Airspace Modernisation – 2023 Progress Report

CAP 2600

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Introduction

In 2017, the Government updated the UK Civil Aviation Authority's (UK CAA's) strategic role for airspace modernisation by issuing new Air Navigation Directions. Consistent with our role as the specialist aviation regulator and our statutory responsibilities, the UK CAA is required to prepare and maintain a co-ordinated strategy and plan for the use of UK airspace for air navigation, including for the modernisation of the use of such airspace.

The Airspace Modernisation Strategy (CAP1711 Part 1: Strategic objectives and enablers) has been refreshed since its original publication in 2018, to extend the strategy's focus from 2024 out to 2040, as required by the Air Navigation Directions. It takes account of the latest developments in innovation and technology, placing integration of all airspace users at the core of the strategy, including accommodating new types of aerial craft like remotely piloted aircraft systems, advanced air mobility[1] and spacecraft. The revised strategy aims for simpler airspace design and supporting regulations. Environmental sustainability is an overarching principle throughout modernisation activities. The strategy has been updated to meet the UK's international obligations, aligning delivery of the Airspace Modernisation Strategy with the International Civil Aviation Organisation[2] Global Air Navigation Plan, and ensuring interoperability of the UK network with neighbouring air traffic management areas. The Airspace Modernisation Strategy is the single roadmap to guide the UK CAA's approach to policy development on airspace modernisation and related legislation (otherwise known as rulemaking) now that the UK has left the European Union and the European Union Aviation Safety Agency.

The strategy is split into three parts, published separately. Part 1 (Strategic Objectives and Enablers) explains the strategy's objectives (the ends), a high-level overview of what will enable those objectives to be fulfilled (the enablers or ways), and governance arrangements for overseeing delivery. Part 1 does not specify detailed solutions, allowing the space for innovation.

Part 2 (CAP 1711A Delivery elements) and Part 3 (Deployment) describe the short-term ambition and explain how the strategy is being delivered. Part 2 and 3 are likely to be updated more frequently than Part 1 as the elements evolve and mature for delivery. Part 2 explains the different elements that make up delivery (the ways, in more detail). It includes a linked online database. Part 3 sets out delivery plans for deployment of those elements (the means).

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[1] Refences in the Airspace Modernisation Strategy to the advanced air mobility concept generally mean eVTOL (electric vertical take-off and landing) aircraft i.e., aerial taxis, but this terminology may change.

[2] The International Civil Aviation Organization, a specialist agency of the United Nations responsible for international standards for civil aviation which the UK has by international treaty agreed to implement.
It's strategic objectives (in respect of global aviation, not just airspace) can be read here:
https://www.icao.int/about-icao/Council/Pages/Strategic-Objectives.aspx.

The UK CAA must report to the Secretary of State annually on the delivery of the strategy. The update provided within the following chapters of this report comprises of detail on the progress made by the industry, as well as on the work the UK CAA has conducted in 2023, covering the period 1 January – 31 December 2023.

In line with the UK Reg (EC) No. 2150/2005 the UK CAA is also required to report annually to the Secretary of State for Transport on the application of the Flexible Use of Airspace Concept. This report analyses the Flexible Use of Airspace performance and describes the concept developments under element 3.

The structure of this report differs from the previous versions, as it has been updated and now relates to the January 2023 refreshed version of Airspace Modernisation Strategy. This is therefore the first report, that follows the nine- element structure.

It is also the first report drawing on reporting efficiencies with the Eurocontrol's Local Single Sky Implementation Plan[3] (LSSIP) monitoring and reporting, which UK remains committed to.

In Chapter 1 the UK CAA provides an overview of the Airspace Modernisation Strategy delivery elements and our assessment of progress towards completion of each one. This has been done in the form of a 'RAG' status and compared against the progress captured under the previous 15 initiatives in 2022. Mapping of those initiatives against the updated structure of the nine elements are shown in table 1 below.

Within the refreshed structure of the Airspace Modernisation Strategy, the elements are grouped under two categories: Aircraft-Based Navigation and Airspace Management.

In Chapter 2 the UK CAA provides an update on the Airspace Modernisation Strategy co-sponsors' programme board and sets out further detail regarding the UK CAA's internal Airspace Modernisation Strategy delivery governance. Part 3 development and the Single Design Entity project status is also outlined, together with an overview of projects funded under the Airspace Modernisation Strategy Support Fund.

Chapter 3 sets out the Airspace Modernisation strategic risks and mitigations, which include the Airspace Modernisation Strategy scope and delivery model; delivery of the Masterplan and Airspace Change Proposals that form part of element 2 and the UK CAA and Industry resource availability.

The Airspace Modernisation Strategy contains the following delivery elements.

Aircraft-Based Navigation

   ▪ UK-ABN/1. Trajectory-based operations

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[3] LSSIP documents provide an annual view of how 41 member states of Eurocontrol (plus Israel and Morocco) and relevant stakeholders are progressing in planning and deploying the mature elements of the European ATM Master Plan Local Single Sky implementation monitoring (LSSIP) | EUROCONTROL.

- UK-ABN/2. Terminal airspace redesign

- UK-ABN/3. Network management

- UK-ABN/4. Integration

Airspace Management

- UK-AM/5. Airspace management

- UK-AM/6. Data services

- UK-AM/7. Future surveillance and spectrum

- UK-AM/8. Integration of communications, navigation, surveillance, and spectrum

- UK-AM/9. Aircraft capabilities

Executive Summary

Two out of nine elements require attention, a 20% improvement on overall risk to delivery of the Airspace Modernisation Strategy, comparing to last year.

Element 2 has not met its baseline milestones, with continued risk around funding and delivery complexity, managed by the Airspace Change Organising Group and the Airspace Modernisation Strategy co-sponsors.

Element 6, a key enabler to several other elements has seen little progress, with the key risk around resource, policy gaps and unknown industry requirements to support new airspace users. The risk is currently managed by UK CAA through identification of technical policy gaps against European legislation to ensure interoperability, establishing appropriate coordination group and investigating short- and long-term delivery options.

Good progress has been made under element 1 with Free Route Airspace delivering the West Airspace Deployment in March 2023. According to NATS (En Route) plc the benefits will bring fewer delays, greater traffic predictability, reduced controller workload, increased network capacity, as well as deliver significant environmental benefits. NATS (En Route) plc estimate annual saving of over 12,000T in CO_2 emissions; 150,000 fewer nautical miles flown by aircraft using this airspace over one year and flying time reduced by 844 hours per year for aircraft using this airspace.

Queue Management and Advanced Flexible Use of Airspace projects under elements 3 and 5 made progress in line with their 2023 objectives. Arrival Manager Head Branch, Time Based Separation Gatwick Advanced / Optimised Mixed Mode and Time-Based Separation Pairwise Heathrow progressed to the various stages of software development, Factory Acceptance Tests and validation, as planned. Airport Operations Plans implementation progress has been made, to inform the Network Operations. Aeronautical Information Publication Harmonisation and Special Use Airspace Policy have commenced under the airspace management policy development, together with support provided for the UK's first orbital space launch, conducted by Virgin Orbit.

UK CAA-led policy development elements 4, 7 to 9 are having their project teams stood up and baseline delivery plans are currently being drawn up, expected to be published in Q2 2024 under the Airspace Modernisation Strategy Part 3.

Element 2 – Terminal Redesign and element 6 – Data Services both have 'Amber' strategic status, requiring attention. Whilst progress under element 2 has been made, the Masterplan Iteration 2 dates have not been met and the airspace change activities require attention from senior stakeholders, due to continuing funding issues, a significant risk of programme compression, due to delays already experienced, and an ongoing challenge with technical resource availability.

Data services underpin several other elements of the Airspace Modernisation Strategy. The need for bridging the gap between UK and European legislation to aid interoperability, limited subject matter expertise and currently unknown requirements to support new airspace users, are key stakeholder considerations requiring attention. Summary of the risk status for all elements is provided below.

Airspace Modernisation Strategy – 2023 Delivery Risk Status

UK-ABN/2. Terminal Airspace Re-design

The ongoing steady red delivery status is due to significant delays, with the Masterplan Iteration 2 milestones not being met. Risks to progress include funding, program compression, and complexity, especially in the South East cluster. Mitigating actions in 2023 included the co-sponsors exploring options for a future, alternative delivery model, the Airspace Change Organising Group engaging and coordinating with sponsors through additional governance steps, alongside a lesson learned review in the South of Scotland cluster to improve practices and processes going forward.

UK-AM/6. Data Services

Data services is a key enabler for several other elements of the AMS. The need for bridging the gap between UK and European legislation to aid interoperability, with limited subject matter expertise to progress the workstream and undefined requirements to support new airspace users, are key drivers for the continuing steady red status. Mitigating activities include the standing up of the Common Project Coordination Group and publication of the UK CAA delivery plans in Q2 2024 under AMS Part 3.

UK-ABN/1. Trajectory Based Operations

Whilst good progress has been made, the steady amber status is mainly due to uncertainties around the delivery of the Free Route Airspace Deployment 3 and 4, and the dependency with the DP En-Route programme, which has currently stalled. NATS (En Route) plc is managing this risk closely through their portfolio re-prioritisation activity, with oversight and monitoring from the UK CAA.

UK-ABN/3. Network Management

The steady amber delivery status reflects the NATS (En Route) plc risk around resource availability of specialist resources.

UK-ABN/4, UK-AM/5, UK-AM/7, UK-AM/8 and UK-AM/9

For the remaining elements the steady amber delivery status reflects the current absence of the UK CAA delivery plans. Those were being developed throughout 2023 and so the risk is expected to reduce in Q2 2024, with the publication of the AMS Part 3 baseline.

Airspace Modernisation Strategy – 2023 Delivery Progress summary: Aircraft - Based Navigation

UK-ABN/1. Trajectory Based Operations

NATS (En Route) plc's Free Route Airspace West Airspace Deployment was successfully achieved in March 2023. Free Route Airspace Deployment 3 (Central and Southeast Flight Information Region) is temporarily paused to accommodate NATS (En Route) plc's technical transformation programme. Resourcing challenges remain the key risk to the programme, with dependency on the DP En Route and Voice programme being critical to unlocking the full benefit realisation.

NATS (En Route) plc's DP En Route and Voice programmes Prestwick Centre Upper Airspace Full Operational Service delayed due to the need to conduct urgent sustainment to the current network. Second Voice Service (SVS) was successfully deployed in October 2023. Deployment of Integrated DSESAT Services and Main Voice Service (MVS) at Swanwick remain on track for future deployments.

NATS (En route) plc's Doppler VHF Omni Directional Radio Range (DVOR) as part of NATS (En Route) plc Sustainment and Surveillance Programme, on-site testing, and completion of handover of the Tiree Doppler Very High Frequency Omni Directional Radio Range replacement was completed in September 2023.

Under Performance Based Navigation (PBN) a UK CAA internal work mandate was accepted by the Aviation Legislation & Policy Sponsorship Board in October 2023. The UK CAA's next step is to finalise the consultation documents and engage with the industry, anticipated to be Q2 2024. Pending the legal processes relating to the development of required legislation, it is anticipated that the new Performance Based Navigation regulation will be published in the Q2 2025.

UK-ABN/2. Terminal Airspace Re-design

NATS (En Route) plc via the Airspace Change Organising Group under the Airspace Masterplan made the following progress:

In Q1 2023, the South of Scotland cluster sponsors completed Stage 2 of the CAP1616 process but faced design integration issues driving delays. An ability for Aberdeen to progress independently from the cluster has been identified by the Airspace Change Organising Group and their advice was accepted by the co-sponsors (DfT/UK CAA).

Progress in the West of England cluster stalled due to resource and funding issues experience by Cardiff and Exeter, with no formal decision made regarding Cardiff's position on programme withdrawal in 2023. Exeter did not progress through Stage 2, while Bristol completed their work in Q3 2023.

In the North of England cluster Manchester, Liverpool, and East Midlands completed Stage 2 in 2023, Leeds-Bradford faced resource challenges and delayed Stage 2 until Q2 2024. Critical to the programme simulation preparations were completed in Q4 2023.

In the South – East cluster, 11 of the 15 Airspace Change Proposals have now completed Stage 2, with Gatwick, Southampton, London Biggin Hill and NATS (En Route) plc progressing through in 2023. The 4 remaining sponsors are expected to complete in Q2 2024. Additionally, the Airspace Change Organising Group worked with Gatwick, NATS (En Route) plc and the interdependent sponsors, to define the scope on an early deployment phase, known as the London Airspace South.

UK-ABN/3. Network Management

For Queue and Capacity Management (QCM) via NATS En Route plc Arrival Manager Headbranch, Time Based Separations Advanced Mixed Mode and Time Based Separation Pairwise projects progressed in line with the plan, towards deployment targets in 2024 and 2025. There is however a risk to delivery, due to NATS (En Route) plc's portfolio re-prioritisation and resource availability, which may impact these originally planned timescales.

For the Initial Airport Operations Plan/Network Operations Plan via NATs (En route) plc Gatwick Initial Airport Operations Plan development commenced through an initial engagement with Eurocontrol. Heathrow has made progress in collaboration with NATS (En Route) plc and Eurocontrol, however deployment will not achieve original timescales. Stansted has made progress, with deployment expected by the end of 2024. Manchester has started the project with implementation planned by the end of 2024. To enable collaborative Network Operations Plan deployment by the end of 2024, NATS (En Route) plc is in the process of developing an appropriate system infrastructure.

UK-ABN/4. Integration

For Electronic Conspicuity in Q4 2023, the UK CAA published a report investigating how human factors affect the use of Electronic Conspicuity, and what can be done to enhance airspace safety. The findings of the report will be used alongside new research to set a future standard for the use of Electronic Conspicuity. The UK CAA is also working with Ofcom and have a supplier contracted to conduct trials, for the use of 978MHz for uncrewed aircraft.

Airspace Modernisation Strategy – 2023 Delivery Progress summary: Airspace Management

UK-AM/5. Airspace Management

Flexible Use of Airspace in the UK is an ongoing strategy to improve airspace efficiency, currently focusing on making the non-Airspace Management Cell areas managed. Airspace Management Cell-managed areas have risen from 2017 to 2023 showing continued

improvement. The UK CAA published an update to CAP740, UK Airspace Management Policy in March 2023. Publication of the Special Use Airspace Policy and revised CAP740 are planned for Q1 2024. In January 2023 Virgin Orbit conducted the UK's first orbital space launch. Through Letters of Agreement with Airspace Management Cell France and the Irish Air Navigation Service, the UK Airspace Management Cell cooperates with adjacent States to coordinate the management and notification of specified Danger Areas to the Network Manager. The Letters of Agreement outlining the agreed procedures were renewed during 2023.

UK-AM/6. Data Services

UK SWIM requirements policy and guidance material is under development by the UK CAA with an initial analysis of the legislative gap between UK Regulation (EU) No 716/2014 (the Pilot Common Project Regulation - PCP Reg) and CIR (EU) 2021/116 (Common Project 1 – CP1) to assess the need for any amendments to the UK Regulation. Resourcing challenges may result in longer than anticipated timescales of SWIM deployment. Currently plans are being drawn up with an aim of identifying short-term and long-term objectives that could be delivered.

European Meteorological Aircraft derived data centre (EMADDC) 2023 progress is The UK Met Office has been involved in this project which KNMI (the Dutch National Met Office) is leading, and the UK Met Office focused on the development and deployment of Mode-S receivers. The project is still active however the UK Met Office's tasks related to this project have been completed. All in-scope aerodrome operators were required to deliver CAP1732 surveys to the UK CAA by the end of 2023. 60 UK aerodrome operators are delivering surveys, and the aerodrome inspectors are verifying compliance as part of their oversight, using the Management of Aeronautical Data.

UK-AM/7. Future surveillance and spectrum & UK-AM/8. Integration of communications, navigation, surveillance, and spectrum

For Spectrum, communications, navigation, and surveillance a UK CAA Steering Group has been stood up under Airspace Modernisation Strategy Governance. Initial discussions have taken place with NATS (En Route) plc regarding Global Navigation Satellite System resilience. Conversations have taken place with Ofcom to develop a plan to enable 978MHz use.

Satellite Based Augmentation system requirements and associated timescales are currently in development and government funding scope is being defined with the UK CAA's input to the government business case for UK Satellite Based Augmentation System, which is being coordinated by UK Space Agency.

For Datalink performance issues related to aircraft datalink equipment and frequency management (congestion) have been noted by the UK CAA. Actions to address these issues are currently being investigated, although negotiations on the exact allocations and use to ease the congestion have slowed. Work on international agreements will be proposed for

agreement regarding frequency use. Promotion of UK engagement within the European Union datalink improvement activities is ongoing, with a view of increasing the datalink message set to enhance operations.

UK-AM/9. Aircraft Capabilities

The UK CAA Steering Group was established in June 2023. Recent work includes completion of the first iteration of the European Concept for Higher Airspace Operation (ECHO), where the UK CAA provided feedback. The UK CAA ATM policy team has raised possible Standardised European Rules of the Air (SERA) activity, relating to supersonic flight over land.

1 Delivery plans and progress in 2023

1.1 This chapter is an overview of the 2023 Airspace Modernisation Strategy (CAP 1711) elements and delivery plans.

1.2 Each element indicates the level of progress made under two assessment horizons. Delivery progress rating is focussed on a 0-2 year lookahead, focusing on the status of key milestones driven by, short-term, detailed plans of higher certainty, and where tactical interventions may be required from key stakeholders, to unlock progress. Strategic progress rating is focussed on a 2+ year lookahead focusing on the status of major milestones integral to the delivery of the relevant elements' strategic objective, typically based on a medium-term, less detailed plans of lower certainty around scope and timescales.

1.3 The progress rating is indicated by a green, amber, or red status against the delivery plans, for example, the latest accepted by the co-sponsors version of the Masterplan for the Airspace Change Organising Group delivery and the most recent Service and Investment Plan for NATS (En Route) plc delivery. For the UK CAA-led elements, where delivery plans have been in development throughout 2023, the status in this report assesses the plans' readiness for publication and the current levels of certainty around the scope and delivery milestones of the specific elements they contribute to. Once all the delivery plans are published under the Part 3, those will be baselined and assessed as follows:

- GREEN from a strategic perspective indicates that the element is on track to be completed in the timescales outlined by the current strategy (2040). From a delivery perspective, the indicator highlights that major milestones within the next 2 years are on track.

- AMBER from a strategic perspective indicates that the element needs attention from key stakeholders to ensure completion in the timescales expected, or that there may be merit in reviewing deadlines. From a delivery perspective indicates that major milestones within the next 2 years are at risk of delay or have experienced minor delays that do not impact delivery of the element's strategic objectives.

- RED from a strategic perspective indicates there are major issues with the element and a significant risk that completion will not be achieved in the timescales expected. From a delivery perspective indicates that numerous major milestones within the next 2 years are at risk of significant delay or have been delayed, with the potential to impact delivery of the element strategic objectives.

Element 1 – Trajectory Based Operations

- Delivery Progress is amber. Progress is getting better; severity is trending down.

- Strategic Progress is green. Progress is steady.

Key Enabling Services

1.4   The DP En Route & Voice programme, being developed and delivered by NATS (En Route) plc, aims to deliver a modernised technical architecture, which will replace significant parts of the current ageing, critical infrastructure and underpin future operational services. The programme is a significant enabler to the successful delivery of the Airspace Modernisation Strategy. The programme will deliver new tools and capabilities which, in conjunction with investment in airspace design, will be a key enabler for new airspace concepts, that align with capabilities of modern aircraft fleets, to provide resilience, capacity, safety and NATS (En Route) plc's service performance improvements. The programme aims to deliver major changes to the operation of en-route airspace and is an essential precursor to the delivery of modernised capabilities for the entire NATS (En Route) plc's operation, which would require further development. The programme is currently delivered through four live streams with recent progress noted by NATS (En Route):

- Stream 1 – Prestwick Centre Upper Airspace Full Operational Service utilising the latest version of controller tools (iTEC version 2). This milestone is delayed, according to NATS (En Route) plc, due to the need to conduct urgent sustainment to the current network services, requiring a system configuration 'freeze' (where other change is prohibited). This unanticipated by NATS (En Route) plc new requirement, together with a review of the training and transition plan, which concluded there would have been very significant transition impact in summer 2024, results in a later planning assumption of deployment.

- Stream 2 – Deployment of the new technical platform (Integrated DSESAR Services). Remains on track with the latest plan deploying in Q4 2024.

- Stream 3 – Deployment of Second Voice Service (SVS). The SVS, a modern voice over internet protocol system, was deployed at the beginning of October 2023. It replaced the obsolete Back Up Radio Telephony (BURT) system.

- Stream 4 – Deployment of Main Voice Service (MVS) at Swanwick. Remains on track to the revised date of Q4 2025.

Performance Based Navigation

1.5   UK CAA internal work mandate was accepted by the Aviation Legislation & Policy Sponsorship Board in October 2023. The UK CAA's next step is to finalise the consultation documents and engage with the industry in 2024. This will support the development of all legislative materials requested by the Department for Transport (DfT). Pending the legal processes relating to the development of required legislation, it is anticipated that the new Performance Based Navigation regulation will be published in the Q2 2025. The future UK Performance Based Navigation Regulation implementation will enforce Area Navigation as the minimum specification to be implemented.

Free Route Airspace

1.6   The Free Route Airspace West Airspace Deployment was successfully deployed in March 2023 and enabled transition of the airspace change into operational service.

1.7   Free Route Airspace Deployment 3 (Central and Southeast Flight Information Region) Airspace Change Process is temporarily paused to accommodate NATS (En Route) plc's technical transformation programme. This programme is intended to deliver the Free Route Airspace concept into the highest complexity airspace in the UK.

1.8   NATS (En Route) plc's resourcing challenges remain the key risk to the programme and work is ongoing to establish a series of improvements to further enhance performance throughout the remainder of this year by close collaboration with their suppliers. The UK CAA continues monitoring the risk through regular oversight of NATS (En Route) plc's programme delivery.

Doppler Very High Frequency Omni Directional Radio Range De-commissioning

1.9   As part of NATS (En Route) plc Sustainment and Surveillance Programme, on-site testing, and completion of handover of the Tiree Doppler Very High Frequency Omni Directional Radio Range replacement was completed in September 2023.

Element 2 – Terminal Airspace Re-design

- Delivery Progress is red. Progress is steady.

- Strategic Progress is amber. Progress is steady.

North of England Cluster

1.10   The North of England cluster of the Masterplan, incorporating the strategically important Airspace Change Proposals sponsored by NATS (En Route) plc and East Midlands, Leeds Bradford, Liverpool, and Manchester airports made good progress during 2023.

1.11   Manchester and East Midlands airports successfully completed Stage 2 of the CAP1616 process, developing and assessing a shortlist of airspace design options for their respective Airspace Change Proposals.

1.12   Liverpool Airport resumed its Airspace Change Proposal, after having received support from the government-funded Future Airspace Strategy Implementation Programme Funding Support Package, and adapted portions of its previous Stage 2 design work, enabling Airspace Change Organising Group to establish an overall programme plan for the cluster that was endorsed by all the sponsors in Q3 2023.

1.13   Leeds Bradford is expected to complete Stage 2 in Q2 2024, after having to undertake further work to meet the CAP1616 requirements, following unsuccessful gateway in 2023.

1.14   In the second half of 2023, the Airspace Change Proposals' sponsors began a joint phase of work, coordinated by Airspace Change Organising Group, to integrate their respective design options into an overall system-wide proposal for the North of England cluster. Early phases of the integration work highlighted the potential for interdependencies between the airport-sponsored changes (particularly Manchester and Liverpool) to create design conflicts that will require evaluation through the cumulative analysis framework process for resolution.

1.15   Airspace Change Organising Group conducted a successful audit of the emerging system-wide proposal for the North of England cluster in December 2023 to provide assurance that the design options and integration work were sufficiently robust to support a meaningful development simulation.

South – East Cluster

1.16   During 2023 Airspace Change Organising Group continued to coordinate the design options development and assessment work conducted by the 12 South East airport Airspace Change Proposal sponsors and the 3 NATS (En Route) plc sponsored Airspace Change Proposals. 11 of the 15 South East cluster Airspace Change Proposals have now completed Stage 2 of the CAP1616 process, with Gatwick, Southampton, London Biggin Hill and NATS (En Route) plc progressing through their respective gateways in 2023.

1.17   The 4-remaining airport-sponsored Airspace Change Proposals are expected to complete Stage 2 in Q2 2024. Farnborough Airport initiated an Airspace Change Proposal to support the cluster in Q4 2022, completed Stage 1 during 2023 and

plan to pass the Stage 2 gateway in Q2 2024. The Heathrow, Southend, and Bournemouth airport Airspace Change Proposals each received regulatory feedback to address, following their 2023 gateway reviews and plan to re-submit their proposals in Q2 2024.

1.18   An indicative Southeast cluster programme plan was produced by Airspace Change Organising Group in July 2023 that illustrated the broad timetable for producing a system-wide proposal, conducting a public engagement exercise on the overall integrated design, and grouping the later stages of the plan into a series of phase deployments. The approach to integrating such a large and complex system-wide design and grouping portions of the change into phased deployments must be defined and agreed with the Airspace Change Proposals sponsors before an updated programme plan can be defined and agreed. Airspace Change Organising Group worked with the Airspace Change Proposal sponsors during the second half of 2023 to standardise the design outputs required for integration. All Airspace Change Proposal sponsors have endorsed this plan to provide refined airspace design options by Q3 2024, that will enable the cluster integration phase to begin.

1.19   In addition, Airspace Change Organising Group worked with Gatwick Airport, NATS (En Route) plc and the interdependent airport Airspace Change Proposal sponsors during 2023 to define the scope of an early Southeast cluster deployment phase (known as London Airspace South).

1.20   A public engagement exercise on the system-wide proposal for the London Airspace South deployment phase will be conducted by Airspace Change Organising Group in Q1 2024, ahead of a Masterplan Iteration 3 submission planned for Q2 2024.

South of Scotland Cluster

1.21   The Airspace Change Proposals incorporated in the Scotland cluster of the Masterplan, sponsored by Glasgow and Edinburgh Airports, and NATS (En Route) plc all completed Stage 2 of the CAP1616 process by Q1 2023. This prompted the start of the Scotland cluster design integration exercise, coordinated by the Airspace Change Organising Group.

1.22   In Q2 2023, the Airspace Change Organising Group agreed with Aberdeen Airport that the airspace design options arising from its Airspace Change Proposal did not share interdependencies with those proposed by the Edinburgh, Glasgow or NATS (En Route) plc Airspace Change Proposals. As a result, the Airspace Change Organising Group advised the co-sponsors that the Aberdeen Airport Airspace Change Proposal should detach from the Scotland cluster and continue to develop and deploy its proposed changes, in line with the Airspace Modernisation Strategy, on a separate independent timeline.

1.23   The co-sponsors have agreed with the Airspace Change Organising Group's advice and following Aberdeen's departure, the Airspace Change Organising Group coordinated the first full application of the cumulative analysis framework part 1 process. That was to identify interdependencies and design conflicts between the Scotland cluster Airspace Change Proposals and evaluate the impacts and trade-offs associated with potential solutions.

1.24   In Q2 2023, NATS (En Route) plc identified a safety related issue with the integration of one of Edinburgh's proposed design options, leading to a substantial revision of the system-wide proposal and a significant delay to the agreed timeline.

1.25   A public engagement exercise on the system-wide proposal for the Scotland cluster will be conducted by the Airspace Change Organising Group in Q1 2024, ahead of a Masterplan Iteration 3 submission planned for Q2 2024, where revised and re-baseline plans for delivery will be submitted to the co-sponsors for assessment and acceptance.

West of England

1.26   Progress in the West of England cluster incorporating NATS (En Route) plc and the Bristol, Cardiff and Exeter sponsored Airspace Change Proposals stalled due to resource and funding issues encountered by Cardiff and Exeter airports. In Q1 2023, the Airspace Change Organising Group provided advice to the co-sponsors regarding Cardiff Airport's inability to continue funding its Airspace Change Proposal and the implications this could have on the West cluster. Subsequently, the co-sponsors engaged with the relevant stakeholders, including the Welsh Government, to consider the advice and identify potential solutions. A formal decision regarding the advice has not been made in 2023.

1.27   Bristol successfully progressed through Stage 2 in Q3 2023. Due to the cluster-wide issues described above, Bristol paused its work on the Airspace Change Proposal at the beginning of Stage 3.

1.28   In Q2 2023, Exeter did not progress to progress through the Stage 2 gateway for the fourth time. No further progress was made on the Airspace Change Proposal for the remainder of 2023. It is envisaged that work will recommence on the re-submission of their stage 2 gateway in 2024.

Strategic Environmental Assessment and a Habitats Regulations Assessment

1.29   The Masterplan is subject to a Strategic Environmental Assessment and a Habitats Regulations Assessment. These assessments are a legal requirement, and the UK CAA is responsible for carrying them out.

1.30   The UK CAA ran a consultation which launched in March 2023 on the scoping of the Strategic Environmental Assessment and the Habitats Regulation Assessment. The consultation concluded with [feedback posted in August](.)

1.31   The UK CAA and its consultants will require information from the Airspace Change Organising Group, and the airspace change sponsors identified under the Masterplan, to feed into the required assessments. The bulk of the assessments will be fed from the content of Iteration 3 of the Masterplan, as well as the outputs of Cumulative Analysis Framework 1 and 2. The UK CAA is currently waiting for the Scottish cluster to progress, before continuing with the work.

1.32   The Strategic Environmental Assessment and the Habitats Regulation Assessment will be finalised once Iteration 4 of the Masterplan is ready.

Risk

1.33   Key parties (for example, airlines, airports, and Air Navigation Service Providers), that are required to invest in complementary changes to deliver airspace modernisation, are unable or unwilling to produce viable and coherent business cases, which may lead to the fragmentation of the Masterplan. This risk is currently owned by the individual airports participating in the programme and is closely monitored by the Airspace Change Organising Group and the UK CAA's oversight team.

1.34   There is a risk that new policy guidance or a legislative mandate regarding the environmental performance of aviation, (for example, emissions, air quality and noise) may impact the development of the Masterplan Iteration 3. This risk is currently being managed by close cooperation between the Airspace Change Organising Group, the UK CAA and the DfT, ensuring that the Masterplan acceptance criteria are well understood by the Airspace Change Organising Group and incorporated in the developed iterations.

1.35   There is a risk that insufficient resources across the sector and within the regulatory teams, to support the delivery phases of the Masterplan, could result in fragmentation of the airspace change proposal development and deployment within and across the regional clusters. The Masterplan programme would be unable to adhere to planned cost, time, and performance milestones. As a result, there may be a delay to benefits realisation. The risk is currently being managed by the Airspace Change Organising Group, where resource considerations are being made in the programme plan development for each Masterplan deployment cluster. Input from key stakeholders is being sought through planning workshops, including input from UK CAA regulatory teams, to ensure key resource is planned to be made available where required. The UK CAA's oversight team monitors that risk and reports to the Airspace Modernisation co-sponsors on its status regularly.

1.36   There is a risk associated with the size and complexity of the airspace changes required in the London cluster. The Airspace Change Organising Group is managing that risk through close collaboration with key stakeholders, through planning workshops and engagement regarding the deployment strategy within the cluster. The UK CAA's oversight team is closely monitoring the risk through regular meetings with the Airspace Change Organising Group and plans to engage jointly with the airport sponsors, reiterating the need for continued commitment to the programme and adherence to its governance.

1.37   An example of a key risk, likely to span several years, is programme compression, because of airspace change proposals not progressing through gateways. Other delaying factors could include financial issues, judicial review, local planning, or other delays to the programme that results in the backlog of airspace change proposals on the current programme timeline. The Airspace Change Organising Group is managing that risk through their coordination and planning efforts with key stakeholders and escalating issues where appropriate (for example, around funding) to the co-sponsors.

1.38   Due to uncertainty about future airport developments and the scope and timeframes of plans to introduce additional runway infrastructure in the South-East of England, there is a risk that the airports and NATS (En Route) plc are unable to fully determine the scope required for airspace modernisation in the London/Southeast cluster and the interdependencies between them. The Airspace Change Organising Group is managing that risk through their effective communication, keeping their planning assumptions up to date and ensuring the scope of change within each Masterplan iteration is clearly defined, planned for and that the timescales of deployment have been considered and committed to by all key stakeholders.

Element 3 - Network Management

- Delivery Progress is amber. Progress is steady.

- Strategic Progress is green. Progress is steady.

1.39   Delivery element 3 looks to balance the capacity of the operational network with the demand from users through the sharing of accurate plan information. This is enabled through accurate Airport Operations Plans informing the Network Operations Plan managed through the Network manager. The changes are enabled through queue management concepts – arrival and departure management techniques that can utilise the runway capacity efficiently, while reducing the need for the airborne holding of aircraft.

Queue and Capacity Management

1.40   Arrival Manager Head Branch received the final software build from their supplier in July and successfully fixed and closed some minor observations found during validation. The project has delayed some verification activities due to a slowdown in the production of essential engineering documentation, which supports that activity. This risk is currently being managed by NATS (En Route) plc and is monitored by UK CAA's oversight team.

1.41   Time Based Separation Gatwick Advanced / Optimised Mixed Mode successfully completed early integration, verification and validation on software builds from Leidos and Nav Canada, informing both training needs analysis for Air Traffic Control training and Factory Acceptance Testing for Leidos.

1.42   Time Based Separation Pairwise Heathrow received the pre–Factory Acceptance Testing software build on schedule allowing the project to complete its validation early October (slightly ahead of schedule). Leidos completed Factory Acceptance Testing (to their revised schedule) identifying all necessary fixes required for the post Factory Acceptance Testing rectification build.

Local Single Sky Implementation: Initial Airport Operations Plan / Network Operations Plan

London Gatwick

1.43   Initial Airport Operations Plan development commenced through an initial engagement with Eurocontrol. Requirements gathering to commence after implementation of Airport Collaborative Decision Making (ACDM) in Q4 2024, which is a pre-requisite.

London Heathrow

1.44   Significant progress made, in collaboration with NATS (En Route) plc and Eurocontrol, however deployment will not be achieved to meet the original timescales. Lack of Eurocontrol resource and challenging communication, has been raised by London Heathrow as an issue, limiting the ability of data exchange validation to enable deployment to live operation. The UK CAA is working with the stakeholders through the Common Project Coordination Group to validate the issue and identify next steps for mitigation where appropriate.

London Stansted

1.45   Progress has been made with deployment expected by the end of 2024.

Manchester Airport

1.46   Project has started with implementation planned by the end of 2024.

NATS (En Route) plc

1.47   To enable collaborative Network Operations Plan deployment by the end of 2024, NATS (En Route) plc is in the process of developing an appropriate system infrastructure.

Element 4 – Integration

- Delivery Progress is amber. Progress is steady.

- Strategic Progress is green. Progress is steady.

Electronic Conspicuity

1.48   As well as enhancing airspace safety, Electronic Conspicuity is vital to enabling the safe and efficient integration of airspace for all airspace users.

1.49   Electronic Conspicuity is an umbrella term for the technology that can help General Aviation pilots, drone operators and air traffic services be more aware of what is flying in surrounding airspace. It includes the devices fitted to aircraft and unmanned systems that send out position information, and the support infrastructure on the ground to help them work together.

1.50   Electronic Conspicuity Rebate scheme, funded by the DfT and administered by the UK CAA, has given out almost £1.8million in funding to thousands of pilots since its launch, which aims to encourage wider use of the technology used in light aircraft.

1.51   In Q4 2023, the UK CAA published a report investigating how human factors affect the use of Electric Conspicuity within the General Aviation community, and what can be done to enhance airspace safety. The findings of the report will be used alongside new research the UK CAA has commissioned to set a future standard for the use of Electronic Conspicuity equipment.

1.52   The UK CAA is also working with Ofcom and have a supplier contracted to conduct trials, for the use of 978MHz for uncrewed aircraft in support of multiple Airspace Modernisation Strategy-related concepts.

Risk

1.53   The UK CAA and Ofcom legal, subject matter and project management resource challenges risk slowing down the delivery of Electronic Conspicuity. Resource requests have been raised and work is ongoing to map resource requirements against other workstreams and identify potential resolution options. Additionally,

there is no direct funding for the delivery of this critical national infrastructure transformation. Any funding required is applied through DfT Section 16 funding, with some industry trials funded via the Airspace Modernisation Strategy Support Fund.
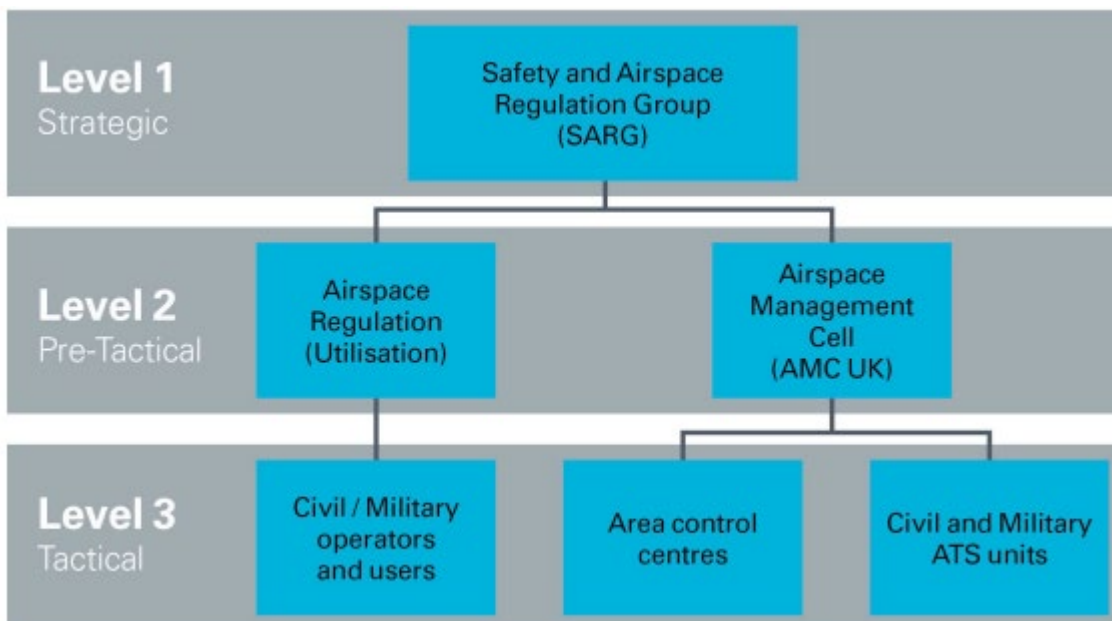
Element 5 –Airspace Management

- Delivery Progress is amber. Progress is steady.

- Strategic Progress is green. Progress is steady.

Flexible Use of Airspace Overview

1.54   The Flexible Use of Airspace concept is based on three levels of Airspace Management, Strategic (Level 1), Pre-Tactical (Level 2) and Tactical (Level 3). UK CAA Safety and Airspace Regulation Group (SARG) sit within Level 1 and formulate national Airspace Management policy and strategic plans. Level 2 Airspace Management is the temporary allocation of airspace restrictions and reservations while Level 3 airspace is the real time management of airspace allocated at Level 2, and includes civil/military operators and airspace users, area control centres and civil/military ATS units.

Illustration of the three levels of airspace management

Flexible Use of Airspace Evaluation

Safety

1.55   Special Use Airspace is designed and operated using robust safety management system processes to ensure activities are conducted safely. Operators of Special Use Airspace are required to monitor safety occurrence reports to ensure the continued safe operation of Special Use airspace.

1.56   The Ministry of Defence and NATS (En Route) plc have not reported any major safety occurrences relating Airspace Management during this reporting period that could be considered a serious incident. Most occurrences relate to the inefficient release of airspace rather than safety. Within this, a trend of Human Factors errors has been identified during investigations that are a result of the human/machine interface required when making airspace bookings. Improvements through the automation of booking processes are expected in 2024 following the implementation of the Local and sub-Regional Airspace Management Support System web-based client.

1.57   Airspace capacity. Planned improvements in data collection and analysis will enhance the level of information available to determine Flexible Use of Airspace performance. The current performance metric for capacity in relation to Flexible Use of Airspace is measured by NATS (En Rute) plc as delay attributable to military activity that segregates airspace from Network availability; this segregation typically occurs due to the activation of Danger Areas.

1.58   During 2023, 2275 minutes of military attributable delay were recorded compared to 7387 minutes in 2022, representing a significant improvement. Analysis of this data has identified the Portsmouth Danger Areas as a significant contributor, and the UK CAA anticipates further improvements can be made by increasing the flexibility in which flight planning restrictions are applied.

Efficiency

1.59   Efficiency is measured by comparing Special Use Airspace bookings with actual usage. Comparison of data from 2022 to 2023 for the most utilised Airspace Management Cell managed Special Use Airspace shows a decrease in efficiency of approximately 5%. While the UK CAA would not expect to see reductions in efficiency it should be highlighted that demand for these Special Use Airspace structures has increased by 7% during the equivalent period. It must also be noted that the accuracy of the data gathered in relation to this efficiency measurement cannot be guaranteed year on year due to the manual collection of data. It is an aspiration to provide more accurate data analysis through the introduction of PRISMIL-CURA (a data analysis tool), which uses information from UK Airspace Management and Eurocontrol systems.

1.60   One of the ongoing strategies to improve the efficiency of Flexible Use of Airspace in the UK has been to make non-Airspace Management Cell managed Special Use Airspace manageable, based on the actual requirement. Airspace Management Cell-managed areas have risen from 124 in 2017 to 156 in 2023 showing continued improvement. As most of the relevant Special Use Airspace has now transitioned to become Airspace Management Cell-managed, further methods to improve efficiency will be considered as part of the update to the Flexible Use of Airspace Strategy.

Flexible Use of Airspace Developments

CAP 740 update

1.61   The UK CAA published an update to CAP 740, UK Airspace Management Policy in March 2023 to reflect extant UK Regulation and policies following the withdrawal from the European Union, which included the method of reporting on Flexible Use of Airspace performance. The update also set the policy framework for future incorporation of new entrants such as space and uncrewed aircraft systems into airspace management.

1.62   The integration of emerging airspace users, particularly space and high-altitude operations, will require careful Airspace Management and prioritisation protocols to be established. Early development of UK industries in these fields is clearly in the National Interest but longer-term transition to commercial operations must consider airspace sharing and integration without the prioritisation afforded by State sponsorship. As such prioritisation agreements need to be developed at a national level.

Airspace Use Statistics

1.63   The UK CAA and Defence Airspace and Air Traffic Management have agreed that the airspace use statistics are subject to variances related to the integrity and completeness of the airspace use data provided to the Ministry of Defence. Whilst it is recognised that the current data set can provide a guide to UK Flexible Use of Airspace performance it was agreed that a better system should be identified and supported for the future gathering of statistics. Due to the interoperability with the Local and sub-Regional Airspace Management Support System and Eurocontrol, and NATS (En Route) plc technical support, PRISMIL-CURA was chosen because of its capability to provide the fidelity of information required to give detailed analysis of statistics related to the application of Flexible Use of Airspace. This will be utilised from 2024 and the improved data provided by this new system will drive targeted improvements in airspace capacity and efficiency as overseen by the Airspace Management Steering Group.

Local and sub-Regional Airspace Management Support System

1.64   NATS (En Route) plc has established a business-to-business link between Local and sub-Regional Airspace Management Support System and the Network Manager, improving efficiency and resilience of the system. This will also enable future benefits such as increased visibility of neighbouring states' Special Use Airspace activity and improved interactions with neighbouring states' Airspace Management Cells.

Aeronautical Information Publication Harmonisation

1.65   A project to systematically review the airspace content of the UK Aeronautical Information Publication is underway to improve clarity and ease of access to a broader range of potential airspace users. It will also increase harmonisation with neighbouring states by coordinating with Eurocontrol initiatives (such as the Operational Excellence Programme). One of the key improvements in 2023 is the improved harmonisation of digital aeronautical data which is increasingly important as many in cockpit devices and flight planning tools are reliant on automated processing of this data.

Special Use Airspace Policy

1.66   The UK CAA is developing a policy to provide clarity on the utilisation of Special Use Airspace in the UK. The policy enables some of the strategic objectives of the Airspace Management while harmonising with neighbouring states where possible. It also includes a revised safety buffer policy, reducing the buffer requirements for some activities. The policy will enhance the integration of a broader range of airspace users, including new entrants, and improve the flexible use of airspace by applying Flexible Use of Airspace principles to all Special Use Airspace. This will be particularly visible in Class G airspace where use of pre-tactical airspace activation will become more common practice. A revised version of CAP 740, UK Airspace Management Policy, will also be published which expands on the application of pre-tactical and tactical airspace management and increases accountability for the application of Flexible Use of Airspace principles. Publication of the Special Use Airspace Policy and revised CAP 740 are planned for Q1 2024.

Flexible Use of Airspace Audits

Airspace Management Cell audit

1.67   The UK CAA conducted a routine audit of the UK's Airspace Management Cell in December 2022 which assessed the extent to which their pre-tactical management of airspace met the regulatory requirements of UK Reg (EC) No. 2150/2005 and national Airspace Management policy contained in CAP 740. The UK CAA found zero non-compliances and identified three observations to indicate areas for

potential improvement. The Airspace Management Cell acknowledged and actioned these observations and the audit was closed in January 2023.

Cooperation with Adjacent States

Airspace Management Sub-Group and Route Network Development Sub-Group engagement

1.68   NATS (En Route) plc, UK CAA and Ministry of Defence Members of the Airspace Management Steering Group routinely attend the Airspace Management Sub-Group and Route Network Development Sub-Group, providing a vital link with neighbouring states. The Airspace Management Sub-Group provides direct communication to Network Operations on activities relating to the development, planning and implementation of European wide Airspace Management issues and related Air Traffic Services systems and associated civil/military coordination. The Airspace Management Sub-Group contributes to the Eurocontrol Airspace Action Plan in accordance with the European Airspace Strategy. It also has linked attendance with the Route Network Development Sub-Group, helping to ensure that cross boundary routes and Airspace Management procedures are reviewed and improved where possible. Attendance at the joint working group meeting brings together European representatives from all countries with an Airspace Management Cell. They can influence operational procedures and strategies to ensure a common approach to Flexible Use of Airspace and Airspace Management and provide advice and influence on regulatory issues.

Virgin Orbit

1.69   In January 2023 Virgin Orbit conducted the UK's first orbital space launch. Significant collaboration was required with European states to establish and manage a 1850nm Danger Area to enable the launch. The Danger Area was split into 5 individual Danger Areas which extended across 5 Flight Information Regions (Shanwick Oceanic, London, Lisboa, Madrid and Santa Maria Oceanic) and impacted 4 nations directly (Ireland, UK, Spain, and Portugal). Significant international engagement was required to gain approval for the Danger Area complex and allow the airspace to be notified and managed appropriately. Challenges included: differing risk appetites (due to no commonly accepted mitigations for Commercial Space Launch) and different approaches to the implementation of the Danger Areas. These challenges will continue into 2024 with an anticipated increase in space launch activities.

French and Irish Letters of Agreements

1.70   Through Letters of Agreement with Airspace Management Cell France and the Irish Air Navigation Service, the UK Airspace Management Cell cooperates with adjacent States to coordinate the management and notification of specified Danger Areas to the Network Manager, enhancing cross border Flexible Use of

Airspace. The Letters of Agreement outlining the agreed procedures were renewed during 2023.

Element 6 - Data Services

- Delivery Progress is red. Progress is steady.

- Strategic Progress is amber. Progress is steady.

System Wide Information Management

1.71　　Regulation UK (EU) 716/2014 Pilot Common Project (PCP) requires Digital Notice to Airmen and International Civil Aviation Organisation datasets services in the Aeronautical Information Exchange Model format by the end of 2025. Digital datasets are being developed by the UK CAA at present, this includes an Aeronautical Information Publication dataset, Instrument Flight Procedure dataset and Obstacle and Terrain dataset. Expectation is that Aeronautical Information Publication, and obstacle datasets will be available in 2024.

1.72　　The UK CAA is also conducting a gap analysis between UK Regulation (EU) No 716/2014 (the Pilot Common Project Regulation - PCP Reg) and CIR (EU) 2021/116 (Common Project 1 – CP1) to assess the need for any amendments to the UK Regulation.

1.73　　A SWIM Delivery Group has been stood up within the UK CAA, to develop and validate the programme delivery plan, for inclusion within the Airspace Modernisation Strategy Part 3. A risk has been identified where lack of expertise may hamper progress when developing the holistic plan for the UK framework and governance arrangements. Short-term solutions have been identified, however long-term investment in building the knowledge will become more important.

European Meteorological Aircraft Derived Data Centre

1.74　　The European Meteorological Aircraft Derived Data Centre (EMADDC) project is one which the UK Met Office has been involved in and have provided updates directly to Local Single Sky Implementation Plan in previous years. The UK Met Office has been involved in this project which KNMI (the Dutch National Met Office) is leading, and the UK Met Office focused on the development and deployment of Mode-S receivers. This project is developing an operational centre for the collection, processing, and dissemination of quality controlled meteorological upper air observations, based on aircraft data. The project is still active however the UK Met Office's tasks related to this project have been completed.

1.75   All in-scope aerodrome operators were required to deliver CAP1732 surveys to the UK CAA by the end of 2023. 60 UK aerodrome operators are delivering surveys, and the aerodrome inspectors are verifying compliance as part of their oversight, using the [Management of Aeronautical Data](#).

Elements 7 and 8 - Future Surveillance, integration of communications, navigation, surveillance, and spectrum

- Delivery Progress is amber. Progress is steady.
- Strategic Progress is green. Progress is steady.

Spectrum, Communications, Navigation and Surveillance

1.76   A dedicated Steering Group has been stood up within the UK CAA governance structure for delivery of projects under the Airspace Modernisation Strategy. The group held initial discussions with NATS (En Route) plc regarding Global Navigation Satellite System resilience and has been progressing work with Ofcom on developing a plan to enable 978MHz use, to increase Automatic Dependent Surveillance - Broadcast capacity.

Satellite Based Augmentation System

1.77   Requirements and associated timescales are currently in development and government funding scope is being defined with UK CAA's input to the government business case for UK Satellite Based Augmentation System, which is being coordinated by UK Space Agency.

Datalink

1.78   Performance issues related to aircraft datalink equipment and frequency management (congestion) have been noted by the UK CAA. Actions to address these issues are currently being investigated, although negotiations on the exact allocations and use to ease the congestion have slowed. Work on international agreements will be proposed for agreement regarding frequency use. Promotion of UK engagement within the European Union datalink improvement activities is ongoing, with a view of increasing the datalink message set to enhance operations.

Element 9 - Aircraft Capabilities

- Delivery Progress is amber. Progress is steady.

- Strategic Progress is green. Progress is steady.

1.79   Aircraft Capability Steering Group membership is under development within the UK CAA's governance for delivery of projects relevant to this new element under the Airspace Modernisation Strategy. The group was established in June 2023 with the first task of assisting with the development of the Airspace Modernisation Strategy Part 3 Deployment Plan, specifically the areas from the Global Air Navigation Plan that relate to on-board equipage and airframe capabilities, such as Airborne Collision Avoidance System. The system is helping pilots avoid potential mid-air collisions by tracking other aircraft in the surrounding airspace through replies from their transponders.

1.80   The Steering Group is yet to conclude this activity which has a significant dependency on air traffic management and communications, navigation, and surveillance requirements that are also under development within the Airspace Modernisation Strategy Part 3 Deployment Plan.

1.81   Recent work includes completion of the first iteration of the European Concept for Higher Airspace Operation, where the UK CAA provided feedback.

1.82   The Air Traffic Management policy team has also raised a possible Standardised Rules of the Air activity, relating to supersonic flight over land, with further discussion to be held on the formation of a delivery group.

1.83   The group has also commissioned its first delivery group, the High-Altitude Platform System group to explore, define and plan the detailed activates required to enable higher altitude operations within UK airspace. High-Altitude Platform System represents the first and most pressing use case for Higher Airspace Operations, which include all operations (including supersonic and hypersonic flights, suborbital flights, aero-launching and vertical launching into orbit, and re-entry from orbit), carried out in the higher airspace above conventional aircraft operations (over 60,000 feet). That presents significant opportunities for the UK and our international partners to potentially enable the innovative transport of people and goods.

1.84   The UK, USA, Canada, the European Union and its member states and Japan have issued a joint statement calling on the International Civil Aviation Organization to work towards achieving harmonised rules and global standards for Higher Airspace Operations.

2   Co-sponsors' Update

Airspace Modernisation Co-sponsors

2.1   The DfT and the UK CAA are the co-sponsors for airspace modernisation. The DfT is accountable for national policy on airspace, and the UK CAA for the strategy. While these accountabilities are distinct, they act as co-sponsors together to ensure alignment. Together, the DfT and the UK CAA commission specific projects, necessary for airspace modernisation, including the delivery of the elements set out in part 2 of the Airspace Modernisation Strategy. Such commissions will require delivery groups or an organisation leading a delivery group to develop a realistic, evidenced and financed plan with any contingencies made explicit. It must be noted however, that while in some cases delivery of elements is a matter of law, for others delivery depends on the voluntary participation of delivery groups. In such cases, the confidence of delivery is dependent on the benefits and delivery bandwidth that organisations can commit to.

2.2   The co-sponsors agree deliverables and outcomes and set parameters for delivery groups tasked with planning and delivering modernisation projects and Airspace Modernisation Strategy elements.

2.3   The expectation of the co-sponsors is that progress of the commissioned projects is monitored and reported on by the UK CAA's Airspace Modernisation Oversight Team, further described in the section below. The co-sponsors will be the point of escalation on delivery issues, communicated by the Oversight Team, and will jointly consider when and how to intervene.

2.4   In 2023, the co-sponsors have met 8 times, to discuss and make decisions on:

- The Joint DfT/CAA Airspace Modernisation Strategy Co-Sponsors Programme Board's Terms of Reference and its relationship with the Aviation Council

- Allocation of funding under The Future Airspace Strategy Implementation Programme Funding Support Package

- Establishing a Single Design Entity project (see chapter 2 for further information) and its governance arrangements

- Element 2 - Terminal Redesign:

  - Masterplan approval durations

  - Cardiff and Aberdeen's exit from the programme

Airspace Modernisation Oversight

2.5   Reporting into the Airspace Modernisation Strategy co-sponsors, the UK CAA's delivery, monitoring, and oversight role is carried out by the Oversight team in the UK CAA Strategy, Policy, and Communications Department and is independent from the UK CAA's delivery teams. The key function of the team is to oversee, track and regularly report on the delivery of the Airspace Modernisation Strategy elements to the co-sponsors and annually to the Secretary of State. That function is performed through formal engagement with the industry delivery entities, the outputs of which have been captured under Chapter 1 of this report.

2.6   The Oversight team is also responsible for administering and managing financial grants such as the Airspace Modernisation Strategy Support Fund, described in more detail later in this chapter.

2.7   In 2023 a recruitment campaign was held to ensure adequate oversight resource is in place, in line with the broadened governance requirements under the refreshed Airspace Modernisation Strategy. The team is now complete and consists of the Head of Airspace Modernisation Oversight, three Airspace Modernisation Oversight Principals, one Airspace Modernisation Oversight Risk and Benefits Manager and four Airspace Modernisation Oversight Associates.

2.8   In October, the Oversight team engaged with members of the National Air Traffic Management Advisory Committee (an advisory body chaired by the UK CAA with representation across the UK aviation community and a key engagement entity within the Airspace Modernisation Strategy Governance, see CAP1711 Appendix A), to provide its members with an opportunity to provide views on the progress of delivery under airspace modernisation. No responses were received by the deadline given.

UK CAA Airspace Modernisation Internal Governance

2.9   The Airspace Modernisation Strategy consists of a three-tier internal UK CAA governance approach.

UK CAA ExCo Airspace Board

2.10   The top level of internal UK CAA Airspace Modernisation governance is the UK CAA ExCo Airspace Board. This provides strategic direction on airspace modernisation in the short term and long-term. This board provides strategic direction at a senior leadership level.

2.11   The ExCo Airspace Board is accountable to the UK CAA Board for overall management of airspace modernisation and the UK CAA's delivery of the elements defined within the strategy. The ExCo Airspace Board provides direction on appropriate frameworks, policies, and procedures to support delivery of airspace modernisation objectives. Using the frameworks in place, the board

monitors and reviews performance and agrees corrective measures where necessary.

2.12   The ExCo Airspace Board will oversee the ongoing development of the Airspace Modernisation Strategy so that when it is presented to the Secretary of State for Transport, it is robust in terms of its scope, objectives, priorities, and performance measures.

2.13   The ExCo Airspace Board plays a key role in developing and agreeing the overall direction of airspace modernisation and its associated Airspace Modernisation Strategy. It is also the formal route to support the UK CAA Board, through Group Director SARG, in effectively discharging the UK CAA's responsibilities under the air navigation functions as per the Air Navigation Directions from the DfT. Alongside this, the board provides strategic direction on issues where there is a read across to the economic regulation of NATS (En Route) plc and funding of UK CAA airspace activities from airspace user charges.

Airspace Modernisation Programme Board

2.14   The second level of internal UK CAA Airspace Modernisation governance is the Airspace Modernisation Programme Board. This board provides management oversight to ensure appropriate resource is allocated, work prioritised and delivered, and risks are appropriately mitigated, under the UK CAA -led work programme, currently being developed under the Airspace Modernisation Strategy Part 3 Delivery Plan.

2.15   Delivery of the programme will be realised through steering and delivery groups within level 1 of the governance.

UK CAA Airspace Modernisation Steering Groups

2.16   Throughout 2023 the groups were established, and Terms of Reference agreed, which support the delivery plans under the Airspace Modernisation Strategy Part 3 Delivery Plan. The following steering groups have been established:

- Airspace Integration

- Air Vehicle Capability

- Data Digitisation

- Spectrum, Communications, Navigation & Surveillance

2.17   Policy development work progress made by each group has been captured under the relevant element in Chapter 1.

Illustration of the three-tier internal UK CAA governance approach.
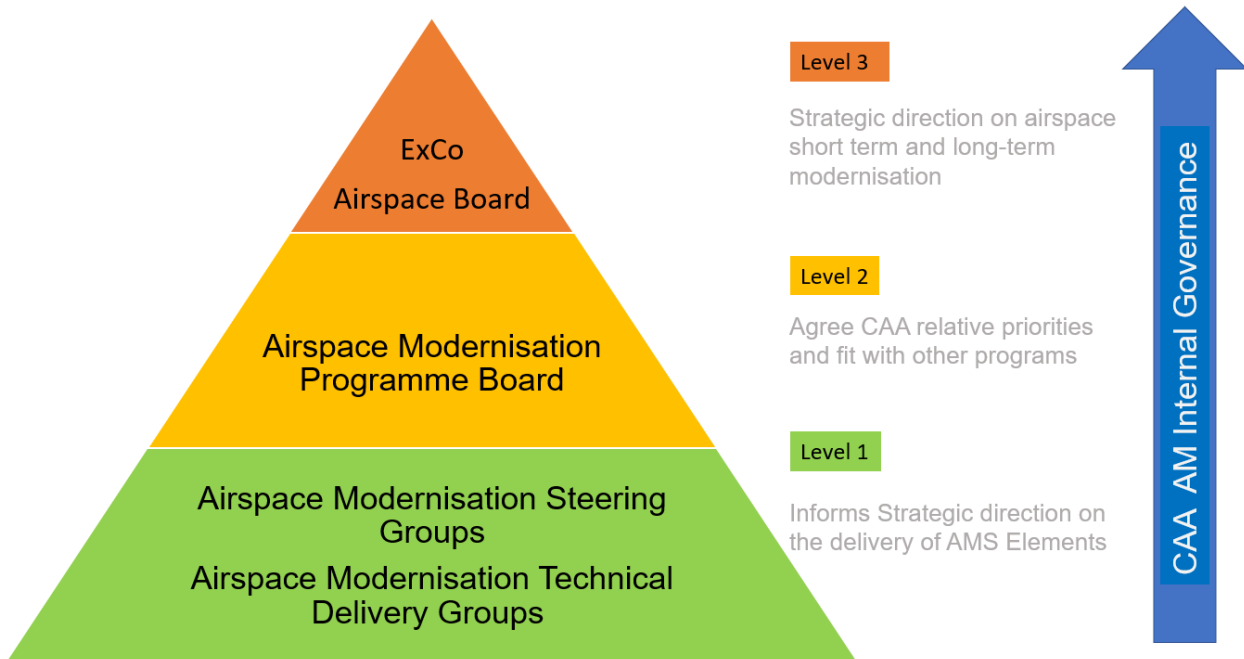
Airspace Modernisation Strategy Part 3 Update

2.18   The refreshed Airspace Modernisation Strategy was published in January 2023 consisting of Parts 1 (Strategic Objectives and Enablers) and 2 (Delivery Elements). Part 3 (Deployment) sets out timelines and delivery plans for each element, describing the short-term (0-2 years) ambition and explains how the strategy is being delivered.

2.19   Part 3 of the Airspace Modernisation Strategy is under development and is expected to be published in Q2 2024. It will be a collection of plans that evolve over time and may be published as a single document, online.

2.20   The UK CAA may need to consult on certain aspects of their delivery plans under Part 3, although this may not need to be required in every case.

2.21   These activities are overseen by the Oversight team, with progress reported through the Airspace Modernisation Strategy governance structure. The output will inform future updates to the Secretary of State for Transport, and the UK input to the Local Single Sky Implementation Plan monitoring.

Airspace Modernisation Strategy Support Fund

2.22   In 2020, the UK CAA established the Airspace Modernisation Strategy Support Fund to aid projects in support of the delivery of airspace modernisation, where delivery benefits multiple stakeholders or research will enable wider industry deployment. It follows on from the 2015-2019 Future Airspace Strategy

Deployment Facilitation Fund[4] (specifically the Small Gaps element) but is broader in scope and has a new advisory function within its governance. It provides the opportunity for recognised UK legal entities[5], other than NATS (En Route) plc and the UK CAA, to apply for financial support to deliver activities in support of airspace modernisation, where the required work cannot be funded by other means.

2.23   The fund of about £2 million per annum is funded through the UK en route unit rate, charged to aircraft receiving air traffic services in the UK. It was established as part of the UK regulatory cycle reference period (RP3) performance plan and maintained in the NR23 performance plan. It is administered by the UK CAA, on the basis that unutilised funds will be returned to airlines through an adjustment to the UK unit rate in a future regulatory period.

2.24   For proposals to be eligible for funding, they must align with the overall objectives of the Airspace Modernisation Strategy. We expect a proposal's ambition to support the ends (the outcomes) of modernisation.

2.25   Funds are allocated based on bi-annual calls for applications. We welcome any relevant proposals to be submitted, thereby providing an opportunity for a wide range of organisations to come forward, where consistent with the Airspace Modernisation Strategy elements and objectives.

2.26   The Oversight team, supported by UK CAA technical specialists, operates as the Airspace Modernisation Strategy Support Fund Advisory Board, to consider and assess applications against the criteria set out in the Terms of Reference, and makes recommendations to the Decision Board. In Q4 2023, several improvements were made to efficacy of the process in making recommendations to the Decision Board.

2.27   The Airspace Modernisation Strategy Support Fund Decision Board acts as an objective and independent decision-maker, providing advice to the Chair of the group on the approval or rejection of funding proposals. Airline representatives participate in the advice and decision-making of individual applications.

2.28   Following a decision to fund a proposal, the Oversight team governs its delivery through the Airspace Modernisation Strategy Support Fund Programme Board, reporting regularly to the Airspace Modernisation Programme Board and records the grant funding information in line with the UK subsidy control regime.

2.29   The first call for Airspace Modernisation Strategy Support Fund applications was issued in September 2021, and funds have been committed to 12 projects, totalling approximately £4 million, to date.

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[4] The Terms of Reference for the Future Airspace Strategy (FAS) Deployment Facilitation Fund were set out in CAP1249.
[5] Legal entities must be UK aviation industry, engaged in modernising the UK airspace.

Completed projects

2.30   Five projects have delivered their outputs in 2023 and are now complete:

- Electronic Conspicuity Interoperability Test Programme (ECITP) - led by The Aviation Innovation Centre. This project tested and compared the accuracy, latency and coverage between different Electronic Conspicuity equipment and created a Flight Information Display (FID). The outcome of the trials validated the benefits of electronic conspicuity, such as ensuring safety of the airspace as it mitigates collisions and ensures awareness of airspace users. Access to the report can be requested by contacting airspace.modernisation@caa.co.uk.

- Light General Aviation Digitalisation of Flight Data – led by Skyverse, focussed on development of a concept to deliver end-to-end digital transfer of Visual Flight Rules data via the internet. This project is an enabler for future implementations, that will help modernise UK airspace, by providing a more robust demand view of General Aviation traffic to air traffic control, reducing air traffic control officer workload, and ensuring radio transmissions are minimised, whilst also planning transits of controlled airspace. Future projects are expected to enhance safety in the airspace, along with the potential to reduce emissions through less refusals or delays to crossing controlled airspace. Full report can be downloaded here.

- FID Document Templates – led by Custom Chess Company. The project allowed Flight Information Display data to reduce the burden on Aerodrome Flight Information Services. It also provided some common standards to the documentation, improved the efficiency of UK CAA's approval process, and encouraged common standards across the aviation industry. The templates can be requested by contacting airspace.modernisation@caa.co.uk.

- Trial of ADS-B Obstruction Beacons on 978Mhz UAT – led by uAvionix. The trial evaluated the effectiveness of the Automatic Dependent Surveillance Broadcast obstruction beacons, from the operator and the other airspace user's point of view. This demonstrated the use of the technology to support safer and greener airspace operations. Full report can be downloaded here.

- Reduced Departure Divergence – led by Heathrow Airport Limited and Gatwick Airport Limited. The project aimed to reduce the existing minimum standard angle of divergence for conventional departures below 45˚. The research validated the use of flight data from the existing Standard Instrument Departure routes and a robust analytical approach to loss of separation risk modelling. Access to the report can be requested by contacting airspace.modernisation@caa.co.uk.

Ongoing projects

2.31   Seven projects are ongoing or approved.

- Fair and Equitable Distribution of Aircraft Noise

  Sponsor: Gatwick Airport

  Throughout 2023, the project team organised focus groups and community fundamental workshops which generated key learnings. Benefits of this project include engaging community to demonstrate that feedback from stakeholders in the early stages of the airspace change proposal influences the overall approach to airspace modernisation.

- Scottish Terminal Manoeuvring Area Cumulative Impact Assessment

  Sponsor: Glasgow and Edinburgh

  Throughout 2023, the Scottish cluster completed the Cumulative Analysis Framework part 1 and the Instrument Flight Procedure. This framework will be shared between the clusters.

- Digital Transformation of Airspace Management

  Sponsor: Airspace Unlimited Scotland

  Between July and December 2023, the project team undertook stakeholder engagement with EUROCONTROL and the Royal Air Force. Initial validation and verification on the analytics of one of the web prototypes took place, with this continuing into 2024.

- Electronic Conspicuity Interoperability Test Programme 2

  Sponsor: The Aviation Innovation Centre

  Between September and December 2023, a report was produced on the analysis of static pressure change on portable Electronic Conspicuity devices, whilst also assessing 978MHz performance.

- Enhanced Use of Flight Intent Data

  Sponsor: Skyverse

  Approved in October 2023.

- Fuel-efficient Delay Absorption

  Sponsor: GE Aerospace

  Approved in October 2023.

- Next Generation Airspace Operations and Surveillance

  Sponsor: LiveLink Aerospace

  Approved in October 2023.

2.32   The UK CAA anticipates launching a further call for applications in May 2024, with an aim of aligning objectives to specific themes.

2.33   More information, including guidance on how to apply can be found on a dedicated Airspace Modernisation Strategy Support Fund webpage.

Single Design Entity[6]

2.34   The co-sponsors have established a joint project team to identify and set out how, in line with the level of ambition set by the Airspace Modernisation Strategy, a single entity, which for the purposes of this project the UK CAA has temporarily termed the "Single Design Entity - SDE", could deliver a modernised airspace design.

2.35   The SDE will initially focus on the complex South – East Cluster within the Airspace Change Masterplan, under the Airspace Modernisation Strategy element 2 Terminal Airspace Re-design, but ultimately it could one day become the only body responsible for changes to the design of UK airspace.

2.36   The project team is considering the role, scope, and funding model for the SDE, whether the role sits within a new or existing body, the legislative and consultation requirements, as well as other policy and regulatory considerations.

2.37   For the project itself, the team have put in place proportionate governance and drawn up a plan for appropriate stakeholder engagement. This project is about airspace design. The UK CAA is not planning to fundamentally change who manages the airspace or sponsors airspace changes – that will for the most part remain with airports and air traffic service providers, who know their local stakeholders' interests best.

2.38   It is crucial that sponsors continue to progress ongoing work on their airspace change proposals to already established timelines, as this will be critical to timely implementation. The outcome of this joint project should not require work that has already been undertaken on airspace change proposals to be redone. This will be factored into planning assumptions.

2.39   No decisions have yet been made, including on the key question of who might take on this role. Before reaching any decisions, and subject to Ministerial approvals, the UK CAA will run a formal consultation on the proposals in 2024. Prior to this, as the project team develops those proposals, it will also engage as appropriate with relevant stakeholders in accordance with an engagement plan, which the UK CAA will share as soon as that is possible.

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[6] The Single Design Entity (SDE), as of July 2024, has been renamed the UK Airspace Design Service (UK ADS).

Air Navigation Directions – 2023 Review

2.40   In 2023, the DfT reviewed the scope of the Air Navigation Directions, including:

- Prioritisation of Airspace Change Proposals to deliver the Airspace Modernisation Strategy and other government objectives.

- Previously considered updates.

- International Civil Aviation Organisation Meteorological Service designation (UK-EU Transition related)

- Loss of communication requirements

- Amendments to text to better cater for drone operations under 'temporary airspace change' Direction.

2.41   Following the review, the Air Navigation Directions were updated on the 31 March 2023.

3   Airspace Modernisation – Strategic Risks & Mitigations

Airspace Modernisation Risk Management Process

3.1   A Risk and Benefits Manager joined the Oversight team in late November 2023 to develop the Airspace Modernisation Strategy Risk Management Plan. Whilst still under development a high-level overview of this plan is as follows:

- Internal Airspace Modernisation Strategy Risk Workshops (UK CAA Only) – Focusing on delivery and strategic risks to UK CAA-led policy development elements.

- External Airspace Modernisation Strategy Risk Workshops - (Airspace Change Organising Group, NATS (En Route) plc and Defence Airspace and Air Traffic Management) – Focusing on delivery and strategic risks to relevant elements.

- Joint Airspace Modernisation Strategy Risk Review Workshops - (UK CAA and DfT) – Focusing on risk across Airspace Modernisation Strategy portfolio.

- Governance & reporting frequency for prioritised risks

3.2   Currently internal UK CAA risks are identified, escalated, and mitigated through the governance processes described earlier in Chapter 2.

3.3   External delivery risks are identified through bi-monthly oversight sessions between the Oversight team and Airspace Change Organising Group, NATS (En Route) plc and Defence Airspace and Air Traffic Management.

3.4   External strategic risks are identified through engagement with Airspace Change Organising Group, Defence Airspace and Air Traffic Management, and from NATS (En Route) plc's Service & Investment Plan.

3.5   An Airspace Modernisation Risk Register, setting out both internal and external risks, is under development, aligning risks to the UK CAA's Risk Management framework. The Risk Register will be published in future iterations of this report.

3.6   Risks requiring escalation are shared with the co-sponsors through the bi-monthly DfT/CAA Joint Airspace Modernisation Programme Board to provide direction and support on mitigation actions.

3.7   In Chapter 1, we set out our assessment of each element and how delivery has progressed in 2023. At a strategic level, the UK CAA uses this progress report to raise any concerns or strategic risks with the Secretary of State and consider any mitigating actions. These are summarised below.

Airspace Modernisation Strategy - Scope and Delivery Model

3.8   The scope of the UK airspace modernisation programme is set out in the January 2023 refreshed Airspace Modernisation Strategy and its 9 delivery elements.

3.9   There is a risk that the revised, broadened Airspace Modernisation Strategy, for example integration of new entrants in uncontrolled airspace, is not fully progressed, due to the structure of the current delivery mechanisms and/or funding models, especially in the areas outside of NATS (En Route) plc and Airspace Change Organising Group's current scope and competencies, which focus on Controlled Airspace and Commercial Air Transport.

3.10   This could mean the ambition and benefits of modernisation beyond Controlled Airspace and Commercial Air Transport are not fully realised, whilst the ambitions for new entrants and technologies, General Aviation and others are constrained.

3.11   The UK CAA is in the process of addressing these risks, working with the DfT and relevant stakeholders to develop the Airspace Modernisation Strategy Part 3 deployment plan, to the necessary funding and resource required for delivery.

Delivery of the Masterplan and Airspace Change Proposals of Element 2

3.12   One of the strategic risks in the Airspace Modernisation Strategy is the delivery of the Masterplan and Airspace Change Proposals under element 2, relating to the coordinated redesign of terminal and upper airspace across the UK.

3.13   A pause or delay on the part of one sponsor may have impacts on other sponsors who have interdependent airspace change proposals. That may lead to a breakdown of collaboration needed and defined within the Masterplan.

3.14   Sponsors need to remain coordinated with other interdependent sponsors, to ensure that both timing and designs align. We will continue to monitor progress closely, and provide assistance, support, and advice to the DfT as it develops policy.

3.15   Airspace Change Proposal sponsors are unable to progress through the Stage 3 gateway of the CAP1616 process until potential conflicts and interdependencies between airspace changes are identified in an accepted Iteration 3 of the Masterplan. The UK CAA expects sponsors to work closely with the Airspace Change Organising Group and other interdependent sponsors, to develop the appropriate Masterplan content, to the quality required.

UK CAA & Industry Subject Matter Resource

3.16   As the detailed scope and scale of the Airspace Modernisation Strategy Part 3 has developed, it has been possible to further identify the ongoing programme management requirement to deliver it. This includes greater granularity of the

resourcing requirements, the need for further funding and opportunities to prioritise and shape delivery plans in line with expected resources.

3.17   The UK CAA needs to consider its resource with the airspace regulation function for making decisions about individual changes. The UK CAA Airspace Regulation resource constraints could cause delay to the review of Airspace Change Proposal submission documents impacting sponsor timelines. Sponsors are working with the UK CAA and the Airspace Change Organising Group to ensure all Airspace Change Proposals and submissions are deployed with UK CAA resource available.

3.18   Resource challenges are also apparent within the industry itself, where careful consideration and work re-phasing is already taking place. Whilst short-term solutions around bringing in consultancy services have been employed where possible, in the long-term the government, UK CAA and the industry will need to continue taking proactive steps to develop the required skills and resources to deliver modernisation.