Airspace Change Organising Group

Airspace Change Masterplan Iteration 3 – ScTMA Cluster

Proposed airspace structure and route network envisaged by the Airspace Change Proposals in the ScTMA Cluster

Version 2.2

July 2025

OVERVIEW

The UK Airspace Change Masterplan (the Masterplan) sets out a coordinated implementation plan for the strategically important airspace changes required to deliver the objectives of airspace modernisation at a national and regional level.

The Department for Transport and Civil Aviation Authority co-sponsor airspace modernisation in the UK, meaning they work together to deliver a shared vision for, “quicker, quieter, cleaner journeys and more capacity for the benefit of those who use or are affected by airspace”.

The Masterplan is being produced in stages by the Airspace Change Organising Group (ACOG), a separate and impartial unit within NATS (En Route) plc. More detail is added with each iteration. In the Masterplan Iteration 2, ACOG proposed organising the airspace changes into geographical clusters.

This document is the Masterplan Iteration 3 for the Scottish Terminal Control Area (ScTMA) cluster. It concentrates on a busy region of the UK’s airspace in the south of Scotland that serves flights to and from Edinburgh and Glasgow airports and several smaller airports in the surrounding area.

The Masterplan Iteration 3 identifies where and when airspace change proposals (ACPs) are needed in the ScTMA, with indicative timelines for developing design options, conducting consultations and implementing the changes. It describes the overall airspace structure and route network envisaged by the ScTMA ACPs when viewed as a collective but without the detailed design of all the routes. Detailed information about the proposed design options and how they may affect stakeholders will be set out in the individual ACP consultations that are planned to commence in Q4-2025.

Iteration 3 also describes how the ScTMA ACPs relate to each other, and highlights potential conflicts between their designs, explaining how any proposed trade-offs to resolve the conflicts have been made.

Iteration 4 of the Masterplan for the ScTMA will be created by ACOG once feedback from the consultations have been analysed and taken into account. Building on the previous iterations, Iteration 4 will provide an updated description of the airspace structure and route network envisaged by the ScTMA proposals when viewed as a collective, including the final proposed trade-offs and the expected cumulative impacts.

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1. INTRODUCTION

1.1. Background to airspace modernisation

1. At both the national and regional level, aviation keeps people connected and provides the commercial air transport services that the UK needs for business, tourism, and economic growth. All forms of aviation depend on access to airspace, making it an essential but largely invisible part of our national infrastructure.

2. The basic design of the UK's airspace is largely predicated on an aging network of ground navigation beacons. The design has remained largely unchanged since the 1950s when there were only around 200,000 flights per year in UK airspace, compared with 2.5m in 2019 and projections of 3m by 2030.[1] Despite this, in many cases, today's aircraft are still having to use the same outdated routes that are an inefficient use of airspace and reaching capacity. Aircraft often fly further than necessary at sub-optimal altitudes and speeds because the routes were originally intended to overfly the location of navigation beacons on the ground, instead of following shorter, more efficient flight paths.

3. If the UK's airspace is not modernised, NATS (En Route) plc (NERL), the UK's licenced provider of en route air traffic control services, estimates that by 2040, delays at a national level may increase by over 200% which would result in 1 in 5 flights experiencing disruption for over 45 minutes.[2] For passengers, cargo, businesses, and the wider economy that benefit from aviation, a failure to act would create significant negative impacts. Modernising airspace is also a key part of the aviation sector's plans to decarbonise. The proposed changes aim to make it easier for aircraft to fly more direct routes, with better climb and descent profiles to and from energy-efficient cruising altitudes to help reduce CO_2 emissions.

4. The Government's priorities when considering the potential environmental impacts of airspace changes are laid out in the Air Navigation Guidance 2017 here.[3] The guidance describes altitude-based priorities which must be taken into account by the Civil Aviation Authority (CAA) and the sponsors of Airspace Change Proposals (ACPs) when considering the potential environmental impacts of airspace changes. The environmental priority in the airspace below 4,000 ft is to limit and where possible reduce the total adverse effects of aircraft noise on people. Where options for route design from the ground to below 4,000 ft are similar in terms of the number of people affected by total adverse noise effects, preference should be given to that option which is most consistent with existing published airspace arrangements. The priority is the same in the airspace between 4,000 ft and 7,000 ft unless this would disproportionately increase CO_2 emissions.

[1] NATS (En Route) plc forecast traffic growth estimates (2026 to 2040)

[2] Airspace Change Masterplan Iteration 2, CAP2312b, ACOG (2022)

[3] UK Air Navigation Guidance, Department for Transport (2017)

5. In the airspace above 7,000 ft the environmental priority is to reduce CO_2 emissions and the minimising of noise is no longer the priority. Where practicable, it is desirable that routes below 7,000 ft should seek to avoid flying over Areas of Outstanding Natural Beauty (also referred to as National Landscapes and in Scotland, National Scenic Areas). All changes below 7,000 ft should take into account local circumstances in the development of the airspace designs, including the actual height of the ground level being overflown, and should not be agreed to by the CAA before appropriate community engagement has been conducted by the ACP sponsor.

1.2. Overview of the UK Airspace Change Masterplan

6. The Department for Transport (DfT) and CAA co-sponsor airspace modernisation in the UK, meaning they work together to deliver a shared vision for:

Quicker, quieter, cleaner journeys and more capacity for the benefit of those who use or are affected by airspace.

7. The reasons for modernising the UK's airspace and the costs of not doing so are laid out in a report published by the DfT here.[4] The objectives of airspace modernisation and the ways and means of achieving them are described by the CAA in the Airspace Modernisation Strategy (AMS) here.[5]

8. Airspace modernisation will be delivered, in part, through a series of ACPs that are strategically important to achieving the AMS objectives at a national and/or regional level. The definition of a strategically important ACP in the context of airspace modernisation is set out in section 2.3 of this document.

9. Twenty of the UK's airports are sponsoring ACPs to upgrade the arrival and departure routes that serve their operations in the lower airspace (below 7,000 ft). NERL is currently sponsoring seven related ACPs to upgrade the route network that mostly sits above 7,000 ft.[6]

10. The number, complexity and overlapping scope of the ACPs needed to deliver modernisation requires a coordinated implementation plan out to 2040 – known as the UK Airspace Change Masterplan (or the Masterplan). The DfT and CAA (in their role as airspace modernisation co-sponsors) commissioned NERL to create and maintain the Masterplan. The co-sponsors required NERL to set up a separate and impartial unit within NERL, the Airspace Change Organising Group (ACOG), to deliver the commission - develop the Masterplan documents, coordinate the development of the ACPs and support engagement with external stakeholders. ACOG was established in 2019 and is overseen by an independent Steering Committee of senior representatives drawn from across the aviation sector. More information is available on ACOG's website, www.acog.aero.

[4] Upgrading UK airspace: Strategic rationale, DfT (2017)

[5] Airspace Modernisation Strategy 2023 to 2040, CAP1711, CAA (2023)

[6] The number of NERL sponsored ACPs to upgrade the route network may change as the Masterplan matures.

1.3. The Masterplan scope and acceptance criteria

11. The CAA set out the acceptance criteria that the Masterplan must meet here.[7] The criteria require ACOG to identify where, when and why strategically important airspace changes may be developed or needed (in Part A), and provide planning information about the scope of the proposed changes, how they relate to one another and their expected impacts (in Part B). The Part A criteria are set out in table 4 of this document and the Part B criteria are set out in table 6.
12. When it is finalised, the Masterplan will:

- identify where and when ACPs are needed
- describe how the ACPs relate to each other (i.e. **interdependencies**) and highlight potential **conflicts** between their designs
- explain how **trade-off** decisions to resolve those conflicts have been made
- set out the proposed **timelines** for implementation of the individual airspace changes
- demonstrate the anticipated cumulative impacts of the ACPs

13. An interdependency can be described as two or more ACPs that are linked together in some way. For example, there is a potential conflict in their design options or there is a potential cumulative impact on stakeholders on the ground. A conflict can be described as two or more ACPs that cannot both proceed in their proposed form. A trade-off is the decision to resolve a conflict and could be between two or more separate ACPs, or between two or more objectives (such as achieving a noise reduction or fuel efficiency improvements).

1.4. Development of the Masterplan in iterations

14. The Masterplan is being developed in iterations that will each be assessed separately by the co-sponsors (DfT and CAA). The iterations broadly align with the gateways of the CAA's airspace change process (known as the CAP1616 process), published here.[8] Based on the co-sponsors' assessment, the CAA must decide to formally accept each iteration of the Masterplan into the AMS. Once accepted, each iteration of the Masterplan becomes, together with the CAA's general duties in section 70 of the Transport Act 2000, the basis against which individual airspace change decisions are made by the CAA. Therefore the CAA's decisions on the ACPs must not be inconsistent with the latest accepted iteration of the Masterplan. The Masterplan will show more detail about the ACPs as the iterations are developed. Iteration 1 of the Masterplan (2020) provided a high-level plan for airspace changes in the South of England and is published here.[9] Iteration 2 (2022) expanded the scope to provide a national view of the ACPs needed for airspace modernisation and the potential interdependencies between them and is published here.[10]

[7] Airspace Change Masterplan, CAA Acceptance Criteria, CAP2156a, CAA (2022)

[8] The Process for Changing the Notified Airspace Design, CAP1616, CAA (version 5 of CAP1616 came into effect in 2024.

[9] Airspace Change Masterplan Iteration 1 (Southern UK), CAP1884, NERL (2021)

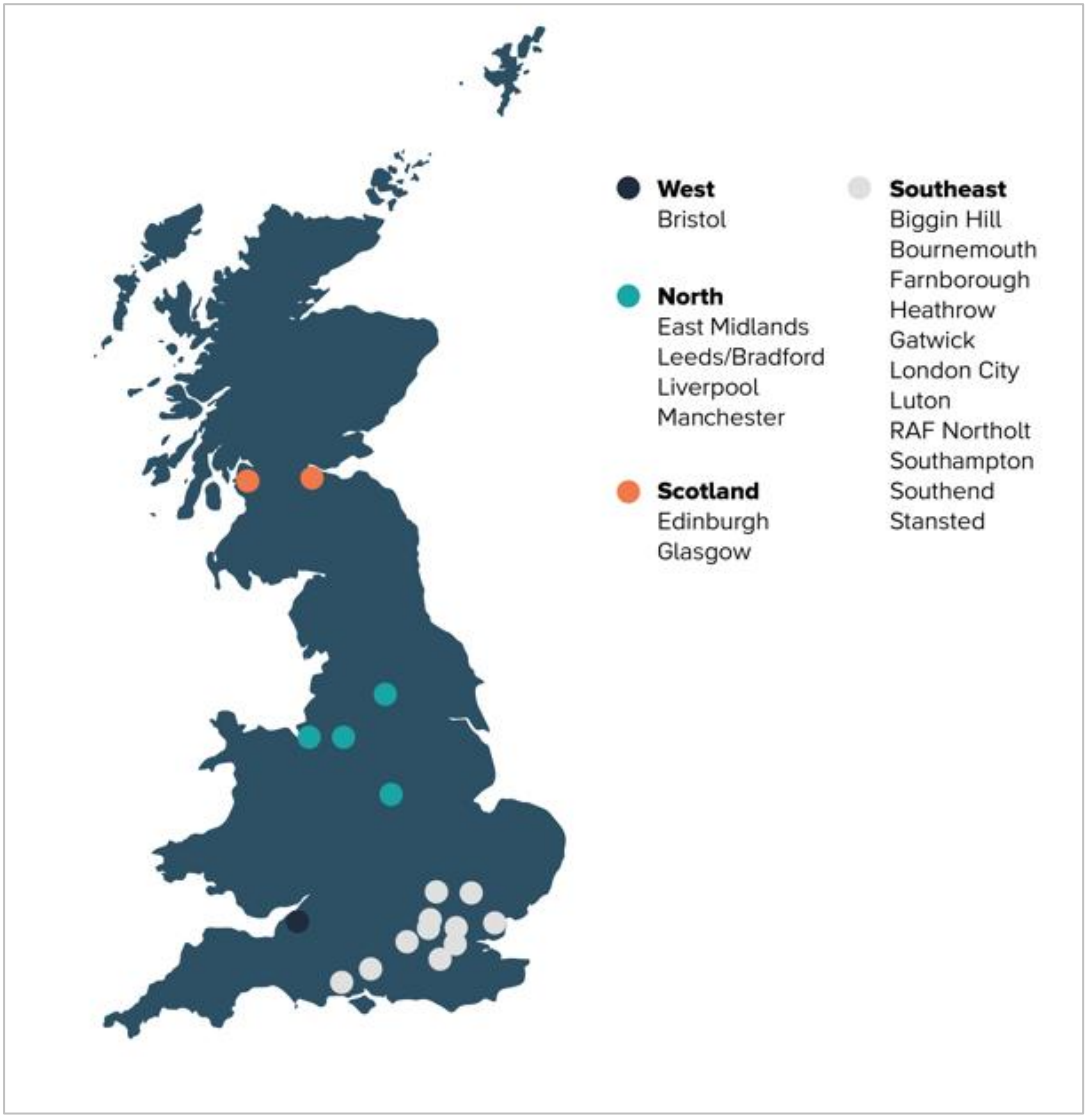
[10] Airspace Change Masterplan Iteration 2, CAP2312b, ACOG (2022)

15. Iteration 2 of the Masterplan organised the ACPs into four regional clusters so that the simpler airspace changes can be deployed sooner, realising benefits earlier. A single nationwide change would be too big to manage. The clusters are based on the interdependencies between the ACPs and analysis into areas of the existing airspace where inefficiencies in the use of airspace and delays are expected to worsen as traffic levels grow.

16. Figure 1 illustrates the airports that are sponsoring ACPs in each regional cluster, in:

- the West of the UK, also known as the West Terminal Airspace (WTA)
- the North of England, also known as the Manchester Terminal Control Area (MTMA)
- the South of Scotland, also known as the Scottish Terminal Control Area (ScTMA)
- the Southeast of England, also known as the London Terminal Control Area (LTMA), which is significantly larger and more complex than the other regional clusters so the ACPs will need to be developed and implemented in a series of phased deployments.

Figure 1: Four regional clusters of the Airspace Change Masterplan and the airport sponsored ACPs



17. The timelines for making airspace changes are generally shorter for the simpler clusters, like the ScTMA, where there are fewer airports and less complex interdependencies. Airspace modernisation will take longer in the more complicated clusters, like the LTMA, with a larger number of airports and more challenging interdependencies. As a result, iterations 3 and 4 of the Masterplan will be prepared by ACOG according to the development timelines of each cluster or deployment.

18. Iteration 3 for each regional cluster or deployment describes the overall airspace structure and route network envisaged by the proposals when viewed as a collective (but without the detailed design of all the routes). Iteration 3 also needs to describe the airspace design trade-offs between interdependent ACPs in greater detail than Iteration 2, with more information about the cumulative impacts of different design choices and the methods used to calculate them. For the ScTMA cluster, this information is set out in sections B3, B4 and B5 of this document and supported by the information in Appendix 3.

19. It is important to emphasise that Iteration 3 is an overarching strategic document. The illustrations used in Iteration 3 to explain aspects of the proposed designs and trade-offs are high-level and indicative. Detailed information about the proposed design options and how they may affect stakeholders will be set out in the individual ACP consultations that will be conducted as part of the CAP1616 process. Iteration 3 also describes how the ACP sponsors will consult on their proposals in a coordinated manner so that stakeholders are presented with a holistic view of the overall airspace design, the cumulative impacts of the changes and the potential trade-offs to be made. For the ScTMA cluster, this information is summarised in section B7 and will be set out in greater detail in a coordinated consultation strategy submitted by ACOG to the CAA before the stage 3 (Consult) gateway of the CAP1616 process.

20. Iteration 4 of the Masterplan for each regional cluster or deployment will be created by ACOG once feedback from the relevant ACP consultations has been analysed and taken into account. Building on the previous iterations, Iteration 4 will provide an updated description of the airspace structure and route network envisaged by the ACPs when viewed as a collective for each cluster, including the final proposed trade-offs and the expected cumulative impacts.

2. SCTMA CLUSTER OVERVIEW

2.1. Overview of the existing ScTMA airspace

21. The ScTMA airspace was originally designed to support operations to and from Glasgow and Edinburgh Airports. The ScTMA also serves flights to and from several other airports including Glasgow Prestwick, Dundee, Cumbernauld and Leuchars Station (formerly RAF Leuchars Airfield), and on the region's periphery, flights to and from Aberdeen Airport.

22. In the existing ScTMA airspace (during both westerly and easterly operations) outbound flights follow one of several Standard Instrument Departure (SID) routes immediately after take-off and are then vectored by controllers as they climb. Inbound flights follow one of several Standard Arrival Routes (STARs) that terminate at the airborne holds. Arriving aircraft are then vectored from the hold or the end of the STAR onto the intermediate and final approach for landing.

23. Figure 2 illustrates the existing air traffic flows in the ScTMA airspace, including the current location of the airborne holds (where arriving aircraft fly in a racetrack pattern at assigned altitudes and speeds waiting for instructions from controllers to begin their approach for landing) and the position of the main inbound and outbound traffic flows when the prevailing wind is from the west.[11] The yellow arrows indicate the general position of the current departure flows from both airports. The blue arrows indicate the general direction of the current arrival flows into the existing airborne holds. The yellow and blue shaded areas, indicate the broad swathes of airspace where inbound and outbound flights are currently vectored by controllers on arrival and departure. A vector is an instruction given by an air traffic controller to a pilot to fly a particular compass heading and altitude to keep aircraft safely separated and maintain an expeditious flow of traffic. Figure 3 illustrates the same information as figure 2 when the prevailing wind is from the east.

24. When the airspace was originally designed, the ScTMA was not expected to cope with the number of flights and the complexity of the operations it does today. Analysis conducted by NERL in 2021 for the Masterplan Iteration 2 indicated that traffic demand in the busiest hours of the day is likely to exceed the maximum capacity in parts of the ScTMA by 2040 if the airspace is not modernised. When a portion of airspace reaches maximum capacity the need to maintain safety restricts the number of additional flights that air traffic controllers can manage. The operation responds by:
    - slowing flights down and directing aircraft onto longer, less efficient flight paths;
    - directing inbound flights into airborne holds delaying their scheduled arrival; and
    - instructing outbound flights to hold on the ground, delaying their scheduled departure and increasing ground emissions.

[11] Aircraft usually take-off and land into the wind. The prevailing wind in Scotland is from the west for approximately 70% of annual operations. Figure 2 shows flights departing and arriving in a westerly direction (known as westerly operations), illustrating the most common case in the ScTMA. When the prevailing wind is from the east, flights arrive and depart in an easterly direction using a different configuration of routes (known as easterly operations), as shown in figure 3.

Figure 2: Illustration of the existing ScTMA air traffic flows during westerly operations

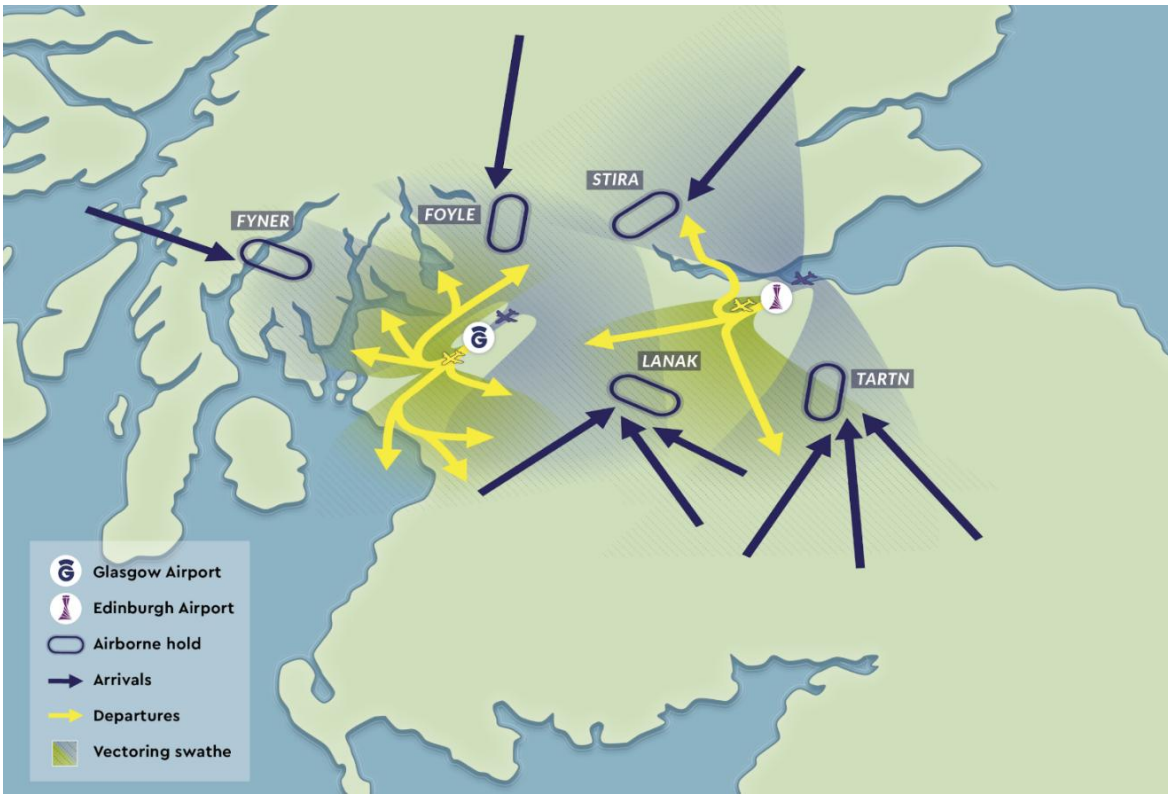
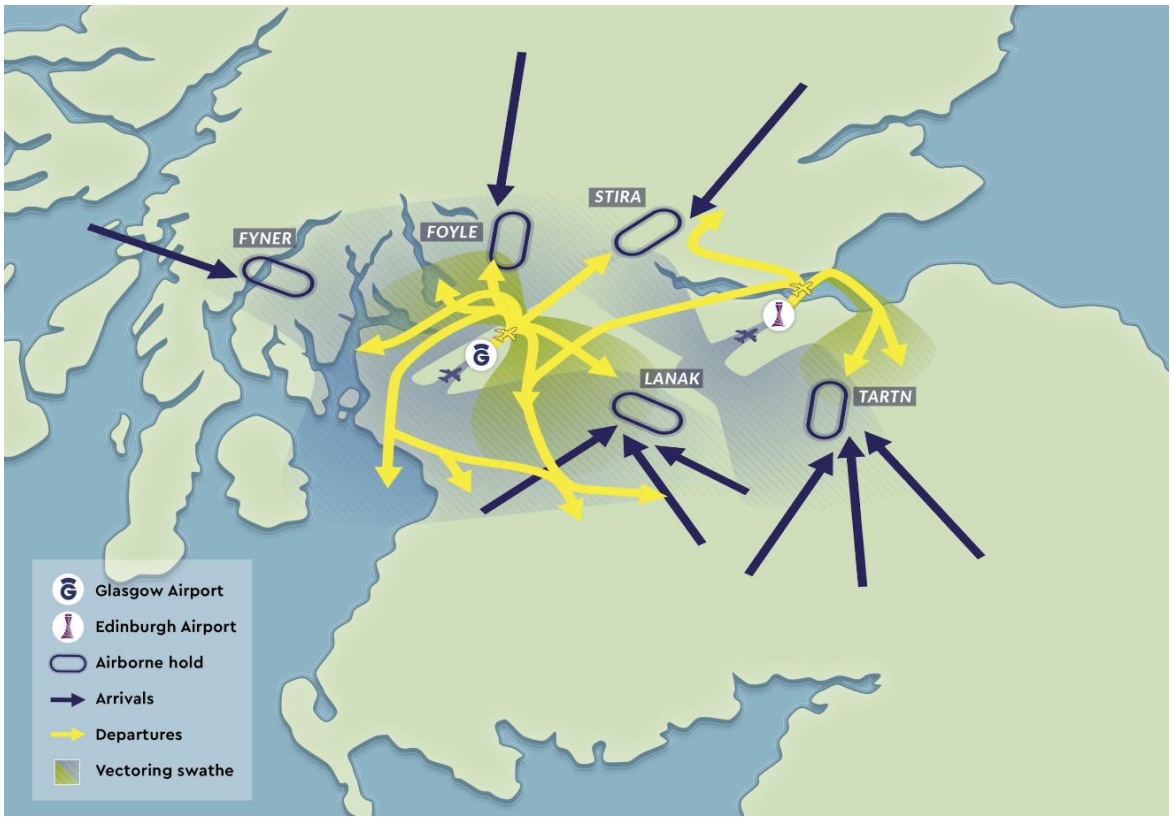


Figure 3: Illustration of the existing ScTMA airspace and air traffic flows during easterly operations



2.2. Main issues with the existing ScTMA airspace design

25. The capacity and efficiency of the existing airspace in the ScTMA is constrained by four main design issues described in table 1.

Table 1: Main issues with the airspace design affecting the capacity and efficiency of the existing ScTMA

ScTMA design issue	Description
1. Outdated design of the existing arrival and departure routes that serve Glasgow and Edinburgh airports	The existing arrival and departure routes that serve Glasgow and Edinburgh airports were designed around the locations of ground navigation beacons and the surrounding airspace volumes, and as a result could not follow shorter, more efficient flight paths. The existing routes typically converge at the same points over the ground creating pinch points that constrain capacity and lead to traffic congestion at busy times. Outbound flights departing the ScTMA level off at lower altitudes to avoid crossing traffic, restricting climb performance and creating excess noise and CO_2 emissions. Inbound flights may not currently always achieve continuous descent profiles due to the current design.
2. Position and orientation of the airborne holds	The positions and orientation of the airborne holds serving Glasgow and Edinburgh airports are not optimised to manage the main inbound traffic flows to the ScTMA as efficiently as possible. Some of the holds also interact with some of the existing departure routes, meaning outbound traffic must fly longer and/or climb less efficiently to avoid them en route to the cruise.
3. Route connectivity to/from the east and southwest of the ScTMA	A lack of route options and associated controlled airspace to the east of the ScTMA means that most flights to and from the east and southeast are channelled through a single point to the southeast of the ScTMA (in the Newcastle area), which creates traffic bottlenecks and congestion during busy times. Similarly, traffic to and from the southwest route via single points south of Prestwick and to the west of Carlisle that also become congested, constraining capacity, when traffic volumes are high.
4. Special use airspace that can be reserved by the Military	There are several areas of special use airspace within and surrounding the ScTMA that can be reserved by the Military for training and exercises. Civil flights plan to avoid these areas when they are in use, flying longer, less efficient routes around them.

2.3. Scope of the strategically important ACPs required for modernisation in the ScTMA

26. Only the ACPs that are strategically important and make a significant contribution to achieving the objectives of airspace modernisation at a national and/or regional level are included in the Masterplan. There are several main ways through which an ACP could make a significant contribution to achieving airspace modernisation and meet the definition of strategically important. For example, if the proposal is likely to improve the overall performance of the airspace at a national and/or regional level:

- from an operational perspective, in terms of safety, capacity, efficiency and resilience
- from a consumer perspective, in terms of choice, value and the multiplied economic benefits of air connectivity
- in terms of supporting the aviation sector to reach net zero emissions by 2050, and limit and, where possible, reduce the total adverse effects of aircraft overflight
- in terms of integrating other airspace users including General Aviation, the Military and new and emerging forms of aviation.

27. An ACP could also make a significant contribution to airspace modernisation where it influences the decisions made about other strategically important ACPs. For example:

- Where an ACP forms part of a coordinated overall airspace design improving the performance of the airspace at a national or regional level (like those ACPs that are already included in the four Masterplan clusters set out in figure 1).
- Where an ACP either enables or constrains other strategically important ACPs because of its location, altitude, timing or sequencing.

28. For the ScTMA cluster the strategically important ACPs were identified in Iteration 2 of the Masterplan as; the NERL-led proposal to upgrade the route network above 7,000 ft, and linked proposals led by Glasgow, Edinburgh and Aberdeen airports to redesign the arrival and departure routes that serve their operations below 7,000 ft. The ACP sponsored by Aberdeen Airport was subsequently removed from the Masterplan, as explained below.

29. The rationale for identifying the ScTMA ACPs sponsored by NERL, Glasgow and Edinburgh as strategically important for airspace modernisation is set out in section 3 of this document with reference to part A of the Masterplan acceptance criteria.

30. ACOG conducted a public engagement exercise (PEX) during February and March 2024 to support the development of the Masterplan Iteration 3 for the ScTMA cluster. Similar engagement exercises will be conducted by ACOG for the other clusters or deployments in due course. The purpose of the PEX was to explain in general terms the high-level approach to coordinating the ACPs required to deliver airspace modernisation in the ScTMA and seek feedback from stakeholders on any gaps in, or improvements to, the Masterplan, for example whether ACOG has identified the strategically important airspace changes. The PEX also sought stakeholders' feedback on the principles for coordinating the delivery of the ScTMA ACP consultations.

31. None of the stakeholder responses to the PEX highlighted gaps in, or improvements to, the Masterplan that relate to the number or scope of the strategically important ACPs needed to deliver airspace modernisation in the ScTMA cluster. More information about the outputs of the PEX is provided in section B7 of this document and in a separate ScTMA PEX Feedback Report published on ACOG's website.

32. Following the publication of Iteration 2 and further design development work, ACOG agreed with Aberdeen Airport that the airspace design options arising from its ACP (2019-82) did not share interdependencies with those proposed by the Edinburgh, Glasgow or NERL ScTMA ACPs. As a result, ACOG advised the DfT and CAA that the Aberdeen Airport ACP should detach from the ScTMA cluster and continue to develop and deploy its proposed changes in line with the AMS, on a separate independent timeline. The CAA published an addendum to Iteration 2 of the masterplan in October 2022 that summarises ACOG's advice on the withdrawal of Aberdeen Airport and the co-sponsors' acceptance of the rationale here.[12]

33. Aberdeen airport is located 95 miles north of Edinburgh and 125 miles northeast of Glasgow in an area of airspace with relatively low traffic volumes. The Aberdeen ACP includes two specific proposals: 1) The introduction of new performance-based navigation (PBN) arrival routes for use alongside the existing procedures by a very small percentage of flights; and 2) The reclassification of a section of the Controlled Airspace that is not used by aircraft arriving or departing from Aberdeen Airport for the benefit of other airspace users. Aberdeen Airport conducted a consultation on these proposals between April and July 2024. The proposals are not interdependent with the ScTMA cluster ACPs nor they are likely to improve the overall performance of the airspace at a national/regional level given the scope of the proposals. For these reasons the Aberdeen ACP is not considered a strategically important airspace change in the context of the Masterplan. More detail about the Aberdeen ACP and information for stakeholders to track the progress of the proposal through the remaining stages of the CAP1616 process can be found on the CAA's Airspace Change Portal here.

34. Table 2 sets out the strategically important ACPs that are now included in the scope of the ScTMA cluster of the Masterplan and provides links to the CAA's Airspace Change Portal that hosts all relevant documentation and information about the development of the individual proposals as required by the CAP1616 process.

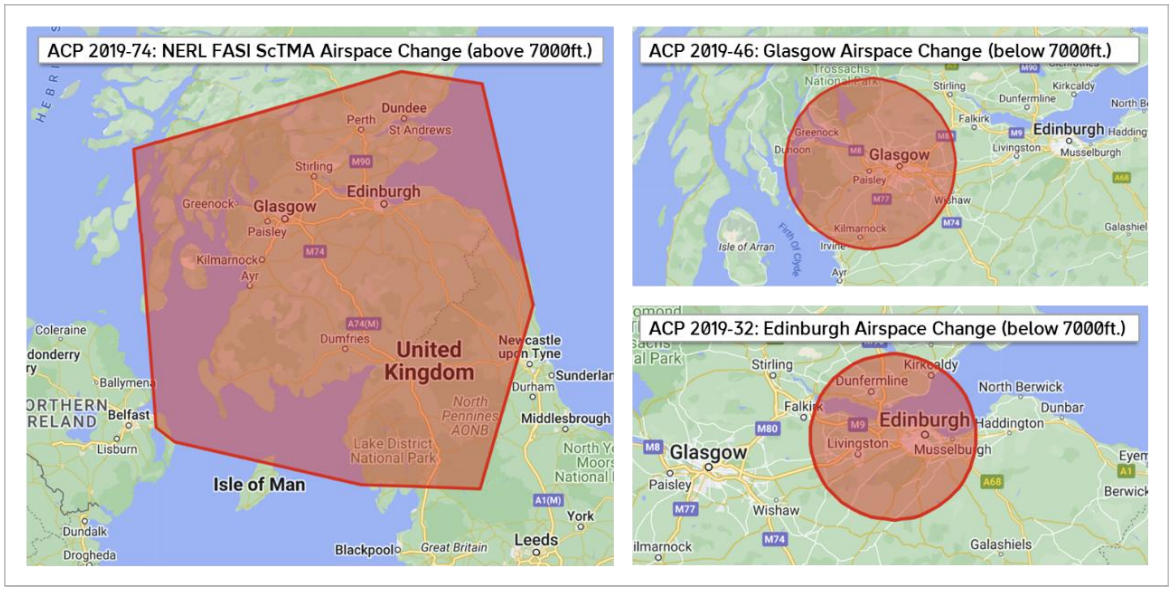
Table 2: Strategically important ACPs included in the scope of the ScTMA cluster

ACP sponsor	ACP-ID and CAA Airspace Change Portal link
Edinburgh Airport Limited	ACP-2019-32 can be viewed on the portal here
Glasgow Airport Limited	ACP-2019-46 can be viewed on the portal here
NERL	ACP-2019-74 can be viewed on the portal here

[12] Addendum to the Masterplan Iteration 2, CAP2312a, CAA (2024)

35. Figure 4 illustrates the broad geographical areas of airspace that are potentially affected by the ScTMA cluster ACPs, sourced from the CAA Airspace Change Portal.

Figure 4: Illustration of the broad geographical areas that are potentially affected by ScTMA cluster ACPs



2.4. Objectives and expected benefits of airspace modernisation in the ScTMA

36. The objectives of airspace modernisation in the ScTMA align with the overall aims of the AMS to:

- **Maintain and where possible improve the high levels of aviation safety**, simplifying the airspace design and reducing the complexity of the flight paths.
- **Improve the environmental sustainability of aviation in Scotland**, reducing CO_2 emissions through the more efficient use of airspace and enabling aircraft to climb more quickly, descend more quietly and limit the total adverse effects of aircraft noise on people.
- **Increase the airspace capacity** meaning predicted traffic growth can be accommodated with less delay, enhancing Scotland's global connections, giving better value and more choice for businesses and individual travellers and helping to stimulate economic growth benefiting the Scottish population. While airspace modernisation itself neither delivers nor caps growth – that is governed by the land-use planning regime – more efficient operations and improved system resilience to disruption facilitated by modernised airspace will contribute to growth being achieved more sustainably.
- **Secure the most efficient use of airspace**, by creating an airspace design that can facilitate better sharing and access for commercial air transport, the Military, General Aviation (GA)[13], and in due course, new and emerging airspace users.

[13] The definition of General Aviation incorporates a wide range of operators (other than scheduled commercial air transport), pursuing a mix of different interests in a variety of different classes of aircraft, including (but not limited to) fixed-wing light aircraft, business jets, helicopters, microlights, gliders, hang gliders, paragliders, gyrocopters, balloons and large model aircraft operators.

37. The various benefits expected from achieving the ScTMA airspace modernisation objectives fall to a range of different stakeholder groups, as summarised in table 3.

Table 3: Expected benefits of airspace modernisation in the ScTMA organised by stakeholder group

Stakeholder group	Summary of the expected benefit of airspace modernisation in the ScTMA
For passengers and the economy	Fewer flight delays and service disruptions are expected to save time and improve the passenger experience. The capacity to accommodate predicted growth with less delay will lead to more choice, better value, and enhanced global connections.
For the environment	Airspace modernisation is expected to reduce the average environmental impact of each flight in the ScTMA. This is to help the UK to move towards its commitment to net zero emissions while maintaining the aviation sector in Scotland. The Government set out its proposed approach to reach net zero aviation by 2050 in its 2021 Jet Zero consultation and expects a significant proportion of the required emissions reductions will come from improving the efficiency of the existing aviation system, including aircraft, airports as well as airspace.
For local communities	The priority for airspace modernisation at lower altitudes is to limit and, where possible, reduce the total adverse effects of aircraft noise on people. Modernisation is expected to deliver an overall reduction in adverse effects from noise by moving flight paths to where they effect fewer people. However, as this overall benefit can only be achieved by the redistribution of noise between different areas, it may lead to disruption for some communities living under new flight paths.
For airlines	Additional airspace capacity will accommodate predicted growth with less delay, while maintaining and enhancing high levels of safety. Modernisation will also improve flight efficiency, enabling the airlines to capitalise on the performance of their modern fleets of aircraft.
For airports	Modernisation is expected to reduce delays on the ground pre-departure caused by capacity constraints in the airspace and for Glasgow Airport to increase runway throughput during busy periods.
For other airspace users	Modernisation offers opportunities for other airspace users to access volumes of airspace that are not required by commercial air transport through the reclassification of unused controlled airspace as uncontrolled, and by more effective airspace sharing.
For the Military	Airspace modernisation will continue to ensure that Military operators have access to suitably sized and sited areas of airspace to fulfil defence and national security objectives, recognising that new Military aircraft and weapons platforms often require larger volumes of airspace in which to train and maintain operational readiness.

3. PART A CRITERIA REVIEW

3.1. Review of the strategically important ACPs against the Masterplan acceptance criteria

38. During the development of the Masterplan, ACOG reviewed the strategic importance of the airspace changes in the ScTMA cluster that were identified in Iteration 2. The review considered the nine criteria provided by the CAA in Part A of the Masterplan acceptance criteria regarding where, when and why airspace changes may be needed to deliver modernisation. These criteria are summarised in table 4. The aim of the review was to ensure that the strategically important airspace changes required to deliver modernisation in the ScTMA cluster had been identified and to consider if there were any gaps or improvements that should be addressed. The outputs of the review were presented in the ScTMA PEX in February and March 2024. As explained above, none of the stakeholder responses to the PEX highlighted gaps in, or improvements to, the Masterplan that relate to the scope of the strategically important airspace changes needed to deliver airspace modernisation in the ScTMA cluster. The ScTMA PEX Feedback Report can be viewed in full on ACOG's website and is summarised in section B7.

Table 4: Masterplan acceptance criteria Part A – Where, When and Why ACPs may be developed or needed

#	Masterplan acceptance criterion
A1	Identify areas where, in light of forecast growth in demand and airspace bottlenecks, ACPs could be developed to accommodate that growth and alleviate delays by the introduction of additional airspace capacity.
A2	Identify areas where ACPs could be developed in light of planned developments on the ground which will require new airspace designs.
A3	Identify areas where ACPs could be developed to allow for more direct routes.
A4	Identify areas where ACPs are needed to deliver a safety benefit.
A5	Identify areas where ACPs can limit the total adverse effects of noise.
A6	Identify areas where ACPs can deliver air quality or fuel efficiency benefits.
A7	Identify areas where ACPs are needed to improve access to airspace for all users.
A8	Identify areas where ACPs are needed to enable military access to airspace for training and national security.
A9	Identify areas where ACPs are needed to introduce new technology.

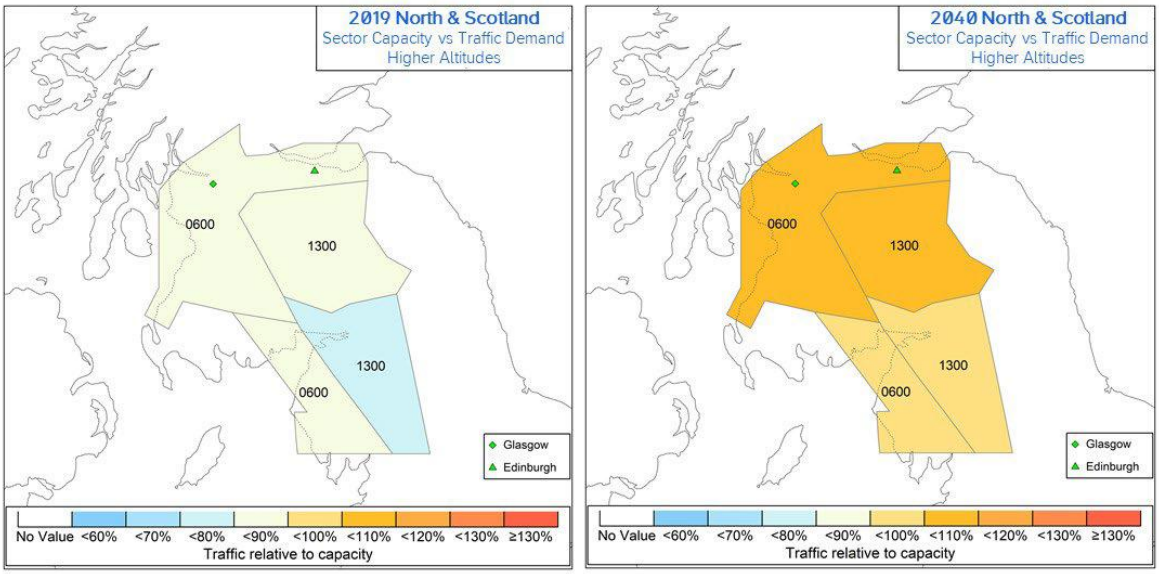
39. The review against Part A of the Masterplan acceptance criteria concluded that the ACPs listed in section 2.3 (and initially identified in Iteration 2) sponsored by Edinburgh Airport, Glasgow Airport and NERL are the strategically important airspace changes required to achieve the objectives of modernisation in the ScTMA cluster. No gaps in, or improvements to, the strategically important airspace changes for the ScTMA cluster were identified by ACOG during the development of the Masterplan Iteration 3, or by external stakeholders responding with feedback to the PEX. The outputs of the Part A acceptance criteria review for the Masterplan Iteration 3 for the ScTMA cluster are set out in sections A1 to A9 below.

A1: Strategically important ACPs to accommodate growth and alleviate delays

40. The capacity of the ScTMA is determined by the design of the existing routes and the ability for controllers to safely manage the flow of traffic through the available airspace. The existing ScTMA route network is based on the locations of ground navigation beacons and outdated airspace design practices. The beacons are like junctions in the network, with multiple routes feeding into the same points, creating traffic bottlenecks at busy times. To create capacity, controllers vector traffic - taking aircraft off their planned routes and instructing pilots to fly a particular compass heading and altitude. The ScTMA airspace has become heavily reliant on vectoring to manage large volumes of climbing and descending traffic to and from Edinburgh and Glasgow airports. Capacity becomes constrained during busy periods because of the physical limitations of the available airspace to vector traffic, and because the volume of work associated with issuing vectoring instructions becomes too large for controllers to manage safely without applying restrictions.

41. Figure 5 illustrates where demand in the existing ScTMA airspace is expected to increase, potentially leading to capacity constraints as traffic levels grow. The images illustrate the evolution of traffic demand versus maximum capacity in the en route airspace during the busiest hours of the day in key sectors of the ScTMA in 2019 and 2040. The left side of the chart shows that aggregated traffic demand in the ScTMA sectors was 80% – 90% of available capacity during 2019. On the right-hand side of the chart, by 2040 with forecast traffic growth and no additional capacity, traffic demand in the peak hours is predicted to exceed 100% to 120% of the available capacity.[14]

Figure 5: Traffic demand vs maximum airspace capacity in key sectors of the ScTMA 2019 to 2040



42. The sectors immediately to the south of Edinburgh and Glasgow airports are the most capacity constrained and inefficient in the current operation of the airspace because they are used by the majority of arriving and departing flights. Departing aircraft are routinely required to level off when climbing to the south to remain safely separated from the arrival flows, leading to the inefficient use of airspace. Similarly, arriving aircraft are often instructed to follow longer, less efficient flight paths and descend sooner than necessary to avoid the departing traffic.

[14] Source: UK Airspace Change Masterplan Iteration 2, v2.2, ACOG, March 2022.

43. Analysis produced by NERL for Iteration 2 of the Masterplan, predicts that flight delays will increase disproportionately, at a far greater rate than traffic levels, if additional airspace capacity is not introduced to accommodate the growing number of flights. The associated costs of the delays, flight cancellations and lost connectivity would be significant. NERL's analysis also highlights the poor resilience of the existing airspace against bad weather and unexpected events because of the lack of spare capacity. The resilience issues facing today's operation would intensify significantly if additional airspace capacity were not introduced in response to growing traffic levels.

44. As part of the proposed ScTMA cluster airspace design the Edinburgh, Glasgow and NERL ACPs are considering options to deconflict the arrival and departure routes to increase airspace capacity, especially in the key sectors highlighted in figure 5. The goal is for many of the new routes to be positioned so they are broadly parallel and safely separated by design (rather than multiple routes converging on the same points as they do today). This is expected to reduce the reliance on controller vectoring and help to ensure the departure flows heading south cross the arrival flows heading north in a more ordered way, increasing the efficient use of airspace.

45. The Part A review considered the potential for gaps in the Masterplan regarding the identification of strategically important ACPs to introduce additional airspace capacity in the ScTMA, in light of the traffic demand. An indication of the size and nature of the existing traffic demand in Scotland can be drawn from data about annual flight numbers at the largest airports. Table 5 sets out the 2022 annual air transport movements and associated passenger numbers for the 10 largest Scottish airports.

Table 5: Annual air transport movements and passenger numbers at the 10 largest Scottish airports

#	Airport	2022 annual movements	2022 annual passengers	%*
1	Edinburgh	98,065	11,248,549	29%
2	Aberdeen	74,098	1,959,883	22%
3	Glasgow	70,391	6,516,029	21%
4	Inverness	23,820	699,982	7%
5	Prestwick	19,034	444,433	6%
6	Sumburgh	17,715	246,390	5%
7	Dundee	13,522	36,882	4%
8	Kirkwall	11,758	123,055	3%
9	Stornoway	7,384	101,121	2%
10	Wick	2,998	6,935	1%
	Total	**338,785**	**21,383,259**	

** Percentage of total 2022 annual movements*

46. Operations at Edinburgh, Glasgow and Aberdeen airports accounted for over 70% of the total flights across the 10 largest Scottish airports. The ratio of annual movements to passenger numbers is higher for Aberdeen Airport because of the large number of flights serving North Sea offshore oil operations. Most of the remaining 30% of flights were linked to operations at Inverness, Sumburgh, Prestwick and Dundee airports. Inverness and Sumburgh airports are geographically isolated from the busy ScTMA region with routes and traffic levels that do not have a significant influence on the overall performance of the airspace at a national level in Scotland. Prestwick and Dundee airports are located within the ScTMA region. However, annual air transport movements at both airports are consistently low (and in the case of Dundee, declining) meaning additional airspace capacity is not required to accommodate forecast growth and any resultant airspace bottlenecks. As a result, the airspace structures and routes serving these four airports have not been identified by ACOG for inclusion in the Masterplan. In addition, no gaps in, or improvements to, the strategically important airspace changes required to accommodate growth or alleviate delays were highlighted in the stakeholder feedback to the ScTMA PEX.

A2: Strategically important ACPs needed due to planned developments on the ground

47. The Masterplan must consider areas where ACPs could be developed in light of planned developments on the ground which would require new airspace designs. The Part A review considered three main types of ground development that may require new airspace designs in the ScTMA cluster:

- Airport infrastructure developments
- Safeguarding linked to wind farm developments
- Non-aviation commercial and residential developments

Airport infrastructure developments

48. Commercial air transport airports typically produce an infrastructure plan or similar capital investment strategy which informs their planned developments on the ground. These plans take forecast data that show how different aspects of the airport's operation are expected to grow and change in the future. Airports typically examine expected changes in passenger numbers, aircraft movements, types of operation and other factors to determine their response to changing or growing demands for aviation services.

49. ACOG has reviewed the latest published airport infrastructure plans or similar strategies for the 10 largest Scottish airports listed in table 5. No planned infrastructure developments on the ground were identified at these airports which would require new airspace designs that could be considered strategically important to the performance of the airspace in Scotland at a national or regional level.

Safeguarding linked to wind farm developments

50. Safeguarding refers to the assurance activities conducted by airports to ensure the continuing safety of aircraft manoeuvring on the ground, taking off, landing or flying in the vicinity of the airports. All airports in Scotland that conduct commercial air transport operations participate in a well-established aerodrome safeguarding process that is overseen by the CAA. Wind farm developments are now common in Scotland. The introduction of wind powered generator turbines can create issues for aviation operations.

51. In addition to their potential to present a physical obstacle, wind generator turbines can also affect some aviation communication and surveillance systems. This may lead to the requirement for airspace changes to facilitate developments on the ground. The amount of interference depends on the number of wind turbines, their size and location and on the shape of the blades. Local authorities, airports and ANSPs collaborate closely with developers to mitigate the risks to aviation.

52. The Government directs local authorities to consult the safeguarded airports on all new wind farm developments. During the Part A review, ACOG has not identified any such developments that would require new airspace designs of a size or nature that could affect the overall performance of the airspace in Scotland at a national or regional level. However, it is essential that the existing ScTMA cluster ACPs engage with wind farm developers appropriately as the proposals progress through the CAP1616 process to ensure the requirements of the renewables sector are considered.

Non-aviation commercial and residential developments

53. Due to the impact of an airport's operation on its neighbours, airport ACP sponsors will often keep up to date with local authority planning and development strategies. This mitigates new developments particularly housing being impacted by an existing operation or a proposed airspace change. Local authorities produce detailed maps and accompanying project information setting out where commercial and residential developments are planned as part of their regular local planning processes. ACP sponsors are required as part of the airspace change process (CAP1616) to engage with relevant local authorities when producing design options and incorporate any identified developments on the ground into the impact assessments that support the proposal. During the Part A review, ACOG has not identified any such developments that would require new airspace designs of a size or nature that could affect the overall performance of the airspace in Scotland at a national or regional level.

A3: Strategically important ACPs to allow for more direct routes

54. During the development of the Masterplan, ACOG has reviewed flight track data provided by EUROCONTROL, an intergovernmental organisation responsible for coordinating air traffic control operations across Europe. The data shows the horizontal efficiency of the existing flight paths operated by aircraft in the ScTMA. In this context, horizontal flight efficiency is measured by comparing the shortest distance between two endpoints in the ScTMA against the actual tracks flown by aircraft.

55. The Horizontal Flight Efficiency metric takes into account various features of the existing airspace system including route length and track deviations. It is used to identify areas where more efficient flight paths can be achieved. The metric is expressed as a percentage. The lower the score the more efficient the flight paths. Horizontal flight efficiency across the overall Scottish region (including some flights in Northern England) has remained at around 5% for the past five years, with the average for European States sitting at 4%, highlighting that there is some scope for improvement.

56. ACOG has reviewed the high-level scope of the existing ScTMA ACPs to redesign the existing configuration of arrival and departure routes and introduce more direct routes into, out of and through the ScTMA region. The existing airspace does not include departure and arrival routes that connect to the east side of the ScTMA over the Firth of Forth and out over the North Sea. This means that outbound flights from Glasgow and Edinburgh airports with onward destinations in the east and southeast must fly south before turning east adding unnecessary track miles, CO_2 emissions, and in the case of Edinburgh Airport, positioning more low-level flights over land. Inbound flights from the east and southeast must approach the ScTMA from either the north or south, again resulting in additional track miles, emissions and flights over land.

57. Most of the airspace changes required to allow for more direct routes in the ScTMA cluster are included in the NERL-sponsored ACP above 7,000 ft. However, some changes to the orientation of the arrival and departure routes serving Edinburgh and Glasgow airports below 7,000 ft may also require changes to optimise the performance of the overall design. For example, as part of the proposed ScTMA design the Edinburgh, Glasgow and NERL ACPs are considering the introduction of new arrival and departure routes to the east that would enter and exit the ScTMA over the Firth of Forth. These routes would require additional controlled airspace to manage the safe, orderly flow of flights through this new area. The proposed ScTMA design also considers the potential to introduce an additional hold in the east of the ScTMA so that inbound traffic flows to Edinburgh and Glasgow airports from the east and southeast would have a dedicated airspace procedure for managing such arrivals following more direct routes.

58. The area to the south is the most congested in the ScTMA, so in addition to the environmental benefits described above, these proposed new routes over the Firth of Forth and the North Sea enable both departures and arrivals to/from the east and southeast to avoid this congested area. This both improves safety and reduces complexity, which will ultimately mean precited growth can be accommodated with less delay.

59. No gaps in, or improvements to, the strategically important airspace changes required to allow for more direct routes in the ScTMA cluster were identified by ACOG during the Part A review or highlighted in the stakeholder feedback to the ScTMA PEX.

A4: Strategically important ACPs to deliver a safety benefit

60. To maintain and, where possible, improve the existing high levels of aviation safety is a priority for airspace modernisation, above all other objectives. The ScTMA cluster has an excellent aviation safety record - in line with the UK more generally. The UK's airspace safety goal is that there are no accidents involving commercial air transport that result in serious injuries or fatalities, as well as no serious injuries or fatalities to third parties as a result of any aviation activities.[15]

61. While the UK's safety record is excellent the aviation sector cannot afford to be complacent. The safety of airspace is underpinned by a well-established set of rules and procedures. Flights are operated in different categories of airspace using a system of classifications based on the performance of the aircraft and the nature of their operation.

62. Most commercial flights carrying passengers and freight use controlled airspace, following instructions from air traffic controllers who are responsible for keeping aircraft separated. General Aviation operates mostly, but not entirely, in uncontrolled airspace, where pilots typically follow the principle of 'see and avoid' to separate themselves. The Military uses both types of airspace. New and rapidly developing forms of aviation like drones and air taxis are also expected to use both controlled and uncontrolled airspace when their operations mature.

63. The growth in traffic levels and the emergence of new forms of aviation, is changing the aviation sector's ability to anticipate and mitigate safety risks. When the design of the UK's airspace was established in the 1950s it was not expected to cope with the number and complexity of flights that operate today.

64. In the ScTMA cluster specifically, safety management monitoring and reporting activities conducted by Edinburgh, Glasgow and NERL demonstrate that there are very few safety incidents and no trends within the existing airspace that are driving remedial actions. An improvement in safety performance is expected from the ScTMA ACPs that each aim to remove risk factors from the existing airspace through greater systemisation of the route network.

65. ACOG does not consider that there are strategically important ACPs that are needed to deliver a safety benefit in the ScTMA cluster. In addition, no gaps in, or improvements to, the Masterplan associated with strategically important airspace changes required to deliver a safety benefit were highlighted in the stakeholder feedback to the ScTMA PEX.

[15] Aviation 2050, the future of UK aviation, Department for Transport, 2018 [link].

A5: Strategically important ACPs that can limit the total adverse effects of noise

66. The adverse effects of aircraft noise are considered to be those related to health and quality of life. There is no one threshold at which all individuals are significantly adversely affected by aircraft noise. It is possible to set a Lowest Observed Adverse Effect Level (LOAEL) that is regarded as the point at which adverse effects begin to be seen on a community basis. As noise exposure increases above this level, so will the likelihood of experiencing an adverse effect. In line with this increase in risk, the proportion of the population likely to be significantly affected can be expected to grow as the noise level increases above the LOAEL.

67. The Scottish Government requires airports with more than 50,000 annual air transport movements and airports located within agglomerations, to develop Noise Action Plans every five years.[16] During the development of the Masterplan, ACOG has reviewed the Noise Action Plans and related materials for Edinburgh, Glasgow and Aberdeen airport's (the Scottish airports with over 50,000 movements). The Aberdeen ACP has now been removed from the Masterplan (see section 2.3 of this document).

68. For Glasgow and Edinburgh airports, the contours within which there is the potential for adverse noise effects (i.e. effects related to health and quality of life) extend approximately 15km from the respective runway ends.[17] There are no restrictions on the vertical profiles of the departure and arrival routes within the respective airport contour areas, so identifiable noise improvements within the contours are not likely to arise from airspace changes that enable greater use of continuous climb and descent operations in these areas. Opportunities to limit total adverse noise effects at Glasgow and Edinburgh airports may arise from potential changes to the tracks of flight paths over the ground, the introduction of respite routes that aim to distribute noise and potentially an increase in the climb profiles applied to the departure routes.

69. ACOG does not consider that there are strategically important ACPs that are needed to limit the total adverse effects of aircraft noise in the ScTMA cluster. In addition, no gaps in, or improvements to, the Masterplan associated with strategically important airspace changes required to limit the total adverse effects of noise were highlighted in the stakeholder feedback to the ScTMA PEX.

[16] In this context an agglomeration is defined by the Scottish Environmental Protection Agency as an urbanised area having a population in excess of 100,000 people and a population density equal to or greater than 500 people per km^2.

[17] The methodology used to produce the noise contours in the NAPs may be different to that required in CAP1616 and CAP2091.

A6: Strategically important ACPs that can deliver air quality or fuel efficiency benefits

70. During the development of the Masterplan ACOG has reviewed flight track data provided by EUROCONTROL, an intergovernmental organisation responsible for coordinating air traffic control operations across Europe. In addition to the potential for airspace changes to allow for more direct routes (thereby delivering fuel benefits by improving horizontal efficiency – see section A3), the EUROCONTROL data also shows the vertical efficiency of the existing flight paths operated by aircraft in the ScTMA. A measure of vertical efficiency offers an indication of the potential for airspace changes to deliver air quality or fuel efficiency benefits by improving aircraft climb and descent profiles.

71. In this context, vertical efficiency is measured by the proportion of flights in the ScTMA that climb and descend continuously with no requirement to level off (a manoeuvre that typically generates additional fuel burn). Generally, the less level flight the more efficient an aircraft's vertical profile is. In the existing ScTMA airspace, 86% of all outbound flights in 2019 (the majority of which departed from Edinburgh and Glasgow airports) climbed continuously from the surface to the cruise. 43% of all inbound flights in 2019 (the majority of which arrived into Edinburgh and Glasgow airports) descended continuously during their approach to landing.

72. The conclusion that vertical efficiency is worse for descents than climbs is consistent with the experience in other regions of busy terminal airspace. Flights inbound to Edinburgh and Glasgow airports currently route towards one of five airborne holds dependent on their direction of arrival. The ScTMA holds are used by controllers to manage the flows of inbound traffic, especially during busy periods. Over 80% of flights inbound to Edinburgh and Glasgow airports arrive from the south. As a result, the LANAK hold that serves Glasgow arrivals and the TARTN hold that serves Edinburgh arrivals are by far the busiest. The STIRA hold in the northeast that serves flights inbound from northern Scotland, Europe and beyond, is shared by both Glasgow and Edinburgh traffic making it complicated for controllers to use efficiently. The position of flights in the hold are assigned on a first come first basis, creating an imbalance in the flow of inbound traffic to both airports during busy periods.

73. As part of the proposed ScTMA airspace design, the Edinburgh, Glasgow and NERL ACPs are considering options to change the position and orientation of the holds so that they are better aligned with the proposed flows of inbound and outbound traffic to and from the airports. Changes to some or all of the holds creates further opportunities to redesign the departure routes at lower altitudes, so they are separated from the arrival flows, enabling more flights to climb and descend continuously in the most efficient way possible, improving vertical efficiency on both departure and arrival.

74. Beyond redesigning the Edinburgh and Glasgow holds to separate them from the arrival and departure routes serving the airports, no gaps in, or improvements to, the strategically important airspace changes that can deliver air quality or fuel efficiency benefits in the ScTMA cluster were identified by ACOG during the Part A review. The other Scottish airports listed in table 5 service far fewer flights and many operate in portions of lower complexity airspace with fewer restrictions that already facilitate high rates of continuous climbs and descents. In addition, no gaps in, or improvements to, the Masterplan associated with strategically important airspace changes that can deliver air quality or fuel efficiency benefits were highlighted in the stakeholder feedback to the ScTMA PEX.

A7: Strategically important ACPs that are needed to improve access to airspace for all users

75. The ScTMA airspace is a scarce resource shared by a diverse mix of users. The use of controlled airspace has increased over time in response to growing traffic levels. Controlled airspace can restrict access for other users, including General Aviation operators, pilot training, sports, leisure and other private flying that mostly use uncontrolled airspace.

76. Airspace modernisation aims to safely facilitate access for all airspace users by moving towards greater integration. In addition, the Masterplan must address the requirement to, where possible, minimise the total volume of controlled airspace required to service commercial air transport as part of the existing ScTMA cluster ACPs in support of the AMS access and integration objectives.

77. The strategically important ACPs in the ScTMA cluster, sponsored by Edinburgh, Glasgow and NERL, are working together to comprehensively review the existing structure and classifications of controlled airspace. Where possible, the base of controlled airspace will be lifted, releasing portions at lower altitudes for other airspace users to access.

78. As the number and variety of airspace users accessing airspace in the ScTMA region continues to grow, the lack of integration will become increasingly inefficient and unsustainable. Operators in rapidly developing parts of the sector are already requesting greater access to airspace, for example to trial new services like drone flights beyond the visual line of sight of a remote pilot. Airspace modernisation is needed to introduce a more innovative structure supported by new communications and surveillance technologies that can integrate the operations of different users without the need for segregation. For example in Scotland there is significant work in train to enable the operation of drones between the mainland and the islands as well as inter-island. These operations rely on current airspace arrangements including where necessary segregation of the drone flights.

79. There will be a requirement for future ACPs to enable the integration of new entrants and other current airspace users. Their operations will be managed through current airspace regulation or through new emerging policy set out by the Government and the CAA. Future ACPs to enable the integration of new airspace users are expected to be initiated by sponsors over time as technology, operational concepts and policies mature.

80. ACOG does not consider that there are strategically important ACPs that are currently needed to improve access to airspace for all users in the ScTMA cluster. In addition, no gaps in, or improvements to, the Masterplan associated with strategically important airspace changes needed to improve access to airspace were highlighted in the stakeholder feedback to the ScTMA PEX.

A8: Strategically important ACPs that are needed to enable military access

81. The Masterplan is required to identify areas where ACPs are needed to enable military access to airspace for training and national security. To address this requirement ACOG has liaised with the Defence Airspace and Air Traffic Management (DAATM) Team within the Ministry of Defence about the Military's future requirements for suitably sized and sited airspace.

82. Military operations rely on access to the full range of UK airspace to secure our borders and carry out training. There are several areas of existing special use airspace within and surrounding the ScTMA that can be reserved by the Military for training and exercises. Civil flights avoid these areas by flying longer, less efficient routes around them.

83. The strategically important ACPs in the ScTMA cluster, sponsored by Edinburgh, Glasgow and NERL are seeking to take maximum advantage of existing joint Civil-Military procedures for the Flexible Use of Airspace (FUA) as part of the proposed ScTMA design. Under the FUA arrangements, civil traffic may fly directly through certain areas of special use airspace en route to and from their destinations, when available.

84. FUA procedures for airspace sharing are already used effectively in the ScTMA today. The proposed ScTMA design is considering route options that are configured to deliver the greatest potential improvements for the efficient use of airspace through airspace sharing. For example, the new routes to the east and southeast mentioned above are only possible with effective airspace sharing arrangements with the Military. The proposed Firth of Forth controlled airspace will be deployed using the principles of FUA with the Military because it interacts with a portion of established special use airspace known as Danger Area EGD514. When EGD514 is activated, the proposed Firth of Forth controlled airspace and associated routes would be notified to airspace users as unavailable. Alternative routes within the network would be used instead.

85. The military's airspace requirements are expected to evolve over the coming years as the UK and its allies bring more advanced aircraft and weapons into service. As a result, future airspace changes may be needed to provide the military with new or modified portions of special-use airspace of the appropriate size, shape and location. Future ACPs to enable military access are expected to be initiated by sponsors over time as new training and operational requirements become clear.

86. ACOG does not consider that there are strategically important ACPs currently needed to enable military access in the ScTMA cluster. In addition, no gaps in, or improvements to, the Masterplan associated with strategically important airspace changes needed to enable military access were highlighted in the stakeholder feedback to the ScTMA PEX.

A9: Strategically important ACPs that are needed to introduce new technologies

87. The ScTMA is the busiest and most complex airspace in the Scottish region. This is because air traffic controllers must routinely manage high volumes of climbing and descending flights to and from Glasgow and Edinburgh airports. In the existing airspace, controllers use a constant stream of vectoring instructions to manage the flows of traffic safely and efficiently.

88. The introduction of PBN routes that rely on satellite technology rather than ground navigation beacons is a cornerstone of airspace modernisation in the Masterplan ACPs. The use of PBN improves aircraft track keeping so that routes can be positioned to enable a more flexible approach to design. The strategically important ACPs in the ScTMA cluster, sponsored by Edinburgh, Glasgow and NERL, are introducing new PBN arrival and departure routes that are laterally separated by design, reducing the volume of converging tracks and crossing traffic that controllers need to manage.

89. With less crossing traffic, controllers can manage more flights without the airspace reaching capacity. Departure routes can be redesigned with greater precision so that even more outbound flights climb continuously with fewer emissions and lower noise impacts. Arrival routes can be redesigned in a similar way so that inbound flights descend continuously and more quietly to the final approach for landing. New route options can also be included within the design, offering additional airspace capacity, more efficient connections with the network and opportunities to better manage environmental impacts.

90. The volumes of controlled airspace needed to protect routes may be reduced in some areas of the ScTMA cluster following the introduction of PBN. However additional controlled airspace may also need to be introduced to protect routes deployed in areas that were not previously overflown. The overall goal is to minimise the total volume of controlled airspace required to support commercial air transport operations in the ScTMA.

91. The widespread deployment of new routes designed and operated to PBN standards is a technological cornerstone of airspace modernisation in the ScTMA cluster. However, the introduction of PBN routes as part of the strategically important ACPs may increase the concentration of aircraft overflight, and therefore noise impacts, in some areas. It is essential that proposed changes at lower altitudes are informed by a range of design options developed as part of a coherent process that seeks to balance the impacts appropriately.

92. The precision and flexibility offered by PBN routes can create opportunities for the strategically important ACPs in the ScTMA cluster to deploy new operational techniques that may improve the management of aircraft noise and mitigate, to some extent, the impacts of greater concentration. For example by introducing multiple flight paths for noise dispersion and predictable respite. As part of the AMS, the co-sponsors encourage these opportunities to be exploited wherever feasible, taking into account local circumstances and community preferences.

93. No gaps in, or improvements to, the strategically important airspace changes that are needed to introduce new technologies in the ScTMA cluster were identified by ACOG during the Part A review, or highlighted in the stakeholder feedback to the ScTMA PEX.

4. PART B CRITERIA

94. Part B of the Masterplan sets out the information about the ScTMA cluster ACPs required by the co-sponsors (DfT and CAA) for the iteration to be accepted into the AMS. The information in Part B is organised to align with criteria B1 to B12 of the Masterplan acceptance criteria that are summarised in table 6.

Table 6: Masterplan acceptance criteria Part B – Information about the ScTMA cluster ACPs

#	Masterplan acceptance criterion
B1	a) A credible and implementable plan for the necessary airspace changes. b) Key assumptions and risks. c) The degree of commitment offered by each of the ACP sponsors.
B2	Demonstrate how the Strategic Environmental Assessment (SEA) and Habitats Regulations Assessment (HRA) interact with – and inform the development of – the Masterplan.
B3	Identify potential interdependencies between the constituent ACPs.
B4	Identify potential solutions to interdependencies.
B5	Set out proposed trade-offs to resolve interdependencies.
B6	Explain the potential implications for government policy objectives of the proposed solutions.
B7	Report on engagement carried out since the previous iteration, and present an ongoing engagement strategy with the sponsors of the constituent ACPs and relevant stakeholders.
B8	Include a plan for the content of subsequent iterations of the Masterplan.
B9	Include an assessment of the impacts on airspace accessibility, including on the General Aviation sector overall.
B10	Include a safety strategy.
B11	Identify the operational concepts required to deliver the airspace changes and their level of maturity.
B12	Be written in a way that can be understood by all stakeholders and published simultaneously in an accessible format.

95. The required information about the ScTMA cluster ACPs related to each criterion is set out in sections B1 to B12 below, with further details included in the appendices.

B1: ScTMA cluster Implementation Plan

96. Criterion B1 requires ACOG to set out a credible and implementable plan for the ACPs included in the ScTMA cluster. The implementation plan should include:

- a list of the airspace changes with identified sponsors in specific volumes of airspace;
- indicative timescales for their ACPs' adherence against each step of the CAP 1616 process; and
- a clearly identified critical path of delivery.

97. ACOG is also required to identify the assumptions upon which the ACPs are based and dependent and the risks associated with delivering the plan (including a consideration of how they can be mitigated). Finally, ACOG should provide an assessment of the degree of commitment offered by each ACP sponsor to deliver the plan.

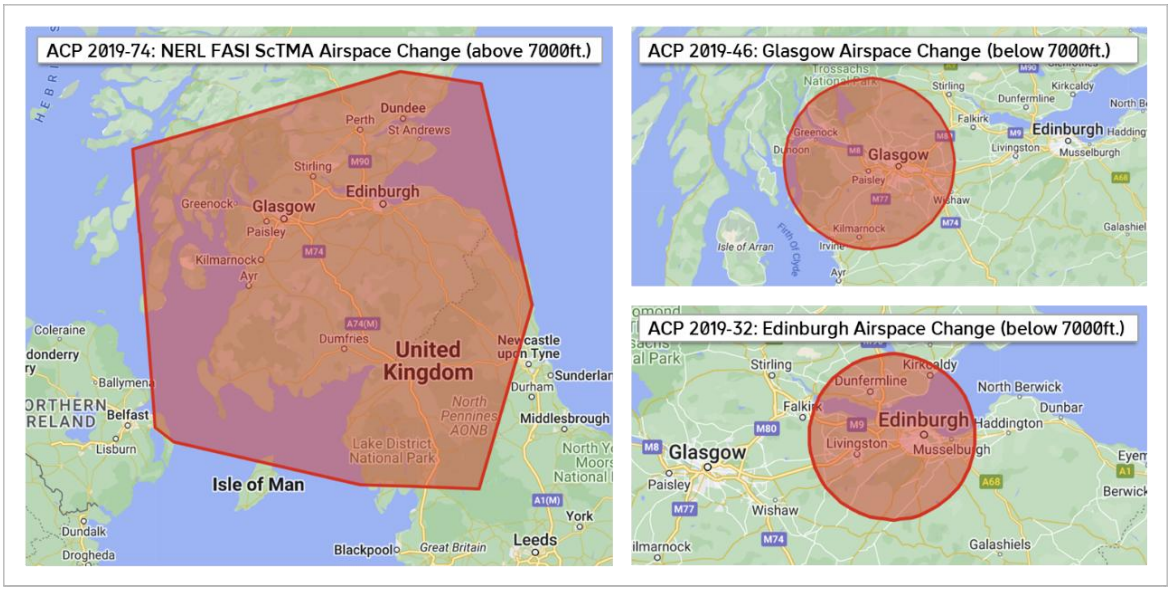
List of airspace changes with identified sponsors in specific volumes of airspace

98. Table 7 sets out the ACPs required to achieve the objectives of airspace modernisation in the ScTMA cluster of the Masterplan with identified sponsors. Figure 6 (a repeat of figure 4) illustrates the specific volumes of airspace that are potentially within scope for each of the ScTMA ACPs.

Table 7: List of the ScTMA ACPs with identified sponsors

#	ACP ID	Title	Sponsor	Scope
1	2019-46	Glasgow Airport Airspace Change	Glasgow Airport Limited	Arrival and departure routes serving Glasgow Airport and the controlled airspace that contains them below 7,000 ft.
2	2019-32	Edinburgh Airport Airspace Change	Edinburgh Airport	Arrival and departure routes serving Edinburgh Airport and the controlled airspace that contains them below 7,000 ft.
3	2019-74	Future Airspace Implementation – ScTMA	NATS En Route Limited	Route network in the ScTMA above 7,000 ft and interfaces with Glasgow and Edinburgh arrival and departure routes below 7,000 ft.

Figure 6: Illustration of the broad geographical areas potentially affected by the ScTMA cluster ACPs



Indicative timescales for the ScTMA ACPs' adherence against each stage of the CAP 1616 process

99. For planning purposes, ACOG has agreed an overall implementation plan for the ScTMA cluster with the ACP sponsors so that the timelines for the development and deployment of the individual proposals remain aligned. The ScTMA ACPs are working towards a target implementation date to deliver the airspace changes as a single integrated deployment from Q1 2027. Time risk allowance of up to 21 months to Q4-2028 has been applied to the implementation plan to manage essential IFP validation tasks and deconflict the ScTMA ACPs from other large scale airspace changes and NERL led system and technology developments that are also required for airspace modernisation. Table 8 summarises the key milestones and estimated timescales in the ScTMA cluster implementation plan, aligned to the stages of the CAP1616 process. The ScTMA ACP sponsors and ACOG have baselined this implementation plan up to the coordinated consultations (milestone #7), committing the funding, resources and management attention required to deliver the activities and outputs to the agreed scope and timelines. Similar to all large-scale airspace changes there is a risk that the consultation stage will need to be extended to fully address stakeholders' feedback to the ScTMA proposals. As a result, the milestone dates in table 8 from Stage 4 onwards are indicative only.

Table 8: Indicative timescales and key milestones for the ScTMA cluster implementation plan

#	Milestone	Start	Finish
	CAP1616 Stage 3 (Consult): Timetable agreed and baselined		
1.	ScTMA ACP sponsors submit Stage 3 gateway materials to CAA Airspace Regulation team.	-	Aug-24
2.	CAA conduct Stage 3 (Consult) gateway review.	Aug-24	Sep-2025
3.	ScTMA ACP sponsors prepare for the consultations.	Sep-2025	Nov-2025
4.	ScTMA ACP sponsors conduct the consultations.	Nov-2025	Mar-2026
5.	ScTMA ACP sponsors review consultation feedback.	Nov-2025	Apr-2026
	CAP1616 Stage 4 (Update and Submit): Detailed timetable to be agreed by ACP sponsors		
6.	ScTMA ACP sponsors update the designs, conduct validation simulations and complete the Final Options Appraisals and Safety Assessments.	By Q1-2027 (including 3 months of time risk allowance from Q4-2026)	
7.	ScTMA ACP sponsors document their final proposals in full and submit them to the CAA for a decision.		
	CAP1616 Stage 5 (Decide): Detailed timetable to be agreed by ACP sponsors		
8.	CAA assess the finalised ScTMA ACPs.	By Q3-2027	
9.	CAA hold a public evidence session (if required).		
10.	CAA make a decision and document the reasons.		
	CAP1616 Stage 6 (Implement): Detailed timetable to be agreed by ACP sponsors		
11.	ScTMA ACP sponsors complete training and system adaptations, IFP flight validation and database validation in preparation to implement the change.	Q4-2029 (including 21 months of time risk allowance from Q1-2028)	
12.	ScTMA ACP sponsors implement the change.		

100. The critical path is the longest sequence of tasks (in time) from start to finish that must be completed to deliver the ScTMA cluster implementation plan. The 12 key milestones summarised in table 8 comprise the critical path for the ScTMA cluster implementation plan (with the exception of milestone 10, the CAA public evidence session, which if required can be conducted alongside the activities to deliver the CAA assessment for milestone 8.)

101. The indicative timescales of the overall plan for the ScTMA cluster remains subject to change because the implementation of the approved changes (milestones 11 and 12 in table 8) must be managed alongside the wider NERL investment portfolio which includes system and technology developments. Several of these system and technology developments are required to improve and enable future airspace changes. NERL will continue to work with ACOG and relevant stakeholders to ensure that prioritisation decisions between airspace change deployments and system and technology developments and their implications are understood. There are three critical deployment activities that NERL, as the UK's licenced en route ANSP, must conduct to prepare for the implementation of each large-scale airspace change. These are summarised in table 9. Assumptions about the size and nature of these activities are important to ensure the associated implementation plans are credible.

Table 9: Critical NERL activities to prepare for large-scale airspace changes

#	Activities
1	High fidelity air traffic simulations that enable the development, testing and safety assurance of the proposed changes.
2	Training for each air traffic control validation affected by the proposed changes.
3	Technical adaptations to ATC systems and tools to accommodate the proposed changes.

102. The high-fidelity air traffic simulation and testing activities required to support large-scale airspace changes are a major undertaking and the time required in NERL's simulation facilities for each cluster/LTMA deployment is assumed to be significant. At the same time, NERL's simulation facilities will also be required to carry out on-going, high priority activities to support the current operation, including important controller licencing obligations. It is assumed that to minimise service disruption there is a requirement to deliver large-scale airspace changes during the quieter winter period (November to March), avoiding significant training and implementation activities during the peak summer period (April to October).

103. The technical adaptation activities required to accommodate large-scale airspace changes are especially complex because many critical ATC systems and tools will require significant modifications and/or new tools integrated. It is assumed that the technical adaptations cannot be conducted for each system in isolation; much of the activity will need to concentrate on the integration between NERL systems, as well as extensive testing to ensure the overall operating environment is functioning as expected.

104. For large-scale airspace changes, a period of stability is essential following the completion of the technical adaptations, to ensure the updated systems can consistently perform their intended functions without any reliability issues. It is assumed that the planned implementation dates for successive large-scale airspace changes must be sufficiently separated with time to build, test,

assure and deliver the required adaptations, and to enable operational staff to adequately assimilate the new operating environment before further changes can be introduced.

105. NERL conducted a detailed review during 2023 into the delivery of technical adaptations for large-scale airspace changes, focusing on safety, resilience, service delivery and the lessons drawn from previous proposals. The review followed the successful delivery of the LAMP Deployment 1.1 ACP (2017-70) that is the largest airspace change to be implemented in the UK to date. More information about LAMP Deployment 1.1 can be found on the CAA Airspace Change Portal here.

106. The review concluded that, given the scale of the transformation to both ATC systems and airspace across the UK network, it is assumed that a deconfliction period between large-scale airspace changes of up to 18-months is required to assure safety, resilience and ongoing service delivery.

107. NERL is taking action to improve the planning constraints implied by this assumed deconfliction period. At this early stage in the implementation plan, there is no guarantee that the deconfliction period can be reduced substantially and time risk allowance has been added to the ScTMA cluster timelines accordingly, however NERL, ACOG and the airport ACP sponsors will continue to work for a positive outcome. Stakeholders will be updated as the implementation plans progress.

Specific assumptions upon which the ScTMA ACPs are based and dependent

108. Table 10 sets out the specific assumptions upon which the ScTMA ACPs are based and dependent and the implications for the implementation plan summarised in table 8.

Table 10: Assumptions upon which the ScTMA ACPs are based and dependent

#	Assumption	Implication	Source
1.	Timing of deployment It is assumed that, for operational reasons, it is infeasible to implement major airspace changes such as those proposed in the ScTMA cluster during the summer period due to the peak in traffic levels, requiring the ANSPs to be at full capacity to deliver a safe, efficient, and effective service.	The ScTMA cluster ACPs are scheduled for implementation in the quieter winter period	ACP sponsors
2.	Training for deployment It is assumed, due to the rules governing how controllers are trained and the demand on NERL's facilities, that it is not possible to train controllers in preparation for implementation of an airspace change longer than 26 weeks before the planned initial operating date. The ScTMA plan currently assumes that a 45 day controller training programme is required to support the implementation of the proposed changes.	Controller training schedules are built into the ACP implementation plans at Stage 6	ACP sponsors
3.	Synchronisation of ACPs It is assumed that the SCTMA ACPs will be implemented in the same time period . As a result, the timescales for each ACP's adherence to the steps of the CAP1616 process and the subsequent activities to prepare for implementation are the same across the three ScTMA ACPs.	The ScTMA ACP sponsors must develop their proposals in lock step. A delay to one ACP creates knock-on delays to the others	ACOG
4.	Timing of Masterplan assessment and acceptance An eight-week period is assumed for the co-sponsors (DfT and CAA) to assess and accept Iterations 3 and 4 of the Masterplan for the ScTMA cluster.	The Masterplan assess and accept timelines are built into the ACP implementation plans	CAA/DfT

5.	Timing of ACP gateway reviews An eight-week period is assumed between the submission of the ScTMA ACP materials for CAA review in preparation for each CAP1616 regulatory gateway assessment.	Gateway timeline built into the ACP implementation plan	ACOG
6.	Timings in response to gateway failures It is assumed that all CAP1616 regulatory gateways for the ScTMA ACPs are passed at the first attempt. The implementation plan includes small amounts of contingency for moderate refinements to ACP materials based on gateway feedback that can be addressed in a matter of weeks, but not enough to absorb a significant gateway failure that would require re-work over a period of months.	There is no material contingency in the implementation plan for significant delays caused by a failure to pass the CAP1616 gateways	ACP sponsors
7.	Timing of simulation activity It is assumed that the air traffic simulations of the proposed design and associated IFP/technical validation activities will be able to take place in the timeframes required by the implementation plan. Each simulation will require a development phase, which will require multiple test activities involving both controllers, airspace designers and specialist air traffic engineering resources.	Air traffic simulations and the schedule of activities required across all ACP sponsors to prepare for them are built into the ACP implementation plans	ACOG
8.	Funding of ACP sponsors It is assumed that all the ScTMA ACP sponsors have access to sufficient funding and specialist resources to complete the development of their respective proposals during each stage of the CAP1616 process in the timescales envisaged.	Lack of sponsor funding and/or access to specialist resources are not delivery risks for the ScTMA ACP implementation plan	ACP sponsors
9.	Regulatory resources It is assumed that the CAA has sufficient regulatory resources to complete the assessment of the ACP submissions for the SCTMA ACPs at each Stage of the CAP1616 process.	Lack of regulatory resources to meet pre-agreed timescales is not a delivery risk to	CAA

		the ScTMA ACP implementation plan	
10	New operational concepts It is assumed that aspects of the proposed ScTMA design (for example the vertical separation between some of the PBN arrival and departure route options) which rely on new operational concepts which may not be covered by existing regulatory policy can be adequately addressed by the ACP sponsors in their respective safety arguments.	Proposed concepts to be addressed by the ACP sponsors in their safety arguments so that they can be considered for acceptance by the CAA	ACP sponsors

Risks associated with delivering the plan

109. Table 11 sets out the key risks identified by ACOG associated with delivering the implementation plan summarised in table 8 and the proposed mitigations.

Table 11: Identified delivery risks to the ScTMA implementation plan and planned mitigations

#	Delivery risk to the ScTMA implementation plan	Planned mitigation	Owner
1.	Gateway submission risk The implementation plan assumes that the ScTMA ACP sponsors' submissions pass the relevant CAP1616 regulatory gateways for each stage at the first attempt. There is a risk that the submissions are delayed at the gateways due to either non-compliance with the CAP1616 process requirements or misalignments with the content of the latest accepted Masterplan, delaying the ACP development activities in the next stage of the process for all sponsors.	ACOG to coordinate assurance and peer review of the ACP submissions prior to the gateways and seek greater clarity from the CAA on the key indicators for demonstrating alignment with the Masterplan, to minimise the risks of gateway failures.	ACOG
2.	Integration risk between sponsors The approach to developing and assessing airspace design options are different across the three ScTMA ACP sponsors. There is a risk that integrating the design options into an overall system-wide proposal continues to take longer than expected and requires additional design and assessment work because of uncertainties about how the lower altitude arrival and departure routes and the NERL-led ScTMA network design will interact.	ACOG to work closely with the ScTMA ACP sponsors to coordinate and programme manage the airspace design integration phase, adding discipline and rigour to the development and assessment tasks and minimising the risk of design gaps and duplications of effort.	ACOG
3.	Sponsor commitment and funding risk There is a significant cost in terms of time, money, resource and political capital to complete the CAP 1616 process. There is consequently a risk of one or more sponsors withdrawing their ACP.	ACOG to regularly monitor sponsor commitment and funding positions across the programme, escalating to the CAA/DfT where necessary.	ACP Sponsors, ACOG, CAA and DFT

4.	Programme compression risk Issues with the integration of the ACP design options into a system-wide proposal (linked to risk #2) have delayed the ScTMA deployment timeline. There is a risk that timeline delays lead to a compression of the wider national programme so that regional clusters that were scheduled for implementation sequentially begin to overlap and there are insufficient resources to accommodate the overall scope of the changes without further knock-on delays.	ACOG to re-profile the overall national programme and test the assumptions about the industry's capacity to deploy significant airspace changes in more than one regional cluster concurrently – with a particular focus on the plans for the London Airspace South proposals (see paras 101 to 108).	ACOG
5.	Regulatory assurance risk (design concepts) The instrument flight procedures (IFPs) and associated airspace design concepts that form the constituent parts of the overall system-wide proposal included in each ScTMA ACP, are not fully validated by the CAA until Stage 5 of the CAP1616 process. There is a risk that specific IFPs are not considered compliant with the regulatory standards, undermining aspects of the overall system-wide proposal and potentially delaying approval to implement the changes.	ACOG to seek assurances (as far as possible) from the relevant CAA Safety and Airspace Regulation teams that the IFPs and associated airspace design concepts in the overall system-wide proposal will be considered viable and compliant to de-risk the later phases of the CAP 1616 process.	ACOG & ACP Sponsors
6.	Design changes post-consultation risk There is a risk that the ScTMA cluster ACP sponsors will need to conduct additional consultation with stakeholders following updates to the local designs made in response to feedback gathered during the coordinated consultations.	ACOG will monitor the implementation plan during the consultations and consider including additional time to address the requirement for re-consultation if needed.	ACOG
7.	Specialist resources and facilities risk There is a risk that due to a scarcity of specialist resource (e.g. air traffic controllers, air traffic and flight simulators, IFP designers) planned activities cannot take place or are delayed, causing a knock-on	ACOG coordinates planning of timings and resources with the sponsors to provide clarity and future visibility of specialist resources requirements.	ACOG & ACP Sponsors

	impact to the planned implementation date and additional costs to deliver the cluster.		
8.	Consultation coordination risk There is a risk that sponsors do not coordinate their consultations or stakeholders are unclear about what is being consulted upon or how/where to direct their responses.	ACOG has agreed an approach to coordinated consultations with the sponsors and regular dialogue is in place to actively manage this risk.	ACOG & ACP Sponsors

Commitment offered by each ACP sponsor to deliver the implementation plan

110. Following engagement with the ScTMA ACP sponsors, this section outlines the level of commitment offered by each ACP sponsor to deliver the implementation plan, as set out in table 8, guided by the assumptions set out in table 10 and manage the risks described in table 11.

111. All three ACP sponsors have re-confirmed their commitment to continue developing their proposals in line with the target dates in the implementation plan to deliver the objectives of airspace modernisation in the ScTMA cluster.

112. NERL has confirmed it has an approved business case to deliver its portion of the ScTMA implementation plan up to the completion of the coordinated consultations. Thereafter, additional funding and resources will need to be secured to continue the development and deployment of the NERL ScTMA ACP.

113. Glasgow Airport has confirmed it has an approved business case to deliver its portion of the ScTMA implementation plan up to the completion of the coordinated consultations. Thereafter, additional funding and resources will need to be secured to continue the development and deployment of the Glasgow ScTMA ACP.

114. Edinburgh Airport has confirmed it has an approved business case to deliver its portion of the ScTMA implementation plan up to the completion of the coordinated consultations. Thereafter, additional funding and resources will need to be secured to continue the development and deployment of the Edinburgh ScTMA ACP.

B2: Strategic Environmental Assessment and Habitats Regulations Assessment

115. The Masterplan, through the individual ACPs, may alter where aircraft fly. This could have consequential environmental impacts, including noise levels on the ground, CO_2 emissions and local air quality.

116. To ensure that environmental impact considerations are integrated into the development of the Masterplan, the CAA must ensure that it is subject to a strategic environmental assessment (SEA) and a Habitats Regulations assessment (HRA). These assessments are legal requirements.

117. The SEA is an iterative process of gathering data and evidence, assessing environmental effects, making recommendations to refine plans or programmes in view of their predicted environmental effects, and developing mitigation measures where environmental effects cannot be designed out. The aim is to influence strategic decisions taken early on, to take account of alternatives and assess the cumulative effects of different proposals. In the case of the Masterplan, the SEA is carried out by the CAA as the 'responsible authority'. This SEA complements the more project-specific assessment of environmental impacts carried out by each individual ACP sponsor through the CAP 1616 process. The SEA must be kept up to date through monitoring as the Masterplan is developed and implemented.

118. The HRA refers to the several distinct stages of assessment which must be undertaken in accordance with law on conservation of habitats and species. The HRA determines the potential effects of the Masterplan on protected sites, referred to as 'European sites', in view of those sites' conservation objectives. As the 'competent authority', the CAA must first screen for 'likely significant effects', then carry out an 'appropriate assessment' of any potential adverse effects that were not ruled out at the screening stage. If the Masterplan might have adverse effects on the integrity of a European site, then it can only be accepted by the CAA into the Airspace Modernisation Strategy if there are no alternative solutions, and there are imperative reasons of overriding public interest why the Masterplan must nevertheless be accepted into the Airspace Modernisation Strategy.

119. The first stage of each of these assessments for the Masterplan is to decide what they must cover, including the methodology that the CAA proposes to use. The CAA has already completed a consultation on:

- For the SEA, a draft scoping report that can be viewed here; and
- For the HRA, a draft screening report that can be viewed here.

120. The reports explain why the law requires these assessments to be carried out for the Masterplan. The CAA also used the consultation to seek stakeholders' views on the approach to the SEA and HRA assessments. This is set out in a third document:

- The approach to the SEA and HRA that can be viewed here.

121. Work has begun on both the SEA and HRA for the ScTMA cluster. The CAA intends to consult on those assessments at or around the same time as when the sponsors plan to consult on their ACPs during Stage 3 of the CAP 1616 process (planned to start in November 2025 – see table 8).

122. The outputs from those assessments, including the consultation responses received from statutory nature conservation bodies and the public, will inform the development of iteration 4 of the Masterplan for the ScTMA cluster.

123. The final Masterplan for the ScTMA cluster will set out how the SEA has been taken into account. This will include explaining how predicted environmental effects have led to changes to the policies and proposals contained in the Masterplan as it develops; how the environmental assessments have informed the final options appraisal; and how the environmental assessments have informed the development of mitigation measures and monitoring arrangements.

124. The final Masterplan for the ScTMA cluster will also explain how the draft appropriate assessment has been taken into account in developing iteration 4 of the Masterplan for the ScTMA cluster, addressing (where necessary) how the policies and proposals have been adapted to mitigate for effects on European sites wherever possible. Where adverse effects on the integrity of European sites have not been entirely ruled out, ACOG and the co-sponsors will consider whether there are any alternative solutions that would have a lesser effect on European sites and, if not, whether the proposal should nonetheless be carried out for imperative reasons of overriding public interest.

B3: Potential interdependencies between the ScTMA ACPs.

125. The intention of the information provided for criterion B3 (and the related information set out in sections B4 and B5 below) is to set out how the options in each ScTMA ACP relate to each other (i.e. their interdependencies) and the proposed treatment of any design conflicts, potential solutions and trade-offs.

126. Edinburgh, Glasgow and NERL each developed and assessed a shortlist of airspace design concepts and options for their respective ScTMA ACPs during Stage 2 of the CAP1616 process. In Stage 3 of the process the ACP sponsors are working together, in coordination with ACOG, to further refine and integrate the shortlisted options into a proposed ScTMA design. As part of this process, the ACP sponsors must consider their options from a cumulative and collective basis to properly reflect the expected impacts on the ScTMA airspace as a whole.

127. The Masterplan acceptance criteria (CAP2156a) requires the ACP sponsors to identify the interdependencies between their shortlisted options and examine any specific design conflicts that arise. In this context, an interdependency can be described as an area where the options from different ACPs are linked together in some way (e.g. where one sponsor's design options had the potential to affect the options included in another's ACP). A design conflict may arise from an interdependency if the options cannot both proceed in their current form. When this happens, the ACP sponsors, coordinated by ACOG, must consider the potential solutions and make joint design choices to modify one or more of the options (or to remove options altogether).

128. These choices result in trade-offs being made between the alternative potential solutions, which each create a different mix of positive and negative impacts (noting that safety remains the priority above all else). The phrase 'trade-off' is used to refer to the compromises made by ACP sponsors to pursue benefits in one area, at the expense of improvements elsewhere.

Methods used to calculate cumulative and collective impacts

129. ACOG has established a methodology for the ACP sponsors to apply, including the evidence required when identifying interdependencies and proposing trade-offs to resolve any design conflicts. The methodology is described in the ACOG Cumulative Analysis Framework (CAF) that is published alongside the Masterplan Iteration 3 for the ScTMA cluster as Appendix 1. The CAF methodology is supported by 5 technical annexes (consolidated into Appendix 2) that provide detailed guidance on the use of data and metrics to support the evaluation of potential solutions and proposed trade-offs.[18]

130. The CAF methodology considers where *cumulative* impacts from interdependent design options below 7,000 ft may affect stakeholders on the ground and the *collective* impacts of all the ACPs in the cluster when they are added together. More information about the definitions and types of cumulative and collective impacts are provided in Appendix 1.

[18] The CAF methodology and its technical annexes have been reviewed by the CAA. All comments raised by the CAA as part of that review have been addressed to their satisfaction, however the CAF remains in draft until it is formally approved as Appendix 1 of the Masterplan Iteration 3 for the ScTMA cluster.

131. **Cumulative impacts** only arise when two or more routes from different ACPs are positioned in the same portion of airspace below 7,000 ft, creating impacts for people on the ground in a specific location from more than one flight path. For example if:

- ACP 1 positions route A in a certain area below 7,000 ft, which results in 5 overflights an hour impacting people in a specific location; and
- ACP 2 positions route B in the same area below 7,000 ft, which results in a further 10 overflights an hour impacting the same location; then
- The cumulative impact generated by ACP 1 and ACP 2 is the total adverse effects of 15 overflights an hour for people on the ground in that location.

132. **Collective impacts** on the other hand, incorporate all the impacts (both positive and negative) of the ACPs contributing to the overall design when they are added together consistently, regardless of their effects on specific stakeholders or locations. In other words, specific areas of cumulative impact within the design can be described as a subset of the overall collective impact. When considering solutions to resolve a design conflict, ACP sponsors examine both cumulative impacts below 7,000 ft (affecting people in specific locations) and the summation of collective impacts generated by the overall design.

133. The CAF incorporates the outputs that are available from the Initial Options Appraisals conducted by ACP sponsors on their design options in Stage 2 of the CAP1616 process, the Full Options Appraisals conducted in Stage 3 and the Final Options Appraisals in Stage 4. The CAF methodology is organised into three parts that broadly align with these stages. The Full Options Appraisals are a more rigorous quantitative analysis of the options than the qualitative Initial Options Appraisals. The Final Options Appraisals update the Full Options Appraisals, taking into account modifications to the design as a result of the ACP consultations conducted during Stage 3. Importantly, the CAF does not tell the ACP sponsors what the solutions of different design conflicts and trade-offs should be. Rather, it guides sponsors through a three-part methodology to ensure they gather the necessary evidence in a robust, coherent and transparent way as the CAP1616 process progresses. Table 12 summarises the three parts of the CAF methodology.

Table 12: Summary of the three parts of the CAF methodology

#	Title	Summary
CAF part 1 (linked to the Initial Options Appraisals)	Review of route interdependencies, design conflicts and trade-offs	Before the Full Options Appraisals are carried out, ACOG coordinates a joint ACP sponsor review of the interdependencies between the shortlisted options from the Initial Options Appraisals to identify design conflicts, consider the potential solutions and where required describe the proposed trade-offs.
CAF part 2 (linked to the Full Options Appraisals)	Full cumulative analysis	ACOG collates the data from the individual Full Option Appraisals carried out by the ACP sponsors in the cluster to describe the collective cluster-wide performance and makes this information available for sponsors to present in their ACP submissions and consultation materials.

CAF part 3 (linked to the Final Options Appraisals)	Final cumulative analysis	ACOG collates the data from the individual Final Option Appraisals undertaken by the ACP sponsors in the cluster to describe the collective cluster-wide performance and makes this information available for sponsors to include in their final ACP submissions.

134. Glasgow Airport, Edinburgh Airport and NERL conducted the CAF part 1 review for the proposed ScTMA design. The review identified 18 specific areas across the proposed ScTMA design where interdependencies may arise between the specific options developed by the ACPs (i.e. where one sponsor's design options had the potential to affect the options included in another's ACP). Figure 7 indicates the approximate location of each identified interdependency.

Figure 7: Approximate location of each identified interdependency in the ScTMA CAF part 1 review

135. Eight of the interdependencies arose from the possibility of interactions between the proposed low-level arrival and departure routes in the Edinburgh and Glasgow Airport ACPs. However, the CAF1 analysis demonstrated that none of these potential interdependencies would result in a specific design conflict between the airports. In other words, all the design options for low-level arrival and departure routes that are considered for inclusion in the proposed ScTMA design are compatible in their current form. This conclusion was based on one of two reasons:

- The departure route options climbed quickly enough to jump the arrival route options without a design conflict; or

- The arrival route options all remained high enough for the departure route options to climb continuously beneath them without the need to level off.

136. As a result, the CAF part 1 review concluded that there are no design conflicts, proposed trade-offs or cumulative impacts below 7,000 ft created by the ScTMA ACPs.

B4: Design conflicts arising from the interdependencies and potential solutions

137. The remaining ten interdependencies concerned the proposed locations and orientations of the airborne holds and the possibility that they may affect the position of new PBN arrival and departure route options. During the CAF part 1 review, design conflicts did not arise for 8 out of the 10 interdependencies because the preferred positions of the proposed PBN arrival and departure routes were vertically or laterally separated from the preferred hold locations (allowing for continuous climb and descent operations where appropriate), and both options were compatible in their current forms.

138. The CAF part 1 review did identify two potential interdependencies that may result in design conflicts. These are the interdependencies at locations 1 and 14 in figure 7. Both interdependencies concerned the location of airborne holds serving traffic inbound to Glasgow Airport (that were developed as part of the NERL ScTMA ACP above 7,000 ft) and the position of PBN arrival route options (that were developed as part of the Glasgow Airport ACP below 7,000 ft). The first design conflict involved an option to locate a new hold to the west of Glasgow. The second involved an option to locate a new hold to the north of Glasgow.

139. ACOG coordinated a qualitative assessment of the potential solutions available to resolve the conflicts, working with subject matter experts from NERL and Glasgow Airport. The qualitative assessments were sufficient to demonstrate that one solution was clearly preferrable to resolve the conflicts in both scenarios, because the chosen design delivered better outcomes than the alternatives when considering the collective impacts across all categories (e.g. Noise, CO_2 emissions, airspace capacity, airspace access etc.).

140. The trade-offs associated with these conflicts are described in section B5. Following acceptance of the Masterplan, the ACP sponsors will include the proposed trade-offs as part of the consultations, and clearly highlight them so that stakeholders can influence the final proposed design. More detail about the interdependencies and design conflicts are set out in Appendix 3.

B5: Proposed trade-offs to resolve the design conflicts

Trade-offs associated with the design option to introduce a hold to the west of Glasgow

141. Interdependency #14 in figure 7 refers to a design option in the NERL ScTMA ACP to introduce a new airborne hold to the west of Glasgow airport with the working name LARGO. The option created a design conflict with the Glasgow ScTMA ACP because the proposed LARGO hold could influence the options to modernise Glasgow's arrival and departure routes in this portion of airspace below 7,000ft.

142. Two potential solutions were identified to resolve the design conflict:

- Solution 1: Arrivals above 7,000 ft inbound to Glasgow from the south west would route to a hold positioned to the south east of the airport, in the vicinity of today's LANAK hold (the position of the existing LANAK hold is indicated on figures 2 and 3).
- Solution 2: Arrivals above 7,000 ft inbound to Glasgow from the south west would route to a new hold - LARGO - to the west of the airport, in the vicinity of existing and proposed Glasgow departure routes to the west of the airport.

143. A CAF part 1 review of the trade-offs associated with the proposed solutions was conducted qualitatively by subject matter experts (SMEs) provided by the ACP sponsors and coordinated by ACOG. Table 13 summarises the outputs of the CAF part 1 trade-off review for the LARGO design conflict, comparing the expected outcomes of solution 2 against solution 1. A full review of the trade-offs associated with the proposed LARGO hold are set out in Appendix 3.

Table 13: Summary outputs of the CAF part 1 trade-off review for the LARGO design conflict

	Noise	**CO_2 and Fuel Burn**	**Capacity & Resilience**	**Airspace Access**
Solution 1 (without LARGO)	In solution 1 Glasgow departures and arrivals below 7,000ft have been designed to provide continuous climb/descent operations where possible – this helps minimise the area overflown below 7,000 ft.	The continuous climb/descent operations offered in solution 1 will provide fuel/CO_2 efficiency benefits below 7,000 ft	The continuous climb/descent operations offered in solution 1 will enable aircraft to fly routes with minimal ATC intervention	The continuous climb/descent operations offered in solution 1 helps to minimise the impact of controlled airspace requirements because aircraft have shorter track segments at lower levels
Solution 2 (with LARGO)	The LARGO hold would require level segments to be introduced/extended on a number of departure and arrival	The LARGO hold would be more fuel/CO_2 efficient for the network above 7,000ft than solution 1	The LARGO hold would require extended level segments which would lead to more ATC intervention and	The LARGO hold would require additional controlled airspace to contain the level segments required below 7,000 ft

	routes below 7,000 ft		workload than solution 1	
Solution 2 (with LARGO) vs Solution 1 (without LARGO)	Solution 1 is better than solution 2 from an overflight perspective (considering that overflight is a proxy for noise in areas beyond those captured in noise contours)	Overall it was qualitatively assessed that the fuel/CO_2 benefits to the network of solution 2 were likely to be greater than the solution 1 fuel/CO_2 costs of introducing levels offs below 7,000ft. However, the assessment was that the scale of any net CO_2 impacts would not be sufficiently disproportionate to justify the added noise/overflight impacts below 7,000ft	Solution 1 is better than solution 2 from an airspace capacity perspective, because solution 2 would increase workload and reduce the effective capacity of Glasgow Airport ATC managing flights below 7,000 ft	Solution 1 is better than solution 2 from an airspace access perspective because it would require less controlled airspace below 7,000 ft

144. The review of trade-offs highlighted that although the LARGO design option could provide some benefit for the NERL sponsored ACP above 7,000 ft. in terms of fuel and CO_2 efficiencies, negative changes to the Glasgow departure route options below 7,000ft would be necessary to accommodate the new hold, in particular:

- Introducing and/or extending level segments in the route design, interrupting continuous climb operations and worsening continuous descent approach performance below 7,000 ft.
- The requirement for additional portions of controlled airspace below 7,000 ft. to contain the extended level segments.
- An increase in Glasgow ATC workload, reducing effective capacity, which could not be overcome through the use of systemisation.

145. Based on the CAF part 1 qualitative review of impacts, the ScTMA ACP sponsors agreed that the expected impacts on noise, flight efficiency and controlled airspace at lower altitudes, and ATC workload would exceed the network benefits. Consequently, at this stage NERL discontinued the LARGO design option from the ACP. Further quantitative analysis of the CO_2, noise or airspace access impacts was not required at this stage to inform the proposed trade-off.

Trade-offs associated with the design options to change the Glasgow holds to the north

146. Interdependency #1 in figure 7 refers to design options in the NERL ScTMA ACP to change the location and orientation of airborne holds serving Glasgow arrivals to the north of the airport.

147. Glasgow airport currently operates with four airborne holds: these are currently referred to as FYNER for flights from the west, FOYLE for flights from the North, STIRA (shared with Edinburgh arrivals) for flights from the north east and LANAK for flights from the South and East. FYNER, FOYLE and STIRA are all positioned to north of the airport, with only LANAK to the South. However, due to prevailing traffic patterns most flights inbound to Glasgow Airport approach from southerly directions, which can contribute to congestion in these portions of airspace to the south of the ScTMA.

148. A key feature of the proposed ScTMA design is rebalancing the inbound traffic flows by bringing arrivals in from the east, through new network route structures above the Firth of Forth, into a hold to the east of the ScTMA. The existing STIRA hold was found to be undesirable for servicing these new inbound traffic flows from the east because, as a shared hold servicing both airports, it is complex for controllers to operate during busy times.[19] The STIRA hold is also not available when NERL permit airspace use northeast of the ScTMA by the Scottish Gliding Centre at Portmoak.

149. An alternative design option for the management of Glasgow arrivals from the north and east was therefore sought, which concentrated on removing the STIRA hold and combining and/or realigning the remaining northerly holds. Two potential solutions were considered as part of the CAF 1 review:

- Solution 1: a replacement for both the STIRA and FOYLE holds, with the working name COYLE. This design option would position a new hold near where the existing FOYLE hold is positioned, with a realigned orientation to more efficiently accommodate the new flow of traffic from the east. Solution 1 also aims to minimise impact on General Aviation operations (the controlled airspace for the proposed COYLE hold is located in areas less frequently used by GA than the existing controlled airspace that protects FOYLE).
- Solution 2: a single replacement for the STIRA, FOYLE and FYNER holds, with the working name LOCHY positioned between the existing FOYLE and FYNER holds.

150. The potential solutions could impact the position of the Glasgow arrival routes below 7,000 ft so a CAF part 1 trade-offs review was conducted. This was a qualitative exercise undertaken by the SMEs provided by the ACP sponsors and coordinated by ACOG. Table 14 summarises the outputs of the CAF part 1 trade-off review for the proposed changes to the holds to the north of Glasgow airport. A full review of the trade-offs associated with the proposed changes to the holds to the north of Glasgow is set out in Appendix 3.

[19] The position of flights in the hold are assigned on a first come first basis, creating an imbalance in the flow of inbound traffic to both airports during busy periods.

Table 14: Summary outputs of the CAF part 1 trade-off review for changes to Glasgow holds to the north

	Noise & tranquillity	CO_2 and Fuel Burn	Capacity & Resilience	Airspace Access
Solution 1 (COYLE)	The position of the COYLE hold would not be expected to increase overflight of the National Parks	The position of the COYLE hold is relatively efficient as the hold positions do not require arrivals to make a significant detour	ATC workload was not a significant issue for solution 1	The position of the COYLE hold would enable the transition from the hold to remain within that main area of controlled airspace required by the change (which is largely existing already)
Solution 2 (LOCHY)	The position of the LOCHY arrivals would require aircraft to descend below 7,000 ft over the Loch Lomon and Trossachs National Park	The LOCHY arrivals from some directions would require aircraft to fly past, or turn away from the airport to reach the hold location	ATC workload was not a significant issue for Solution 2	LOCHY would require additional new controlled airspace for the arrival transitions
Solution 2 (LOCHY) vs Solution 1 (COYLE)	Solution 2 creates no notable difference in the overflight of populated areas below 7,000 ft, but generates additional tranquillity impacts. Solution 1 is therefore favoured from a noise and tranquillity perspective.	A combined track length assessment conducted by NERL showed solution 2 generated significant additional track miles compared to solution 1; this would translate into additional fuel burn and CO_2	Solution 2 does not create a discernible difference in ATC workload, capacity and resilience	Additional low level controlled airspace would be required to accommodate the arrival transitions from the solution 2 LOCHY hold

151. Based on the CAF part 1 qualitative review of impacts the ScTMA ACP sponsors agreed that COYLE (solution 1) was the preferred design option and as a consequence, at this stage NERL discontinued the LOCHY design option (solution 2). Further quantitative analysis of the CO_2, noise or airspace access impacts was not required to inform the proposed trade-off.

152. **Following acceptance of the Masterplan Iteration 3 for the ScTMA cluster, the ACP sponsors will include the proposed trade-offs summarised in tables 13 and 14 as part of the consultations, and clearly highlight them so that stakeholders can influence the final proposed design.**

B6: Implications for Government Policy

153. This section sets out the potential implications for government policy objectives of the proposed solutions to the design conflicts set out in sections B4 and B5.

154. Through the ScTMA CAF part 1 review explained in sections B3, B4 and B5, the ACP sponsors have gathered the necessary evidence for a robust, coherent and transparent design narrative that demonstrates how the proposed trade-offs have been reached. The supporting justification provided by the sponsors in selecting design options and proposing trade-offs will be set out in their respective ACP consultations and ultimately in their ACP submissions. These justifications must ensure that the proposed trade-offs are made in accordance with the Airspace Modernisation Strategy and that the outcomes deliver government policy. The evidence justifying how ScTMA ACP sponsors have proposed trade-offs taking stakeholders views into account will be laid out in the Consultation Response Documents published during Stage 4 of the CAP1616 process.

155. The proposed solutions chosen by the ACP sponsors to resolve conflicts in the ScTMA design are intended to deliver the best achievable outcome that provides system-wide benefits and overall optimisation of the network while taking account of local circumstances (especially where potential solutions to the design conflicts affect the position of routes over the ground below 7,000 ft). The proposed trade-offs have taken account of the ACP sponsors design principles that were agreed with local stakeholder representatives during Stage 1 of the CAP1616 process. The proposed trade-offs arising from these conflicts (described in section B4 and B5) are consistent with the ScTMA ACP sponsors agreed design principles.

156. The proposed trade-offs arising from the ScTMA design have resulted in individual ACP performance being traded-off for a collective benefit, where potential CO_2 and fuel efficiency improvements above 7,000 ft have been ceded to the need to minimise noise impacts and maintain airspace access below 7,000 ft.

157. In the course of proposing trade-offs, the ScTMA ACP sponsors have considered how each proposed trade-off performs against the strategic objectives of the Airspace Modernisation Strategy and the statutory factors in section 70 of the Transport Act (noting that maintaining a high standard of safety takes priority over all other factors).

158. The ScTMA ACP Sponsors have considered the environmental objectives set out in the Air Navigation Guidance (ANG) 2017. These environmental objectives are designed to minimise the environmental impact of aviation within the context of supporting a strong and sustainable aviation sector. Where the objective to limit the adverse impacts of aircraft noise is potentially in conflict with the objective to reduce emissions, the ScTMA ACP sponsors have considered the altitude-based priorities in the ANG. As a result, the sponsors have attached a preference to the solutions that minimise the impact of aircraft noise between 4,000 ft and 7,000 ft, providing that the proposed trade-offs do not disproportionately increase CO_2 emissions (at or above 4,000 ft to below 7,000 ft).

B7: Report on engagement since the previous Masterplan Iteration

159. This section reports on the engagement carried out since publication of the Masterplan Iteration 2, including the Public Engagement Exercise for the ScTMA to support the development of the Masterplan Iteration 3. Creating and maintaining the Masterplan is the cornerstone of ACOG's work and the focus of our engagement with all stakeholders interested in airspace modernisation. Since Iteration 2 of the Masterplan was published in January 2022, ACOG has continued its comprehensive campaign of communications and engagement to promote the Group's coordination role in the process, develop the Masterplan Iteration 3 and demonstrate the importance of airspace modernisation for the future of UK infrastructure. One of the key steps in this campaign was the delivery of a Public Engagement Exercise (PEX) that explained the proposed changes in the ScTMA at a strategic level, as required by the CAA, ahead of submission of the Masterplan.

National level stakeholder engagement and communications since the publication of the Masterplan Iteration 2

Website and social media

160. The One Sky One Plan website, ACOG corporate site and social media channels have been developed to communicate the case around airspace change and continue to see good levels of engagement from a range of stakeholders. ACOG posts on average once a week, on both LinkedIn and Twitter (now X). In the last year, the ACOG LinkedIn account has secured more than 24,000 organic impressions and nearly 600 post engagements. The ACOG Twitter account amassed 36,000 organic impressions and nearly 2,000 post engagements. The ACOG website has had more than 7,500 visitors, while the One Sky One Plan site has had more than 10,400 visitors. (Impressions quantify the number of times a post has been seen. Engagements include the number of times an action has been taken on a post – for example a comment, like or share)

ACOG newsletter

161. The ACOG newsletter has been issued regularly over the last two years to over 1,000 stakeholders including elected representatives, airports and airlines, regulators and interested businesses. The newsletter issued in February 2024, which included details of the engagement exercise for the ScTMA cluster, was the ACOG update with the highest engagement to date, with an open rate of 25 per cent.

Time Flies Awareness Campaign

162. Launched in April 2023, the campaign highlights the need to upgrade airspace using examples of how technology has evolved over the decades. This included the creation of a new 90-second explainer video of what airspace modernisation is and how it works, a series of 'static' advertisements and a longer more detailed web briefing with an ex-air traffic controller to help bring to life the objectives of modernising airspace. The social media campaign received over 3,500 clicks in just the first two weeks, with 1,040 of these coming from LinkedIn, 1,370 from Twitter and 970 from Google. The associated newsletter also had a high open rate of 22%.

Industry and General Aviation

163. ACOG has spoken at various industry panels and conferences including those for AOA (now Airports UK) and Airlines UK. We also hosted a stand and spoke on a panel at the Sustainable Skies Summit in 2023. This two day event is attended by government representatives, regulators, airlines, academia and media from around the world to discuss and address the immediate and long-term concerns and actionable solutions that are driving the sector towards a more sustainable future. In Q2-2022, ACOG recruited a General Aviation coordinator to support the Group's engagement with other airspace users on the impacts of the Programme on access and integration for all current and potential future user groups (General Aviation, Military, Drone, Advanced Air Mobility and commercial space launch operators).

Community and Business Stakeholders

164. In Q2-2022, ACOG established a Community Advisory Panel to help shape the Group's approach to engagement with community stakeholders on the Masterplan. The panel is made up of individuals from representative groups (including the Aviation Environment Federation (AEF), UKACC and SASIG) as well as individuals from local community groups. The panel meets quarterly and covers a range of topics related to the overall programme and Masterplan development.

165. In conjunction with the British Chambers of Commerce, we hosted a series of business roundtables across Edinburgh, Glasgow and Manchester in 2022/23 to discuss the benefits of airspace modernisation for businesses operating in the ScTMA and MTMA regional clusters. The event in Glasgow resulted in a positive story on the front page of The Scotsman newspaper.

Parliamentary Engagement

166. ACOG holds regular meetings with the Minister for Aviation, highlighting key areas of progress and the main challenges that the Programme must tackle to assure successful delivery. The Shadow Minister for Aviation and the SNP Spokesperson for Transport have also received dedicated ACOG briefings and continue to be updated. Regular briefings have been offered and continue to be offered to Members of Parliament who hold a particular interest in airspace modernisation. These include MPs local to airports keen to understand how ACPs and the Masterplan fit together and those concerned by flight paths over their communities. ACOG has also hosted two parliamentary receptions in autumn 2021 and 2022. Each of these saw over two dozen MPs in attendance.

Research Reports

167. The ACOG Environmental Strategy, published in Q3 2022, set out the environmental challenges and opportunities created by airspace modernisation, including how it contributes to the net zero 2050 goals for UK aviation.

168. In January 2023, we published a report produced by PA Consulting on behalf of ACOG examining the economic benefits of airspace modernisation. The findings demonstrate that upgrading airspace can lead to increased efficiency and reduced delays while mitigating carbon emissions and broader environmental harm. This will also result in significant benefits for passengers, increased business productivity, and economic growth for the UK as a whole.

169. In Q4 2024 ACOG ran several focus groups in Scotland, the North West and London to assess community attitudes towards airspace modernisation. The focus groups were backed up by a nationally representative quantitative poll. Some of the key findings included:

- Passenger experience at airports, delays and reducing environmental impact were seen as top priorities for industry to tackle.
- The general public largely believes 1) that demand for air travel will increase; but 2) airspace is at, or nearly at, full capacity
- When provided with the reasons for upgrading airspace, there is strong support for it.

170. These have helped ensure the programme is framed in the most relatable way possible, both in terms of the language the campaign uses and the benefits it outlines. These insights have been presented to the ACP sponsors participating in the programme and the Department for Transport.

Public Engagement Exercise for the Masterplan Iteration 3 for the ScTMA cluster

171. The engagement conducted by ACOG to support the Masterplan Iteration 2 was high-level due to its strategic nature and focused on the representative stakeholders set out in the AMS Governance structure at the time.

172. Ahead of submission of the Masterplan Iteration 3 for the ScTMA cluster, ACOG was required to conduct a Public Engagement Exercise (PEX). The purpose of the PEX was to explain the overall strategic plan for the ScTMA cluster before stakeholders are invited to participate in formal consultations on the detailed changes led by the ACP sponsors that are planned to commence in Q4 2025. As part of the PEX, ACOG was required to engage on six key areas of the Masterplan. These were to:

- Provide an overall description of the system-wide design for the ScTMA cluster, based on the information available.
- Seek input on gaps or improvements, for example whether ACOG has identified the strategically important airspace changes needed to deliver the objectives of airspace modernisation in Scotland.
- Explain how the Masterplan ACPs have been grouped into clusters or deployments.
- Demonstrate where trade-offs have been proposed between the interdependent ACPs in the ScTMA cluster to create their respective designs, ensuring transparency throughout the process.
- Provide more information about the cumulative impacts (if any) of different design choices in the ScTMA cluster and the methods used to calculate them.
- Ensure stakeholders are aware of how they can be notified of the coordinated consultations for the ScTMA ACPs, enabling them to comment on trade-off decisions that will affect them.

173. The PEX sought to gather stakeholders' views on the approach to grouping the ScTMA ACPs and on the principles that will guide how the airports and NERL will consult on the proposed changes in a coordinated way. ACOG also sought to gather feedback on any possible gaps in, or improvement to, the Masterplan.

174. The PEX for the ScTMA cluster was conducted between 29 January and 10 March 2024. The engagement was predominantly delivered online, using the Citizen Space engagement platform, supported by ACOG's website, social media channels and a targeted social media strategy aimed at those who might have a particular interest in the exercise. Citizen Space is a tried and tested engagement channel that is well known and understood by many existing airspace modernisation stakeholders.

175. The online engagement was supported with supplementary channels including meetings and briefings with key stakeholders, emails and newsletters to inform stakeholders about the PEX, and engagement with local media. The social media campaign to target stakeholders in the region and encourage engagement produced positive results:

- On Twitter, our campaign generated 1.4 million impressions and more than 2,600 clicks.
- On LinkedIn, our campaign secured 202,000 impressions and more than 1,300 clicks.
- The ACOG website also saw a spike in visitors over the period, thanks to our Google search campaign.

176. The total number of responses to the engagement exercise was 11. These were from a mix of local residents, General Aviation representatives, industry and several renewable energy (windfarm) organisations. The low number of responses was not unexpected due to the strategic nature of the PEX content and the geographical areas that ACOG was seeking feedback on.

177. The feedback has been analysed and the PEX Feedback Report setting out how it has influenced the preparation of the Masterplan Iteration 3 for the ScTMA cluster is published on ACOG's website. Aside from gathering stakeholder feedback, the PEX was an opportunity to raise awareness of the airspace change programme in Scotland and to signpost stakeholders to the forthcoming consultations that will be conducted by the ACP sponsors. The national news coverage in The Scotsman newspaper that appeared at the start of the PEX provided some helpful context about airspace modernisation and ACOG also carried out several briefings for MPs and MSPs.

178. Table 15 summarises the key points raised by stakeholders responding to the ScTMA PEX.

Table 15: Key points raised by stakeholders responding to the ScTMA PEX

#	Theme	Summary of key points	ACOG response
1	Engagement with the Renewable Energy Sector	While the principle of airspace change was supported, three organisations expressed concerns about what they believed to be a lack of engagement with the renewable energy sector (wind). It was thought that the sector would be significantly affected by airspace change, considering the Scottish Government's onshore wind policy which aims for the generation of 20 gigawatt of onshore wind per annum by 2030. The organisations stated that it would be important to consider renewable energy developers as key stakeholders in the ScTMA ACPs, and to ensure that any impacts are understood and addressed.	ACOG commits to strengthen future engagement and cross-industry collaboration with the renewable energy sector as the process moves forward. ACOG has also passed this feedback to 1) the CAA with the suggestion that the Regulator advises ACP sponsors to engage with the renewable energy sector from the start of the CAP1616 process and 2) the ScTMA ACP sponsors to consider as part of the on-going engagement for their ACPs, in particular during the Stage 3 consultations.
2	Controlled Airspace	Two organisations stated that they would like to see controlled airspace minimised because of the beneficial effects for General Aviation operators. These stakeholders considered that the airspace redesign activities in the ScTMA prioritised solutions for commercial air transport, with controlled airspace reduction given a lower priority. One organisation considered that the engagement material did not show an understanding of VFR (Visual Flight Rules) operations in the ScTMA. The organisations offered to provide guidance with a view to improving the airspace design process and expressed general concerns that new controlled airspace volumes may be created in which commercial flights rarely operate. It was stated that a sense check must be applied to emerging designs and that ACOG would be well placed to oversee this.	ACOG will share the feedback regarding the priority given to minimising controlled airspace with the ScTMA ACP sponsors to incorporate into the development of their proposed designs. ACOG commits to independently review the design choices made by the ScTMA ACP sponsors to minimise controlled airspace and evaluate the outcomes incorporated into the proposed changes. This review will be included in the next version of the General Aviation Impact Assessment for inclusion in the Masterplan Iteration 4. ACOG also commits to engage directly with the General Aviation stakeholders participating in the ScTMA PEX during the development of the next version of the General Aviation Impact Assessment.

3	Coordinated Consultation Principles	One organisation and one member of the public stated that if properly implemented, the intentions described in the coordinated consultation principles section of the PEX appeared likely to meet the essential needs with regards to compliance with CAP1616. Two organisations stated that it would be essential for the renewable energy sector to be part of the formal consultation process because airspace changes can directly impact the industry. It was suggested by these stakeholders that if many design options proceeded to public consultation the materials should clearly explain each option's likelihood and preference. It was also suggested that the strategic environmental assessment (SEA) should be included alongside the consultation materials. One member of the public thought that their views and opinions would not be taken into account in the airspace change process.	ACOG will incorporate this feedback into the coordinated consultation strategy for the ScTMA & wider Masterplan communications and engagement campaign to continue to build awareness and trust in the process. ACOG will work with the ScTMA ACP sponsors, communications agencies and representatives from local communities to ensure that consultation materials used to explain the development, assessment and relative preference of flight path design options is robust, transparent and accessible. Part of this work includes learning lessons from airspace change proposals in the U.S. where community outreach activities often include the use of flight path visualisation videos. Whilst the SEA is being published by the CAA separately to the ACP sponsors' individual consultations, it has been agreed that they should be released at broadly the same time so as to allow respondents to consider the materials together in the round. As part of the CAP1616 process ACP sponsors must demonstrate they have taken adequate account of the views and opinions of stakeholders that may be affected by the proposals, provided sufficient information during the consultations about the issues and potential impacts so stakeholders can give informed responses and set out clearly why they have categorised each response to explain how the feedback has been heard and understood.

4	Clarity of the information provided in the PEX	Most of the organisations that responded to the PEX commented that the information included was clear and well explained. However, a number of suggestions were made including: • Three organisations wanted ACOG to publicise their efforts more broadly, to provide more awareness of their progress and work on the Airspace Change Masterplan. • It was suggested by one organisation that while the information given was satisfactory, that it also needed to be readily accessible. • It was also suggested that a glossary would be useful as there were a number of acronyms used in the PEX documentation. Members of the public expressed concern and frustration that flight paths were not shown as part of the PEX materials. One member of the public believed that the engagement process wasn't in their view truly public, and that it appeared to be targeted only towards those directly affiliated with the aviation industry. The individual stated that the process lacks efforts to engage with and understand the perspectives of the general public.	ACOG acknowledges that the PEX included some technical information and wherever possible, aimed to limit its complexity. The PEX was conducted to support the preparation of the Masterplan Iteration 3 for the ScTMA and the feedback sought was strategic in nature. The requirements for the PEX are set out by the CAA as part of its assessment criteria for accepting the Masterplan (see CAP 2156). ACOG has produced a range of information about the airspace change programme which is available on its website. The PEX clearly stated that the engagement does not include any detailed information about the options for new route designs or airspace structures proposed in the ScTMA. These detailed designs are still being developed by the Airports and NERL in line with the CAA's airspace change process. Later in the process the ACP sponsors will conduct formal consultations with all stakeholders and the general public that set out the detailed designs of all the proposed changes to the routes and airspace structures in the ScTMA, supported by the outputs of a rigorous quantitative appraisal of the expected impacts (both positive and negative). ACOG will incorporate the PEX feedback into the coordinated consultation strategy for the ScTMA and wider Masterplan communications and engagement campaign.

5	Further opportunity to engage	While the engagement and consultation mechanisms in the CAP1616 process were generally understood, concerns were raised that the renewable energy sector's opinions were not being fully or adequately considered. One organisation mentioned that although the engagement in its words was "high-level and conceptual in nature", it had found the information clear and comprehensive. It was stated that the ScTMA airspace changes needed to be actively coordinated, and that they supported the activities of ACOG in order to avoid suboptimal designs with separate sponsors having to work independently.	ACOG will take steps to ensure it correctly identifies and actively engages with the relevant stakeholders from the renewable energy sector.

Summary of the ScTMA ACP sponsors high level consultation plans

Background to coordinating consultation plans

179. Interdependencies between ACPs typically arise when multiple changes are proposed in the same broad volumes of airspace and in similar timeframes, which must be integrated into an overall system that is safe and efficient. The stakeholders that might be affected by the development of the overall system or specific aspects of the component ACPs should be consulted in a joined-up way on the various impacts and options.

180. The CAP1616 consultations will be the opportunity for stakeholders to provide feedback on the airspace change proposals and influence the final design. As part of the consultation exercise the sponsors will provide more detail on their preferred options, outlining any design conflicts that may have arisen, present the cumulative and collective impacts of the changes, and include further detail on any proposed trade off decisions. The sponsors will also present the full options appraisal with more rigorous evidence for its chosen option(s).

181. The ScTMA ACPs share limited interdependencies, with no cumulative impacts below 7,000 ft. ACOG, working with Edinburgh and Glasgow airports and NATS, has developed a proportionate approach to coordinating consultations, guided by a set of common principles. These principles were developed collaboratively and engaged on in ACOG's ScTMA PEX.

182. ACOG is required to describe the intended approach to coordinating the CAP1616 consultations within the ScTMA that are scheduled for Winter 2025/26. This includes summarising the high-level consultation plans for the constituent ACPs and ensuring stakeholders understand how they will be able to respond. The high-level consultation plans are summarised in the sections below, under the themes audience, approach, materials and length. Coordinated consultation strategies, based on these high-level plans, will be developed collaboratively by Edinburgh, Glasgow and NATS and will be submitted at the CAP1616 Stage 3 Gateway.

Audience

183. Each sponsor has identified which groups, individuals and demographics to target for their consultations. Building on the audience analysis already undertaken in the earlier stages of the airspace change process, sponsors are working on identifying potential stakeholders who should be made aware of the consultation and may want to provide feedback on the proposals.

184. Further identification, analysis of stakeholders and impacted audiences will be drawn from the sponsors' Full Options Appraisals and included in the sponsors coordinated consultation strategy, submitted at the Stage 3 Consult Gateway in the CAP1616 Airspace Change process.

185. Edinburgh, Glasgow and NATS are combining their analysis of potentially impacted audiences to inform the approach to coordination and streamline the delivery of the consultations The sponsors are creating a master shared stakeholder database, highlighting their shared stakeholders and stakeholder groups. The database will be used by ACP sponsors to inform the coordinated approach to reach these shared groups, reducing the likelihood of audiences being contacted multiple times.

186. The database includes shared stakeholder groups such as airports/other adjacent aerodromes, airlines, military, general aviation, representative groups, elected representatives/political groups, seldom heard groups, professional bodies (for example RenewablesUK), and others.

187. Sponsors are using this shared database to undertake a joint stakeholder mapping exercise based on the interest/influence model.

188. This integrated stakeholder map will ensure that stakeholders are contacted in a way that suits them. ACP sponsors will use the map to select the channels that suit an audience group depending on the quadrant they are in. The map will be reviewed frequently throughout the consultation window to ensure it is reflective of the current state.

189. Sponsors will also consult with intermediary/gatekeeper organisations to reach seldom heard audiences and those that may not typically engage online. ACP sponsors will engage with these groups, such as Disability Equality Scotland, to gain insight on how best to consult with the audiences that they represent.

Approach

190. The formal consultations will be predominately undertaken online through the Citizen Space engagement platform and all information for each consultation will be available there, including information on how to respond. There will be provision for offline responses by all three sponsors.

191. Edinburgh, Glasgow and NATS will work together to ensure that all shared audiences will be able to respond effectively to their consultations by developing and sharing their approaches with each other. This will ensure a level of consistency is applied in the delivery of their consultations and across associated materials where applicable.

192. Sponsors will deliver engagement opportunities for their joint stakeholders (both online and in person) across activities such as:

- Coordinated events.
- Collaborative webinars/briefings.

- Joint direct engagement e.g. An email/letter informing stakeholders of the launch of the consultations.
- Coordinated social media activity where appropriate.

193. Sponsors will also consider the creation of joint channels to support the delivery of the related consultations and a common approach to the moderation of responses. Further detail on the approach to coordinated consultations, such as a timetable of joint activity, will be included in the sponsors Stage 3 Consult Gateway proposals. The stakeholder mapping exercise created by sponsors will be used to inform the approach to engaging with certain audiences as well as the frequency of that engagement.

194. Sponsors will meet regularly during the consultation window to discuss the performance of the joint elements of their consultations, as well as any challenges related to the delivery of their coordinated activities. Alongside this, the sponsors will coordinate their engagement with the CAA and consider collectively the need to adapt their consultation approaches by:

- Setting regular touch points during the consultation window to provide updates on how each consultation is performing, sharing information on whether there have been any challenges or unexpected events, whether these have an impact on the other consultations, and discussing whether a joined-up response to these should be considered.
- Developing potential extension plans with each other so that in the event of an extension being required, all sponsors have considered the impact this will have on their in-train consultations.

Materials

195. All common ScTMA design information will be developed in coordination by the ACP sponsors to ensure its accuracy, consistency and completeness. Sponsors will also coordinate on how they will present interrelated materials so that stakeholders can access cluster-wide information regardless of which consultation they engage with such as:

- Presentation of the context and background to the proposed changes, using consistent language about the airspace modernisation programme, ACOGs role and the CAA's associated Airspace Modernisation Strategy.
- Adopting a common approach to how maps are presented, for example using the same metrics to demonstrate altitudes.
- Ensuring consistency around the presentation of cumulative impacts and the methods used to calculate them. ACOG will collate the performance data from the individual Full Options Appraisals undertaken by airspace change sponsors (Cumulative Analysis Framework 2). This will be included in all three consultations.
- Any proposed trade-off decisions arising from interdependencies between the ACPs will be presented in a consistent way, applying the same question for feedback.
- A common glossary for the ACPs covering all technical terms, such as vectoring, appended to each consultation document.
- Creating of a common suite of cluster-wide illustrations and infographics about the overall proposal.

196. Any additional supporting materials will be developed collaboratively to suit shared audiences (based on the information needs of the joint stakeholder groups). Recognising that these consultations will include an associated network element, sponsors will ensure technical information typically presented in ACPs relating to network changes will be created and communicated in an accessible way.

Length

197. The accepted standard for the duration of a consultation exercise for a level 1 ACP is 12 weeks. However, the current schedule for the ScTMA coordinated consultations may include the Christmas holiday period so the ACP sponsors have decided to extend the duration to 14 weeks. The ACP sponsors intend to launch the consultations on the same date and have developed potential extension plans collaboratively so that in the event of an extension being required, all sponsors have considered the impact this will have on their in-train consultation activities.

Post consultation

198. The approach to analysing responses from shared stakeholders will be undertaken collaboratively to ensure cluster-wide feedback is captured and shared regardless of which consultation a stakeholder responds to. Sponsors will follow a common approach to the moderation of responses, consider the relevance of the feedback to the other sponsors and share responses as appropriate. The ACP sponsors will continue to work collaboratively on the development of any plans for re-consultation should they be required, for example if modifications to the system-wide design made in response to stakeholders' feedback leads to new impacts.

Accessing further information about the forthcoming consultations

199. The formal consultations will be undertaken through the Citizen Space engagement platform, and all information for each consultation will be available there. Stakeholders can search the portal by sponsor or ACP ID. Links are provided in table 16.

Table 16: Strategically important ACPs included in the scope of the ScTMA cluster

ACP sponsor	ACP-ID and CAA Airspace Change Portal link
Edinburgh Airport Limited	ACP-2019-32 can be viewed on the portal here
Glasgow Airport Limited	ACP-2019-46 can be viewed on the portal here
NERL	ACP-2019-74 can be viewed on the portal here

200. Further information will be available on each sponsor's website both prior to and post the launch of the consultations:

- Edinburgh Airport website: edinburghairport.com
- Glasgow Airport website: glasgowairport.com

  NATS website: nats.aero and the NATS customer gateway: nats.aero/services-products/customers/

B8: Plan for subsequent iterations of the Masterplan for the ScTMA cluster

201. The Masterplan Iteration 4 for the ScTMA cluster will act as a framework for the ScTMA ACPs, which must be consistent with it. In this capacity, Iteration 4 will present a detailed description of the proposed airspace structure, route network and anticipated cumulative/collective impacts arising from the ScTMA cluster ACPs. It will build on previous iterations of the Masterplan for the ScTMA cluster and incorporate the output of the CAF part 2 and CAF part 3, which respectively draw information on collective performance from the ScTMA ACP sponsors Full and Final Options Appraisals.

202. In the Masterplan Iteration 4, ACOG will provide full details of the final proposed trade-offs to resolve design conflicts between the ScTMA ACPs so that the co-sponsors (CAA and DfT) can assess that information and ensure that the outcomes deliver government policy. Iteration 4 will draw from the responses to the ScTMA ACP coordinated consultations to describe where any further trade-offs have been selected in the final proposed designs.[20]

203. If any residual proposed trade-offs cannot be resolved by the ACP sponsors in coordination with ACOG, the decision may be brought before the co-sponsors, to propose a resolution, before the Masterplan Iteration 4 can be accepted.

204. The Masterplan Iteration 4 will also show how the ACP sponsors have taken account of the SEA and HRA for the ScTMA cluster, including any additional information available compared with earlier iterations of the Masterplan.

205. In line with the preferred timelines and key milestones for the ScTMA cluster implementation plan set out in table 8, ACOG expects to submit the Masterplan Iteration 4 for the ScTMA cluster to the co-sponsors for assessment in the summer of 2026. Before the submission of Iteration 4, ACOG will inform all relevant stakeholders about the development and expected publication of the Masterplan Iteration 4 for the ScTMA cluster and explain the next steps for the ScTMA ACPs.

[20] The co-sponsors (DfT and CAA) may offer additional feedback during the ongoing assessment of the Masterplan, requiring further work or more detail in iteration 4, which must be taken into account, and will be detailed in this section.

B9: Assessment of the impacts on airspace accessibility, including on General Aviation

206. The ScTMA cluster of ACPs are at stage 3 of the change process. Whilst design principles have been agreed and indicative plans set out, it is only as the changes progress towards consultation that designs will be sufficiently detailed and capable of a full assessment of their impact on GA. At this stage sponsors have indicated the potential for useful reductions in Controlled Airspace and are confident that reasonable access requirements for the gliding community can be met. Both statements need to be confirmed with the GA community as part of the public consultation.

207. Similarly, it will only be as airspace options are shared with the GA community, that a full assessment of any reduction in complexity and improved access to the controlled airspace structure around airports will be possible. Turning to new airspace users; either their operations will be managed through current airspace regulation or through new emerging policy set out by the Government and the CAA. Future ACPs will be needed to facilitate the integration of new airspace users, but those ACPs are expected to be initiated by sponsors over time as technology, operational concepts and policies mature.

208. ACOG will continue to engage with stakeholders and provide greater detail in the Masterplan Iteration 4 on the benefits and impacts of airspace change on General Aviation as a result of the AMS.

Definition of General Aviation

209. The definition of General Aviation used in the Airspace Modernisation Strategy is: "Essentially all civil flying other than commercial airline operations, which therefore encompasses a wide range of aviation activity from paragliders, microlights, gliders and balloons to corporate business jets and aerial survey aircraft and includes all sport and leisure flying." The Masterplan assumes that examples used in this definition are not meant to restrict the definition and that General Aviation, in its widest sense, continues to include all aviation activity other than scheduled commercial air transport and military flying. This approach remains consistent with that used by ACOG in previous iterations of the Masterplan.

ACOG's Remit

210. ACOG's remit is to assess where the reduction or increase of Class G airspace, or indeed the reduction of airspace classification back to Class G, has a positive benefit or negative impact on General Aviation operations.

211. ACOG also has an interest in how Remotely Piloted Air Systems are being integrated with other General Aviation users in Class G airspace, as this will signpost the way to potential future benefits from wider integration. The integration of new airspace users is a strategic objective of the Airspace Modernisation Strategy, but the technology, operational concepts and policies to enable integration are emerging.

Controlled Airspace, volume, complexity, and safety

Safety

212. Given the central focus of safety in aviation and particularly within the airspace change process, underpinned by the requirements of Section 70 of the Transport Act, ACOG anticipates all safety assurance requirements will be managed as part of the CAP1616 process, in that the CAA will not approve an unsafe change. For General Aviation it is important that the safety focus is retained on both operations within controlled airspace and those in the adjacent airspace and beyond affected by any changes.

Volume

213. Both the Airspace Modernisation Strategy and the Airspace Change Process specify that the amount of controlled airspace established, amongst other things, must be the minimum required to maintain a high standard of safety. The Airspace Modernisation Strategy objectives reiterates the Transport Act Section 70 requirement for the needs of owners and operators of all classes of aircraft to be met. It stresses that this requirement must be met 'wherever possible' leading to the conclusion that only where a high standard of safety cannot be achieved by other means or perhaps for essential trade-offs agreed through the ACOG process, that those requirements must be met. The CAP 1616 – Airspace Change Process includes the requirement for the establishment of any and all controlled airspace to be the minimum necessary.

214. The airspace boundaries under development to support the overall ScTMA design show the potential to reclassify Controlled Airspace at the lower levels that may provide better access and routing for GA in the area. The ACP sponsors are also confident that the higher-level access requirements for Gliders can be met. There is more Controlled Airspace out to the East of Edinburgh. There may also be more Class G airspace between Glasgow and Edinburgh allowing VFR access north-south up to 3500ft.

215. All the ScTMA ACP sponsors have stressed that some of the potential options could lead to an increase in controlled airspace. A cautious approach by sponsors who have many other factors to take into account is understandable and the situation could improve as more detailed work is progressed towards consultation.

Complexity

216. The Airspace Modernisation Strategy sets out how the co-sponsors require airspace simplification with the alignment of the Airspace Modernisation Strategy with the ICAO Global Air Navigation Plan in mind. This simplification will require the use of the following and more:

- Airspace designed to better enable integration of all users.
- Flexible access to airspace: airspace that has access restrictions assigned (by type of activity contained therein or other reasons), such that it can be collapsed when not required, allowing access to other users, and re-established when necessary.
- CAA review of airspace classifications in accordance with the Air Navigation Directions to the CAA seeking to ensure that the amount of controlled airspace is the minimum required to maintain a high standard of air safety.

- More use of electronic conspicuity using transponder mandatory zones (TMZ) as well as wider use of radio mandatory zones (RMZ) that may have less impact on GA users access than controlled airspace.

217. At this stage of the airspace change process, it is not clear what simplification of airspace structures there may be and what benefit that will provide to GA operators. This is an area that will need to be further explored as designs are finalised for the public consultations. Understandably we have not found any change proposals that seeks to normalise the integration of RPAS (Remotely Piloted Aircraft System) traffic as the policy is not yet in place to understand how such integration could be permitted in a modernised airspace. The only work considering the integration of RPAS traffic either uses Temporary Danger Areas to segregate the activity or is only considering the integration of RPAS traffic with other members of the General Aviation community in Class G airspace.

ScTMA Potential Positive and Negative Impacts from Airspace Change

218. Table 17 lists the potential positive benefits and negative impacts on General Aviation based on the current understanding and development point of the ScTMA airspace changes.

Table 17: ScTMA potential positive and negative impacts from the proposed airspace changes

Item	Potential benefit	Potential neg. impact	Comments
Anticipated that at least some controlled airspace reclassified as Class G	Increase the amount of useable airspace available to GA and reduce bottle necks	Complexity of boundaries of controlled airspace increases	It is unlikely that the GA community would support a significant decrease in complexity of controlled airspace boundaries if that resulted in a significant reduction to the amount of controlled airspace reclassified.
Reclassification of some Class E (permitting VFR access without ATC Clearance) reclassified as Class D (VFR access only with ATC Clearance)	Nil to GA users operating VFR, with potential benefits for GA users operating IFR (e.g. business jet operators).	VFR access will be subject to a clearance requiring greater interaction with ATC (higher pilot workload) and access / clearance not guaranteed substantially increasing pilot workload	
Some areas / routes will require an increase in controlled airspace	Nil to GA users operating VFR, with potential benefits for GA users operating IFR (e.g. business jet operators).	Reduction in available airspace for GA users operating VFR, potential to create or make worse bottlenecks and force traffic lower / further below safety altitude	It is assumed that options to avoid such increases will have been fully explored
Medium and High-Level Gliding activity	Gliding operations can continue with little change and/or new restriction. Potential for improved access of gliding areas and increased volumes	New routes and/or controlled airspace boundaries significantly restrict the current operating areas and activity	Sponsors have been working with the British Gliding Association (BGA) and are confident they have a workable and acceptable solution. This has not yet been confirmed with the BGA
Access to controlled airspace	Lowering airspace classifications and increasing access / clearance to GA VFR traffic would enable more direct routing	Less access or inability to issue crossing clearance result in higher workload for GA and longer routing and fuel burn	Development work has not specifically looked at ways of increasing access to controlled airspace for GA / VFR traffic
New Users integration as a result of current ACPs and new user projects	Short Term: Nil Longer Term: Current work enables move towards better integration of new airspace users	Lack of policy (international and UK) slows integration of new airspace users but development projects for new airspace users at risk	Current RPAS platforms do not meet the requirements for controlled airspace entry. Projects are being managed via airspace reservations / notification. CAA looking at policy for Beyond Visual Line of Sight operations generally and in atypical airspace (airspace with significantly reduced mid-air collision risk with conventional aviation.

B10: Safety Strategy

Safety Assurance Delivery Plan

219. The Masterplan Safety Strategy set out in Appendix 4 aims to ensure that coordinated safety assurance is carried out by the ScTMA ACP sponsors and evidenced to the CAA when the proposals are submitted for approval at Stage 5 of the CAP1616 process. The strategy offers guidance to the ACP sponsors on how a coherent approach to safety can be taken to ensure the overarching safety arguments for the overall ScTMA proposal are developed and understood.

220. The Safety Strategy outlines the steps required to:

- Ensure that the ScTMA ACP sponsors develop their safety cases in a coordinated manner with a clear understanding of the interdependencies and interfaces with other ACPs and how individual safety cases feed into the development of a system-wide safety assurance.
- Provide the co-sponsors with the necessary information to ensure that a safe overall ScTMA design is submitted to the CAA for acceptance in the Masterplan Iteration 4.

221. To enable the delivery of collective safety assurance in the ScTMA cluster, there will be a Safety Assurance Delivery Plan (SADP) which is agreed between the ACP sponsors. ACOG will facilitate the drafting of the SADP with the input of the ACP sponsors' safety experts.

222. The agreed SADP for the ScTMA cluster will set out the safety activities and outputs required for all 3 tiers of assurance to deliver the end-to-end system-wide safety assurance for the overall design and ensure that the approach to safety is coordinated and consistent. Safety arguments and mitigations will be coordinated and shared between the ACP sponsors and the agreed SADP will be shared with the CAA, along with other relevant deliverables, no later than the CAP 1616 Stage 4 ('Submit') submission date.

223. By agreeing to the SADP, the ScTMA ACP sponsors are signing up to provide the necessary resources to deliver the plan, including SMEs and safety experts where required. The SADP will also specify the required timescales for delivering outputs of both individual safety assurance work and collaborative work to ensure the ScTMA cluster remains on track in accordance with the implementation plan set out in table 8. The output of the collaborative safety assurance work will inform the full safety assessment provided to the CAA as part of the final options appraisal at Stage 4 of the CAP1616 process, but does not replace it. Evidence of the collaborative safety assurance work will form part of the ACP submissions and therefore be published.

Roles and responsibilities

224. The Masterplan is made up of ACP sponsors from 20 UK airports and NERL, and incorporates a variety of other ANSPs providing ATC services to airports. This inevitably leads to different approaches to the airspace change process and, in turn to the safety assurance methodology delivered in line with each ANSPs' CAA-approved Safety Management Systems (SMS). When delivering an integrated airspace change programme on this scale the safety arguments and mitigations for multiple changes must be coordinated and coherent. Each ACP sponsor will have a safety assurance plan associated with their proposal that includes validation and assurance of the instrument flight procedures and it is vital that the plans are compatible and include a full assessment of the interdependencies and interfaces with other ACPs and ATC units.

225. The key contributors to the safety assurance for the ScTMA cluster are listed below:

SCTMA contributors to safety assurance	
ACP Sponsor	**ANSP**
NATS, NERL	NATS En-Route Ltd (NERL)
AGS Airports (Glasgow Airport)	NATS Services Ltd (NSL)
Edinburgh Airport LTD	Air Navigation Solutions LTD (ANSL)

226. The responsibilities of the ACP sponsors for safety assurance requirements of their airspace changes are laid out in CAP 1616. The ACP sponsors and the Approved Procedure Design Organisations (APDOs) they engage to develop instrument flight procedures for the proposals, must ensure that safety assessments are developed in accordance with CAP 760 and are carried out throughout the change process leading to a final safety assessment to be reviewed by the CAA at Stage 5 ('Decision') of the CAP 1616 process.

227. This final safety assessment will:

- Describe the scope of the proposed airspace change
- Identify new and changing hazards
- Identify and quantify risks arising from those hazards and set mitigations for those risks

228. It is incumbent on the ACP sponsors, and the APDOs that support them, to work with the associated ANSPs to ensure the proposed changes are operationally safe and meet the requirements of both their SMS and the CAA-approved SMS for their ANSP. In addition to these requirements, the ScTMA ACP sponsors must ensure that all interdependencies and interfaces with other ACPs are identified and managed through collaborative safety assessments and assurance work in line with the guidance provided in this strategy. The ACP sponsors will input into the SADP for the ScTMA cluster and collaborate with the associated ANSPs to ensure that the appropriate safety assurance activities are included to meet the requirements of the unit SMS. The ACP sponsors are responsible for delivering to the agreed SADP.

ANSP Responsibilities

229. Each ANSP has a CAA-approved SMS to ensure the safety of the ATC operation and it is their responsibility to ensure that any changes to the airspace, systems, procedures or services are compliant with the CAA-approved unit SMS. In the case of airspace change where the ANSP is not the sponsor of the ACP, the ANSP is still responsible for working with the ACP sponsor to ensure the change is safe and compliant with the SMS. Any safety assurance provided by the ACP sponsors will need to be validated by the relevant ANSP.

230. Where multiple ACPs have interdependencies, the ANSPs at interdependent units must work collaboratively to ensure that the proposed changes and associated interactions are demonstrably safe.

ScTMA SADP

231. Phase 1 of the ScTMA SADP (development) began in February 2023 and involves populating the plan with all of the safety assurance activities and deliverables for the cluster and identifying areas where collaboration will be required. The SADP is now in phase 2, where the collaborative activities are being scoped and planned, with the support of ACOG, to ensure all contributors are aware of their deliverables and responsibilities and programme timescales will be assigned to the work. At the end of phase 2 a baseline version of the plan will be agreed and the key activities and deliverables added to the ACOG ScTMA cluster programme plan for tracking and reporting.

B11: Maturity of operational concepts required to support the airspace changes

232. This section of the Masterplan identifies the operational concepts required to deliver the proposed airspace changes in the ScTMA and their level of maturity. As described in section A9, the ScTMA is the busiest and most complex airspace in the Scottish region. Controllers routinely manage high volumes of climbing and descending flights to and from the airports, using a constant stream of vectoring instructions to manage traffic flows safely and efficiently. The introduction of PBN is a cornerstone of airspace modernisation because routes can be positioned more flexibly and closer together. In the ScTMA this is expected to reduce the volume of converging tracks and crossing traffic that controllers need to manage.

233. With less crossing traffic controllers can accommodate more flights during busy times without the airspace reaching capacity. Departure routes can be redesigned with greater precision so that outbound flights climb continuously. Arrival routes can be redesigned in a similar way so that inbound flights descend continuously. New route options can also be included within the overall design, offering additional airspace capacity, more efficient connections and opportunities to better manage environmental impacts.

234. The volume of controlled airspace needed to protect PBN routes may be reduced in some areas of the ScTMA although additional Controlled Airspace may also need to be introduced to protect routes deployed in areas that were not previously overflown and procedures that were not previously contained (section B9 provides more information about the changes expected to controlled airspace prompted by the proposed ScTMA design).

235. The technology that enables PBN is mature and well understood. So are most of the operational concepts for deploying new PBN routes (or procedures) in an optimised configuration. However, the total volume of new IFP procedures that are proposed for deployment in the overall ScTMA design is more ground-breaking, especially in the UK. Across the three ScTMA ACPs, there are at least 90 new PBN procedures proposed to support the overall design. Each procedure will require compliance checking, validation and regulatory approval. The scale and complexity of this task is unprecedented and will place an unusually high resource burden on both the industry organisations supporting the development of the design and the CAA that is required to validate and approve the procedures.

236. Although most of the operational concepts linked to the introduction of PBN routes are established and familiar (for example the lateral spacing between routes deployed in different configurations), there are aspects of the overall ScTMA design that rely on concepts which may not be covered by existing policy and will need to be addressed by the ScTMA ACP sponsors in their safety arguments, including:

- Separation assurance for the vertical interactions between PBN procedures that are the foundation for the configuration of new routes in some key areas of the ScTMA design. Currently there is no UK regulatory guidance on the separation standards for descending and/ or climbing PBN procedures that cross, this is further complicated by procedures climbing and descending through the transition layer.

237. The proposed ScTMA design is dependent on these operational concepts being addressed by the ScTMA ACP sponsors in their safety arguments so that novel features of the proposed ScTMA design required to support the airspace changes can be considered for acceptance by the CAA.

Glossary of terms

Term	Meaning	Definition
ACOG	Airspace Change Organising Group	ACOG was established in 2019 at the request of the Department for Transport and Civil Aviation Authority to coordinate the delivery of key elements of the UK's Airspace Modernisation Strategy
AAM	Advanced Air Mobility	Advanced Air Mobility is an air transport system concept that integrates new, transformational aircraft designs and flight technologies into existing and modified airspace operations.
ACP	Airspace Change Proposal	Airspace change proposals are requests from airports or a provider of air navigation services (such as air traffic control), to change the notified airspace design. ACPs must follow the CAA's airspace change process CAP1616.
AEF	Aviation Environment Federation	The Aviation Environment Federation is the principal UK NGO campaigning on aviation's impacts for people and the environment.
AMC	Airspace Management Cell	AMC is a joint civil/military cell responsible for the day-to-day management and temporary allocation of national or sub-regional airspace under the jurisdiction of one or more ECAC states.
AMS	UK Airspace Modernisation Strategy	The UK's Airspace Modernisation Strategy sets out the ends, ways and means of modernising airspace through a series of 'delivery elements' that will modernise the design, technology and operations of airspace. This is further defined in the CAA's CAP1711
ANG	Air Navigation Guidance 2017	Guidance to the CAA on its environmental objectives when carrying out its air navigation functions, and to the CAA and wider industry on airspace and noise management.
ANSP	Air Navigation Service Provider	An ANSP is an organisation that provides the service of managing aircraft in flight or in the control area of an airport
ASMA	Arrival Sequencing and Metering Metric	Arrival Sequencing and Metering is a metric created by the EUROCONTROL PRU to provide an approximate measure of the average inbound queueing time on the inbound traffic flow to an aerodrome

ATC	Air Traffic Control	Air traffic control is a service provided by ground-based air traffic controllers who direct aircraft on the ground and through a given section of controlled airspace and can provide advisory services to aircraft in non-controlled airspace.
ATCOs	Air Traffic Control Officer	Air traffic controllers are people trained to maintain the safe, orderly, and expeditious flow of air traffic in the global air traffic control system
ATFCM	Air Traffic Flow and Capacity Management	A service complementary to Air Traffic Control, the objective of which is to optimise traffic flows according to air traffic control capacity while enabling airlines to operate safe and efficient flights.
ATS	Air Traffic Service	A specified route designed for channelling the flow of aviation traffic as necessary for the provision of air traffic services.
ATZ	Aerodrome Traffic Zone	An airspace of defined dimensions established around an aerodrome for the protection of aerodrome traffic.
BGA	British Gliding Association	The British Gliding Association is the governing body for gliding in the United Kingdom.
BVLOS	Beyond Visual Line of Sight	BVLOS (Beyond Visual Line of Sight) is a term relating to the operation of UAVs (unmanned aerial vehicles) at distances outside the normal visible range of the pilot. BVLOS drone operations provide numerous advantages over regular line-of-sight flying.
CAA	Civil Aviation Authority	The CAA is the statutory corporation which oversees and regulates all aspects of civil aviation in the UK. Its areas of responsibility include Supervising the issuing of pilots and aircraft engineer licences, testing of equipment, calibrating of navaids, as well as and many other inspections
CAF	Cumulative Analysis Framework	The CAF provides guidance and analytical tools to support the appraisal and trade-off of impacts caused by multiple airspace changes using the same airspace.
CAP 760	Guidance on the Conduct of Hazard Identification, Risk Assessment and the Production of Safety Cases: For Aerodrome	CAA guidance on the Conduct of Hazard Identification, Risk Assessment and the Production of Safety Cases.

	Operators and Air Traffic Service Providers	
CAP1616	Airspace change: Guidance on the regulatory process for changing the notified airspace design and planned and permanent redistribution of air traffic, and on providing airspace information	Guidance published by the CAA on the regulatory process for changing the notified airspace design and planned and permanent redistribution of air traffic, and on providing airspace information.
CAP2156a	Airspace change masterplan - CAA acceptance criteria	CAA's criteria for accepting the airspace change masterplan into the Airspace Modernisation Strategy.
CAP2540	Regulatory Sandbox for BVLOS Accommodation Airspace Policy Concept	CAAs Regulatory Sandbox to trial a policy concept that will see the use of temporary reserved areas (TRA) in conjunction with appropriate procedures and/or technology to accommodate the operation of remotely piloted aircraft systems in unsegregated airspace.
CAS	Calibrated Airspeed	Calibrated airspeed is indicated airspeed corrected for instrument errors and position error (due to incorrect pressure at the static port caused by airflow disruption).
CCO	Continuous Climb Operations	CCOs is an aircraft operating technique facilitated by the airspace and procedures design and assisted by appropriate ATC procedures, allowing the execution of a flight profile optimised to the performance of aircraft, leading to significant economy of fuel and environmental benefits in terms of noise and emissions reduction.
CDO	Continuous Descent Operations	An operation, enabled by airspace design, procedure design and ATC facilitation, in which an arriving aircraft descends continuously, to the greatest possible extent, by employing minimum engine thrust, ideally in a low drag configuration, prior to the final approach fix /final approach point.
CDR	Conditional Direct Route	A Conditional Direct Route is defined as non-permanent ATS route or portion thereof which can be planned and used under specified conditions

CO_2 Emissions	Carbon Dioxide Emissions	Emissions stemming from the burning of fossil fuels, specifically jet fuel in the case of aviation
CTA	Control Area	Control Areas are situated above the Aerodrome Traffic Zone (ATZ) and afford protection over a larger area to a specified upper limit. Terminal Control Areas are normally established at the junction of airways in the vicinity of one or more major aerodromes.
DAATM	Defence Airspace and Air Traffic Management	A team within the Ministry of Defence responsible for the Military's use of airspace
DfT	Department for Transport	DfT is a UK Government department that works to support the UK's transport network that helps UK citizens, businesses, goods and services travelling around the country and internationally
EASA	European Aviation Safety Agency	The European Aviation Safety Agency (EASA) is responsible for ensuring safety and environmental protection in air transport in Europe.
ECAC	European Civil Aviation Conference	ECAC was founded to promote the continued development of a safe, efficient and sustainable European air transport system by harmonising civil aviation policies and practices amongst its Member States and promoting understanding on policy matters between its Member States and other parts of the world
Eurocontrol	-	An intergovernmental organisation responsible for coordinating air traffic control operations across Europe
eVTOL	Electric Vertical Take-Off and Landing	An eVTOL aircraft is an aircraft that uses electrical power to hover, take off and land vertically. These vehicles are aircraft optimized for electrical propulsion powered by banks of batteries.
FCA / FCAS	Future Combat Airspace / Future Combat Air System	The Future Combat Air System is a key instrument in ensuring European autonomy and sovereignty in defence and security. FCAS is centred around a core Next Generation Weapon System.
FIR	Flight Information Region	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.

FUA	Flexible Use Airspace	Concept of the Flexible Use of Airspace is that airspace is no longer designated as purely "civil" or "military" airspace, but considered as one continuum and allocated according to user requirements
GA	General Aviation	Civil aviation other than large-scale passenger or freight operations.
GLA	Glasgow International Airport	Glasgow Airports IATA airport code
HACAN	Heathrow Association for the Control of Aircraft Noise	Local Heathrow airport community group.
HFE	Horizontal Flight Efficiency Metric	Expressed as a percentage, used to identify areas where more efficient flight paths can be achieved by taking into account various features of the existing airspace system, including route length and track deviations.
HRA	Habitats Regulations Assessment	A Habitats Regulations Assessment is a process that determines whether or not development plans could negatively impact local plans on a recognised protected site beyond reasonable scientific doubt.
IATA	International Air Transport Association	IATA is the trade association for the world's airlines, representing some 300 members
ICAO	International Civil Aviation Organization	The International Civil Aviation Organization is a specialized agency of the United Nations that coordinates the principles and techniques of international air navigation, and fosters the planning and development of international air transport to ensure safe and orderly growth.
IFPs	Instrument Flight Procedures	A published procedure used by aircraft flying in accordance with the instrument flight rules, which is designed to achieve and maintain an acceptable level of safety in operations.
LADACAN	Luton And District Association for the Control of Aircraft Noise	Local Luton airport noise and environmental impact community group.
LOAEL	Lowest Observed Adverse Effect Level	In reference to aircraft noise, LOAEL is the level of noise exposure above which adverse effects on health and quality of life can be detected.

Masterplan	The Airspace Change Masterplan	The Airspace Change Masterplan is a single coordinated implementation plan for airspace changes in the UK up to 2040, the objectives of which are support the delivery of the UK's AMS
MOD (or MoD)	UK Ministry of Defence	The UK Ministry of Defence is the department responsible for implementing the defence policy set by His Majesty's Government, and is the headquarters of the British Armed Forces.
MTWA	Maximum Take-off Weight Authorised	Defined by the aircraft manufacturer, MTWA is the maximum mass at which the aircraft is certified for take off due to structural or other limits.
NAPs	Noise Abatement Procedures	A noise abatement procedure is a procedure used by aircraft at an airport to minimize the impact of noise on the communities surrounding an airport.
NATS	National Air Traffic Services	NATS, provides en-route air traffic control services to flights within the UK flight information regions and the Shanwick Oceanic Control Area. NATS also provides air traffic control services to a number of UK airports
NERL	National Air Traffic Services (En Route) plc	NERL is the sole provider of civilian en-route air traffic control over the UK and is regulated by the CAA. NERL is funded by Eurocontrol route charges for the provision of air traffic services
PEX	Public Engagement Exercise	Public engagement designed to explain the high-level approach to coordinating ACPs and seek feedback from stakeholders on the Masterplan
PBN	Performance Based Navigation	Performance-based Navigation, in simple terms, redefines an aircraft's required navigation capability from sensor (equipment) based to performance based. The foundation for Performance Based Navigation is area navigation or RNAV.
PRC / PRU	EUROCONTROL Performance Review Commission / Unit	The EUROCONTROL Performance Review Commission (PRC) and Unit (PRU) provide objective information and independent advice based on extensive research, data analysis and consultation with our governing bodies and interested stakeholders on European air traffic management performance.
RMA	Radar Manoeuvring Area	The RMA is an ATC operational area close to an airfield that is established for the purposes of segregating and

		protecting aircraft arriving and departing the same airfield.
RMZ	Radio Mandatory Zones	A radio mandatory zone is airspace wherein the carriage and operation of radio equipment is mandatory.
RNAV	Area Navigation	Area navigation is a method of instrument flight rules navigation that allows an aircraft to choose any course within a network of navigation beacons, rather than navigate directly to and from the beacons. This can conserve flight distance, reduce congestion, and allow flights into airports without beacons.
RPAS	Remotely Piloted Aircraft Systems	An unmanned aircraft which is piloted from a remote pilot station
RT	Radiotelephony	RT is a form of communication that allows pilots and air traffic controllers to communicate with each other effectively over long distances.
SADP	Safety Assurance Delivery Plan	Safety assurance ensures that aviation service providers continuously practice their safety program and that their safety program continues to remain effective even as their operating environment changes.
SEA	Strategic Environmental Assessment	SEA is an iterative process of gathering data and evidence, assessment of environmental effects, developing mitigation measures and making recommendations to refine plans or programmes in view of the predicted environmental effects.
SIDs	Standard Instrument Departure Routes	A SID is a standard Air Traffic Service (ATS) route identified in an instrument departure procedure by which aircraft should proceed from take-off phase to the en-route phase.
SME	Subject Matter Expert	An expert who has accumulated knowledge in a particular field or topic.
SMS	Safety Management System	A Safety Management System is a systematic and proactive approach to managing safety risks.
STAM	Short Term ATFCM Measures	STAM are local traffic regulations implemented by NERL to manage airspace capacity and traffic in specific areas of airspace

STARs	Standard Arrival Routes	A STAR is a standard ATS route identified in an approach procedure by which aircraft should proceed from the en-route phase to an initial approach fix.
TDA	Temporary Danger Area	Temporary Danger Areas may be established at short notice around the scene of emergency incidents or other unusual aerial activity when it is considered that the activity associated with the incident could be hazardous to flight
TMZ	Transponder Mandatory Zones	Transponder Mandatory Zones (TMZ) are designated volumes of airspace, often found around airports, which require aircraft to be appropriately equipped. They can be established with or without accompanying controlled airspace.
ToD	Top of Descent	The computed transition from the cruise phase of a flight to the descent phase, or the point at which the planned descent to final approach altitude is initiated.
UAM	Urban Air Mobility	Urban Air Mobility refers to new mobility, or new mobility concepts, and the large-scale expansion of urban mobility into the air. The aim is to create a safe, environmentally friendly and efficient transport system and to relieve congested infrastructures, especially in fast-growing urban areas.
UAS	Unmanned Aircraft System	An unmanned aircraft system is an unmanned aircraft and the equipment necessary for the safe and efficient operation of that aircraft. A UAV is a component of a UAS.
UAVs	Unmanned Aerial Vehicles	UAVs (or colloquially drones) are aircraft without human pilot on board. They may be controlled by an operator on the ground via a remote controller or by a preprogrammed onboard computer.
UTM	Unmanned Aircraft System Traffic Management	UTM is a "traffic management" ecosystem for uncontrolled operations that is separate from, but complementary to, the Air Traffic Management (ATM) system.
UKACC	UK Airport Consultative Committee	The UKACC brings together 24 airport consultative committees from the UK's largest airports to discuss matters of common interest and to share best practice

VFE	Vertical Flight Efficiency	Methods of ensuring optimal aircraft performance during climb and descent portions of flight
VFR	Visual Flight Rules	A set of regulations under which a pilot operates an aircraft in weather conditions generally clear enough to allow the pilot to see where the aircraft is going.