:

Inputs:

- Policy, legal, and analytical resource from DfT

- Policy, legal and analytical resource from CAA

Activities:

- Laying of secondary legislation required to establish UKADS within an existing third part organisation
- Adjustments to the CAP1616 airspace change process
- Ongoing monitoring of the UKADS

Outputs

- Initial UKADS, with sufficient financial and professional resource to deliver necessary ACP workstreams
- Streamlined process appropriate to application by a UKADS

Outcomes

- ACPs, especially those within the London Cluster, are developed and implemented efficiently, resulting in the timely delivery of this key element of airspace modernisation and an optimised design for UK airspace

Impact

- Reduced fuel consumption
- Reduced carbon emissions
- Passenger time savings
- Greater capacity enabled
- Integration of new airspace users
- Enabling economic growth

**SaMBA and Medium Sized Business Impact**

The preferred option is likely to have a broadly positive impact on small, micro and medium businesses. While smaller organisations would have to act as sponsors under the baseline, and therefore bear the costs of doing so, a fully established UKADS may in future undertake this activity on their behalf.

Of the 20 airports featured in the latest masterplan, there is one micro firm, 10 medium sized firms, 8 large sized firms, and one Ministry of Defence run airport.[13] The reduction in costs for airports captured by early UKADS activity is therefore likely to accrue to larger organisations. Equally, the main identified familiarisation costs will fall predominantly on these larger organisations.

However, on the specific issue of consultation and engagement requirements in accordance with the airspace change process, small, micro and medium-sized businesses will likely see a larger reduction in costs than larger airports, in proportion to what they were paying before. Where agreed, airports will be able to continue to be responsible for delivering some of the engagement required to support effective consultation on ACPs, and consequently bear some of these costs. Alternatively, the UKADS could carry out this work.

[13] Categorisation based on latest available annual accounts from Companies House. Note that Manston is not currently an operating airport.

Based on previous engagement, it is likely that smaller airports will generally be content to take a less active role, whereas larger airports may wish to remain more heavily involved (at greater financial cost to them).

The overall impact will ultimately be dependent on the mechanism used to fund the activities of the UKADS. However, it is thought that it is highly likely that costs facing both airlines and airports in relation to the UKADS will be passed through to consumers, thereby limiting the impact on businesses.

The new charge would be charged to users of airspace, with a range of exceptions – most importantly:

- Flights by aircraft of which the Maximum Total Weight Authorised is 5,700 kg or less made entirely in accordance with the Visual Flight Rules of the Air Regulations 2015.
- Flights terminating at the aerodrome from which the aircraft has taken off.

The preferred option incorporates the use of a new charge informed by the user pays principle. The design of that new charge is likely to have a similar impact to an increase to the current en-route rate[14], in that it will be proportional to the number of passengers. Under this funding approach, the UKADS would impose a minimal burden on smaller firms.

The majority of aircraft registered in the UK fall under the weight limit. CAA data shows a total of 12,224 registered fixed wing aircraft, of which 8,977 weigh 5,700 kg or less.[15] A significant proportion of the activity within the general aviation sector, which is more predominantly comprised of smaller businesses, will therefore not face any additional charges. Furthermore, it has previously been reported that 51% of general aviation flights take off and land at the same airport, thus exempting them regardless.[16]

The vast majority of the cost would therefore fall on the major commercial airlines, both UK and foreign carriers, with those who operate the most flights over the longest distance experiencing the greatest overall cost burden. We approximate the share falling to UK airlines in line with the share of departing flights from UK airports that are accounted for by airlines with UK Air Operator Certificates – which results in 58% of costs falling to UK airlines, and 42% falling on non-UK airlines.[17]

Costs for small, micro and medium UK airlines are also estimated by each individual airline's share of total UK departures.[18] Large companies would be expected to account for 88.3% of UK commercial airlines costs, with a further 11.4% falling on medium sized organisations, and 0.3% falling on small firms.

[14] The en-route rate is a charge on operators for the provision of en route air traffic control services in UK airspace. The 2024 UK en route unit rate is £75.21, while the average cost of UK en route air traffic services is around £2.08 per passenger per flight.

[15] Aircraft register statistics | Civil Aviation Authority (caa.co.uk) 2024

[16] https://web.archive.org/web/20061007122800/http://www.gaac.co.uk/gasar/GASAR_NationalPilotSurvey.pdf

[17] DfT Analysis of CAA Airports Data, 2023

[18] Company size categories are estimated based on the latest available annual accounts at Companies House

The preferred option may have implications for the market for consultancies currently undertaking work on behalf of airspace change sponsors. While it is expected that the UKADS will continue to use these services, at least in the near to medium-term whilst the new service builds its own capability and capacity, there may be a degree of monopsony power that limits earnings potential for some organisations. This is thought to particularly apply to Instrument Flight Procedure design organisations, who undertake highly specialised activity within this sector – unlike consultancies with a broader remit, for whom work on airspace change will only represent a fraction of their overall business activity. Responses to the UKADS consultation from some of these organisations suggests that the impact of the UKADS on their businesses could be material. There is a risk that the UKADS will reduce demand for the services of these organisations, in addition to a further risk that the UKADS may hire staff from these organisations which may make it more difficult for them to fulfil existing contractual obligations or to secure new contracts. It has not been deemed feasible to implement any mitigations against this potential impact.

Of the eight affected approved Instrument Flight Procedure design organisations, there is one micro organisation, four small organisations, and one large organisation. No UK registered business activity could be identified for two of the firms.

In delivering the benefits of airspace modernisation either earlier or more effectively, the UKADS will also indirectly benefit all users of airspace, including micro, small and medium-sized businesses. Many operators of commercial aircraft are likely to be micro, small or medium-sized businesses and therefore stand to benefit from the efficiency savings generated by modernised airspace through reduced fuel costs. In addition, many of the new types of airspace user, e.g. drones, e-VTOL and spacecraft operators, are likely to be smaller businesses and will therefore benefit from the enabling impact of the UKADS on the government's future of flight strategy.

# 7. Regulatory scorecard for preferred option

## Part A: Overall and stakeholder impacts

(N.B. All costs and benefits are presented in present value terms)

## (1) Overall impacts on total welfare

### (i) Description of overall expected impact

**Costs (£1.37m)**
Costs predominately fall upon those organisations that will be captured by the funding mechanism for the UKADS – expected to largely be commercial airlines. In the absence of strong evidence to the contrary, it has been assumed that the same cost estimates for ACP Stages 3-7 apply in both Option 0 and Option 1 to avoid adding unhelpful uncertainty to cost estimates. Activity is assumed to take place earlier following the establishment of a UKADS (i.e. Option 1), leading to a present value cost of £1.28m compared with Option 0, as costs are incurred earlier due to the greater efficiency of the UKADS and thus discounted to a lesser extent.

This is largely a transfer from airspace change sponsors (predominantly airports and ANSPs) who would experience corresponding savings, although the magnitude of any

saving depends on the extent to which their costs are currently passed through to airlines. The net costs are therefore negligible and represent the difference in discounted value of undertaking ACPs in the London Cluster a year sooner than in the absence of the UKADS.

In addition, familiarisation costs of £0.09m are expected across a range of existing airspace change sponsor organisations due to a requirement to become familiar with new processes and changed responsibilities following the establishment of a UKADS.

**Benefits (£102.02m)**
The primary benefits are fuel savings to airlines operating at the London airports that are able to modernise their airspace earlier, valued at £39.20 million.

There are further substantial social benefits delivered through the associated reduction in carbon emissions, valued at £62.82 million.

**Directional Rating (example only)**
Positive (Based on all impacts (incl. non-monetised))

**(ii) Monetised Impacts**
Total NPSV is estimated at £100.65 million.

The present value of the costs and benefits are presented below. The type of impact and impacted party is presented in parentheses alongside each estimate:

**Costs (£1.37m)**
**Familiarisation costs (business, direct) – £0.09 million**

Entities that currently act as airspace change sponsors will need to familiarise themselves with the new split of responsibilities under a UKADS managed ACP. The proposal will have a larger impact on the 12 London airports in scope, which will all be expected to become fully familiar with the process at a total cost of £59,651. There are an estimated 121 current/recent change sponsors outside of the London cluster, all of which will undertake less comprehensive familiarisation, at a total cost of £30,394.

**Modernisation ACPs (business, direct) – £1.28 million**
Non-discounted aggregate ACP costs are the same in Option 1 compared with Option 0 (£122m). However, the establishment of the UKADS is expected to lead to some ACPs being completed a year earlier, with associated costs experienced earlier. With discounting, this leads to an increase in present value costs of £1.28 million between the two options.

**Benefits (£102.02m)**
More efficient use of airspace, i.e. flightpaths that more closely follow the most efficient possible flight path, will reduce fuel consumption. This will lead to financial savings for operators and reduced emissions of carbon dioxide.

**Fuel use (business, direct) – £39.20 million**
Reduced fuel consumption is estimated to lead to fuel savings worth £39.20 million over the 15-year appraisal period.

**Carbon emissions (social, indirect) – £62.82 million**
Reduced fuel consumption is estimated to lead to carbon dioxide emission savings worth £62.82 million throughout the 15-year appraisal period.

**Directional Rating (example only)**
Positive (Based on likely £NPSV)

**(iii) Non-Monetised Impacts**

**Time savings (passengers, indirect)**
As a result of more efficient flightpaths, marginal time savings for passengers are expected. These benefits would not scale linearly with fuel benefits, as fuel consumption varies considerably at different stages of flight. Modelling these impacts would be time consuming and highly dependent on the specifics of future airspace changes. Given the complexity and uncertainty, it has been deemed disproportionate to quantify this impact.

Further potential improvements from a reduction in airspace related delays are also possible.

**Noise impacts (households, indirect)**
Airspace modernisation will also result in revised flightpaths in lower airspace. As previously noted, noise impacts are prioritised in such changes, but the precise outcomes will depend on the final airspace design. It is likely that some households will benefit from revisions to flightpaths, while other households will face disbenefits from additional noise exposure. However, the net impact will not be known until ACPs are progressed.

**Capacity Impacts (indirect)**
The main constraint on the volume of air traffic using UK airports is the capacity of airports, particularly runway capacity. Subject to operational constraints (including safety), the design of airspace and the airspace change process do not specify, or limit future increases in, the volume of air traffic using a piece of airspace at any given point in time. Airspace modernisation may however remove binding constraints on capacity in some cases, enabling future airport planning applications aiming to grow activity.

The noise benefits are uncertain, but the time savings and capacity impacts are sufficiently large that the non-monetised impacts are anticipated to be positive.

**Directional Rating (example only)**
Positive

**(iv) Any Significant or adverse distributional impacts?**

**Yes**
The preferred option may have implications for the market for consultancies currently undertaking work on behalf of airspace change sponsors.

The focus of the initial UKADS will be ACPs within the London Cluster. The primary beneficiaries of the resulting efficiency (i.e. fuel) savings will be operators in the London area. These operators may be based in a variety of locations, but a number of the largest operators are headquartered in the London region (e.g. British Airways, Virgin Atlantic and EasyJet UK with head offices at Heathrow, Gatwick and Luton respectively). It is therefore probable that the impacts will be disproportionately experienced in London and the South East.

**Directional Rating (example only)**
Negative

## (2) Expected impacts on businesses

### (i) Description of overall business impact

The quantified Business NPV is £37.83m, as the result of fuel saving benefits of £39.20m minus familiarisation costs of £0.09m and net ACP costs of £1.28 million.

**Directional Rating (example only)**
Positive

### (ii) Monetised Impacts

The Business Net Present Value is £37.83m.

The estimated Equivalent Annual Net Direct Cost to Business (EANDCB) of the measure is -£3.2 million.

Fuel saving benefits of £39.20m will be experienced by operators as a result of more efficient route choices.

Businesses face net familiarisation costs of £0.09m. Non-discounted aggregate ACP costs are the same in Option 1 compared with Option 0 (£122m). However, the establishment of the UKADS is expected to lead to some ACPs being completed earlier, with associated costs experienced earlier. With discounting, this leads to an increase in present value costs of £1.28 million between the two options.

At present, ACP costs are largely borne by commercial airports, although there is likely to be a degree of cost pass-through to consumers. ACPs delivered by UKADS will be primarily funded by a charge levied on users of airspace, i.e. commercial airlines, which is also likely to be passed through to consumers.

**Directional Rating (example only)**
Positive (Based on likely business £NPV)

### (iii) Non-Monetised Impacts

**Capacity Impacts (indirect)**

The main constraint on the volume of air traffic using UK airports is the capacity of airports, particularly runway capacity. Subject to operational constraints (including safety), the design of airspace and the airspace change process do not specify, or limit future increases in, the volume of air traffic using a piece of airspace at any given point in time.

Airspace modernisation may however remove binding constraints on capacity in some cases, namely constraints on Terminal Control Area capacity, thereby enabling future airport planning applications aiming to grow activity. However, improved airspace design does not guarantee a certain level of air traffic, as the volume of air traffic using an airport may be limited by specific statutory planning caps or defined operating conditions.

**Directional Rating (example only)**
Positive

### (iv) Any Significant or adverse distributional impacts?

**Yes**

**Airspace Change Consultancies**

The preferred option may have implications for the market for consultancies currently undertaking work on behalf of airspace change sponsors. It is expected that the UKADS will

continue to use these services, at least in the medium-term while the new service builds its own capability and capacity. However, once the new service is at full capability, there may be a degree of monopsony power that limits earnings potential for some organisations. This is thought to apply particularly to Instrument Flight Procedure design organisations, who undertake highly specialised activity within this sector – unlike consultancies with a broader remit, for whom work on airspace change will only represent a fraction of their overall business activity.

However, these firms operate in an international market, and the UK is unlikely to represent the only market they operate in. Furthermore, it is expected that procurement rules will ensure that the UKADS does not unfairly utilise this market power.

**Geographical Distribution**
The primary focus of the initial UKADS will be ACPs within the London Cluster. The primary beneficiaries of the resulting efficiency (i.e. fuel) savings will be operators in the London area. These operators may be based in a variety of locations, but a number of the largest operators are headquartered in the London region (e.g. British Airways, Virgin Atlantic and EasyJet UK with head offices at Heathrow, Gatwick and Luton respectively). It is therefore probable that the impacts will be disproportionately experienced in London and the South East.

As a mitigation, the UK Airspace Design Support Fund will be introduced in conjunction with the funding model for the UKADS. This will provide funding for ACPs elsewhere in the UK, subject to meeting eligibility criteria, supporting the delivery of the benefits of airspace modernisation around the UK.

**Directional Rating (example only)**
Negative

## (3) Expected impacts on households

### (i) Description of overall business impact

Households will primarily be impacted through the noise impacts of revised flightpaths in lower airspace. As previously noted, noise impacts are prioritised in such changes, but the precise outcomes will depend on the final airspace design. It is likely that some households will benefit from revisions to flightpaths, while other households will face disbenefits from additional noise exposure. However, the net impact will not be known until ACPs are progressed and implemented.

Passengers, as a result of more efficient flightpaths, are likely to experience marginal time savings. Further potential improvements from a reduction in airspace related delays are also possible.

**Directional Rating (example only)**
Uncertain

### (ii) Monetised Impacts

There are no quantified household impacts

**Directional Rating (example only)**
Neutral (Based on likely household £NPV)

## (iii) Non-Monetised Impacts

### Time savings (passengers, indirect)

As a result of more efficient flightpaths, marginal time savings for passengers are expected. Further potential improvements from a reduction in airspace related delays are also possible.

### Noise impacts (households, indirect)

Airspace modernisation will also result in revised flightpaths in lower airspace. As previously noted, noise impacts are prioritised in such changes, but the precise outcomes will depend on the final airspace design. ACOG[19] highlight four main techniques enabled by airspace modernisation, particularly through the introduction of Performance Based Navigation (PBN) routes,[20] that may be used to limit the effects of aircraft noise through improved airspace design:

> Traffic Dispersion refers to airspace changes that enable traffic to follow the same general routeing but fly a variety of different flight paths when measured over the ground.
>
> Traffic Concentration is the opposite of dispersion and is a consequence of airspace changes that exploit the accuracy of PBN routes, where aircraft avionics are coded to automatically follow the same flight paths consistently and fly very similar tracks over the ground. The accuracy and predictability associated with PBN routes means it is possible to make more efficient use of the airspace by allowing larger volumes of traffic to fly through smaller areas, potentially avoiding population centres. The disadvantages of traffic concentration may however fall to the minority of populated areas that are affected by more frequent and intense noise impacts.
>
> Noise Respite involves the development of airspace changes to enable greater planning and predictability of aircraft noise impacts. For example, the planned use of different arrival routes (or alternating runway use as implemented at London Heathrow) at different times of day, providing communities with predictable relief from the noise impacts of inbound traffic. Another example could be alternating flights between multiple departure routes according to a pre-planned schedule.
>
> Noise Redistribution refers to airspace changes that focus on the redesign of airport arrival and departure routes at lower altitudes to allow for existing noise impacts to be redistributed away from more sensitive areas. This assumes that there are adjacent areas that are less sensitive to noise that the routes can be moved over to. The relative noise sensitivity of areas is difficult to estimate and must be carefully considered as part of a coherent and transparent trade-off process when re-distribution is the goal.

### Directional Rating (example only)

Neutral

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[19] UK Airspace Change Masterplan Iteration 2 (caa.co.uk) p.56

[20] PBN is a very accurate way of flying aircraft which uses satellite technology to allow aircraft to fly routes with more precision and consistency.

**(iv) Any Significant or adverse distributional impacts?**
**Yes**
By definition, any noise impacts brought about by the introduction of a UKADS, whether positive or negative, will be experienced by those working or living in proximity to airports within the London cluster.

**Directional Rating (example only)**
Neutral

## Part B: Impacts on wider government priorities

**(1) Business environment: Does the measure impact on the ease of doing business in the UK?**

**Description of Impact**
The measure is likely to have a positive impact on the business environment. Firstly, the measure will increase the efficiency of the use of UK airspace, leading to fuel savings and increased attractiveness of the aviation sector. In addition, modernisation of airspace is likely to have a positive impact on capacity, thereby providing opportunities for economic growth through enabling increased use of existing routes, or new routes to be opened.

**Directional Rating (example only)**
Supports

**(2) International Considerations: Does the measure support international trade and investment?**

**Description of Impact**
The measure will have a positive impact in removing some constraints on capacity within the UK aviation sector. Given the inherently global nature of air transport, this may lead to an increase in inward investment as overseas operators will be likely to benefit from additional capacity.

**Directional Rating (example only)**
Supports

**(3) Natural capital and Decarbonisation: Does the measure support commitments to improve the environment and decarbonise?**

**Description of Impact**
The measure will have a positive impact on decarbonisation. Carbon emissions from aviation are likely to be reduced by approximately 224 kilotonnes in 2033 relative to baseline emissions.

The measure will have no impact on natural capital.

**Directional Rating (example only)**
Supports

# 8. Monitoring and evaluation of preferred option

The relevant legislation will contain no statutory review clause to specify that a formal post-implementation review will take place. However, the CAA and DfT will maintain continuous oversight of the UKADS and we have committed to a review ahead of implementing any end-state UKADS model. This section contains a description of the proportionate approach to M&E that will be used by the CAA and DfT as part of this commitment.

The ongoing M&E will consider the extent to which the policy has met its overarching objective, namely the efficient development and implementation of ACPs within the London Cluster. In addition, we will seek to understand if the quality of ACPs has improved as a result of delivery by the UKADS.

This assessment will be based around progress through the CAP1616 process for each individual ACP taken forward by the UKADS and the achievement of the UKADS' Strategic Plan. Early success will be measured by the proportion of ACPs that successfully pass the "Consult/Engage" Gateway, while the ultimate measure of success will be receiving approval from the CAA at Stage 5. As this is an administrative process, process data is already captured.

ACPs related to airspace modernisation will be assessed against the timelines provided in the latest available masterplan. It is recognised that these changes are unprecedented, particularly for the London TMA region, and as such it is possible that existing estimates for delivery may not be realistic. Future iterations of the timeline will ensure that performance can be assessed against a plausible target. The CAA will be notified of any delays from the change sponsor through an "Airspace Change Proposal Change Sponsor Indicative Timeline Update Request", including a rationale for the delay.

While the UKADS will only take forward some ACPs, particularly in the short term, it is not thought reasonable to use the progress of other ACPs as a baseline against which to measure the UKADS's performance. The UKADS will explicitly be dealing with the most complex and challenging ACPs, and so will not be undertaking a directly comparable task.

Once airspace changes have been fully implemented, they will be assessed using the 3Di measure of environmental efficiency, which is calculated by comparing actual flight paths to the "preferred profile", i.e. the most efficient possible flight path[21]. While divergence from optimal flight paths, as measured by the 3Di indicator, can occur due to multiple reasons, an improvement in this measure would be expected following the successful implementation of modernised airspace.

The UKADS will also be assessed against its running costs, and the subsequent impact that the chosen funding mechanism has on the wider aviation industry and, by extension, the consumer.

The timing of this M&E will be determined by the timing of any transition to the end-state operating model of the UKADS. It is intended to utilise the experience of the initial operating model of UKADS to form the development of this body. This second phase (i.e. the establishment of an end-state UKADS), would be conditional on further consultation, legislation, and the outcome of a review of the first phase (the initial UKADS).

That review would determine:

[21] Airspace efficiency - NATS

the extent to which the initial UKADS has succeeded in delivering its objectives as set out in Section 3, and
what policy, process or legislation changes would address any unfulfilled objectives.

# 9. Minimising administrative and compliance costs for preferred option

NERL is already licenced to provide en-route air traffic services in the UK, and they provide these services subject to regulation by the CAA. The UKADS will also be subject to regulation through the NERL licence, thereby using a familiar mechanism.

Governance and reporting processes will be overseen by the co-sponsors through existing arrangements and will aim to utilise information collected in the normal course of the UKADS's work. NERL will be required to maintain the UKADS as a distinct entity within the organisation, in order to maintain accountability and for the new UK Airspace Design Charge to be applied appropriately.

The initial operating model of the UKADS is likely to have a limited geographic scope, prioritising ACPs in the London TMA region. This means that the vast majority of sponsors of ACPs across the UK will face no or negligible administrative burdens of complying with the regulation at the outset. Those whose ACPs are taken on by the UKADS will transition into a partner role through a process set out and overseen by the CAA. Airport sponsors of ACPs in the London TMA region, as well as eligible airport ACP sponsors elsewhere in the UK who satisfy the requirements for the Support Fund, are actually likely to see a decrease in ACP-related costs. While these airport sponsors pay fully for ACPs under the existing model, the majority of the costs of the UKADS' work will be borne by commercial airlines through the Airspace Design Charge.

The Government has committed to reduce regulatory administrative costs by 25%. While it is difficult at this stage to estimate exactly how much costs will fall by, there will be process efficiencies and simplifications associated with introducing the UKADS. It should be recognised that in the complex London airspace, the DfT and CAA (and other stakeholders) had lost confidence that the current model would even deliver modernisation to the timescales required; that is the counterfactual with which the UKADS should be compared.

Rather than multiple ACP sponsors each being responsible for proceeding through the CAP 1616 regulatory process themselves, coordinated by a bespoke body, ACOG, once ACP sponsors transition to the partner role, the administrative burden on them will naturally reduce, as the UKADS takes the greater share of the administrative responsibility.

At present, there are significant administrative costs associated with proceeding through the CAP 1616 regulatory process. NERL's response to the UKADS consultation noted that in the Scottish cluster of the airspace change masterplan, comprising Glasgow and Edinburgh airports and NERL, documentation submitted at the Stage 3 gateway stage totalled more than 2,500 pages. The London cluster is significantly more complex than the Scottish cluster and the administrative burden of those 11 London airports, each with interdependencies with their neighbours, designing their own portion of airspace and progressing that proposal through the CAP 1616 process, with ACOG coordinating those airports through an elaborate airspace change masterplan, is potentially enormous. There

is very significant potential for a single airspace design entity creating a single design and subsuming ACOG's role to reduce that administrative burden.

The process for consulting impacted stakeholders (including local communities), while still led by each airport, is potentially much less onerous because the UKADS will act as coordinator and stipulate common consultation materials and so on.

The UKADS will be a single point of contact between sponsor and the CAA as regulator rather than 11 different touchpoints at present, plus ACOG, plus NERL. Regulatory oversight and governance of the modernisation programme by the DfT and CAA will be less burdensome.

Furthermore, the DfT and CAA recognise that in order to introduce the UKADS, it will be necessary to simplify and streamline the airspace change process. Not only does the CAA plan to produce new UKADS-specific guidance, but the DfT and CAA are also planning a package of measures to make the process for making airspace design decisions more proportionate, whilst retaining the important principles of a transparent, evidence-based airspace change process that will involve impacted stakeholders. These measures will facilitate the setting of more proportionate administrative requirements for the UKADS and other ACP sponsors, and therefore more proportionate administrative costs for complying with CAP 1616.

Most airports do not have the expertise for airspace design in-house and contract out the technical work. Dispersed and scarce airspace design expertise in the industry sometimes leads to inconsistent standards and variable quality in ACP submissions. The outputs may be based on differing working assumptions, interpretations and standards. Submissions sometimes have to be reworked, creating knock-on effects to interdependent airports (the cluster proceeds at the pace of the slowest). This causes delays in the modernisation programme. Because the specialist consultancy firms are in competition and expertise is dispersed among them, it is difficult to share best practice and lessons learned, or to establish a more common approach. All this creates significant inefficiencies. In some cases, airports have not progressed through the Stage 2 process gateway multiple times, requiring work to be redone and adding to cost accumulation. In contrast, we would expect the UKADS to consolidate the necessary experience and technical expertise such that gateways (which are confirmation that the process has been followed correctly) would generally be passed first time.

The UK Airspace Design Charge is expected to be collected through existing mechanisms used to collect the UK en-route rate, thereby minimising the costs of familiarisation and administration for those who will pay it (primarily commercial airlines) and to the process of passing the funds on to the UKADS.

The performance of the UKADS will be subject to continuous oversight and future reviews by DfT and the CAA as the co-sponsors of airspace modernisation, and is expected to be monitored closely by affected stakeholders (especially airport partners or airlines funding the model). If administrative and compliance costs were deemed to be particularly burdensome, this could be revisited by the co-sponsors. There will be no administrative burdens on households or individuals.

# Declaration

Department:

Department for Transport

Contact details for enquiries:

airspace.modernisation@caa.co.uk

Minister responsible:

Mike Kane

I have read the De-Minimis Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed:

Date: 19/05/2025

# Summary: Analysis and evidence

For Final Stage De-Minimis Assessment, please finalise these sections including the full evidence base.

## Price base year: 2025

## PV base year: 2025

**Net present social value**
**(with brief description, including ranges, of individual costs and benefits)**

**1. Business as usual (baseline)**
Not estimated – this is the baseline against which other options have been evaluated

**2. Do-minimum Option**
The net present social value (NPSV) of this option is estimated to be £100.65m in the Central Effectiveness scenario. This estimate consists of present value costs of £1.37m, resulting from familiarisation costs (£0.09m) and net ACP costs (£1.28m) and present value benefits of £102.02m, consisting of £39.20m of fuel savings and £62.82m of carbon dioxide emissions savings.

Based on a 15-year appraisal period, chosen to align with the remaining timelines of the Airspace Modernisation Strategy (2025-2040), the Equivalent Annual Direct Cost to Business (EANDCB) is -£3.2m.

**Public sector financial costs (with brief description, including ranges)**

1. **Business as usual (baseline)**
Not estimated – this is the baseline against which other options have been evaluated

**2. Do-minimum Option**
There are no estimated public sector financial costs. Any charges incurred by the UKADS will be recouped from industry through a suitable charging mechanism, ensuring that costs are levied on a “user pays” principle.

**Significant un-quantified benefits and costs (description, with scale where possible)**

1. **Business as usual (baseline)**
Not estimated – this is the baseline against which other options have been evaluated.

**2. Do-minimum Option**
As a result of more efficient flightpaths, marginal time savings for passengers are expected. Further potential improvements from a reduction in airspace related delays are also possible.

Airspace modernisation will also result in revised flightpaths in lower airspace. As previously noted, noise impacts are prioritised in such changes, but the precise outcomes will depend on the final airspace design. It is likely that some households will benefit from revisions to flightpaths, while other households will face disbenefits from additional noise exposure. However, the net impact will not be known until ACPs are progressed.

Airspace modernisation may however remove binding constraints on capacity in some cases, enabling future airport planning applications aiming to grow activity and enable economic growth.

## Key risks (and risk costs, and optimism bias, where relevant)

1. **Business as usual (baseline)**
Not estimated – this is the baseline against which other options have been evaluated.

**2. Do-minimum Option**
The modelling has used three scenarios to estimate the potential impacts of the policy. However, there remains some uncertainty regarding key inputs to the analysis, most notably the extent to which airspace modernisation will lead to savings in excess CO2 emissions. This risk has been mitigated through the use of High and Low Effectiveness scenarios to estimate a range of potential benefits.

In addition, there is some uncertainty regarding the costs of delivering ACPs. However, these costs are also expected in Option 0 and the net impact is minimal as it is the result of differences arising due to discounting of future cash flows.

## Results of sensitivity analysis

1. **Business as usual (baseline)**
Not estimated – this is the baseline against which other options have been evaluated.

**2. Do-minimum Option**
Estimates of the NPSV in the High Effectiveness and Low Effectiveness scenarios are £126.16m and £46.64m respectively

# Evidence base

## Summary of Analysis

This section outlines the methodologies used for estimating the cost and benefits of Option 1 in comparison with Option 0.

This Impact Assessment focuses on costs and benefits arising from airspace changes found within the masterplan for airspace modernisation. To align with the masterplan, which provides a single coordinated implementation plan for ACPs up to 2040, costs and benefits are assessed over a 15-year period. This allows for sufficient consideration of ongoing benefits, while not spuriously including longer term impact for which there remains an unacceptably high degree of uncertainty.

The establishment of an End state UKADS would require future primary legislation. More detailed analysis of the long-term impacts of this option would be undertake at the relevant time.

The assessment does not consider in detail the implications of different funding mechanisms. Any new charge would be subject to its own assessment and consultation. As any new charge would be designed to follow the user-pays principle, the likely impacts on business are inferred based on similar existing charges. While the choice of funding mechanism will have implications for the wider sector, it is not thought to substantially affect the core outcomes being delivered by the UKADS and assessed in this IA.

The quantitative assessment of benefits focusses on changes to airspace in each of the relevant four clusters. While changes may deliver a range of benefits, including the more efficient use of airspace, it is not possible to pre-judge the precise impact of individual ACPs. Potential noise impacts of lower airspace change are therefore considered qualitatively.

Substantial efficiencies are also expected to be achieved through NERL's changes to upper airspace outside of the regional clusters. While there are clear dependencies between changes to lower and upper airspace, as the UKADS will have less of a direct impact on upper airspace changes, any potential impact outside of the regional clusters is excluded from the quantitative assessment.

**Figure 6 Summary of Costs and Impacts, 2025 prices, not discounted**

**(1) Impact: Familiarisation**
- Type: Cost – Business – Direct – Quantified
- Option 1: £0.1 million

**(2) Impact: Modernisation ACPs (Net)**
- Type: Cost – Business – Direct – Quantified
- Option 1: £1.3 million

**(3) Impact: Fuel Use**
- Type: Benefit – Business – Direct – Quantified
- Option 1: £39.2 million

**(4) Impact: Carbon Emissions**
- Type: Benefit – Social – Indirect – Quantified
- Option 1: £62.8 million

**(5) Impact: Aviation Noise**

- Type: Unclear – Social – Direct – Unquantified
- Option 1: Noise impacts uncertain – while modernisation will introduce additional technologies to manage impacts, specific outcomes will depend on agreed flightpaths.

**(6) Impact: UKADS start-up**

- Type: Cost – Business – Direct – Unquantified
- Option 1: Further costs will be incurred when establishing the Initial UKADS. These costs will be recovered from industry through a suitable charge.

**(7) Impact: Passenger time savings**

- Type: Benefit – Business / Social – Indirect – Unquantified
- Option 1: Both leisure and business passengers will benefit from reduced delays and journey times.

## Modelling Approach

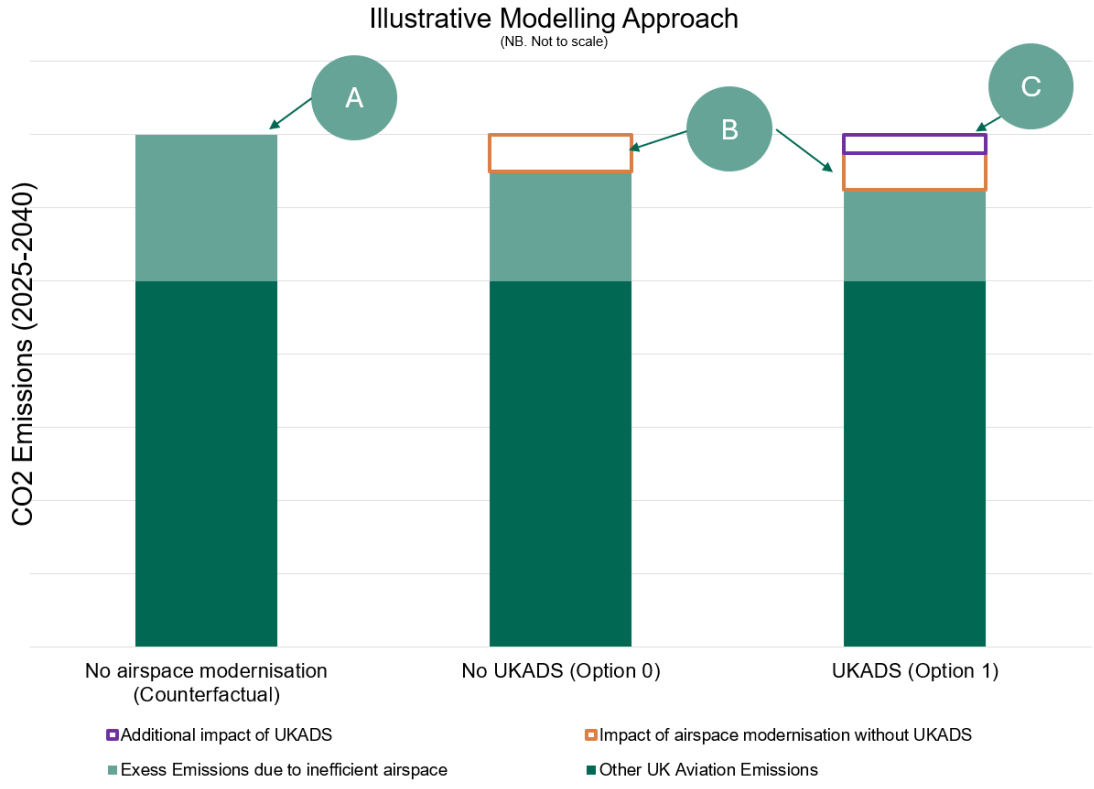
The overall approach used to model the benefits of the preferred option is outlined below. For the period 2025-2040:

1. A time series is constructed to estimate carbon emissions that are the consequence of inefficient use of (unmodernised) airspace (label A below)

2. Estimates are made regarding the proportion of A that will be avoided by airspace modernisation in the absence of the UKADS (label B below).

3. Further estimates are made regarding the additional proportion of A that will be avoided by earlier airspace modernisation as a result of the UKADS (label C below). This is estimated by considering the additional years of modernised airspace that will be realised by the preferred option.

**Figure 7 Illustration of modelling approach**



Fuel benefits are subsequently calculated by considering the carbon intensity of aviation fuel throughout the appraisal period.

# Option 0 – Do nothing

## Summary

In order to create a baseline against which to assess the proposed option, it is necessary to first establish the likely progress and impact of airspace modernisation in the absence of a UKADS. To this end, we have made indicative estimates of:

1. Fuel burn and CO2 emissions caused by the inefficient use of (unmodernised) airspace
2. The year that modernised airspace designs will be in place for each cluster
3. The proportion of the inefficient use of airspace that modernisation will be able to abate

To produce estimates of baseline excess CO2 emissions, the following calculations were undertaken:

1. Future inefficiency due to unmodernised airspace is based on modelling presented in Masterplan Iteration 2[22]. This provides estimates for the total amounts of excess CO2 emitted in 2019 as a result of the inefficient use of airspace in each of the four clusters. These are calculated using the NATS 3Di indicator, which calculates environmental efficiency by comparing actual flight paths to the “preferred profile”, i.e. the most efficient possible flight path[23].
2. These estimates are first adjusted to 2023, proportionally in line with changes to passenger numbers since 2019. While excess CO2 emissions and fuel burn will not correlate perfectly with changes to passenger numbers, it is deemed sufficiently correlated to undertake this initial adjustment.
3. Excess emissions are increased by 2% per year to account for future growth in aviation activity. This assumption is broadly in line with the average long term forecast passenger growth under Scenario 1 of the department’s Jet Zero forecasts (which predict a 74% increase by 2050)[24].
4. CO2 emissions and fuel burn are reduced by 1.5% each year to account for assumed fuel efficiency improvements, also in line with Scenario 1 of the Jet Zero passenger forecasts.
5. The impact of the Sustainable Aviation Fuel (SAF) mandate is incorporated, with SAF increasing from 2% of fuels in 2025 to 22% by 2040. In line with previous DfT analysis, it is assumed that SAF reduces carbon emissions for each kg of fuel by 70%.

The resulting baseline excess emissions for 2025 are presented below:

[22] UK Airspace Change Masterplan Iteration 2 (caa.co.uk) p.42 - 48

[23] Airspace efficiency - NATS

[24] Jet Zero illustrative scenarios and sensitivities (publishing.service.gov.uk)

**Figure 8 Baseline annual excess CO2 emissions, tonnes**

| Annual Excess CO2 emissions | 2019 (original estimate) | 2025 (adjusted baseline) |
|---|---|---|
| Scottish Cluster | 35,651 | 33,740 |
| Western Cluster | 81,000 | 86,119 |
| Manchester Cluster | 87,500 | 83,748 |
| London Cluster | 1,234,765 | 1,170,995 |

In the do-nothing scenario, timelines for airspace modernisation are broadly based on those set out in Masterplan Iteration 2[25], updated to account for further delays to the programme in the two years since this was published. These do not represent a conclusive assessment by the department of expected future progress, but are intended to provide a plausible baseline upon which to base analysis. These dates are displayed in Figure 9 below:

**Figure 9 Indicative dates for masterplan ACP completion**

| Cluster | Year |
|---|---|
| Scottish Cluster | 2027 |
| Western Cluster | 2026 |
| Manchester Cluster | 2029 |
| London Cluster | 2034 |

The proportion of inefficiency that airspace modernisation will be able to abate is subject to significant uncertainty. Observed differences between actual and ideal flightpaths may occur for a number of reasons, including ones that cannot be controlled (such as the actions of other countries' air traffic control organisation). Furthermore, even with modernised airspace, the London area in particular will remain highly congested – it is unlikely that all flights from all airports would be able to fly their optimal path.

For the purposes of this DMA we have utilised a central value of 20% to represent the proportion of excess carbon emissions that will be avoided through the modernisation of airspace within each cluster. This value is an estimate and is motivated by DfT engagement with the CAA and industry. Previous research has indicated a wide range of efficiency improvement potential for modernised airspace and this value was identified as a plausible mid-point from this research. There is a high degree of uncertainty in this estimate and the impact of this estimate is explored in subsequent sensitivity analysis.

Based on the above timelines for airspace modernisation, the excess quantities of CO2 emitted over the appraisal period, incorporating the impact of airspace modernisation in the absence of the UKADS, can be estimated. This is presented in Figure 10 below, which shows excess CO2 emissions throughout the appraisal period for Option 0, i.e. CO2

[25] UK Airspace Change Masterplan Iteration 2 (caa.co.uk) Appendix A

emissions due to inefficient use of airspace, incorporating the impact of airspace modernisation based on non-UKADS timelines.

**Figure 10 Excess CO2 emissions, thousand tonnes**

| Cluster | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scottish Cluster | 34 | 33 | 27 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 25 | 25 | 25 |
| Western Cluster | 86 | 68 | 68 | 67 | 67 | 67 | 66 | 66 | 66 | 66 | 66 | 65 | 65 | 64 | 64 |
| Manchester Cluster | 84 | 83 | 83 | 82 | 65 | 65 | 65 | 64 | 64 | 64 | 64 | 64 | 63 | 63 | 62 |
| London Cluster | 1,171 | 1,160 | 1,157 | 1,145 | 1,142 | 1,131 | 1,127 | 1,124 | 1,121 | 894 | 891 | 888 | 878 | 876 | 865 |

When analysing the impacts of the preferred option, these CO2 emission estimates are subsequently used alongside carbon intensity estimates to calculate excess fuel consumption.

## Costs

Costs incurred by airports to undertake masterplan ACPs in the baseline are based on preliminary cost estimates for small, medium and large ACPs, broken down by stage.

ACOG have made initial categorisations of the airspace changes within the masterplan as either small, medium or large. These are summarised at cluster level below.

**Figure 11 Categorisation ACPs within masterplan**

| Cluster | Small ACPs | Medium ACPs | Large ACPs |
|---|---|---|---|
| Scottish Cluster | 0 | 2 | 0 |
| Western Cluster | 1 | 1 | 0 |
| Manchester Cluster | 1 | 2 | 1 |
| London Cluster | 6 | 3 | 3 |

The specific costs incurred by any ACP will be highly dependent on individual circumstances. As such, these figures only serve as broad indicators. These costs have been adjusted to 2025 prices and uplifted by 25% to account for contingency / risk. This is an unevidenced assumption that has been included to ensure alignment with HMT Green Book guidance regarding optimism bias[26].

Since the publication of the UKADS consultation and accompanying DMA, the CAA have published a complementary consultation, CAP3063[27], to explore elements of the proposal relating specifically to the economic regulation of NERL. Part of this project incorporated engagement with NERL and a range of masterplan airports to understand the costs relating

[26] https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government/the-green-book-2020#a5-uncertainty-optimism-bias-and-risk

[27] CAP3063: Economic Regulation of NERL, available at https://www.caa.co.uk/our-work/publications/documents/content/cap3063/

to ACPs to date. Although detailed data from this engagement was not available due to commercial sensitivities, sufficient evidence was gathered to suggest that the ACP cost estimates used within the consultation DMA significantly underestimated the costs of undertaking ACPs. Therefore, in addition to the adjustments listed above, the consultation ACP cost estimates have been uplifted by a further 100% to incorporate new evidence. The adjusted ACP costs are detailed in Figure 12.

**Figure 12 Estimated cost of delivering an airspace change, by size of change and stage of process, £m**

| Cost + risk / contingency | Small ACPs | Medium ACPs | Large ACPs |
|---|---|---|---|
| **Stage 3** | £1.30 | £2.08 | £7.80 |
| **Stage 4** | £0.84 | £1.35 | £5.07 |
| **Stage 5** | £0.13 | £0.21 | £0.78 |
| **Stage 6** | £0.32 | £0.52 | £1.95 |
| **Stage 7** | £0.13 | £0.21 | £0.78 |

Finally, costs are profiled to align with the indicative dates for each cluster's completion of their masterplan related ACPs, as follows:

Stages 3-5: aggregated and allocated uniformly between 2025 and the year prior to assumed implementation
Stage 6 (implementation): assumed to fall in the year of completion
Stage 7 (Post Implementation Review): the CAP1616 process requires ACP sponsors to collect data for 12 months following implementation before working through the PIR process. A simplifying assumption is made that the majority of the PIR costs are incurred in the year following implementation, i.e. during data collection.

The resulting cost profile is displayed below:

**Figure 13 Baseline masterplan ACP cost (not discounted), 2024 prices, £m**

| Cluster | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scottish Cluster | £3.64 | £3.64 | £1.04 | £0.42 | £0.00 | £0.00 | £0.00 | £0.00 | £0.00 | £0.00 | £0.00 | £0.00 | £0.00 | £0.00 | £0.00 |
| Western Cluster | £5.91 | £0.84 | £0.34 | £0.00 | £0.00 | £0.00 | £0.00 | £0.00 | £0.00 | £0.00 | £0.00 | £0.00 | £0.00 | £0.00 | £0.00 |
| Manchester Cluster | £5.80 | £5.80 | £5.80 | £5.80 | £3.31 | £1.33 | £0.00 | £0.00 | £0.00 | £0.00 | £0.00 | £0.00 | £0.00 | £0.00 | £0.00 |
| London Cluster | £7.28 | £7.28 | £7.28 | £7.28 | £7.28 | £7.28 | £7.28 | £7.28 | £7.28 | £9.36 | £3.74 | £0.00 | £0.00 | £0.00 | £0.00 |

# Option 1 – Initial UKADS (London TMA region)

## Monetised Benefits

To demonstrate the potential impact of the UKADS, three indicative scenarios have been developed:

- Medium Effectiveness scenario: it is assumed that ACPs within the London cluster are delivered one year earlier than currently anticipated, i.e. in 2033 rather than 2034. As above, it is assumed that modernised airspace will avoid 20% of excess carbon emissions in each cluster.
- High Effectiveness scenario: As in the central scenario, it is assumed that the timelines for ACPs in the London cluster are delivered one year earlier than anticipated. It is assumed that the proportion of inefficiency that modernisation can abate is 25% greater than in the baseline scenario, i.e. 25% of excess carbon emissions can be abated, rather than 20%. This upper range has been chosen as the maximum plausible efficiency saving that could be delivered.
- Low Effectiveness scenario: The timelines are unchanged from the central scenario. It is assumed that the proportion of inefficiency that modernisation can abate is reduced by 50%, i.e. 10% of excess carbon emissions can be abated, rather than 20%.

The Medium effectiveness scenario is considered the most plausible of three scenarios and forms the basis of the central scenario within this impact assessment. Compared with the Do Nothing scenario, all scenarios lead to an additional year of carbon savings (2033), with no longer term impacts assumed.

### Carbon Savings

The effectiveness parameters, baseline excess carbon emissions from Figure 10 and UKADS masterplan ACP completion timings to estimate the carbon savings of the preferred option. The carbon savings of each scenario are presented in Figure 12 below:

**Figure 124 Change in CO2 emissions relative to Option 0, thousand tonnes**

| Effectiveness | 2032 | 2033 | 2034 |
|---|---|---|---|
| Central Effectiveness | 0 | -224.2 | 0 |
| High Effectiveness | 0 | -280.2 | 0 |
| Low Effectiveness | 0 | -112.1 | 0 |

Changes in carbon emissions are monetised in line with DfT appraisal guidance[28]. As such, the expected traded value in future emissions are subtracted from the expected future social value when emissions fall under a carbon trading scheme in order to “take account of variations in the market price of carbon between different pricing schemes.”

[28] TAG Unit A5.2 Aviation Appraisal (publishing.service.gov.uk)

Carbon Appraisal Values are based on the Green Book central scenario[29], while traded values are based on forecast "Market Carbon Values" for flights under the UK ETS[30], and illustrative price assumptions developed for the Jet Zero Strategy for flights falling under the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). A small proportion of flights are expected to remain outside of the traded sector. The proportion of flights expected to fall under each trading scheme is taken from the department's Jet Zero Strategy forecasts.

The weighted traded value at time t is calculated by performing the following calculation:

$$\textit{Weighted traded value}_t$$

$$= \textit{ETS Price}_t \times \textit{Proportion of flights taking place under ETS}_t$$

$$+ \textit{CORSIA Price}_t \times \textit{Proportion of flights taking place under CORSIA}_t$$

This is subsequently subtracted from the corresponding Green Book central scenario social values to calculate the net social cost for each year of the appraisal period.

**Figure 15 Carbon price summary, £/tCO2**

| Factor | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 |
|---|---|---|---|---|---|---|---|---|---|
| **Carbon Appraisal Value** | 401 | 407 | 413 | 419 | 426 | 432 | 439 | 446 | 452 |
| **ETS price** | 118 | 127 | 135 | 139 | 152 | 161 | 169 | 182 | 182 |
| **CORSIA price** | 9 | 9 | 11 | 13 | 14 | 50 | 89 | 128 | 170 |
| **Weighted traded value** | 39 | 41 | 44 | 46 | 50 | 76 | 104 | 133 | 161 |
| **Net Carbon Appraisal Value** | 362 | 366 | 369 | 374 | 375 | 356 | 335 | 312 | 291 |

## Fuel Savings

The reduction in carbon emissions is converted into fuel savings for airlines at a ratio of 1kg jet fuel to 3.18 kg CO2e[31]. Fuel costs are based on market jet fuel prices[32], grown in line with future Fossil Fuel Price Assumptions for Oil[33]. In addition, the price impact of an increasing proportion of SAF within the fuel mix is incorporated, using DfT's internal assumptions regarding SAF prices.

Both benefits are discounted at 3.5% per annum over the course of the appraisal period and are summarised below.

[29] Valuation of energy use and greenhouse gas (GHG) emissions (publishing.service.gov.uk)

[30] Traded carbon values used for modelling purposes, 2023 - GOV.UK (www.gov.uk)

[31] Conversion factor for "aviation turbine fuel" from the Department for Energy Security and Net Zero (DESNZ) Greenhouse gas reporting: conversion factors 2024 dataset

[32] IATA Jet Fuel Price Monitor (w/e 29th November 2024)

[33] DESNZ Fossil Fuel Price Assumptions 2023

**Figure 16 Option 1 monetised benefits (Monetary values expressed in present value terms, 2025 prices)**

| Effectiveness | CO2 emissions reduction (thousand tonnes) | CO2 emissions reduction (£m) | Fuel saving (tonnes) | Fuel Saving (£m) | Total |
|---|---|---|---|---|---|
| **Central Effectiveness** | 224 | £62.82 | 78 | £39.20 | £102.02 |
| **High Effectiveness** | 280 | £78.52 | 97 | £49.00 | £127.53 |
| **Low Effectiveness** | 112 | £31.41 | 39 | £19.60 | £51.01 |

## Non-monetised benefits

### Time savings

Alongside reduced expenditure on fuel by airlines, and the associated reduction in emissions, we would expect time savings to occur for passengers as a result of more efficient flightpaths. Marginal time savings would be expected as a direct outcome of more efficient flightpaths, with further potential improvements relating to a reduction in airspace related delays.

### Noise impacts

Airspace modernisation will also result in revised flightpaths in lower airspace. As previously noted, noise impacts are prioritised in such changes, but the precise outcomes will depend on the final airspace design. ACOG[34] highlight four main techniques enabled by airspace modernisation, particularly through the introduction of Performance Based Navigation (PBN) routes,[35] that may be used to limit the effects of aircraft noise:

- **Traffic Dispersion** refers to airspace changes that enable traffic to follow the same general routeing but fly a variety of different flight paths when measured over the ground.
- **Traffic Concentration** is the opposite of dispersion and is a consequence of airspace changes that exploit the accuracy of PBN routes, where aircraft avionics are coded to automatically follow the same flight paths consistently and fly very similar tracks over the ground. The accuracy and predictability associated with PBN routes means it is possible to make more efficient use of the airspace by allowing larger volumes of traffic to fly through smaller areas, potentially avoiding population centres. The disadvantages of traffic concentration may however fall to the minority of populated areas that are affected by more frequent and intense noise impacts.
- **Noise Respite** involves the development of airspace changes to enable greater planning and predictability of aircraft noise impacts. For example, the planned use of different arrival routes (or alternating runway use as implemented at London Heathrow)

[34] UK Airspace Change Masterplan Iteration 2 (caa.co.uk) p.56

[35] PBN is a very accurate way of flying aircraft which uses satellite technology to allow aircraft to fly routes with more precision and consistency.

at different times of day, providing communities with predictable relief from the noise impacts of inbound traffic. Another example could be alternating flights between multiple departure routes according to a pre-planned schedule.

- **Noise Redistribution** refers to airspace changes that focus on the redesign of airport arrival and departure routes at lower altitudes to allow for existing noise impacts to be redistributed away from more sensitive areas. This assumes that there are adjacent areas that are less sensitive to noise that the routes can be moved over to. The relative noise sensitivity of areas is difficult to estimate and must be carefully considered as part of a coherent and transparent trade-off process when re-distribution is the goal.

### Capacity Impacts

The main constraint on the volume of air traffic using UK airports is the capacity of airports, particularly runway capacity. Subject to operational constraints (including safety), the design of airspace and the airspace change process do not specify, or limit future increases in, the volume of air traffic using a piece of airspace at any given point in time. Airspace modernisation may however remove binding constraints on capacity in some cases, enabling future airport planning applications aiming to grow activity. Further activity would be expected to lead to growth in both the benefits and disbenefits of aviation. Any such planning application would be subject to its own full appraisal.

Should the UKADS enable the earlier delivery of lower / middle airspace redesign, this may also help enable the benefits delivered by upper airspace redesign. As terminal airspace was responsible for slightly less than 50% of environmental inefficiency in the UK airspace system in 2019[36], the benefits of upper airspace redesign are considerable. While these benefits are not attributable directly to the UKADS, it is reasonable to conclude that the UKADS reduces the risks to delivery faced by the programme of upper airspace change.

## Monetised Costs

### Familiarisation Costs

Entities that currently act as airspace change sponsors will need to familiarise themselves with the new split of responsibilities under a UKADS-managed ACP. Given the proposed timescales for the introduction of the UKADS, this may involve short-term reorganisation of staffing and wider budgets.

For this option, we assume that only those airports within the London Cluster become fully familiarised with the process. We assume that the equivalent of one person-month at ‘Manager, director or senior official’ level is required at each of the 12 London airports in scope, at £45,348 per annum (in 2023 prices)[37]. This value is adjusted to 2025 prices and further uplifted by a factor of 1.265 to account for non-wage costs. This results in a cost per firm of £4,971, and a total cost of £59,651.

[36] UK Airspace Change Masterplan Iteration 2 (caa.co.uk) p.19

[37] ASHE Provisional Figures, 2023 – Table 14.7a – Median salary for ‘Managers, directors and senior officials’ uplifted to 2024 prices

A total of 133 current / recent change sponsors have been identified on the CAA's Airspace Change Portal.[38] We assume that current change sponsors outside of the London Cluster will undertake a less comprehensive process of familiarisation. Assuming the 121 non-London organisations spend only 8 hours familiarising, with all other assumptions as above (using the equivalent ASHE hourly wage figure), this results in a per-firm cost of £251, and a total cost of £30,394.

Total familiarisation costs for Option 1 are therefore £90,045 and it is assumed that all of these costs are experienced in the first year of the policy.

### ACP Costs

The estimated costs of airport-led ACPs are presented below. It is unclear how these costs may vary if the ACPs are instead delivered by the UKADS. There are number of reasons to assume that costs may be lower - the UKADS may benefit from economies of scale, allowing for individual ACPs to be delivered more cheaply. Furthermore, if the UKADS is able to mitigate the risk of further delays to airspace change delivery, ongoing costs may be reduced.

There is, however, insufficient evidence at this stage to form a robust estimate of the potential change in costs. As such, we conservatively assume that the same cost estimates for Stages 3-7 used in the baseline apply in this case. Present value costs therefore increase in all scenarios, as activity is re-timed to be earlier, and are thus discounted to a lesser extent. Net Present Costs for all scenarios are displayed below:

**Figure 17 Option 1 London ACP Net Present Costs, £m**

| Effectiveness | Net Present Cost |
|---|---|
| **Central Effectiveness** | £1.28 |
| **High Effectiveness** | £1.28 |
| **Low Effectiveness** | £1.28 |

While there is limited change to the total cost of undertaking these ACPs, the organisations that these costs initially fall to will differ to the baseline, depending on the selection of funding mechanism. At present, ACPs are funded by airports, although it is understood that a significant proportion of costs are passed through to airlines by airports. It is highly likely that these costs are subsequently passed through to consumers.

Following the establishment of a UKADS, it is anticipated that airlines will be charged in a more mechanistic manner so that NERL can recover the costs of undertaking ACPs. For certain ACPs, it is likely that airports will be willing to undertake stakeholder engagement and consultation activities. In these instances, it is expected that they would pay some of the costs of these activities, although it is not yet known what proportion airports would pay. As is currently the case, it is highly likely that costs facing both airlines and airports will be passed through to consumers.

[38] DfT analysis of Airspace change portal (caa.co.uk)

## Non-monetised costs

There will be further costs, for example relating to administrative changes and operational set-up, associated with the establishment of an Initial UKADS, although these would be limited by establishing the UKADS within an existing third-party organisation. It has not been possible to quantify these costs but these are thought to be small in comparison with the monetised benefits.

## Summary

All monetised impacts for the three indicative scenarios are presented below. For reporting purposes within this De-Minimis Assessment, the Central Effectiveness scenario is considered to be the core scenario.

**Figure 18 Option 1 monetised impacts, Net Present Value, £m**

| Effectiveness | CO2 emissions reduction | Fuel Saving | Familiarisation | ACP Net Cost | Net Present Value |
|---|---|---|---|---|---|
| Central Effectiveness | £62.82 | £39.20 | -£0.09 | -£1.28 | £100.65 |
| High Effectiveness | £78.52 | £49.00 | -£0.09 | -£1.28 | £126.16 |
| Low Effectiveness | £31.41 | £19.60 | -£0.09 | -£1.28 | £49.64 |

In addition, the Central Effectiveness scenario has a Business NPV of £37.8 million and an Equivalent Annual Net Direct Cost to Business of -£3.2 million.

### Risks and Assumptions

There is a risk that current airspace change sponsors may delay progressing their own ACPs if they expect a UKADS to assume responsibility in the future, thus reducing their own costs. In such a case, the UKADS could potentially result in some ACPs being delivered later than under the baseline option. This is not thought to be a substantive risk for two main reasons. Firstly, airports stand to gain some benefit from the modernisation of their airspace and are thus incentivised to ensure it is achieved as soon as possible. Secondly, the Secretary of State has powers under the Air Traffic Management and Unmanned Aircraft Act 2021[39] that allow for the direction of airports to progress their airspace changes to reasonable timescales, with financial penalties for noncompliance.

A second risk relates to the ability of the UKADS, regardless of the precise delivery model, to hire sufficient skilled staff to progress the targeted ACPs. The labour pool for certain skills such as instrument flight procedures design is extremely small, and acquiring staff may be highly challenging. However, this may largely be mitigated by the UKADS adopting the same approach of current change sponsors – utilising consultancies to deliver much of this activity. Such a solution may however limit the potential economies of scale that the UKADS could benefit from. Another risk relates to the split in responsibilities for progressing ACPs under the UKADS. Under the preferred option, previous change sponsors would still deliver items such as the safety case, stakeholder consultation and implementation. It is possible that frictions may arise between the UKADS and the former change sponsor. As each creates outputs that the other will require as inputs, relationships between the UKADS and

[39] Air Traffic Management and Unmanned Aircraft Act 2021 (legislation.gov.uk)

former change sponsors will need to be closely managed, with governance processes ensuring accountability for delivery.

Similarly, there is a risk that the UKADS is not effective as it's not established on a statutory basis and therefore lacks the powers it needs. This would only apply to the initial operating model for the UKADS. This is mitigated both by the longer-term plan for the UKADS and by the accountability for delivery built into its governance model, as well as the generally supportive approach of current ACP sponsors. It is expected that the UKADS will have sufficient capability to meet its remit.

Lastly there is a risk that the UKADS is not set-up in time to progress priority ACPs through stage 3 of the CAP1616 process. This would most likely mean delays while existing sponsors waited for the UKADS to take over their ACPs. However, it is anticipated that the UKADS can feasibly be set-up in broad alignment with current ACPs in the London cluster reaching stage 3, and failure to achieve this could also be mitigated by the co-sponsors working with affected airports to progress specific areas of work, minimising delays without causing duplication.

**Small, Micro and Medium Business Assessment**

The preferred option is likely to have a broadly positive impact on small, micro and medium business. Under the baseline, smaller organisation would themselves have to act as sponsors and experience the costs of doing so. When the UKADS is fully established, responsibility for undertaking ACPs on behalf of the smaller organisations is likely to lie with the UKADS, thereby providing a benefit to these organisations. This may help to level the playing field between smaller and larger organisations given that the costs of undertaking ACPS are disproportionately large for smaller organisations.

As such, it is not reasonable to exempt small and micro businesses. Of the 20 airports featured in the latest masterplan, there is one micro firm, 10 medium sized firms, 8 large sized firms, and one Ministry of Defence run airport.[40] The reduction in costs for airports captured by early UKADS activity is therefore likely to accrue to larger organisations. Equally, the main identified familiarisation costs will fall predominantly on these larger organisations.

The overall impact will ultimately be dependent on the mechanism used to fund the activities of the UKADS. The preferred option incorporates the use of a new charge informed by the user pays principle. The design of that new charge is likely to have a similar impact to an increase to the current en-route rate. Under this funding approach, the UKADS would impose a minimal burden on smaller firms. The new charge would be charged to users of airspace, with a range of exceptions – most importantly:

- Flights by aircraft of which the Maximum Total Weight Authorised is 5,700 kg or less made entirely in accordance with the Visual Flight Rules of the Air Regulations 2015.
- Flights terminating at the aerodrome from which the aircraft has taken off.

The majority of aircraft registered in the UK fall under the weight limit. CAA data shows a total of 12,224 registered fixed wing aircraft, of which 8,977 weigh 5,700 kg or less.[41] A

[40] Categorisations based on latest available annual accounts from Companies House. Note that Manston Airport is not currently an operating airport.

[41] Aircraft register statistics | Civil Aviation Authority (caa.co.uk) 2024

significant proportion of the activity within the general aviation sector, which is more predominantly comprised of smaller businesses, will therefore not face any additional charges. Furthermore, it has previously been reported that 51% of general aviation flights take off and land at the same airport, thus exempting them regardless.[42]

The vast majority of the cost would fall on the major commercial airlines, both UK and foreign carriers, with those who run the most flights over the longest distance experiencing the greatest overall cost burden. We approximate the share falling to UK airlines in line with the share of departing flights from UK airports that are accounted for by airlines with UK Air Operator Certificates – which results in 58% of costs falling to UK airlines, and 42% falling on non-UK airlines.[43]

Costs for small, micro and medium UK airlines are also estimated by each individual airline's share of total UK departures.[44] Large companies would be expected to account for 88.3% of UK commercial airlines costs, with a further 11.4% falling on medium sized organisations, and 0.3% falling on small firms. This assessment will be updated as the new charge is developed and its distributional impacts become clear.

Of the eight affected approved Instrument Flight Procedure design organisations (discussed in section 9.3), there is one micro organisation, four small organisations, and one large organisation. No UK registered business activity could be identified for two of the firms.

In delivering the benefits of airspace modernisation either earlier or more effectively, the UKADS will also indirectly benefit all users of airspace, including micro, small and medium-sized businesses.

[42] https://web.archive.org/web/20061007122800/http://www.gaac.co.uk/gasar/GASAR_NationalPilotSurvey.pdf

[43] DfT Analysis of CAA Airports Data, 2023

[44] Company size categories are estimated based on the latest available annual accounts at Companies House