

<b>Title:</b> Enforcing the development of airspace change proposals <b>IA No:</b> DfT00405 <b>RPC Reference No:</b> RPC-4396(2)-DFT <b>Lead department or agency:</b> Department for Transport <b>Other departments or agencies:</b> Civil Aviation Authority	<b>Impact Assessment (IA)</b>			
	<b>Date:</b> 14/08/2019			
	<b>Stage:</b> Final			
	<b>Source of intervention:</b> Domestic			
	<b>Type of measure:</b> Primary legislation			
<b>Contact for enquiries:</b> Luke Sharpin (XXXX@XXXXX)				
<b>Summary: Intervention and Options</b>				<b>RPC Opinion:</b> GREEN

Cost of Preferred (or more likely) Option				
Total Net Present Value	Business Net Present Value	Net cost to business per year (EANDCB in 2014 prices)	One-In, Three-Out	Business Impact Target Status
£-14.29m	£-14.11m	£1.3m	N/A	Non qualifying provision

**What is the problem under consideration? Why is government intervention necessary?**

The UK's airspace requires modernisation in the coming years as it is struggling to keep pace with the growing demand for aviation. If the structure of UK airspace is not upgraded we expect a sharp increase in air traffic delays, which will in turn create costs and disruption for passengers and businesses and lead to increased queuing in holding stacks, which cause unnecessary noise and emissions. While those responsible for preparing and submitting Airspace Change Proposals (ACPs) are expected to engage with this modernisation programme, legislation is required to ensure that appropriate ACPs take place in a coordinated manner when organisations may be unwilling or unable to do so, which could otherwise delay wider modernisation.

There is also a risk that without legislation ACPs which could be identified as being important to deliver a wide range of benefits, such as noise benefits or improved access to controlled airspace, are not taken forward.

**What are the policy objectives and the intended effects?**

The policy aims to ensure that quality ACPs will be prepared and submitted in a coordinated and timely manner to deliver the benefits of national modernisation where airspace change sponsors are unwilling or unable to take these ACPs forward voluntarily.

Legislative actions would only be used when sponsors did not voluntarily prepare and submit ACPs that have been identified in the masterplan to completion. This would provide greater reassurance to airports, airlines, consumers and communities that a masterplan of appropriate airspace changes can be delivered.

**What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)**

Option 0) Do nothing

Option 1) The DfT and CAA continue to provide leadership through co-sponsoring a new Airspace Modernisation Strategy, including through commissioning the development of a masterplan of changes (Non-regulatory)

Option 2) Alongside option 1, introduce legislation that provides the Secretary of State or a delegated authority (which would be the CAA) the power to direct airport operators/Air Navigation Service Providers (ANSPs) to:

- submit ACPs that have been identified as appropriate for improving the use of airspace in the UK; This would be to an agreed timescale.
- cooperate with another party (airport operator/ANSP/other body) to enable that party, on behalf of the airport operator/ANSP, to prepare and submit ACPs identified as appropriate for improving the use of airspace in the UK. This would be to an agreed timescale (in addition to option 2a).

**Implementation of both option 2 powers is preferred, alongside option 1 (i.e. Option 2b).** This would provide a backstop to ensure that appropriate ACPs are undertaken, while providing support for private sector delivery in the first instance.

**Will the policy be reviewed?** It will not be reviewed. **If applicable, set review date:** N/A

<b>Does implementation go beyond minimum EU requirements?</b>	N/A			
<b>Are any of these organisations in scope?</b>	<b>Micro</b> Yes	<b>Small</b> Yes	<b>Medium</b> Yes	<b>Large</b> Yes
<b>What is the CO<sub>2</sub> equivalent change in greenhouse gas emissions? (Million tonnes CO<sub>2</sub> equivalent)</b>	<b>Traded:</b> N/A		<b>Non-traded:</b> N/A	

*I have read the Impact 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 by the responsible Minister: Verena Narbiton Date: 21 October 2019

# Summary: Analysis & Evidence

# Policy Option 1

Description: Provide additional support to airports/ANSPs undertaking Airspace Change Proposals, including through the development of a masterplan of changes

## FULL ECONOMIC ASSESSMENT

Price Base Year: 2017	PV Base Year: 2019	Time Period Years: 10	Net Benefit (Present Value (PV)) (£m)		
			Low: -9.29	High: -9.89	Best Estimate: -9.65

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	-	Optional	-	9.29
High	-		-	9.89
Best Estimate	Optional		Optional	9.65

### Description and scale of key monetised costs by 'main affected groups'

Key monetised costs fall on the CAA (£7.14m PV) in the development of a new governance structure for the AMS through the establishment of the DMO, and NATS (£2.34m PV) in developing and overseeing the masterplan of necessary airspace changes, with further costs for the DfT (£0.17m PV).

### Other key non-monetised costs by 'main affected groups'

There may be minor additional costs for airports / ANSPs engaging with the process, but these would be voluntary and likely offset by reduced costs elsewhere as a result.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	-	Insert	-	-
High	-		-	-
Best Estimate	NQ		NQ	NQ

### Description and scale of key monetised benefits by 'main affected groups'

N/A

### Other key non-monetised benefits by 'main affected groups'

To the extent that support could result in modernisation being delivered more rapidly or effectively, some of the benefits outlined under Option 2 may be realised, but there is no evidence to suggest the scale of any possible effect. In terms of the number of ACPs that would not be undertaken, it is not thought likely that different outcomes to the do nothing scenario would be achieved.

### Key assumptions/sensitivities/risks

Discount rate (%)

3.5

Without legislation there is a key risk that airports/ANSPs would not undertake Airspace Change Proposals identified within the masterplan, thus delaying modernisation and/or preventing the full benefits of the Airspace Modernisation Strategy from being realised.

Costs to NATS and the CAA are treated as costs to business as they are primarily industry funded bodies.

## BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:	Score for Business Impact Target (qualifying provisions only) £m:
Costs: 0.9   Benefits: N/A   Net: -0.9	N/A



## Summary: Analysis & Evidence

## Policy Option 2a

Description: Provide the Secretary of State or a delegated authority power to direct airports/ANSPs to prepare and submit ACPs that have been identified as appropriate for improving the use of airspace in the UK. This could be to a particular timescale (in addition to option 1)

### FULL ECONOMIC ASSESSMENT

Price Base Year: 2017	PV Base Year: 2019	Time Period Years: 10	Net Benefit (Present Value (PV)) (£m)		
			Low: -9.90	High: -96.51	Best Estimate: -14.29

COSTS (£m)	Total Transition (Constant Price) Years		Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	-	1	-	9.90
High	-		-	96.51
Best Estimate	Optional		Optional	14.29

#### Description and scale of key monetised costs by 'main affected groups'

In addition to the costs identified under option 1, the primary monetised cost would be incurred by airports/ANSPs required to undertake appropriate ACPs identified within the masterplan that they would not have otherwise completed voluntarily, estimated at between £0.0m and £85.7m (best estimate £3.9m). They would additionally face minor costs to familiarise themselves with the legislation. The CAA and DfT would face further regulatory related costs of £0.73m.

#### Other key non-monetised costs by 'main affected groups'

Airlines operating from airports required to undertake additional ACPs may be forced to use less efficient flightpaths as a result, incurring additional fuel costs and increased flight times. Passengers at these airports may also experience costs associated with longer flight times. However, specific impacts are impossible to determine at this point as they will be entirely dependent on local conditions.

BENEFITS (£m)	Total Transition (Constant Price) Years		Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	-	1	-	-
High	-		-	-
Best Estimate	NQ		NQ	NQ

#### Description and scale of key monetised benefits by 'main affected groups'

N/A

#### Other key non-monetised benefits by 'main affected groups'

Other airports, ANSPs, airlines and passengers would benefit from the enhanced resilience and capacity of nationally modernised airspace. This may occur through more efficient flight paths or a reduction in delays. Airports undertaking interdependent ACPs would face potentially lower costs, as the risk of needing to re-consult on plans would be reduced. There may also be opportunities for noise benefits for local communities through more efficient operating procedures and airspace design.

Key assumptions/sensitivities/risks	Discount rate (%)
The key assumption is the number of additional ACPs that would have to be undertaken by airports/ANSPs due to the legislation. This is subject to considerable uncertainty and as such a broad range of estimates has been adopted. Likewise, the complexity and therefore cost of these changes is unclear, but has been estimated based on plausible assumptions.	3.5

### BUSINESS ASSESSMENT (Option 2a)

Direct impact on business (Equivalent Annual) £m:	Score for Business Impact Target (qualifying provisions only) £m:
Costs: £1.3m   Benefits: N/A   Net: -£1.3m	N/A

# Summary: Analysis & Evidence

# Policy Option 2b

Description: Provide the Secretary of State power to direct airports/ANSPs to cooperate with another organisation to put forward ACPs that have been identified as appropriate for improving the use of airspace in the UK on the airports/ANSPs behalf (in addition to Option 2a)

## FULL ECONOMIC ASSESSMENT

Price Base Year: 2017	PV Base Year: 2019	Time Period Years: 10	Net Benefit (Present Value (PV)) (£m)		
			Low: -9.90	High: -96.51	Best Estimate: -14.29

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	-	1	-	9.90
High	-		-	96.51
Best Estimate	Optional		Optional	14.29

**Description and scale of key monetised costs by 'main affected groups'**  
 Key costs are as stated for Option 2a. NERL would additionally face minor costs to familiarise themselves with the legislation.

**Other key non-monetised costs by 'main affected groups'**  
 Other key non-monetised costs are deemed equivalent to those described under Option 2a.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	-	Insert	-	-
High	-		-	-
Best Estimate	NQ		NQ	NQ

**Description and scale of key monetised benefits by 'main affected groups'**  
 N/A

**Other key non-monetised benefits by 'main affected groups'**  
 Non-monetised benefits are deemed equivalent to those described under Option 2a.

<b>Key assumptions/sensitivities/risks</b>	<b>Discount rate (%)</b>	3.5
Key assumptions are broadly equivalent to those listed under Option 2a. There is also uncertainty around the relative efficiency of ACPs being pursued by other organisations as compared to airports/ANSPs.		

## BUSINESS ASSESSMENT (Option 2b)

<b>Direct impact on business (Equivalent Annual) £m:</b>	<b>Score for Business Impact Target (qualifying provisions only) £m: N/A</b>	
Costs: £1.3m	Benefits: N/A	Net: -£1.3m



# Evidence Base (for summary sheets)

## 1) Background

1. The Department for Transport (DfT) is currently developing an Aviation Strategy that aims to achieve a safe, secure and sustainable aviation sector that meets the needs of consumers and of a global, outward-looking Britain. The DfT published a green paper, *Aviation 2050 – the future of UK aviation*<sup>1</sup> in December 2018, and will publish a final white paper version of the strategy in 2020.
2. One of the key objectives of the Aviation Strategy is to consider how we can support growth while tackling environmental impacts. As part of this overarching objective, the DfT is examining whether further policy is required to support airspace modernisation. Potential options for supporting airspace modernisation were consulted on as part of the green paper, and have since been further refined.
3. The nature of UK airspace is highly complex and requires cooperation between multiple organisations. A description of the organisations involved in the management of UK airspace, as well as a summary of the structure of UK airspace, is included below.

### 1.1) Airspace roles and responsibilities

#### Government

4. **The Department for Transport** develops national policy and law, and ensures the UK contributes to and meets its obligations under relevant international policy and law. As part of this policy responsibility the Government also plays a role in making the strategic case for airspace modernisation.
5. For certain types of airspace change, the Secretary of State may decide to call-in an airspace change proposal in order to make a decision instead of the CAA.<sup>2</sup>
6. **The Ministry of Defence** requires access to airspace in order to train and maintain competency for the UK's defence needs. It acts as an airspace change sponsor when requesting dedicated airspace that is reserved for activities which may be hazardous to other airspace users, such as high-energy manoeuvring and testing munitions.

#### Civil Aviation Authority (CAA)

7. **The CAA** is the airspace regulator and primary decision-maker. Government is responsible for setting the CAA's objectives, outlining the CAA's functions and responsibilities and providing guidance to the CAA. More specifically, the Air Navigation Directions (given by the Secretary of State under Sections 66(1) and 68 of the Transport Act 2000) set out several airspace responsibilities for the CAA. In all its responsibilities, the CAA is obliged to consider certain factors set out in Section 70 of the Transport Act 2000 which include safety, security, operational impacts and environmental guidance from the Government (covering impacts such as aircraft noise and emissions), and the needs of all users of airspace.
8. The Air Navigation Directions set a strategic role for the CAA (Direction 3). The CAA is tasked with developing a strategy to modernise UK airspace and a plan setting out the best approach to a new design, operational concepts and use of technology. The Directions and supporting government policy provide the framework for the strategy and for the roles and accountabilities of the CAA and other bodies in delivering that strategy. While the CAA must own the strategy and plan, delivery (including the design of any airspace changes) is undertaken by other entities, such as airports, air navigation service providers or airspace users.
9. The Directions give the CAA responsibility for deciding whether to approve a proposal for a change to the published design of airspace, administering the airspace change process and providing guidance on the process to stakeholders (Direction 4). Airspace design includes the airspace structure and the instrument flight procedures for the use of that airspace (i.e. procedures which enable aircraft to fly in a more technologically automated manner).
10. The CAA also has additional duties in respect of the regulation of the provision of air traffic services under Section 2 of the Transport Act 2000. In carrying out these duties, the CAA is

<sup>1</sup> <https://www.gov.uk/government/consultations/aviation-2050-the-future-of-uk-aviation>

<sup>2</sup> The call-in process is outlined at <https://www.caa.co.uk/Commercial-industry/Airspace/Airspace-change/Secretary-of-State-call-in-process/>



responsible for the economic regulation of NATS' monopoly service provision activities under a licence.

### Airspace change sponsor

11. An airspace change sponsor owns the airspace change proposal and is responsible for developing it, including taking into account feedback from relevant stakeholders, in accordance with the CAA's airspace change process and the guidance provided by the CAA and by the Government. 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 NERL (the air navigation service provider for en-route airspace, as discussed below) will typically sponsor changes to upper airspace.

### Airports

12. The airport operator is responsible for the arrival and departure routes serving its runways. It will therefore typically sponsor a change to the airspace design and associated routes in its immediate vicinity, and is required to consult and collaborate closely with those affected by the change. The airport will work closely with the air navigation service provider that manages the approach and en-route airspace to ensure seamless and safe connectivity.

### NATS

13. **NATS Holdings Ltd**, the biggest air navigation services provider in the UK, provides air traffic control services through two principal subsidiaries: NATS (En Route) plc (called NERL) and NATS (Services) Ltd (called NSL), which provides air traffic services on a commercial basis.
14. **NERL** is the sole provider of air traffic control services for aircraft flying 'en route' in UK airspace and provides some air traffic control services in the eastern part of the North Atlantic, as well as providing a combined approach function (London Approach) for five London airports. NERL is regulated by the CAA within the framework of EU and domestic law.

## **1.2) The Structure of UK Airspace<sup>3</sup>**

15. 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 CAA is the controlling authority for the UK, with NATS providing air traffic services for them.
16. 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 not mandated to take air traffic control services but can call on them if required.
17. In the UK there are currently 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.
18. 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:
  - i. **Aerodrome Control Zones** afford protection to aircraft in the immediate vicinity of aerodromes;
  - ii. **Control Areas** are situated above Aerodrome Traffic Zones and afford protection over a larger area to a specified upper altitude;
  - iii. **Terminal Control Areas** are normally established at the junction of airways in the vicinity of one or more major aerodromes. The London Terminal Control Area is an example of this;
  - iv. **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;

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<sup>3</sup> This section summarises NATS' introduction to airspace, which provides further detail and is available at <https://www.nats.aero/ae-home/introduction-to-airspace/>



- v. **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;
  - vi. **Restricted** areas prevent aircraft from entering dangerous places. To ensure efficient use of airspace, most Restricted areas can be deactivated when they are not in use.
19. Finally, airspace within an FIR is divided into 'Sectors'. Airspace sectors can be created and reduced dynamically to deal with demand. For example, when there are high levels of air traffic, more sectors may be opened with more controllers allocated to manage traffic. When there are low levels of traffic, sectors may be grouped and managed by fewer air traffic controllers. Further information on the UK's airspace is available in Annexes A and B.

## 2) Problem under consideration

20. The UK's airspace requires modernisation in the coming years. Our airspace is struggling to keep pace with the growing demand for aviation. More traffic is being squeezed into the same congested areas of airspace, causing inefficient flight paths that are not optimised to reduce noise and passenger delays, and offer poor resilience to disruption.<sup>45</sup>
21. If the structure of UK airspace is not upgraded, the lack of capacity is expected to lead to a sharp increase in air traffic delays, which will in turn create costs and disruption for passengers and businesses, and lead to more planes queuing in holding stacks, which cause unnecessary noise and emissions around airports.<sup>6</sup>
22. We also face a challenge, particularly in the South of the UK, in coordinating multiple forthcoming airspace changes across different airports to achieve airspace modernisation. In 2017 the DfT published the Strategic Case for Airspace Modernisation, which found that average air traffic delays are likely to rise 72-fold between 2015 and 2030 without modernisation, leading to one in three flights experiencing a delay of over 30 minutes. Such consistently high delays are also forecast to result in increased numbers of cancellations. The anticipated cost of these delays could be a cumulative £1bn between 2016 and 2030 with an annual cost of £260million by 2030.<sup>7</sup>
23. Further to this, the Secretary of State commissioned NATS to undertake a study into the feasibility of airspace modernisation in the South of the UK. This supported the findings of the strategic case and emphasised the need for collaboration between airports in order to modernise airspace.<sup>8</sup>
24. DfT have therefore been working with key stakeholders to develop policy to support coordination of appropriate ACPs across the UK. One part of this has been to consider whether there are any legislative changes that could support airspace modernisation.

## 3) Rationale for intervention

25. We expect that there will be a high level of interdependence between different airports' demands over airspace, particularly in the South East. This was one of the major findings of NATS' report on the feasibility of airspace modernisation in the South of the UK.
26. Given this, airports or air navigation service providers (ANSPs) will need to develop their airspace change proposals (ACPs) in close collaboration with each other and ensure that they develop and consult on these in a coordinated way. If they did not, it could create a scenario whereby airports consult separately on, and then submit to the CAA for decision, conflicting design options. This would be inefficient and could cause major issues and delays to the modernisation programme should the CAA subsequently require sponsors to revisit stages of the process including the potential to have to re-consult.
27. As the airspace which airports must develop their flightpaths in is an excludable resource, the presence of interdependent airports limits the options available to any single airport making a change. Iterative development of new routes can therefore result in a series of sub-optimal decisions, constrained by the wider network of existing routes. Only through facilitated co-ordination of multiple changes can development be optimised at a strategic level. The potential

<sup>4</sup> <https://www.nats.aero/discover/the-skys-the-limit/>

<sup>5</sup> Increasing airport resilience – discussion paper, CAA, 2016, p.6.

<sup>6</sup> Upgrading UK Airspace: Strategic Rationale. Department for Transport, 2017.

<sup>7</sup> *ibid*

<sup>8</sup> Airspace Modernisation Supporting Documents – NATS Feasibility Report into Airspace Modernisation in the South of the UK



for such a co-ordination failure is particularly high during the crucial phases of modernisation occurring in the upcoming decade.

28. A similar issue would arise should one airport decide not to progress with an airspace change that has interdependencies with other airspace changes, as this could create delays for other airports. This could be a particular issue in the south-east of England where NATS' preliminary assessment has found that multiple airports and NERL need to pursue interdependent ACPs as part of the wider modernisation programme.
29. There are, in other words, significant positive externalities stemming from an airport modernising its airspace, as doing so provides benefits to other airports and their airlines. The extent of these externalities could potentially be orders of magnitude larger than the benefits felt directly, particularly when there are interactions between smaller and much larger airports, thus there may be substantial market distortions.
30. Although a number of levers are open to CAA and Government to shape existing airspace change proposals, there are no effective levers or powers which can ensure that airspace change happens. Airspace change usually relies on goodwill between NERL and the airports/ANSPs. Sponsors – whether airports/ANSPs or NERL – will typically choose when, if and how, they progress on airspace-related matters. An airport may also not want to cooperate with a broader airspace reform programme if it viewed that the changes were not in its interests.
31. While there is currently no requirement for airports/ANSPs to engage with the modernisation process, there has been considerable engagement between industry stakeholders, the CAA, and NATS, as shown by the number of airports submitting information to NATS' feasibility study and the decision of many airports to begin the airspace change process. This reflects airports' willingness to co-operate in modernisation when thought necessary for their future growth. While this indicates that a substantial proportion of airports are likely to undertake ACPs in the absence of legislation, some ACPs deemed critical could potentially deliver limited benefits to the individual airport but facilitate greater national benefits, which affected airports will naturally be less likely to support. Likewise, even if airspace modernisation is pursued, airports may choose to prioritise different objectives or may not fully engage with other affected airports, delivering suboptimal outcomes at a national level.
32. Experience shows that the risk of airport operators pulling out partway through an airspace change programme is high. For example, the LAMP programme, involving the five largest London airports, was scaled back significantly in 2014/15.
33. If one or more airports/ANSPs involved in the critical path for airspace modernisation did not submit coordinated airspace change proposals then communities, passengers and airlines would continue to suffer from increasingly outdated designs. Interdependent airports/ANSPs would be forced to delay or alter their own proposals for change, potentially requiring further consultation with communities, and reduced efficiency for their own operations. In the South East, where the level of interdependency between airports is highest, there could also be implications for the delivery of the Northwest Runway at Heathrow, which will require substantial redevelopment of flightpaths.
34. There are additionally no current effective levers to direct an airport or ANSP to take forward an ACP to deliver a wide range of other socially desirable outcomes, such as safety, capacity, management of noise impacts, air quality, fuel efficiency, improving access to airspace for all users (including where controlled airspace is no longer justified), military access, or to introduce new technology.

#### **4) Policy objective**

35. The aim is to ensure that quality ACPs will be developed and proposed, and the benefits of national modernisation realised, where airports/ANSPs are unwilling or unable to take these ACPs forward voluntarily. Success is dependent on the delivery of all ACPs identified in a masterplan as appropriate for the delivery of airspace modernisation, to timescales that allow for co-ordinated delivery of other airports' changes to lower airspace use, as well as NERL's changes to upper airspace. Additionally, the policy can ensure that other airspace changes that are identified within the masterplan as being needed to deliver safety, capacity, noise reduction, improvements to air quality, fuel efficiency, improved access to airspace for users, military access, or to introduce new technology, are taken forward.



36. The CAA's Airspace Modernisation Strategy<sup>9</sup> outlines key milestones for the delivery of airspace modernisation, including both Future Airspace Implementation North and South by 2024. The policy aims to facilitate both of these undertakings in the short term, as well as supporting future development of UK airspace to 2040.
37. The powers would only be used where airports/ANSPs did not voluntarily prepare and submit ACPs that had been identified as a requirement in the masterplan. While this is not expected to occur often, given the planned support for private sector delivery of changes, this will provide greater reassurance to airports, airlines, consumers and communities that a masterplan of airspace changes can be delivered.

## **5) Description of options considered (including status-quo)**

38. Initial discussions between DfT, CAA and NATS took place to look at options for creating a mechanism to deliver airspace change, should airports or ANSPs not bring about the airspace change proposals that are necessary to delivery as a part of a masterplan of changes to the wider modernisation of airspace.
39. A number of options were identified and subsequently narrowed down during the development of the Aviation Strategy Green Paper. These options were consulted on between December 2018 and April 2019, and further shaped in light of comments from stakeholders. This consultative process reaffirmed the industry's recognition of airspace modernisation's importance, as well as providing broad support for legislative change.

### **5.1) Option 0 – Do nothing**

40. Under the 'do nothing' option the status quo would be for DfT to keep the progress of airspace modernisation under review and would seek to exert what influence it can if it considered there was a need to. However, there would be no guarantee of success due to the lack of enforcement available. Given the severe implications of even one major airport refusing to engage in the modernisation process, it is prudent to ensure that modernisation is backed by appropriate further measures.
41. As discussed further in section 6.1, it is expected that most UK airports would develop ACPs to deliver airspace modernisation even in the absence of legislation. There is a clear incentive for the industry as a whole to do so, but there may be individual cases in which a change is not beneficial for the organisation in question. It is in these situations where there is the potential for a desired ACP to not go ahead under the counterfactual.

### **5.2) Option 1 – The DfT and CAA continue to provide leadership through co-sponsoring a new Airspace Modernisation Strategy, including through the development of a masterplan of changes**

42. The DfT and CAA proposed through the CAA's Airspace Modernisation Strategy (AMS) that the two organisations would act as the co-sponsors of airspace modernisation. As part of this the two organisations plan to perform a number of roles in order to support the successful delivery of the programme. Specific actions include:
- i. The creation of a new governance structure to oversee airspace modernisation, with the Aviation Minister chairing an Airspace Strategy Board (this new governance structure was first published in December 2018)
  - ii. The development within the CAA of a team responsible for "delivery, monitoring and oversight (DMO) of their AMS (for which recruitment is underway)
  - iii. The establishment of a new ring-fenced body within NATS, the Airspace Change Organising Group (ACOG) to co-ordinate airspace change across airports in the UK (for which recruitment is underway, with the majority in post)
  - iv. The DfT and CAA commissioned NATS, supported by ACOG, to develop a masterplan of airspace change.

#### **5.2.1) Masterplan**

43. The airspace changes needed at a broad level will mainly be identified through an airspace change masterplan. DfT and the CAA have asked NATS to work with key stakeholders to develop an airspace change masterplan for airspace changes required during the period 2020 –

<sup>9</sup> <https://publicapps.caa.co.uk/docs/33/CAP%201711%20Airspace%20Modernisation%20Strategy.pdf>



2024 in the South of the UK. A new body, ACOG, has been set up to support the development of this masterplan. The CAA also plans to introduce a condition into the NATS licence that would formalise this request. This commission will also be extended to cover the rest of the UK in due course.

44. The masterplan will initially identify where airspace changes are needed to deliver safety, capacity, noise reduction, improvements to air quality, fuel efficiency, improved access to airspace for users including where controlled airspace is no longer justified or should be a different classification, military access, or to introduce new technology. These are all factors that the CAA considers when undertaking its airspace functions under section 70 of the Transport Act 2000. Once the masterplan is complete, it will be submitted to DfT and the CAA for assessment. The first iteration was submitted in June 2019 and is currently being assessed. Following this, the CAA will monitor delivery through the new DMO team. A further update to the masterplan is expected after July 2020 once FASI South airports have reached the options appraisal stage (stage 2b) of the CAA's airspace change process.

### 5.2.2) ACOG

45. ACOG is overseen by a Steering Committee chaired by an independent member with other members drawn from NATS, airports, airlines and independent members.
46. Through close engagement with key stakeholders, ACOG will help to ensure that the airspace change programme is developed in a collaborative manner, balancing the needs of airports, airlines and wider stakeholders alongside the requirements listed under s70 of the Transport Act 2000.
47. Through the masterplan and the actions listed above, the DfT, CAA and NATS will support the delivery of airspace modernisation. However, successful delivery of particular airspace changes cannot be guaranteed with a non-regulatory approach alone, because the CAA or DfT do not have effective powers to direct airports/ANSPs take forward ACPs identified within the masterplan. While these actions will help airports to collaboratively undertake their airspace changes, they will not fundamentally alter the costs and benefits for an airport facing an ACP that has a negative business case, which the airport would have little incentive to undertake.
48. It is not certain that such a situation will arise. However, as identified by NATS, there is a particularly high degree of interdependency between airports in the South of the UK, indicating a high likelihood that some airports will face trade-offs. The risk of a lack of progress on one airspace change delaying one or more other ACPs means that the legislation as outlined in Option 2 is required in addition to non-regulatory approaches.
49. Such a regulatory approach received support in the Aviation Strategy consultation from a number of industry groups, including Airlines UK and the International Air Transport Association. Additionally, such an approach is conditionally supported by the Airport Operators Association which represents over 50 UK airports. This support is dependent on a number of factors, including provision of clarity on the framework for the use of the powers, such as specifying how they should only be used as a measure of last resort. Option 2 has been shaped in light of such considerations.

### 5.3) Option 2 – Introduce new legislative powers, alongside undertaking the actions in option 1

- (a) **Provide the Secretary of State or a delegated authority power to direct airport operators/ANSPs to submit ACPs identified as appropriate for the purpose of improving the use of airspace in the UK. This would be to a specified date.**

50. Airports, ANSPs and other organisations (for future flexibility) could be directed by the Secretary of State to develop airspace change proposals in accordance with the CAA's airspace change process.<sup>10</sup> The ACPs would, in the first instance, be identified through an airspace change masterplan. The legislation is not expected to specifically refer to the masterplan, to keep open future flexibility for them to be used more widely, though in the first instance we expect them to be used primarily in relation to changes identified within the masterplan.
51. The powers will be held by the DfT SofS with the option of delegating them to an appropriate authority. If the powers are delegated, we expect that this would be to the CAA.

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<sup>10</sup>CAP1616: Airspace Design: Guidance on the regulatory process for changing airspace design including community engagement requirements: <https://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=8127>



52. The legislative powers would be used to ensure that the changes identified within the masterplan are delivered.
53. As previously stated, the legislation would be intended solely as a back-up to private sector driven airspace reform. In advance of exercising the proposed direction-making power, the Secretary of State would consult with the CAA as a matter of course (with the DMO having flagged the need for the new direction-making power to be used in the first place). There will likewise be a strict requirement for the Secretary of State or the CAA (as appropriate) to consult with the airport operator / ANSP prior to any exercising of the direction-making power.
- (b) In addition to option 2a, provide the Secretary of State or a delegated authority power to direct airport operators/ANSPs to cooperate with another party (airport operator/ANSP/body) to enable that party, on behalf of the airport operator/ANSP, to prepare and submit ACPs identified as appropriate for improving the use of airspace in the UK. This would be within a specified timeframe (preferred option)**
54. Airport operators/ANSPs could be directed by the Secretary of State or a delegated authority to work with another airport operator/ANSP/body who would prepare and submit the changes on its behalf in accordance with the CAA's airspace change process. Any sponsor would be required to follow the proper process and fulfil all aspects of the sponsor's responsibilities including community engagement. This approach is deemed as a back-up for cases in which, for whatever reason, an airport/ANSP was unable to deliver an ACP when directed under Option 2a.
55. The previously consulted upon option considered only NERL in the role of the additional organisation to put forward an ACP on another organisation's behalf. NERL remain an option within the new policy, though the power is now broader and could be applied to a range of third parties. However, it was noted that while this would reduce the burden on airports/ANSP themselves, it would represent a significant potential change to the current operation of NERL. Enabling other organisations to also potentially fulfil this role allows for greater flexibility, while reducing staffing and capacity risks at individual organisations. The other organisations could include another airport operator, ANSP (including NERL), or some other body which could take forward ACPs on the original sponsor's behalf.
56. Following any decision to exercise powers, a right of appeal to the Competition Appeals Tribunal (CAT) has been proposed for the organisation given a direction, given that non-compliance with the direction could lead to an enforcement order and a substantial penalty. This appeal would also apply to any other person who appears to the Tribunal to have a sufficient interest in the direction. There would also be a right of appeal for the imposition of an enforcement order and penalty (see **5.3.3**).
57. Our proposal is that both of the above powers are made available, but option (a) is the lead option as it would be preferable for the ACP to remain with the owner of the ACP, as identified in the masterplan. Option (b) would be used as a back-up to this. Option 2b, encompassing both powers, is therefore the preferred option.

### **5.3.1) Direction-making powers**

58. The direction-making powers are to be conferred on the Secretary of State, who could delegate the role to the CAA if this proves desirable. Further time is required for the policy to develop to determine if or when the CAA should be asked to exercise the powers, and such an approach allows for flexibility in this regard.

### **5.3.2) Triggers for use of the powers**

59. When appropriate powers are in place, we propose that before any formal action is taken to take forward an ACP using the new powers, the new Airspace Modernisation Strategy Delivery Monitoring and Oversight (DMO) team (currently being set up in the CAA) would provide support and engage with the airport/ANSP to consider the circumstances and what other measures could be used to assist in bringing forward an airspace change. Where technical issues arose, or something exceptional, unforeseeable and outside the sponsor's control occurred, the preference would be to use alternative approaches rather than the powers.
60. The DMO team would first establish the reasons why the ACP was not underway, or achieving timely gateway assessment (steps in the CAA's airspace change process) milestones and explore measures to support and incentivise the sponsor to bring forward the change, such as bringing in additional outside technical support.
61. We have identified that there could be at least two triggers for the activation of the powers:



**v. Initiation: failure to initiate an ACP identified as appropriate.**

Where an airspace change is not already in progress the masterplan would be used to identify which ones are critical and should be directed when a sponsor is not forthcoming.

**vi. Progress: failure to adhere to the proposed timeline for an appropriate ACP.**

Sponsors agree a timeline for the airspace change with the CAA at an early stage of the airspace change process. This timeline takes into account the dates of any gateways the sponsor intends to meet, and when the CAA will make a decision, and will be aligned with the overall masterplan. This trigger will be noted should a sponsor fall behind schedule because they have not passed their gateways on time (either because they have failed to submit materials to the gateway assessment, or the quality of those materials is rejected by the CAA at the gateway assessment e.g. for failing to adhere to the objectives of the ACP) to the extent that the overall masterplan delivery is called into question.

### **5.3.3) Sanctions**

62. In order to ensure that the powers can be effectively enforced, we propose that the powers are accompanied by appropriate sanctions for non-compliance. We consider that under the circumstances, civil sanctions rather than criminal sanctions would be appropriate for ensuring compliance with the direction. This is in line with the findings from the Macrory review of regulatory sanctions, where it was highlighted that criminal sanctions are often disproportionate and are not effective deterrents for non-compliance.<sup>11</sup>

63. Similar enforcement tools to those available to the CAA under the Civil Aviation Act 2012 for enforcing the economic licences of airports are to be introduced to enforce the proposed powers.<sup>12</sup> We also propose that these additional tools are accompanied by appeal rights for airports/ANSPs, as is the case for airports regulated under the Civil Aviation Act 2012. This is in line with the Government's Better Regulation principles to make regulation predictable in order to give stability and certainty to those being regulated within a sector.

64. Alongside an initial contravention notice for not complying with the direction to take forward an ACP, it is proposed that an enforcement order could be used to impose fines of up to 10% of turnover and/or a daily amount up to 0.1% of turnover until the direction to take forward an ACP is carried out by the company. A maximum fine of 10% of turnover is already in place for the regulation of airports under the Civil Aviation Act 2012, and is consistent with enforcement penalties issued in other regulated sectors such as water and energy. As is the case for these sectors and in line with HMT policy, all proceeds from financial penalties would go into the Consolidated Fund.

### **5.3.4) Funding/Resourcing**

65. Our expectation is that future guidance in support of this legislation may set out a number of tests before its use, for example, regarding the ability of the airport operator / ANSP / other entity to fund/resource the development and design of the required ACP.

## **6) Monetised and non-monetised costs and benefits of each option (including administrative burden)**

66. All costs and benefits are assessed over a 10 year period (2019 – 2028) and presented in 2017 prices where monetised. As industry-funded bodies, costs incurred by NATS and the CAA are considered costs to business.

### **6.1) Option 0 – Do-nothing**

67. It is important to first establish the number of airspace changes likely to fall in scope of the masterplan that the DfT and CAA have commissioned. As the masterplan is under development, there is natural uncertainty here, but an estimate can be formed by considering the likely changes in scope. The most pressing and substantive series of changes relate to airspace modernisation in the South East, for which NATS has identified up to 16 airports.<sup>13</sup> The Future Airspace Implementation-South (FASI South) programme would expect these airports to have designed, consulted upon and implemented updated airspace by 2024/5. Alongside these changes to lower

<sup>11</sup> Regulatory Justice: Making Sanctions Effective – Final Report, 2006

<sup>12</sup> Economic Licensing Enforcement Guidance, CAP 1234, CAA, 2015

<sup>13</sup> In addition to the 15 airports previously identified, Manston Airport is now engaged in FASI South, although the need for airspace changes will only arise if planning permission is granted to reopen the airport.



airspace, NERL are systematically redesigning the use of upper airspace for use by all UK airports, which naturally has substantial implications for airports' plans (and vice versa).

68. As previously stated, the Government's expectation is that all airports will engage in this process, and submit ACPs in a coordinated manner according to established timelines. The engagement with, and the results of, NATS' preliminary feasibility study provide some indications of the likelihood of airports not undertaking necessary changes. Firstly, even at this early stage of development, twelve of fifteen airports consulted provided NATS with information on likely letterboxes / gateways<sup>14</sup> and / or traffic levels in 2030.<sup>15</sup> Two of the three airports failing to provide any information were small airfields that do not offer any commercial passenger services. This demonstrates the high level of engagement with the programme, but highlights that smaller organisations may be more likely to be unwilling or unable to do so.
69. Of the letterboxes provided (or assumed in the case of no submission) 32% were found to be in conflict. For the purpose of NATS' modelling, 14% of letterboxes were relocated to conform with Performance Based Navigation (PBN)<sup>16</sup> separation requirements, while 2% were removed from the initial concept model entirely.<sup>17</sup> Even without consideration of potential interactions at lower levels of airspace, the extent of letterbox overlaps shows that there is a high level of interdependence. The ability to relocate a substantial proportion of these does on the other hand suggest that conflicts can be resolved, albeit with implications for the efficiency of individual airports' operations.
70. While these early figures provide some indication of the scale of the problem, we would naturally expect a reduction in the number of these issues if airports took a collaborative approach with NATS. Use of these figures is further complicated as they refer to incompatibility at letterbox level, not at airport level – it is not clear how this 32% is distributed across airports.
71. For the purposes of this IA, under a low cost scenario it is assumed that all airports in FASI South would undertake ACPs in the baseline. Given the strong strategic case for modernisation, and the nature of the proposed legislative measures as backstops, this is deemed plausible. In the absence of legislation we would expect individual airports to be under considerable pressure from airlines and communities – the former to ensure the network as a whole is made as efficient as possible, the latter to ensure communities benefit from potential noise benefits of modernisation. Likewise, while coordinated airspace changes may lead to conflicts in some areas, modernisation will, other things being equal, increase the general efficiency of individual airports' airspace by allowing for more intensive and flexible use. As such there is a good probability that individual airports will see positive business cases to undertake change, although this may not necessarily always apply for some of the smaller airports. Finally, the Airspace Change Organising Group has been set up in order to support mutual coordination and integration of ACPs, working closely with airports.
72. Under a high cost scenario it is assumed that 5 airports do not undertake changes – which ignores these mitigating factors and corresponds to approximately 32% of the maximum possible 16 relevant airports. In other words, it is assumed that airports do not take forward ACPs in direct proportionality to the level of incompatibility between current (uncoordinated) letterboxes / gateways. It is recognised that this estimate is speculative – it assumes that ACPs are not taken forward in the baseline solely due to (estimated) clashes with other airports' plans. This does not consider, for example, whether an airport may not have taken forward a change because of a lack of resources, or due to local considerations. It is not possible to estimate these latter aspects – but the figure is still expected to represent a valid high cost scenario given the conservative nature of the assumptions used. A lack of resources is likely to only be a potential factor for the smallest airports, of which there are fewer than five in scope.
73. There is no strong evidence to assist in determining a central estimate for the number of airports unlikely to undertake changes in the baseline. While it is expected that all airports will engage in the programme, the potential for the quality and timeliness of a change to be incompatible with wider timescales does increase this possibility. For the purposes of this IA it is assumed that two airports would not undertake changes – representing a majority of the smaller airfields that are

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<sup>14</sup> Letterboxes are the three dimensional points in space where aircraft transition from airport designed outbound tubes into NATS tubes. Gateways are the inbound transitions from NATS tubes into Airport designed approach procedures

<sup>15</sup> The Feasibility of Airspace Modernisation, CAA Assurance Review, p.18. 2018

<sup>16</sup> Performance Based Navigation is a key component of the airspace modernisation programme, and refers to the use of satellite-based navigation rather than the use of ground-based navigation aids.

<sup>17</sup> The Feasibility of Airspace Modernisation, CAA Assurance Review, p.14. 2018



included in the list of 16. It is again recognised that this estimate is highly uncertain, but it serves to indicate a likely order of magnitude of the expected impacts.

74. This central estimate is ultimately a conservative one. As an intended backstop, the central estimate for the number of ACPs that would not be undertaken is arguably 0. This is supported by the number of organisations that have already begun the process of developing ACPs relating to FASI South, including Biggin Hill, one the identified smaller airports.
75. In the case of an airport not undertaking an appropriate airspace change, given the nature of the critical path a number of other airports would potentially be required to redesign and re-consult on their own plans. Depending on the location and size of the airport in question, this could affect a large number of other airports. It is thought most likely that smaller airports would not undertake a ACP identified within the masterplan (due to lower levels of resource as well as being likely to experience smaller benefits from modernisation, especially if they do not operate any commercial passenger services), and would therefore result in relatively few, small changes to other airspace plans. We therefore estimate that across all scenarios, for each ACP not undertaken in the baseline, one airport is forced to redesign and re-consult on its plans. The cost implications of this are considered under Option 2.
76. While FASI South represents the most likely source of airspace changes that will fall in scope of the policy, the masterplan may include other changes during the 10 year appraisal window, such as for noise or access considerations. There is far less certainty on the number of these changes, or on the likelihood that the relevant sponsor would refuse to undertake the ACP in question. CAA data does however provide an estimate for the number of ACPs that have been undertaken historically. This suggests a total of 26 ACPs were brought forward or being brought forward by either aerodromes or NATS in conjunction with aerodromes in the period 2010-2015, giving an average of 4.3 ACPs per year.<sup>18</sup> It is understood that this data may not comprehensively capture all relevant ACPs, but it does provide a suitably accurate estimate.<sup>19</sup> The CAA have noted that the number of ACPs being submitted since 2015 has increased significantly. However, we have continued to use the previous figures for two reasons. First, because the previous figures relate to changes in scope of the powers, and not changes brought by other sponsors, and second, because part of the increase in activity since 2015 is due to airports ramping up activity as part of FASI (S), which we have taken account of separately.
77. There is a self-evident problem in using earlier voluntarily undertaken airspace changes to estimate the number of future airspace changes that would not be taken forward in the absence of legislation. While there is a clear indication that the number of changes is likely to be low outside of large scale modernisation drives, this is highly dependent on the evolution of the policy areas determining the masterplan.
78. As for changes involved in FASI South, there is a strong rationale to assume that all airports would undertake other ACPs identified as necessary in the masterplan in the baseline under our low cost scenario. This is also deemed to be the most plausible approach for our central scenario. It is the South of England where the greatest level of interdependency, thus the greatest level of potential conflict, exists. Given the benefits associated with modernising airspace, in the absence of substantial competing priorities of nearby airports it is unlikely that airports would see negative business cases for undertaking any necessary change.
79. For the high scenario it is assumed that the masterplan will contain an average of 4.3 ACPs per year, in line with the historic number of proposals, but excluding the initial two years during which it would be impractical to expect a full design and consultation process to be undertaken. In the absence of other evidence, the same 32% rate is applied to estimate the total number of ACPs that would not be voluntarily undertaken. This results in a total of approximately 11 ACPs in the masterplan that would not be undertaken in the 8 year window. As the proportion of letterboxes / gateways in conflict is taken from the study of more concentrated airports in the South of the UK, this is likely to overstate the risk for other airports, but given the significant uncertainty and lack of alternate data this provides a plausible baseline for the high cost scenario.
80. The high scenario, with a total of 16 ACPs not undertaken in the baseline, is an extremely cautious estimate due to the high level of uncertainty faced. It is not thought probable that such a high number of cases would occur under any future scenario. If each of these ACPs related to a

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<sup>18</sup> Based on CAA CAP 1389, p.96, available at: <http://publicapps.caa.co.uk/docs/33/CAP%201389%20March%202016.pdf>

<sup>19</sup> It is challenging to form a precise estimate due to issues with data quality and the distribution of cases across the current CAP1616 airspace change process and the previous CAP725 airspace change process. Additionally, single CAA regulatory decisions may apply to multiple ACPs. The dataset in question does however allow for irrelevant ACPs, such as those undertaken by windfarms, to be excluded, thus providing a more targeted estimate for this case.



different airport, it would imply that around one third of UK certified airports would have failed to develop a necessary ACP. There is no suggestion from industry that such an occurrence is likely, but this has been adopted as a high scenario regardless to ensure that the implications of the policy are understood under extreme circumstances.

81. Wider impacts occurring under the baseline, including delays to industry and passengers, as well as the risks to communities of suffering from increased noise are discussed and quantified where possible as benefits under Options 2a and 2b.

## 6.2) Option 1 - Non-legislative

82. The measures proposed under Option 1 are intended to provide broad support to the AMS, giving certainty to airlines, airports/ANSPs and communities on the objectives and timelines of the programme. While this will improve the overall effectiveness of the programme, it is not expected to affect the key variable under consideration, the number of ACPs that would be voluntarily undertaken. As such, one of the primary cause of costs (undertaking additional ACPs) is not relevant in this case.
83. The provision of a forward-looking masterplan, alongside a robust governance structure and the facilitation of airport co-ordination, should stand to deliver a marginal reduction in costs to airports undertaking ACPs (for example through earlier identification of conflicts), at the expense of additional costs to the DfT, the CAA and NATS. It is not possible to monetise the potential savings to business (which may in any case be partially offset by further costs involved in engaging with the new regime), but the costs of developing and overseeing the masterplan and associated programme are provided below.

### 6.2.1) Costs

#### 6.2.1.1) NATS

84. Production of the initial draft masterplan by NATS is estimated to require 0.25 FTE of staff time at full costs of £30,000, with further costs of £30,000 for external collation and editing. Ongoing requirements for updating the masterplan, engaging with the AMS through ACOG and extending to other areas (such as FASI North) are estimated at 2-3 FTEs, or £240,000 - £360,000 full costs per year (central case assumes the mid-point of these).<sup>20</sup>

#### 6.2.1.2) CAA

85. Delivery of the broader AMS is a major undertaking for the CAA and will result in considerable costs over the coming years. But some of this activity relates to the CAA's role as the airspace change regulator, applicable under all cases including the do-minimum, in which it will continue to make decisions on ACPs. For the purposes of this IA we therefore primarily identify costs related to the masterplan and DMO, whilst recognising the difficulty in isolating costs specifically associated with option 1.
86. In relation to the DMO, the CAA estimate there to be transitional costs of £275,000, followed by an average annual cost of £1.16m from 2020/21 – 2024/25.<sup>21</sup> The CAA note their activity in this area to be<sup>22</sup>:

***Delivery Monitoring & Oversight:*** *though the Delivery Monitoring & Oversight function will not have powers to compel action, it will need to exhibit leadership for progressing the overarching AMS programme, develop overarching programme plans, monitor risks to delivery, report on progress, and help problem solving. Project specific Project Management Offices will be established for key elements of the programme (e.g. FASI-S, FASI-N, EC, etc). The team will have a mixture of leadership, technical and programme management capabilities.*

*The new AMS governance structure is intended to mark a substantial stepping up in Government and CAA leadership of modernisation (whilst recognising that much of the detailed delivery will happen at a project level), and both parties want this change to be impactful, visible and to have the confidence of all airspace stakeholders (commercial air transport, GA, military etc). This role and approach has been part of the recent AMS public engagement process.*

<sup>20</sup> Staffing and cost estimates provided by NATS

<sup>21</sup> Costs vary on an annual basis and have been allocated to calendar years as used in the IA on a 75% : 25% basis

<sup>22</sup> <http://publicapps.caa.co.uk/docs/33/CAP1720ConDoc.pdf>



87. For wider ongoing support of relevant masterplan related tasks an additional 1.1 – 1.6 FTEs are required, at a full cost of £150,000 - £220,000 per annum.<sup>23</sup>

### 6.2.1.3) Department for Transport

88. The DfT may incur minor additional staffing costs, although it is likewise difficult to distinguish these from costs that would be incurred under the do-nothing scenario. It is assumed that ongoing additional activities might require 0.3 FTE at HEO, and 0.1 FTE at G7, at a total annual cost of £19,500.<sup>24</sup>

89. Costs associated with Option 1 are displayed in Table 1 below. The majority of these costs relate to the DMO and the establishment of the new governance structure.

**Table 1: Option 1 costs, Present Value, £000s, 2017 prices**

	Low	Central	High
<b>NATS</b>	2,340	2,340	2,340
<b>CAA</b>	6,780	7,140	7,380
<b>DfT</b>	170	170	170
<b>Total Cost</b>	9,290	9,650	9,890
<i>(of which incurred by business)</i>	9,120	9,480	9,720

## 6.3) Option 2a (Implementation of power (a) only, alongside Option 1)

### 6.3.1) Costs

#### 6.3.1.1) NATS

90. NATS, in their role of initially creating the masterplan and overseeing its developments in future, are expected to incur the same costs as identified under Option 1. The existence of legislative powers to enforce this masterplan is not thought to materially alter the costs faced.

#### 6.3.1.2) CAA

91. In addition to the costs incurred by the DMO under Option 1 for monitoring the progress of the AMS and masterplan, further costs will be faced when critically assessing whether a lack of progress / failure to undertake an ACP requires referral to the Secretary of State for a decision on whether to direct them to do so.

92. It is expected that an additional 0.5 – 0.7 FTEs will be required on an ongoing basis, at a cost of £70,000 to £100,000 per annum. These costs incorporate additional workloads across the DMO, the Safety and Airspace Regulation Group, the Consumers Market Group, and legal support.<sup>25</sup>

#### 6.3.1.3) Department for Transport

93. As for the CAA, the DfT will face costs on top of those identified under Option 1 when considering whether or not to direct an airport / ANSP to undertake an ACP.<sup>26</sup> While the procedures for doing so have not been developed, a parallel can be seen in the airspace change call-in process, in

<sup>23</sup> Staffing and cost estimates provided by the CAA. These are as budgeted for in the CAA Statutory Charges 2019-20: Consultation on Charges CAA Response Document

<sup>24</sup> Wage costs of £34,000 (HEO) and £52,000 (G7) are uplifted by 26.5% in line with DfT's WebTAG guidance on on-costs

<sup>25</sup> Staffing and cost estimates provided by the CAA

<sup>26</sup> For the purposes of this IA it is assumed that this role is not delegated to the CAA, although this remains a possibility under the legislation. Costs may therefore be incurred by the CAA rather than the Department for Transport.



which the DfT must decide whether or not to call-in a decision for the SoS on an ACP following a request to do so.

94. This decision to call-in is assisted by an initial report prepared by the CAA, at an estimated cost of £5,200 per call-in request.<sup>27</sup> We assume a similar report would be drafted by the DfT, and an equivalent cost would be incurred for each case identified in the do-nothing scenario.

95. As noted above, the DfT may choose to delegate the decision-making power to the CAA. In this scenario, the DfT costs would fall on the CAA.

**Table 2: Option 2a additional admin costs, Present Value, £000s, 2017 prices**

	Low	Central	High
CAA	603	723	844
DfT	0	10	72
<b>Total Cost</b>	603	733	916

#### 6.3.1.4) Airports and Air Navigation Service Providers

##### Familiarisation costs

96. It is expected that each UK airport (and their Air Navigation Service Provider) would be required to familiarise themselves with the policy. While the majority are unlikely to be on the critical path for ACPs deemed as appropriate in the masterplan, they would be expected to maintain awareness of its existence. This is may occur regardless of whether or not legislative options are pursued, but time would be required to understand the specific implications of the legislation. Based on the CAA's 2018 planned audits of certified ANSPs<sup>28</sup>, we estimate there to be 71 airports that could possibly fall in scope. Under the low cost scenario we assume only the 53 airports that reported data to the CAA in 2016<sup>29</sup> are required to familiarise themselves with the policy.

97. It is assumed that one person from each airport, and their ANSP, will be required to familiarise themselves with the legislation, and disseminate this to relevant colleagues. While some ANSPs provide services to multiple airports, we conservatively assume that each ANSP-airport pair operates as a separate entity. Given the high level of knowledge of the programme in general, it is assumed that half a person-day (or 4 hours) is required for each airport / ANSP to undertake this task. At a median hourly pay of £14.04<sup>30</sup>, uplifted by a factor of 1.265 to take on costs into account, this results in a cost of £71.05 per airport / ANSP. Total costs are displayed in Table 3 below.

**Table 3: Airport & ANSP familiarisation costs**

	Low	Central	High
<b>Staff costs</b>	£7,500	£10,100	£10,100

##### Cost of undertaking airspace change proposals

98. The do-nothing assessment (section 6.1) contains estimates of the number of ACPs that would not be taken forward in the absence of legislation over the 10 year appraisal period. These are summarised in Table 4 below.

<sup>27</sup> Based on two weeks of an airspace change regulator's time, as estimated at [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/653512/decision-making-community-engagement-requirements-changes-design-uk-airspace.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/653512/decision-making-community-engagement-requirements-changes-design-uk-airspace.pdf)

<sup>28</sup> [https://www.caa.co.uk/uploadedFiles/CAA/Content/Related\\_Information/Commercial/Radio\\_equipment\\_approval/ANSP%20Consolidated%20Inspection%20Audit%20Plan%202018.pdf](https://www.caa.co.uk/uploadedFiles/CAA/Content/Related_Information/Commercial/Radio_equipment_approval/ANSP%20Consolidated%20Inspection%20Audit%20Plan%202018.pdf)

<sup>29</sup> [https://www.caa.co.uk/uploadedFiles/CAA/Content/Standard\\_Content/Data\\_and\\_analysis/Datasets/Airport\\_stats/Airport\\_data\\_2016\\_annual/Table\\_01\\_Size\\_of\\_UK\\_Airports\(1\).pdf](https://www.caa.co.uk/uploadedFiles/CAA/Content/Standard_Content/Data_and_analysis/Datasets/Airport_stats/Airport_data_2016_annual/Table_01_Size_of_UK_Airports(1).pdf)

<sup>30</sup> Hourly earnings for 'Other professional, technical and scientific activities', ASHE, 2016, converted to 2017 prices.



**Table 4: Additional ACPs undertaken due to legislation**

	Low	Central	High
<b>FASI South</b>	0	2	5
<b>Other</b>	0	0	11

99. The cost of undertaking an ACP is highly dependent on the nature of the change, and can vary substantially. The department has previously consulted with ANSPs including NATS as well as airports, who have provided a range of estimates for the cost of undertaking an ACP relating to a single change. As simultaneous changes on the scale of FASI South have not been undertaken before, there are difficulties in applying these estimates directly in this case. On the one hand, these airspace changes are likely to be complex and require a greater degree of collaboration with other organisations than usual. On the other, it is thought more likely that smaller airports, with less complex changes, would be those most likely to not undertake ACPs in the absence of legislation.
100. Each airport's change will in all likelihood be far more complex than a change to a single flight path. A thorough redesign of an airport's airspace would require changes to multiple flightpaths. For example, Heathrow Airport currently has a total of 12 departure routes<sup>31</sup>, while Gatwick Airport has 9<sup>32</sup>, and Southend Airport has recently been consulting on a proposed 6.<sup>33</sup> Arrivals routes add further complexity, with, for example, Heathrow Airport currently operating four holding stacks.<sup>34</sup>
101. It is therefore necessary to scale up the cost estimates of a single change to account for this additional complexity. At the lower end of the scale, it is possible that smaller airfields would require only moderate changes to one or two flightpaths. At the other end, a complete redesign of Heathrow's airspace could require something around the order of 20 arrival and departure routes to be designed (and more so with a third runway).<sup>35</sup>
102. As previously discussed, it is thought more likely that smaller airports would be unwilling / unable to undertake an ACP identified within the masterplan. We would therefore expect the complexity of newly undertaken ACPs to be at the lower end of this scale. For a single runway commercial passenger airport, a total of 6 departure routes (3 for each direction of operations), as per Southend's proposed change, and 4 preferential arrivals routes, provides a plausible scale for use. This suggests scaling up cost estimates for an ACP with one change by a factor of 10. This would indicate a more complex change than would be required for an aerodrome that does not deal with commercial passenger services, but provides a general order of magnitude of impacts.
103. NATS' estimates of the cost of a single ACP have been used as inputs, rather than individual responses from other airports. NATS provide ANSP services to 13 UK airports, from small airports including Aberporth and Farnborough to the largest including Heathrow and Manchester, so are well placed to provide a UK-wide assessment. While this may overstate the cost of an ACP for a small airport, no responses have been received from smaller airports against which to compare. It is recognised that this approach relies on the application of only indirectly relevant cost estimates, but this remains the only information available despite additional consultations on the issue.
104. Table 5 below summarises the total estimated cost associated with undertaking additional ACPs. This includes costs of progressing through the CAA's current airspace change process, as well as consulting with local communities. The cost of additional ACPs associated with FASI South are assumed to be the same as the costs of undertaking other ACPs across the UK.

<sup>31</sup> <https://www.heathrow.com/noise/reports-and-statistics/operational-data/route-usage>

<sup>32</sup> <https://www.gatwickairport.com/business-community/aircraft-noise-airspace/airspace/pr-nav/>

<sup>33</sup> <https://southendairport.com/corporate-and-community/proposed-departure-routes>

<sup>34</sup> <https://www.heathrow.com/noise/heathrow-operations/arrival-flight-paths>

<sup>35</sup> This figure is presented only for context and represents the absolute upper limit that could be considered. Heathrow has been selected as it is the UK's busiest airport, but it is fully engaged with the modernisation process and is already consulting on airspace change principles. The cost of Heathrow's airspace redesign associated with development of a third runway would be substantially more complex and costly than any of the ACPs in scope here.



**Table 5: Cost of undertaking additional ACPs, £000s, undiscounted, 2017 prices**

	Low	Central	High
<b>Cost of undertaking an ACP with one change</b>	N/A	205	617
<b>Flightpaths affected</b>	N/A	10	10
<b>Adjusted cost</b>	N/A	2,050	6,170
<b>Total ACPs</b>	0	2	16
<b>Total Cost</b>	0	4,100	98,800

105. In adjusting the cost of ACPs for complexity, an implicit assumption has been made that the costs of changes to multiple flightpaths are linearly additive. It may be the case that undertaking changes to multiple routes at once reduces costs (particularly in terms of consultation), but this may also increase costs (as the interaction between multiple routes may exponentially increase complexity).
106. To estimate present values, dates for the ACPs have been estimated. Costs associated with FASI South are assumed to be incurred evenly in 2020 and 2021, within the wider timelines for modernisation. Costs for other ACPs are distributed evenly over the period from 2021 to 2028.
107. The above calculations have assumed that each ACP must be fully undertaken. As noted in the policy description, it may be that the policy is triggered by a late or inadequate ACP being pursued. In this case, the additional cost would be either whatever is required to improve the quality of the ACP to an acceptable state, or merely bring forward costs that would have otherwise been incurred at a later date.
108. Costs are assumed to be incurred by the directed airport/ANSP/other entity.

#### Reduced airport attractiveness

109. If an airport would have not otherwise undertaken an ACP, the benefits of doing so must be outweighed by the costs of undertaking it. Given the nature of the critical path, it is possible that the effects could extend further than this, and that the change in question could deliver net negative benefits for an individual airport for example by reducing resilience, or attractiveness. This could occur if, for example, less efficient flight paths were adopted in order to allow a neighbouring airport to pursue a change that maximises wider benefits overall.
110. It is not possible to quantify this impact as it is highly dependent on the airports involved and the airspace design finally chosen – neither of which can be known at this time. A mandatory airspace change proposal would have to be highly disruptive in order to affect demand at an airport to a noticeable level. It is however acknowledged that there may be marginal impacts.

#### **6.3.1.5) Airlines**

111. For airports that would not have undertaken an airspace change, it is likely that this is because existing routes provide the shortest or most efficient journeys, or greatest resilience. Each of these are beneficial outcomes for airlines operating from that airport. An enforced airspace change may reduce the operational efficiency of aircraft operating from that airport. However, this may also be due to a range of other factors that would not directly affect profits, such as noise impacts.
112. The scale of this cost is highly dependent on the nature of the specific change undertaken, as well as the scale of activity affected. As previously discussed, it appears that it is the smallest airports, possibly those operating no commercial passenger services, which are most likely to fail to undertake a change. As such, the impact on airlines is expected to be slight. We might expect a greater proportionate burden to fall on general and business aviation compared to commercial airline services given the nature of traffic at these smaller airports.
113. It is not possible to quantify this impact due to the level of uncertainty involved. However, we would expect any costs incurred to be due to increased fuel burn (and other time-related costs from longer flight paths).



### 6.3.1.6) Passengers

114. As discussed under the impact on airlines, passengers utilising these airports could likewise face longer flight times. Business passengers, with higher values of time, would face the greatest proportionate increase in costs. Any additional airline costs may be passed on to consumers.

### 6.3.1.7) Summary

115. A summary of costs under Option 2a is displayed in Table 6 below.

**Table 6: Option 2a Costs, Present Value, 2017 prices, £m**

	<b>Low</b>	<b>Central</b>	<b>High</b>
<b>Option 1 costs</b>	9.29	9.65	9.89
<b>Additional CAA costs</b>	0.60	0.72	0.84
<b>Additional DfT costs</b>	0	0.01	0.07
<b>Airport &amp; ANSP familiarisation</b>	0.01	0.01	0.01
<b>Developing ACPs</b>	0	3.89	85.69
<b>Total cost</b>	9.90	14.29	96.50
<i>(of which incurred by business)</i>	9.73	14.11	96.26

### 6.3.2) Benefits

116. As previously stated, the department's 2017 Strategic Case for Airspace Modernisation found that average air traffic delays are likely to rise 72-fold between 2015 and 2030 without modernisation, leading to one in three flights experiencing a delay of over 30 minutes and incurring cumulative cost of £1bn between 2016 and 2030. While this acts as helpful context to see the potential scale of benefits associated with airspace modernisation, we do not consider it appropriate to generate estimates of monetised benefits using these figures. The above reflects the case for change for modernisation as a whole, but as stated in section 6.1, we would expect most modernisation activity to occur regardless. It is also not clear to what extent modernisation would be able to avoid these costs – it may not be possible for any system to completely remove airspace related delays, and so this figure could be an overestimate of the potential benefits.
117. Attempting to apportion this sum on the basis of a number of hypothetical airspace changes not occurring would be highly speculative and is not deemed sufficiently robust. While an ACP being on the masterplan indicates a certain degree of importance, there may be some changes that are crucial for enabling optimisation at some of the UK's busiest airports. In the case of a key ACP not going forward under the do nothing, it is not that all modernisation would cease – the remaining airports would simply find a 'second best' approach subject to the constraints imposed. Without being able to identify specific ACPs that would not occur, there is simply no way of estimating the difference in outcomes between such a second best approach, and a fully optimised system.
118. Likewise, it is not solely due to modernisation that additional ACPs may be required, for example these may be to reduce controlled airspace or to improve noise. For such changes the above estimate would be entirely irrelevant, and benefits would need to be looked at on a case by case basis once the specifics were available.
119. While benefits are unmonetised in this IA, any ACP taken forward as a result of the policy would be required to undergo a detailed assessment as part of the CAA's planning process. It is at this stage – once the details of the actual flightpath changes are known – that it is possible to monetise the impacts discussed qualitatively below.

#### 6.3.2.1) Airports

##### Airspace Change Proposal cost efficiencies

120. It has been noted that, particularly in the case of FASI South, there are likely to be a number of ACPs being undertaken at once. When one or more of these changes does not occur



in co-ordination with the others, there is an increased risk of incompatibility between plans. We have estimated that between 0 and 5 additional airports would undertake ACPs as part of FASI South as a result of the policy. By achieving 100% compliance, the policy should reduce instances where an individual airport would be required to re-consult due to the plans of another.

121. As discussed in the baseline assessment, it is challenging to assess both the number re-consultations that could be avoided, and the cost of undertaking these. Depending on the nature of the incompatibility, an airport / ANSP could potentially resolve the issue with only minor changes to existing designs, or could be required to fully redesign their proposals. It is considered unlikely that the cost saving for a single airport avoiding a redesign would exceed the additional cost incurred by the airport newly required to take forward a change, but the effect would mitigate the overall burden to business. This gives rise to the distributional impacts discussed in the design of the policy, whereby not all airports will benefit equally (and indeed some may suffer disbenefits).
122. There could potentially be further efficiencies if consultations are co-ordinated amongst airports with interdependent changes. As many airports will have overlapping catchment areas, multiple airports may potentially wish to distribute material to individual households in a co-ordinated manner. Likewise, potential community events can be more easily consolidated. Due to a lack of evidence on the potential scale of these savings, this benefit remains unquantified.
123. These effects are likely to be more substantial when the relevant change affects multiple airports, so are more applicable to the 'FASI South' ACPs where airports are more densely located. While we would still expect some benefits for any 'Other' ACPs newly undertaken, it is less likely that these would have the same level of interdependency.

#### Increased resilience / decreased journey time

124. The purpose of airspace modernisation and the masterplan of ACPs is to ensure the UK's airspace delivers quicker, quieter and cleaner journeys for the benefit of those who use and are affected by UK airspace. The engagement of airports will help to ensure that NATS' simultaneous redesign of upper airspace delivers outcomes that are optimal for the UK as a whole. Even if individual airports achieve less efficient routing in lower airspace as a result of a mandated change, by allowing greater flexibility for the handling of aircraft in upper airspace, they may benefit from these more general improvements. While more direct routing can deliver decreased journey times for specific routes, thus making airports marginally more attractive to consumers, system-wide improvements can also improve resilience, meaning airports are less likely to experience disruption as a result of knock-on effects.

#### **6.3.2.2) Airlines**

125. Airlines would be the major beneficiaries of increased system-wide resilience and potentially reduced journey times. As those airlines from the airport forced to undertake an ACP may experience longer flight times, so may airlines operating from alternate airports experience shorter flight times. This likewise leads to lower fuel costs, and potentially greater passenger demand due to reduced journey times. There would be an associated reduction in carbon emissions, which would either reduce airline costs if carbon is fully internalised in a trading system, or reduce UK emissions. That airline industry trade bodies have expressed support for the policy suggests they see it, on balance, to be of benefit for their members.

#### **6.3.2.3) Passengers**

126. As a corollary to the airline benefits, so passengers from across the UK would benefit from guaranteed adoption of ACPs. These mirror the potential disbenefits experienced by passengers at the airport required to undertake the change. It can reasonably be expected that benefits would be distributed across a wider number of people, but have smaller per capita effects than the costs, which would be concentrated on passengers at the relevant airports. The total benefits from modernisation would however be expected to far exceed any costs faced.

#### **6.3.2.4) Communities**

##### Noise Impacts

127. A lack of co-ordination between multiple ACPs, or ACPs not being undertaken, can result in communities experiencing greater noise impacts than necessary. Maintaining existing routes where flightpaths occupy the same area can mean traffic from certain airports is kept lower than is optimal to avoid conflict, but at the cost of increased noise to communities.



128. The widespread adoption of modernised airspace procedures also provides the greatest flexibility in providing specific communities with respite through the varying of routes. If one or more airports do not, for example, adopt PBN, this may reduce the ability of neighbouring airports to fine tune flight paths to the same degree, as wider levels of separation will be required. To the extent that modernisation allows for an increase in effective capacity, the total amount of aviation noise created could increase, but the increased flexibility provided by modernisation, alongside the application of robust planning conditions, may ensure this effect is mitigated.
129. More directly, the policy will allow for the development of airspace changes explicitly due to issues such as noise and air quality. Such a change would naturally be expected to directly benefit local communities.
130. As with other wider impacts of the policy, it is not possible to quantify these effects due the total reliance on the nature of the specific change in question, which we cannot know at this stage.

## **6.4) Option 2b (Implementation of both Option 2 powers, and Option 1)**

### **6.4.1) Costs**

#### **6.4.1.1) NATS, CAA & DfT**

131. Costs for NATS and the CAA are deemed to be the same as those identified under Option 2a. For any ACPs that cannot directly be undertaken by the relevant airport/ANSP, it is possible that DfT (or the CAA if responsibility is delegated) would face additional costs in identifying an alternate airspace change sponsor, if that was the system followed. As the precise format for this is yet to be determined, it is not possible to generate a specific estimate for this. However, we use costs associated with procuring work as a proxy for the potential cost incurred. Considering the ratio of the value of contracts awarded by the Crown Commercial Services to their operating costs provides an estimate for the cost of undertaking a procurement. For 2017/18, operating costs amounted to approximately 0.6% of the value of contracts awarded.<sup>36</sup> As our estimated cost of undertaking an ACP is between £2.05m and £6.17m, this implies a broad cost of undertaking each identification process at £12,300 - £37,000. It may be that such an identification procedure is not necessary (if, for example, the ACP is simply given to NERL to take forward).
132. It is an implicit assumption in the calculations underlying Option 2a that all airports / ANSPs undertake ACPs when directed to, rather than face sanctions. Likewise, while it might be considered that an alternate organisation would be better placed to develop an ACP than the airport / ANSP it relates to, industry consultation responses strongly supported local delivery of ACPs. This would imply that no such ACPs would fall under the scope of the powers granted under Option 2b. It is acknowledged that such a risk potentially exists however (hence the inclusion of these powers), so it is prudent to consider. Just as there is a significant degree of uncertainty in determining which airports may be unwilling to undertake ACPs under option 2a, there is no evidence to help determine how many cases would fall under the scope of option 2b.
133. We have previously concluded that a total of 16 additional ACPs may be undertaken as a result of legislation. To take the most extreme outcome possible, in which all 16 required referral to an alternate organisation, this would imply a maximum total discounted cost of £510,000 over the 10 year appraisal. However, this is not deemed plausible even under a high cost scenario. Indeed, given the strong preference for executing the powers as per Option 2a, it is thought unlikely that any such costs will occur. The above costs are therefore presented for context, but are not further considered. As is discussed below, no other identified costs are dependent on the number of cases handled under Option 2b powers as opposed to Option 2a, so while noted as a risk, it is not considered proportionate to further assess such an inherently uncertain question.

#### **6.4.1.2) Airports and Air Navigation Service Providers**

##### Familiarisation costs

134. While alternate organisations could additionally be responsible for undertaking ACPs under option 2b, as discussed above we would still expect nearly all, if not all, ACPs to be undertaken by the initial airport / ANSP as directed. As such, we would expect airports to familiarise themselves with the policy. We therefore consider airport / ANSP familiarisation costs to be equivalent to those experienced under option 2a.

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<sup>36</sup> £13bn of contracts over operating costs of £80m.



135. Any organisations wishing to deliver ACPs on behalf of others would likewise be expected to familiarise themselves with the legislation. As one of the key players involved with airspace modernisation, and a potential alternate organisation, NERL have extensive knowledge of the programme and its requirements. They would however be required to familiarise themselves with the detail of any new legislation, as the precise mechanisms determining when they could undertake an ACP on behalf of an airport/ANSP would require understanding. We estimate a manager would spend a day (8 hours) undertaking an initial assessment, resulting in additional costs of approximately £170.<sup>37</sup> This represents a minimal increase over the familiarisation costs incurred under option 2a. It is expected that the vast majority, if not all, of any other potential providers would deliver existing airport / ANSP services at a UK airport – and thus already be accounted for above.

#### Cost of undertaking airspace change proposals

136. The number of additional ACPs undertaken as a result of option 2b is expected to be the same as under option 2a, with both options ensuring all ACPs deemed as appropriate in the masterplan are delivered. There may however be differences in the cost of undertaking these changes, if ACPs are delivered by alternate organisations.

137. Any existing ANSP or likely chosen organisation would have experience of delivering airspace changes, and so there may be scope for efficiency savings compared to a presumably smaller airport/ANSP that is unable to comply. However, there are a number of reasons why this may not be the case. First, the organisation would need to work with the airport/ANSP in question in order to understand the airports/ANSPs operations, particular local considerations, and the implications these may have for airspace design. Secondly, the cost estimates used in option 2a are derived from submissions by NATS' commercial arm, which likewise has substantial experience of delivering ACPs. There may be efficiencies in designing multiple ACPs at once, particularly if they are interdependent, but the scope for this is limited as it is not expected that a large number of additional ACPs will be required due to the legislation.

138. As there are factors that suggest the costs of undertaking ACPs may be greater or lesser when undertaken by an alternate organisation compared to a directed airport/ANSP, and there is no clear indication of the scale of these impacts, our best estimate of costs is equivalent to that for option 2a. Consultation responses raised concerns with the (as then) policy option of NERL undertaking such ACPs. However, while these concerns focused on the potential quality impacts for ACPs of a lack of local knowledge, these did not indicate that costs would necessarily be higher than if undertaken by the directed airport / ANSP under option 2a.

#### **6.4.1.3) Airports, airlines and passengers**

139. With no strong evidence to suggest that ACPs undertaken by an alternate organisation would substantially differ from airspace changes undertaken by airports/ANSPs, we would expect all other non-monetised costs to be similar to those for option 2a.

#### **6.4.1.4) Summary**

140. Costs associated with Option 2b are shown in Table 7 below. The addition of the secondary power is expected to lead to only marginally higher costs than those incurred as a result of Option 2a, when only one power is taken forward.

**Table 7: Option 2b Costs, Present Value, 2017 prices, £m**

	<b>Low</b>	<b>Central</b>	<b>High</b>
<b>Option 2a costs</b>	9.90	14.29	96.26
<b>Additional familiarisation</b>	<0.01	<0.01	<0.01
<b>Total</b>	9.90	14.29	96.51
<i>(of which incurred by business)</i>	9.73	14.11	96.26

<sup>37</sup> Gross hourly salary of £16.00 (after converting to 2017 prices) for 'Activities of head offices; management consultancy activities' of 'PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES' taken from ASHE 2016, table 4.5a, and uplifted by a factor of 1.3.



## 6.4.2) Benefits

141. All benefits are deemed to be similar in nature and scale to those described under option 2a. Although it is deemed preferable for airports/ANSPs, with their greater knowledge of local issues, to undertake their own ACPs, Option 2b ensures that ACPs can still be undertaken by other organisations if and when this is infeasible. The design of ACPs may be enhanced by organisations with considerable experience undertaking them in place of airports. However, airports and their ANSPs will have considerable knowledge of local conditions that will also enhance proposed ACPs. The extent to which airports are required to work with alternate organisations in development of an ACP would determine the extent to which this knowledge could help to improve the quality of routes designed, and therefore the benefits delivered, under the use of the additional powers.

## 7) Rationale and evidence that justify the level of analysis used in the IA (proportionality approach)

142. This Impact Assessment has monetised costs and benefits wherever possible. However, this has been limited by a number of factors. There remains a degree of uncertainty surrounding the masterplan as this is currently under development, and thus the scale of the policy. This uncertainty is compounded by outcomes in other areas which are inherently unknowable, and impossible to estimate to any degree of accuracy – not least with regards to the proportion of ACPs (to be identified in the masterplan) that would not have otherwise been undertaken. To precisely estimate wider impacts, or even all direct costs to business, would then require details of the specific airspace changes in scope.

143. A change could be as minor as a slight diversion to a single arrival / departure route, or could entail the complete redesign of an airport's/ANSP's airspace. The crucial changes in scope (FASI South and, if identified, other potential changes in the masterplan to give other benefits such as noise benefits/improved access to airspace represent a unique set of changes for which no prior experience can provide a clear parallel). As such, we can only consider what is thought most likely, or what has previously occurred under typical changes.

144. Given this uncertainty, it is impossible to develop a meaningful quantified estimate of all costs and benefits, and thus a largely qualitative approach has been adopted. This lack of certainty is apparent from consultation responses, which were unable to provide further quantitative evidence, but did shape the design of the policy to ensure that any regulatory action is only taken as an absolute last resort.

145. While there are potentially significant impacts on business, it is equally likely that industry would undertake the required ACPs in the absence of the proposed legislation, and thus experience only minor familiarisation costs as a result. The broad support of industry trade bodies suggests that the policy, if appropriately applied with safeguards and rights of appeal (as discussed in chapter 5), should nevertheless minimise direct impacts on businesses, while providing assurance that the far greater dispersed costs of not modernising airspace will be prevented.

146. Finally, any airspace change must ultimately go through the CAA's airspace change process, which would require its own detailed options appraisal and not be subject to the uncertainty faced here, ensuring that a thorough assessment of specific changes must be undertaken.

## 8) Risks and assumptions

### 8.1) Risks

147. While the two powers proposed aim to ensure an appropriate ACP within the masterplan is prepared and submitted by an airport or an alternate organisation, there are risks to whether the changes can be delivered. A major risk lies in the technical expertise required across a limited group of organisations in order to achieve these changes, the finance model to achieve that resource, and the lead time to get the resources adequately trained up to deliver the changes. These are further discussed below.

#### *Potential delays to the airspace modernisation programme*

148. If airports/ANSPs/other entities are directed to design and propose an airspace change, there is a risk that the airports/ANSPs/other entities could delay in the hope that it would be taken off them altogether and given to an alternate organisation. Because this risks delaying the airspace modernisation programme, we intend that the development and adoption of the



masterplan should identify potential weak points (e.g. ACPs with very poor business cases or those to be owned by organisations with no ACP experience or revenue stream to support the ACP that is needed), and should include mitigations that avoid its appearance at the delivery stage.

### **Skills and resources**

149. There is a risk of a lack of appropriate technical expert resource available across the entire industry in order to deliver the required ACPs at a given time. While this is a risk regardless of whether or not legislation is taken forward, it does represent a possible challenge for effective implementation of any legislation. Delays could therefore be caused by the time it may take for any additional resource to be trained up to deliver ACPs to the required standard.
150. To assess this risk we consider the impact of a 2-year delay to the delivery of FASI South. This would be expected to have two primary impacts: firstly in delaying the benefits of the programme, and secondly in increasing the CAA's costs relating to the DMO. It is not thought that such a delay would increase the actual costs of undertaking ACPs, these would simply be delayed until resource became available. From a present value perspective, there may be slight reductions in costs as these are incurred later, but for the purposes of this test such an effect is not examined.
151. As the benefits remain unquantified, it is not possible to monetise the impact of a delay on these. However, it is possible to assess the impacts on the CAA. Allowing for two additional years of expenditure on the DMO at £1.16m per year (as per section 6.2.1.2) would result in costs increasing as shown in Table 8 below.

**Table 8: Total CAA costs (Option 2b), Present Value, £m**

<b>DMO end-date</b>	<b>Total CAA costs</b>
<b>2024/25 (central case)</b>	£7.86m
<b>2026/27 (2 year delay)</b>	£9.67m

152. Where an alternate organisation is required to take over or initiate an ACP, it may be the case that more than one ACP occurs at once, and at relatively short notice. There may therefore be resource implications both in terms of capability/skills and capacity. However, given the possible range of organisations available to intercede under option 2b, it is thought likely that any peaks could be dealt with.
153. There is the potential that an organisation could be asked to intervene in airspace it is not overly familiar with or expert in – it could therefore take longer to achieve.

### **Conflicts of interest**

154. As both DfT and CAA have roles in making ACP decisions, appropriate internal governance structures would need to be put in place in both organisations to manage conflict of interest risks. More specifically:
155. DfT may need to make internal governance arrangements to separate out those responsible for (i) discharging the new powers of direction, (ii) decisions on whether to call in an ACP and making recommendations to Ministers on that called-in ACP.
156. The CAA may need to make internal governance arrangements to separate out (i) DMO tracking and advice on when to use the power, (ii) discharging the new powers of direction, if delegated to the CAA, and (iii) decisions on an ACP. The CAA has already created an internal governance that separates out (i) and (iii); the CAA is able to create a third one, though it would be complex.

## **8.2) Assumptions**

157. The fundamental assumption underlying this Impact Assessment is the number of ACPs that would not be undertaken in the absence of any legislative option. While our assumptions have been informed by the evidence available, this evidence is very limited and there is an inherent uncertainty in predicting the actions of other organisations. The Government's objective is ultimately to provide sufficient support to the modernisation programme that legislation will not be required, but it is recognised that there may be reasons why this is not possible. The range of scenarios considered is however expected to capture the range of plausible outcomes in this regard.



158. We consider this further by undertaking a sensitivity test that solely varies the number of ACPs additionally undertaken as a result of the legislation. The number of ACPs is varied in line with the IA's high scenario assumption, and the results are shown in Table 9 below (low case excluded as there are no ACPs undertaken).

**Table 9: ACP Sensitivity Test (costs in Present Values)**

	Central	High
<b>Total ACPs</b>	2	16
<b>Total ACP Cost</b>	£3.89m	£25.82m
<b>Option 2b EANDCB</b>	£1.3m	£3.3m

159. Another notable area of uncertainty relates to the cost of undertaking ACPs. As the nature of each additional ACP is unknown, there can be no detailed estimate of costs. The assumptions taken to adjust the available cost estimates in line with the number of flight paths potentially affected is thought to provide an appropriate estimate of their likely scale.

160. We test the implications of this assumption by undertaking a sensitivity test in which the number of flightpaths requiring changes in each ACP is varied. At the low end of the scale, it is plausible to assume that only a single flightpath may need to be amended. When determining an upper limit, it is important to note that the existing central case takes a conservative approach, reflecting a substantial change to a commercial scheduled passenger airport. This would be far in excess of what would be required for any of the larger aerodromes which do not offer scheduled passenger services, or a more limited change at a larger airport. However, to ensure that the full range of possible outcomes is captured, it is assumed that 20 flightpaths could be affected, approximating an extensive change to one of the UK's largest airports. The results are shown in Table 10 below.

**Table 10: ACP Complexity Sensitivity Test (costs in Present Values)**

	Low	Central	High
<b>Total ACPs</b>	2	2	2
<b>Flightpaths per ACP</b>	1	10	20
<b>Total ACP Cost</b>	£0.39m	£3.89m	£7.79m
<b>Option 2b EANDCB</b>	£1.0m	£1.3m	£1.6m

161. We have been unable to reduce the key areas of uncertainty faced since the publication of the consultation stage IA. This is fully reflective of the nature of the policy and it is not believed that additional data collection is possible at this point to enhance these estimates.

## **9) Direct costs and benefits to business calculations (following BIT methodology)**

162. All monetised costs are considered to be direct costs to business, except where incurred by DfT. As both the CAA and NATS are primarily funded by industry, increased costs for these organisations are considered direct costs to business.

163. Implementation of both powers under Option 2 alongside the non-legislative actions of Option 1 (as assessed under Option 2b above) is the preferred option, and has an EANDCB of £1.3m in 2014 prices, 2015 PV, and as costs are clearly below £5m in any year, the policy is a non-qualifying regulatory provision.

164. It is noted that under the high scenario costs do increase above £5m in some years. However, as stated under section 6.1 and reflected in the sensitivity tests of section 8.2, this is dependent on there being an extremely high number of ACPs not occurring under the baseline, as well as these being of a higher cost than expected. This is not, in reality, deemed a plausible scenario for a policy intended as a backstop – the low scenario reflects a far more likely outcome than the high scenario. It is therefore thought appropriate to maintain the categorisation as a non-qualifying regulatory provision.



## 10) Wider impacts

### Small and Micro Business Assessment

165. All options result in costs to both the CAA and NATS, which will be recouped from industry through charges. As such, a proportion of the costs to these organisations may be expected to ultimately fall on small and micro organisations. This effect is however expected to be small, as the vast majority of these charges fall on large airlines.
166. The regulatory costs will be recouped through the UK Eurocontrol En Route unit rate.<sup>38</sup> This rate is charged to users of airspace, with some exceptions, and is already used to fund airspace regulation costs. While a number of exceptions exist<sup>39</sup>, the key exceptions for reducing the impact on small and micro businesses are for:
- flights by aircraft of which the Maximum Total Weight Authorised is 5700 kg or less made entirely in accordance with the Visual Flight Rules in the Rules of the Air Regulations 2015 (SI 2015/840)
  - flights terminating at the aerodrome from which the aircraft has taken off
167. In regards to (a), the vast majority of aircraft registered in the UK are expected to fall under this weight limit. CAA data shows a total of 10,057 registered fixed wing land planes, of which 8,869 weigh 5700 kg or less.<sup>40</sup> Of the remainder, 770 weigh over 50 tonnes, and are expected to be passenger jets in use by large commercial airlines. As such, there only 418 planes that are likely to exceed this weight limit, and are not clearly in use by large organisations. All 3918 registered microlites, and all 2,265 registered gliders also fall under the 5700 kg weight category.
168. Of these planes in scope, it is likely that many are involved in business aviation. The Royal Aeronautical Society have compiled a list of UK business aviation companies, comprising 31 organisations.<sup>41</sup> A review of Companies House records indicates that 16 of these are small or micro businesses, who are likely to experience marginal increases in costs due to the increased en route rate. However, as previously stated, the vast majority of these costs will fall on large commercial airlines, and the increase in charges will be marginal regardless. The use of the en route unit rate as the funding mechanism will therefore mitigate most of the impact on small and micro businesses.
169. In regards to (b), it has previously been recorded that 51% of general aviation flights took off and landed at the same site, which would exempt them from charging regardless of the aircraft used.<sup>42</sup>
170. Options 2a and 2b would apply to airports of all sizes. It is not possible to exclude smaller airports from the requirements as it is the interdependency between airports that necessitates the policy. In particular, there are a number of small airports in the South East which have airspace requirements that exist in partial conflict with some of the UK's largest airports, as per the assessment made in the NATS feasibility report.
171. It is expected that smaller commercial airports/ANSPs would be more likely to not undertake an ACP in the absence of legislation, and may therefore be disproportionately affected by option 2a. Under option 2b, costs could potentially fall to an alternate organisation if it became evident that the initial airport/ANSP was unable to deliver the change. For example, if NERL was asked to take forward an ACP under 2b, it is possible that the costs could be added to the en route rate, paid for by airlines.
172. While smaller commercial airports are thought to be disproportionately affected, we do not expect any of these to fall under the small or micro business category. A review of Companies House records finds for example that Farnborough Airport employs an average of 143 people a

<sup>38</sup> <http://publicapps.caa.co.uk/docs/33/CAP1720ConDoc.pdf>

<sup>39</sup> <https://www.aurora.nats.co.uk/htmlAIP/Publications/2019-02-28-AIRAC/html/eAIP/EG-GEN-4.2-en-GB.html>

<sup>40</sup>

[https://www.caa.co.uk/uploadedFiles/CAA/Content/Standard\\_Content/Data\\_and\\_analysis/Datasets/Aircraft\\_register/CofA/UK%20registered%20aircraft%20by%20class%20weight%20and%20CofA%202019.pdf](https://www.caa.co.uk/uploadedFiles/CAA/Content/Standard_Content/Data_and_analysis/Datasets/Aircraft_register/CofA/UK%20registered%20aircraft%20by%20class%20weight%20and%20CofA%202019.pdf)

<sup>41</sup> <https://www.careersinaerospace.com/wp-content/uploads/2018/01/UK-Business-Aviation-Companies.pdf>

<sup>42</sup> [https://web.archive.org/web/20061007122800/http://www.gaac.co.uk/gasar/GASAR\\_NationalPilotSurvey.pdf](https://web.archive.org/web/20061007122800/http://www.gaac.co.uk/gasar/GASAR_NationalPilotSurvey.pdf)



year, and Biggin Hill an average of 145.<sup>4344</sup> As ANSP services are typically delivered by a unit within an airport organisation, or by larger dedicated ANSPs serving multiple airports, none of these are deemed to fall in scope either. A full list of UK certificated aerodromes is provided in Annex C.

173. In addition to certificated aerodromes, the UK has a large number of unlicensed airfields – many of which are not visible on OS maps, are grass only sites, and offer few or no ground services such as refuelling. The General Aviation Small Aerodrome Research (GASAR) Study noted over 480 sites present in UK flight guides. In theory, these sites fall in scope of the proposed regulation. However, given such sites often lack any formal flightpaths and operate entirely in uncontrolled airspace (in fact, the GASAR study found that the majority of small sites did not offer any form of ground to air radio communication), it is extraordinarily improbable that such a site would ever be required to undertake a mandatory ACP. Even if such a case were to occur, with these sites entirely lacking the skills or resources to undertake an ACP, use of the Option 2a powers would be totally infeasible.
174. There are not thought to be any substantial indirect costs to other small or micro businesses, such as frequent users of aviation services. While an individual airport may be required to undertake ACPs that have a negative business case, the subsequent impact for users of that airport are likely to be marginal. Additionally, it has been noted that such an ACP would likely only be required if it delivered benefits to an interdependent airport. Such interdependence implies geographic proximity, which means that users of aviation services would face a local market that as a whole provides enhanced services.
175. Overall, implementation of both option 2 powers (Option 2b) allows for flexibility in the delivery of airspace changes and provides the ability to minimise impacts on smaller businesses.

## Competition Assessment

176. Use of the proposed powers may have implications for competition between aerodromes, and between aviation service providers. Requiring an airport to undertake an ACP it would not have undertaken voluntarily may result in services from that airport being of lower quality (for example due to less efficient flightpaths), or may result in the airport raising charges to cover the costs of the additional ACP. Either of these would make the airport or aviation service provider relatively less attractive, distorting competition. In the case thought most likely – that of a smaller airport being required to undertake a change to allow for more efficient routing at a system level / at larger airports, this may however be limited. The services provided by smaller airports, such as to general aviation, are not typically offered by the UK's larger commercial airports. They therefore to some extent exist in different markets, with limited opportunity for consumer choices to be distorted.
177. It is not thought likely that the potential for enforced ACPs will impose substantive barriers to entry in any market. For the development of very small aerodromes, it is unlikely that there would need to be any additional consideration of airspace factors – the policy is not intended to apply to these sites, and so there is little chance of any impact. For larger aerodromes, or sites seeking to become certificated, they would already be required to develop ACPs through the CAA's existing process. As the masterplan of required changes will be public knowledge, new entrants will be able to design flightpaths with this in mind, minimising the chance of being required to undertake a mandatory ACP at a later date.
178. The pass-through of regulatory costs to industry is not expected to have any impact on competition as this will be proportionately applied to all chargeable users of airspace. While this does represent an increase in costs and so may act as a barrier to entry, in reality there is unlikely to be any impact given the very marginal increase in charges, and the small proportion of overall costs that these make up.
179. It is likewise not expected that any industries making frequent use of aviation will face additional barriers to entry, or noticeable wider competition impacts. There is uncertainty around this as the downstream effects of the policy cannot be known until and unless a specific ACP is required, but these are likely to be very small for an individual consumer / business compared to the cost incurred by the airport / ANSP. As users of aviation services can typically choose between a number of aerodromes, any increase in cost / decrease in service quality at a single aerodrome

<sup>43</sup> TAG Farnborough Airport Limited. Annual Report and Financial Statements for the year ended 31 December 2017

<sup>44</sup> Biggin Hill Airport Ltd. Annual Report and Financial Statements for the year ended 31 March 2018



is unlikely to result in unavoidable distortionary costs, as users of that site will have a number of competitors to choose from.

## **Health Impact Assessment**

180. It is not possible to determine the precise impact of the policy on health outcomes, but there is a rationale to support there being a beneficial impact. While the primary reason for requiring airspace change is to ensure airspace modernisation is delivered, the masterplan will also consider whether there are any changes necessary to bring noise benefits (with implications for health). Additionally, the successful delivery of airspace modernisation will allow for greater precision in aircraft flightpaths, thus allowing for greater flexibility in the provision of respite for communities. However, to the extent that the successful delivery of airspace modernisation can allow for greater numbers of, or density of flights, some communities may face higher levels of noise as a result. Any airspace changes delivered as a result of the preferred option would be required to follow the CAA's ACP process, for which detailed consideration of such outcomes would be required.

## **Environmental Impact Test**

181. As above, it is not possible to precisely determine the impact of the preferred policy on the environment. Primarily, we would expect any impacts to be seen in terms of greenhouse gas emissions and air quality. To the extent that the powers enable optimised flightpaths with lower fuel burn, there is a clear rationale to expect lower greenhouse gas emissions; to the extent that more optimal use of airspace may increase the network's capacity, we might expect increased emissions. Environmental issues may also be the cause for an ACP to be directed under the powers – in this case, we would naturally expect an improvement in outcomes. However, it is unclear how often this may occur.

## **Equalities Impact Assessment**

182. The policy is not expected to have a disproportionate effect on any protected characteristic groups.

## **Justice Impact Test**

183. A Justice Impact Test, outlining the potential burden of appeals on the court system has been sent for consideration to the Ministry of Justice (MoJ). Given that the legislative powers will only be used where required, and that the proposed route of appeal would be to the CAT, with only onwards appeals to be heard by the Court of Appeal (in England, Wales and Northern Ireland) and Court of Session (in Scotland), the likelihood of MoJ being affected is very low, if at all.

## **11) Summary and preferred option with description of implementation plan.**

184. The preferred approach is to implement both of the powers identified under option 2, alongside delivery of the non-legislative actions of option 1. Legislation is deemed necessary to ensure that critical ACPs will be undertaken, and providing both powers allows for flexibility in how ACPs are delivered. Regardless, it is still expected that most ACPs will be delivered by the private sector, and the actions undertaken as part of option 1 will support this.

185. We expect that before any formal action is taken to direct an airspace change under the proposed legislation, the new oversight team being set up within the CAA will monitor the progression of the ACPs within a masterplan of changes. The oversight team will advise on the use of the powers and will report to DfT monthly on the implementation of the programme including whether the powers should be used. The CAA oversight team will be tasked to monitor and evaluate the impact of the regulation to inform any future PIR. Furthermore, the CAA must consult the Secretary of State about the preparation and maintenance of its new Airspace Modernisation Strategy, and must give a delivery report annually. The CAA will review the strategy regularly in making their annual report in which we expect them to measure progress against the delivery plans, and could include the effectiveness of the proposed legislation in delivering the airspace modernisation programme.



186. Alongside this review of the programme as a whole, stage 7 of the CAA's CAP1616 process for ACPs is a Post Implementation Review, which usually begins one year after the implementation of the change. These reviews capture a range of the effects that it has not been possible to monetise in this IA, as these are dependent on the specific change in question. An example PIR is the CAA's report into the London Airspace Management Programme's Phase 1A Module E ACP.<sup>45</sup>
187. This policy additionally forms part of the wider Aviation Strategy, which continues to develop and for which a wider implementation plan will be developed.

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<sup>45</sup> [https://publicapps.caa.co.uk/docs/33/CAP1692\\_E\\_Complete\(P\\_LINKS\).pdf](https://publicapps.caa.co.uk/docs/33/CAP1692_E_Complete(P_LINKS).pdf)







## ANNEX B – The current route structure for airfields in the FASI-S programme



Source: NATS



## ANNEX C – UK Certificated Aerodromes

Aberdeen (Dyce) EGPD	Humberside (Hull) EGNJ
Belfast (Aldergrove) International EGAA	Inverness (Dalcross) EGPE
Belfast City (George Best) EGAC	Kirkwall (Grimsetter) EGPA
Benbecula EGPL	Leeds Bradford (Yeadon) EGNM
Biggin Hill EGKB	Liverpool EGGP
Birmingham (Edmdon) EGBB	London City EGLC
	London Gatwick EGKK
Bournemouth EGHH	London Heathrow EGLL
Bristol (Lulsgate) EGGD	London Luton EGGW
Cambridge EGSC	London Stansted EGSS
Cardiff EGFF	Lydd EGMD
	Manchester International EGCC
City of Derry (Eglinton) EGAE	Newcastle (Woolsington) EGNT
Coventry EGBE	Newquay EGDG
Cranfield EGTC	Norwich EGSH
Doncaster Sheffield EGCN	Oxford (Kidlington) EGTK
Dundee EGPN	Prestwick EGPK
Durham Tees Valley EGNV	Scatsta EGPM
East Midlands EGNX	
Edinburgh (Turnhouse) EGPH	Southampton EGHI
Exeter EGTE	Southend EGMC
Farnborough EGLF	Stornoway EGPO
Glasgow EGPF	Sumburgh EGPB
Gloucestershire EGBJ	Wick EGPC
Hawarden EGNR	



