

Title: Enforcing the development of airspace changes IA No: DfT00405 RPC Reference No: Click here to enter text. Lead department or agency: Department for Transport Other departments or agencies: Civil Aviation Authority	Impact Assessment (IA)			
	Date: 28/11/2018			
	Stage: Consultation			
	Source of intervention: Domestic			
	Type of measure: Primary legislation			
Contact for enquiries: Luke Sharpin (Luke.Sharpin@dft.gov.uk)				
Summary: Intervention and Options				RPC Opinion: Not Applicable

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
£-3.9m	£-3.9m	£0.4m	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, 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. While airports are expected to engage with this modernisation programme, legislation is required to ensure that interdependent Airspace Change Proposals (ACPs) take place in a coordinated manner when organisations are unwilling or unable to do so, thus delivering the positive externalities associated with ACPs. There is a particularly high degree of interdependence for airports in the south of the UK, who should work closely together with NATS (En Route) plc (NERL) to develop their ACPs. The level of interdependence creates a risk that a single airport, if behind schedule, could delay the entire airspace modernisation programme.

What are the policy objectives and the intended effects?

The policy aims to ensure that quality ACPs will be developed in a coordinated and timely manner to deliver the benefits of national modernisation where airports are unwilling or unable to take these ACPs forward voluntarily. The policy, if taken forward, would only be used when airports' did not voluntarily take forward key ACPs to completion. This would provide greater assurance to airports, airlines, consumers and communities that a masterplan of necessary 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)

Policy options have been developed through discussions between the Department for Transport, NATS and the Civil Aviation Authority. The DfT also held engagement sessions with stakeholders in June and July 2018.

Option 0) Do nothing

Option 1) That the DfT and CAA continue to provide leadership through co-sponsoring the Airspace Modernisation Programme (Do minimum) [Non-regulatory]

Option 2) Introduce new legislative powers in two areas (preferred option)

a) Provide the Secretary of State the power to direct airports/Air Navigation Service Providers (ANSPs) to take forward ACPs within a masterplan of changes

b) Provide the Secretary of State the power to direct airports/ANSPs to cooperate with NERL to put forward ACPs within a masterplan of changes on the airport/ANSP's behalf

Implementation of option 1 and both aspects of option 2 is preferred. Unlike the do nothing or solely implementing the do minimum approach, this would ensure that necessary ACPs are undertaken while allowing for flexibility in how these are delivered.

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

Does implementation go beyond minimum EU requirements?		N/A		
Are any of these organisations in scope?	Micro Yes	Small Yes	Medium Yes	Large Yes
What is the CO₂ equivalent change in greenhouse gas emissions? (Million tonnes CO₂ equivalent)		Traded: N/A		Non-traded: 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 :

Date : Enter a date

Summary: Analysis & Evidence

Policy Option 1 (Do minimum)

Description: Provide additional support to airports/ANSPs undertaking Airspace Change Proposals

FULL ECONOMIC ASSESSMENT

Price Base Year: N/A	PV Base Year: N/A	Time Period Years: N/A	Net Benefit (Present Value (PV)) (£m)		
			Low: -	High: -	Best Estimate: NQ

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

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

N/A

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

Provision of further support would impose additional costs on Government. The extent of these costs would be highly dependent on the nature of support provided, which is yet to be determined.

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	-	-	-
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. It is deemed unlikely that substantially different outcomes to the do nothing scenario would be achieved.

Key assumptions/sensitivities/risks

Discount rate (%)

N/A

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

BUSINESS ASSESSMENT (Option 1)

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

Policy Option 2a

Description: Provide the Secretary of State power to direct airports/ANSPs to take forward ACPs within 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: -0.0m	High: -85.7m	Best Estimate: -3.9m

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	-	-	<0.1m
High	-	-	85.7m
Best Estimate	Optional	Optional	3.9m

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

The primary monetised cost would be incurred by airports/ANSPs required to undertake necessary ACPs they would not have otherwise completed voluntarily, estimated at between £0.0m and £85.7m (best estimate £3.9m). Airports/ANSPs would additionally face minor costs to familiarise themselves with the legislation.

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

Airlines operating from airports required to undertake these 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.

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	-	-	-
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 (%)

3.5

The key assumption is the number of 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.

BUSINESS ASSESSMENT (Option 2a)

Direct impact on business (Equivalent Annual) £m:	Score for Business Impact Target (qualifying provisions only) £m: N/A
Costs: £0.4m	Benefits: N/A
Net: -£0.4m	

Summary: Analysis & Evidence

Policy Option 2b

Description: Provide the Secretary of State power to direct airports/ANSPs to cooperate with NERL to put forward ACPs within a masterplan of changes on the airports/ANSPs behalf

FULL ECONOMIC ASSESSMENT

Price Base Year: 2017	PV Base Year: 2019	Time Period Years: 10	Net Benefit (Present Value (PV)) (£m)		
			Low: -0.1m	High: -85.7m	Best Estimate: -3.9m

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	-	1	-	<0.1m
High	-		-	85.7m
Best Estimate	Optional		Optional	3.9m

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

The primary monetised cost would be incurred by NERL required to undertake necessary ACPs on the behalf of airports/ANSPs, estimated at between £0.0m and £85.7m (best estimate £3.9m). NERL, airports/ANSPs 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.

Key assumptions/sensitivities/risks

Discount rate (%)

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 NERL as compared to airports/ANSPs.

BUSINESS ASSESSMENT (Option 2b)

Direct impact on business (Equivalent Annual) £m: Costs: £0.4m Benefits: N/A Net: -£0.4m	Score for Business Impact Target (qualifying provisions only) £m: N/A
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Evidence Base (for summary sheets)

1) Background

1. The Department for Transport 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.
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 Department for Transport is examining whether further policy is required to support airspace modernisation.
3. The Civil Aviation Authority's (CAA) policy is that anyone can propose an airspace change – although in practice, NERL usually sponsors upper airspace changes and airports/air navigation service providers (ANSPs) usually sponsor changes in lower airspace. Responsibility for maintenance of the UK's airspace falls to a number of organisations, discussed in Annex A.¹

2) Problem under consideration

4. 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.
5. 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.²
6. We 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 2030.³
7. 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
8. DfT have therefore been working with key stakeholders to develop policy to support coordination 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

9. 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' draft report into airspace modernisation in the South of the UK⁴.
10. 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. Such a co-ordination failure could deliver sub-optimal use of the UK's airspace, particularly during the crucial phases of modernisation occurring in the upcoming decade.

¹ A brief description of how UK airspace is organised is available at <https://www.nats.aero/ae-home/introduction-to-airspace/>

² Upgrading UK Airspace: Strategic Rationale. Department for Transport, 2017.

³ *ibid*

⁴ The Feasibility of Airspace Modernisation, NATS. 2018

11. 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.
12. 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.
13. If such an issue occurred, government or the Civil Aviation Authority (CAA) do not currently have levers or powers to guarantee that the required airspace changes are taken forward in a timely and efficient manner.
14. There may also be instances when an airport or ANSP could be directed to take forward an ACP to deliver: safety, capacity, manage noise impacts, air quality, fuel efficiency, access to airspace for all users (including where controlled airspace is no longer justified), military access, or to introduce new technology.

4) Policy objective

15. The aim is to ensure that quality ACPs will be developed, 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 as necessary by the CAA 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.
16. The CAA's draft Airspace Modernisation Strategy 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.
17. The policy, if taken forward, would only be used where airports'/ANSPs did not voluntarily take forward and complete key ACPs. This will provide greater assurance to airports, airlines, consumers and communities that a masterplan of airspace changes can be delivered.

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

18. Discussions between DfT, CAA and NATS have taken place to look at options for creating a mechanism to deliver airspace change, should airports or NERL 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.
19. A number of options were considered and these have been narrowed down to those set out below. It is important to note that no choice has yet been made on what the lead option(s) in solving the policy problem is, and the department would like to hear your views on what could be workable. The department is consulting on the policy options through the Aviation Strategy Green Paper.

5.1) Option 0 – Do nothing

20. Although a number of levers are open to CAA and Government to drive airspace change, there are no levers or powers which would 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.
21. 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. This reflects airports' willingness to co-operate in modernisation when deemed 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.

22. 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.
23. 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 robust policy levers. Given the severe implications of even one key airport refusing to engage in the modernisation process, it is prudent to ensure that modernisation is backed by appropriate legislation.

5.2) Option 1 – Do Minimum

24. The DfT and CAA proposed through the CAA's draft Airspace Modernisation Strategy (AMS) that the two organisations would act as the co-sponsors of airspace modernisation, and meet regularly to fulfil this role. As part of this the two organisations plan to perform a number of roles in order to support the successful delivery of the programme. These roles will be published in full in the CAA's updated AMS in December 2018 and include:
 - i. To develop and publish shared objectives for the modernisation of UK airspace, to deliver Government policy.
 - ii. Provide leadership.
 - iii. Establish governance to support the delivery of airspace modernisation.
 - iv. Commission specific projects necessary for airspace modernisation, including the delivery of the initiatives set out in the CAA Airspace Modernisation Strategy.
 - v. Agree deliverables and outcomes and set parameters for organisations tasked with planning and delivering modernisation projects and AMS initiatives.
 - vi. Monitor delivery of the initiatives contained within the Airspace Modernisation Strategy
25. Through this, the DfT and CAA will support the delivery of airspace modernisation. However, successful delivery of particular airspace changes cannot be guaranteed with a do minimum approach alone, because the CAA or DfT do not have powers to direct airports/ANSPs take forward critical ACPs. While these soft levers and improved governance should 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.
26. 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. We have already seen examples of airports pulling out of major airspace changes in the past and the government were not able to take any action against this. E.g. a major airspace modernisation programme in the London area was scaled back significantly in 2014/5 after an airport dropped out. This 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 the do minimum option.

5.3) Option 2 – Introduce new legislative powers in two areas (preferred option).

(a) Secretary of State to direct airports/ANSPs to take forward ACPs identified as necessary within a masterplan of changes

27. Airports and ANSPs would be directed by the Secretary of State to develop airspace change proposals in accordance with the CAA's airspace change process.⁵ The ACPs would be identified through a new masterplan of ACPs. The CAA plan to commission NERL to produce a masterplan

⁵CAP1616: 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>

of all airspace changes that will deliver modernisation through the Reference Period 3 (RP3) process.⁶ A masterplan for changes in the south of the UK has already been jointly commissioned with DfT and further commissions will be made for the rest of the UK. The CAA will provide assurance of the masterplan and request periodic updates. Further detail on the production of the masterplan will be included in the CAA consultation on the performance plan for RP3.

(b) Secretary of State to direct airports/ANSPs to cooperate with NERL to put forward ACPs identified as necessary within a masterplan of changes on the airport/ANSPs behalf

28. Airports/ANSPs would be directed by the SofS to work with NERL who would take forward the changes on the airport/ANSPs behalf in accordance with the CAA's airspace change process. NERL, as sponsor, would be required to follow the proper process and fulfil all aspects of the sponsor's responsibilities including community engagement. While this would reduce the amount of engagement required by airports/ANSP themselves, this option would represent a significant change to the way that NERL operates.
29. 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. The Secretary of State will consider whether it is appropriate to delegate the powers to an appropriate authority such as the CAA.

5.3.1) Masterplan

30. In order to be able to use the powers effectively there would need to be a masterplan for interdependent changes that are deemed necessary (i.e. a timeline of ACPs needed as part of a modernisation effort, and a critical path outlining the deadlines for individual ACPs within it).
31. The CAA (jointly with DfT) has commissioned a masterplan for the airspace changes necessary for south of the UK, and further commissions will be made for the rest of the UK, regardless of whether or not legislation is taken forward, as part of the work required to deliver the CAA's new Airspace Modernisation Strategy (AMS).⁷ This is currently being drafted and will be published in December 2018. This is to meet the task given to the CAA in the government's updated direction to it issued in October 2017, where the CAA is required to prepare and maintain a co-ordinated strategy and plan for the use of UK airspace for air navigation up to 2040, including for the modernisation of the use of such airspace.
32. The AMS will set out the policy objectives the UK must meet and the ways of achieving them. A delivery and deployment masterplan is required so that industry organisations delivering the new design work, new operational concepts and new technologies set out in the strategy have a plan that sets out how and when they will adopt modernisation. This masterplan would be expected to be designed around several policy considerations including safety, capacity, manage noise impacts, air quality, fuel efficiency, access to airspace for users including general aviation and the military, or to introduce new technology.
33. The AMS will be reviewed regularly as the CAA must report to the Secretary of State annually on its delivery. This gives the CAA an opportunity to continue to update it, and also to note whether the changes needed are on schedule. This plan would also be monitored as part of the new airspace modernisation governance framework.
34. The CAA intend to place an obligation on NERL to deliver a masterplan of all airspace changes what will deliver modernisation, as part of the licence modifications implementing the UK Performance Plan for RP3. The masterplan will identify key airspace changes needed to deliver safety, capacity, manage noise impacts, air quality, fuel efficiency, access to airspace for all users (including where controlled airspace is no longer justified), military access, or to introduce new technology. These are all the factors that the CAA consider when undertaking their airspace functions, as per s.70 of the Transport Act 2000. Once the masterplan is produced, the CAA will be requested by the Secretary of State to provide independent assurance of the masterplan. The masterplan will also need to be refreshed periodically.
35. The legislative powers would be used to ensure that the key changes identified within the masterplan are delivered. Given that the masterplan will be developed and designed around several policy considerations (changes to deliver safety, capacity, manage noise impacts, air

⁶ Reference Period 3 will run from January 2020 to December 2024

⁷ Draft strategy available at https://consultations.caa.co.uk/policy-development/draft-airspace-modernisation-strategy/supporting_documents/CAP1690%20FINAL%20Draft%20Airspace%20Modernisation%201807182.pdf

quality, fuel efficiency, improved access to airspace for users including GA, military access, or to introduce new technology), we expect that the powers to direct an ACP would apply to all these factors. These factors are in line with s70 of the Transport Act.

5.3.2) Triggers for use of the powers

36. When appropriate powers are in place, we propose that before any formal action is taken to direct a change under legislation, 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 sponsors control occurred, the preference would be to use alternative approaches rather than the powers.
37. The DMO team would first establish the reasons why the ACP was not underway, of a suitable standard through its gateway assessments (a step in the airspace change process), or achieving timescales, and explore measures to support and incentivise the sponsor to bring forward the change, such as bringing in additional outside technical support.
38. Initial views are that there could be at least two triggers for the activation of the powers:
 - i. **Initiation: failure to initiate an ACP identified as necessary.**

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.
 - ii. **Progress: failure to adhere to the proposed timeline for a necessary 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 a necessary ACP) to the extent that the overall masterplan delivery is called into question.

5.3.3) Sanctions

39. 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.
40. An option that we are considering is that similar enforcement tools available to the CAA under the Civil Aviation Act 2012 for enforcing the economic licences of airports are introduced to enforce the proposed powers. 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.
41. 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. We are consulting on the proposed sanctions and penalty regime in the Aviation Strategy Green Paper.

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

42. All costs and benefits are assessed over a 10 year period (2019 – 2028) and presented in 2017 prices where monetised.

6.1) Option 0 – Baseline

43. It is important to first establish the number of airspace changes likely to fall in scope of the masterplan. As the masterplan is still to be developed, 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 15 key airports. The Future Airspace Implementation-South (FASI South) programme would expect these airports to have designed, consulted upon and implemented updated airspace by 2024. Alongside changes to lower 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).
44. 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 / gateways⁸ and / or traffic levels in 2030.⁹ Two of the three airports failing to provide any information are 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.
45. 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)¹⁰ separation requirements, while 2% were removed from the initial concept model entirely.¹¹ 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.
46. While these early figures provide some indication of the scale of the problem, we would naturally expect a reduction in the number of these clashes if any 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.
47. 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 policy 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 use, so there is a good probability that individual airports will see positive business cases to undertake change, though this may not necessarily always hold for some of the smaller airports. Finally, the London TMA Airports Working Group, of which the eight London airports most likely to experience ACP interdependencies are members, has been established specifically to support mutual coordination and integration of ACPs.
48. Under a high cost scenario it is assumed that 5 airports do not undertake changes – which ignores these mitigating factors and corresponds to a straight application of 32% to the maximum possible 15 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 highly 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

⁸ 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

⁹ The Feasibility of Airspace Modernisation, CAA Assurance Review, p.18. 2018

¹⁰ 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.

¹¹ The Feasibility of Airspace Modernisation, CAA Assurance Review, p.14. 2018

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.

49. 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 three smaller airfields that are included in the list of 15. It is again recognised that this estimate is highly uncertain, but it serves to indicate a likely order of magnitude of the expected impacts.
50. In the case of an airport not undertaking a necessary 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 necessary ACP (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.
51. 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. There is far less certainty on the number of these changes, or on the likelihood that the relevant airport 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.¹² It is understood that this data may not comprehensively capture all relevant ACPs, but it does provide a suitably accurate estimate.¹³
52. 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.
53. 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.
54. 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 extreme uncertainty and lack of alternate data this provides a plausible baseline for the high cost scenario.
55. 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.

¹² Based on CAA CAP 1389, p.96, available at: <http://publicapps.caa.co.uk/docs/33/CAP%201389%20March%202016.pdf>

¹³ 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.

6.2) Option 1 – Do minimum

56. 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 may have a marginal impact on 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, the primary channel through which costs and benefits are expected to occur is not relevant to this case.
57. Compared to the do nothing, Option 1 would result in increased costs to government. The precise value of these costs will be dependent on the specific actions taken, but is expected to be small in comparison to the scale of costs considered under Option 2. There may be a corresponding decline in costs to airports, ANSPs and NATS as a result of this, but this is likewise considered to be marginal.
58. Overall, both the costs and benefits of Option 1 are considered negligible in comparison to the do nothing scenario, as this approach critically fails to guarantee that necessary ACPs will be undertaken.

6.3) Option 2a

6.3.1) Costs

6.3.1.1) Airports and Air Navigation Service Providers

Familiarisation costs

59. 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 necessary in the masterplan, they would be expected to maintain awareness of its existence. This is likely to occur regardless of whether or not legislative options are pursued, but additional time would be required to understand the specific implications of the legislation. Based on the CAA's 2018 planned audits of certified ANSPs¹⁴, 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 2016¹⁵ are required to familiarise themselves with the policy.
60. 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 £14.04¹⁶, uplifted by a factor of 1.3 to take on costs into account, this results in a cost of £73.01 per airport / ANSP. Total costs are displayed in Table 1 below.

Table 1: Airport & ANSP familiarisation costs

	Low	Central	High
Staff costs	£7,700	£10,400	£10,400

Cost of undertaking airspace change proposals

61. The baseline assessment 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 2 below.

Table 2: Additional ACPs undertaken due to legislation

	Low	Central	High
FASI South	0	2	5

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https://www.caa.co.uk/uploadedFiles/CAA/Content/Related_Information/Commercial/Radio_equipment_approval/ANSP%20Consolidated%20Inspection%20Audit%20Plan%202018.pdf

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[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)

¹⁶ Hourly earnings for 'Other professional, technical and scientific activities', ASHE, 2016, converted to 2017 prices.

62. 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.
63. 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 routes¹⁷, while Gatwick Airport has 9¹⁸, and Southend Airport has recently been consulting on a proposed 6¹⁹ Arrivals routes add further complexity, with, for example, Heathrow Airport currently operating four holding stacks.²⁰
64. 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).²¹
65. As previously discussed, it is thought more likely that smaller airports would be unwilling / unable to undertake a necessary ACP. 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.
66. 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 as this is the only information currently available it is deemed appropriate at this stage of policy development. We would welcome any views on the likely range of costs to be faced by smaller and larger airports.
67. Table 3 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.

Table 3: Cost of undertaking additional ACPs, £000s, undiscounted, 2017 prices

	Low	Central	High
Cost of undertaking an ACP with one change	N/A	205	617
Flightpaths affected	N/A	10	10
Adjusted cost	N/A	2,050	6,170

¹⁷ <https://www.heathrow.com/noise/reports-and-statistics/operational-data/route-usage>

¹⁸ <https://www.gatwickairport.com/business-community/aircraft-noise-airspace/airspace/pr-nav/>

¹⁹ <https://southendairport.com/corporate-and-community/proposed-departure-routes>

²⁰ <https://www.heathrow.com/noise/heathrow-operations/arrival-flight-paths>

²¹ 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.

Total ACPs	0	2	16
Total Cost	0	4,100	98,800

68. 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).
69. 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, in line with the timelines for modernisation. Costs for other ACPs are distributed evenly over the period from 2021 to 2028.
70. 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.

Reduced airport attractiveness

71. 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 by reducing its level of capacity, 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 welfare overall.
72. 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. However, it is not thought to be a substantial effect. A mandatory airspace change proposal would have to be highly disruptive in order to affect demand at an airport to a noticeable level, and any such change would be deemed unreasonable and not taken forward. It is however acknowledged that there may be marginal impacts.

6.3.1.2) Airlines

73. 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 therefore has a high likelihood of reducing the operational efficiency of aircraft operating from that airport.
74. 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.
75. 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), and potentially increased delays / reduced resilience.

6.3.1.3) Passengers

76. As discussed under the impact on airlines, passengers utilising these airports would likewise face possible disruption and longer flight times. Business passengers, with higher values of time, would face the greatest proportionate increase in costs. Additional airline costs could additionally, in theory, be passed on to consumers.

6.3.2) Benefits

6.3.2.1) Airports

Airspace Change Proposal cost efficiencies

77. 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 ensures that no individual airport will be required to re-consult due to the plans of another.

78. 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 deemed 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).
79. 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.
80. These effects are likely to be more substantial when the relevant change affects multiple airports, so are more applicable to the 'FASI South' ACPs. While we would still expect some benefits for the 'Other' ACPs newly undertaken, it is less likely that these would have the same level of interdependency. Ultimately, any newly required ACP must be on the masterplan's critical path, so there will always be some interdependencies and thus benefits to be realised.

Increased resilience / decreased journey time

81. 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. 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 a incurring cumulative cost of £1bn between 2016 and 2030. However, it is not possible to quantify the benefits of the option as it is unclear what proportion of this cost can be mitigated by the level of compliance assumed in the baseline.

6.3.2.2) Airlines

82. 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.

6.3.2.3) Passengers

83. 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

84. 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.
85. 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 would increase, but the increased flexibility provided by modernisation, alongside the application of robust planning conditions, will ensure this effect is mitigated.
86. 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

6.4.1) Costs

6.4.1.1) Airports and Air Navigation Service Providers

Familiarisation costs

87. While NERL would be responsible for undertaking ACPs under option 2b, we would still expect airports to familiarise themselves with the policy as it has fundamental implications for their operations and their ANSPs. We therefore assume that airports / ANSP familiarisation costs are equivalent to those experienced under option 2a.
88. As one of the key players involved with airspace modernisation 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 are required to undertake an ACP on behalf of an airport/ANSP may be complex. We estimate a manager would spend a day (8 hours) undertaking an initial assessment, resulting in additional costs of approximately £170.²² This represents a minimal increase over the familiarisation costs incurred under option 2a.

Cost of undertaking airspace change proposals

89. 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 necessary in the masterplan are delivered. There may however be differences in the cost of undertaking these changes.
90. NERL have considerable experience of delivering airspace changes, and so there may be scope for efficiency savings. However, there are a number of reasons why this may not be the case. Firstly, NERL would need to work with the airport/ANSP in question in order to understand the airports/ANSPs operations, 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.
91. As there are factors that suggest the costs of undertaking ACPs may be greater or lower under option 2b than option 2a, and there is no clear indication of the scale of these impacts, our best estimate of costs is equivalent to that for option 2a. We recognise the uncertainty of this estimate and welcome stakeholder views on the relative costs of either airports or NERL undertaking airspace changes.

6.4.1.2) Airports, airlines and passengers

92. With no strong evidence to suggest that ACPs undertaken by NERL 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.

6.4.2) Benefits

²² 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.

93. All benefits are deemed to be similar in nature and scale to those described under option 2a. The design of ACPs may be enhanced by a single organisation, with considerable experience, undertaking them in place of airports. However, airports and their ANSPs will have considerable knowledge of local conditions that could also enhance proposed ACPs. The extent to which airports are required to work with NERL 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 option 2b.

6.5) Option 2 – Summary

94. Options 2a and 2b provide different mechanisms to ensure that ACPs are undertaken, but are not mutually exclusive. Implementing both powers allows for the greatest flexibility in delivering ACPs, recognising the wide variety of possible changes that may be required.
95. The costs estimated for Option 2a are fully subsumed within the estimates for Option 2b, thus the costs of Option 2 as a whole are equivalent to those of Option 2b. These are given in Present Value terms in Table 4 below.

Table 4: Option 2 Costs, Present Value, 2017 prices, £m

	Low	Central	High
Airport & ANSP familiarisation	0.01	0.01	0.01
NERL familiarisation	<0.01	<0.01	<0.01
ACPs	0	3.89	85.69
Total	0.01	3.90	85.70

96. While no benefits have been quantified, it is expected that implementation of both powers provides the greatest opportunity for benefits to be realised. 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 NERL when this is infeasible.

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

97. This Impact Assessment has attempted to monetise costs and benefits where possible. However, this has been limited by a number of factors. There is currently a considerable degree of uncertainty surrounding the masterplan, and thus the scale of the policy. This uncertainty is compounded by a lack of information in other areas – 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.
98. 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) 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.
99. 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. We do however welcome comments from stakeholders on the assumptions underlying this IA's quantified impacts, as well as the current approach to non-monetised impacts, to further shape the development of any final policy proposal.
100. 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.
101. Finally, any airspace change must ultimately go through the CAA's current 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

102. While the two powers proposed aim to ensure an ACP required within a masterplan is taken forward by an airport or NERL, 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

103. If airports/ANSPs are directed to take forward an airspace change, there is a risk that the airports/ANSPs could delay taking it forward in the hope that it would be taken off them altogether and given to NERL to take forward. Because this risks delaying the airspace modernisation programme, we intend that the development and adoption of the masterplan should identify potential weakpoints (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 nail down the problem and avoid its appearance at the delivery stage. Delays could also be caused by the time it could take for any additional resource to be trained up to deliver ACPs to the required standard.

Skills and resources

104. The DfT or CAA could potentially assist an airport with resourcing issues which may prevent it from taking forward an ACP by finding an alternative sponsor or providing the sponsor with additional outside specialist resource (e.g. technical design expertise from a central pool, such as from NERL). However, the pool of expertise could be small compared to the numbers of sponsors requiring this assistance. There is therefore a risk of a lack of appropriate technical expert resource available 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.
105. Where NERL is required to take over or initiate an ACP, it seems likely that there would be more than one ACP, and that these could happen at relatively short notice. There will obviously be resource implications for NERL both in terms of capability/skills and capacity. Potentially NERL could be asked to intervene in airspace it is not overly familiar with or expert in – it could therefore take longer to achieve. This in turn could have implications for NERL's other licence commitments in terms of service quality, continuity, resilience and implementation of its technology programmes.

8.2) Assumptions

106. 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.
107. Another considerable 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.
108. We are looking to test and update the assumptions in this IA in order to further refine our estimates, and would appreciate any evidence to assist in their derivation.

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

109. All monetised costs are considered to be direct costs to business. A number of unmonetised costs and benefits have also been discussed. We would expect to treat costs incurred by airlines operating at airports forced to undertake ACPs as indirect, as these secondary impacts would be contingent on changed airport behaviour. We would likewise consider cost savings experienced by other airports undertaking collaborative ACPs to be indirect, as well as any possible savings to airlines as a result of these wider changes.

110. Under Option 2b, increased costs for NERL are considered direct. These may ultimately be passed on to airlines through adjustments to NERL's Regulatory Asset Base, and subsequently on to passengers, but this would be considered an indirect cost reduction.
111. As the monetised impacts of Option 2a are fully contained within those of Option 2b, the direct impact to business for the preferred option (2) is equivalent to that of Option 2b. This results in an EANDCB of £0.4m in 2014 prices, 2015 PV, and as costs are clearly below £5m in any year, the policy is a non-qualifying regulatory provision.

10) Wider impacts

Small and Micro Business Assessment

112. 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.
113. It is expected that smaller 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 would fall to NERL in the first instance, and subsequently to airlines, so the impact on small and micro businesses would be minimal.
114. It is possible that the entire central cost estimate for undertaking ACPs in option 2a could fall on small businesses. However, the estimate would likely be an overestimate in this case, as the figure is based on a larger scale ACP that is unlikely to be required for a smaller airport/ANSP.
115. Implementation of both options 2a and 2b allows for flexibility in the delivery of airspace changes and provides the ability to minimise impacts on small and micro businesses.

Health Impact Assessment

116. It is not possible to determine the precise impact of the policy on health outcomes, but there is a strong 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 changes necessary due to noise considerations. 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.

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

117. The preferred approach is to implement both legislative Options 2a and 2b, alongside the non-regulatory measures proposed in 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.
118. This policy forms part of the wider Aviation Strategy Green Paper currently under consultation. Implementation is dependent on the outcome of this consultation, but in the case that legislation is pursued, DfT and the CAA would work together to develop a full implementation plan.

Annex A – Airspace roles and responsibilities

Government

119. 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.
120. For certain types of airspace change, the Secretary of State may also decide to call-in a particular airspace change proposal in order to make a decision instead of the CAA.
121. The Ministry of Defence must have access to airspace in order to train and maintain competency for the UK's defence needs. It acts as an airspace change sponsor where 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

122. The CAA is the airspace regulator and primary decision-maker. Government are 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.
123. 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 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.
124. 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).
125. 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 responsible for the economic regulation of NATS' monopoly service provision activities under a licence.

Airspace change sponsor

126. 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. 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

127. 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

128. 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.
129. 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.