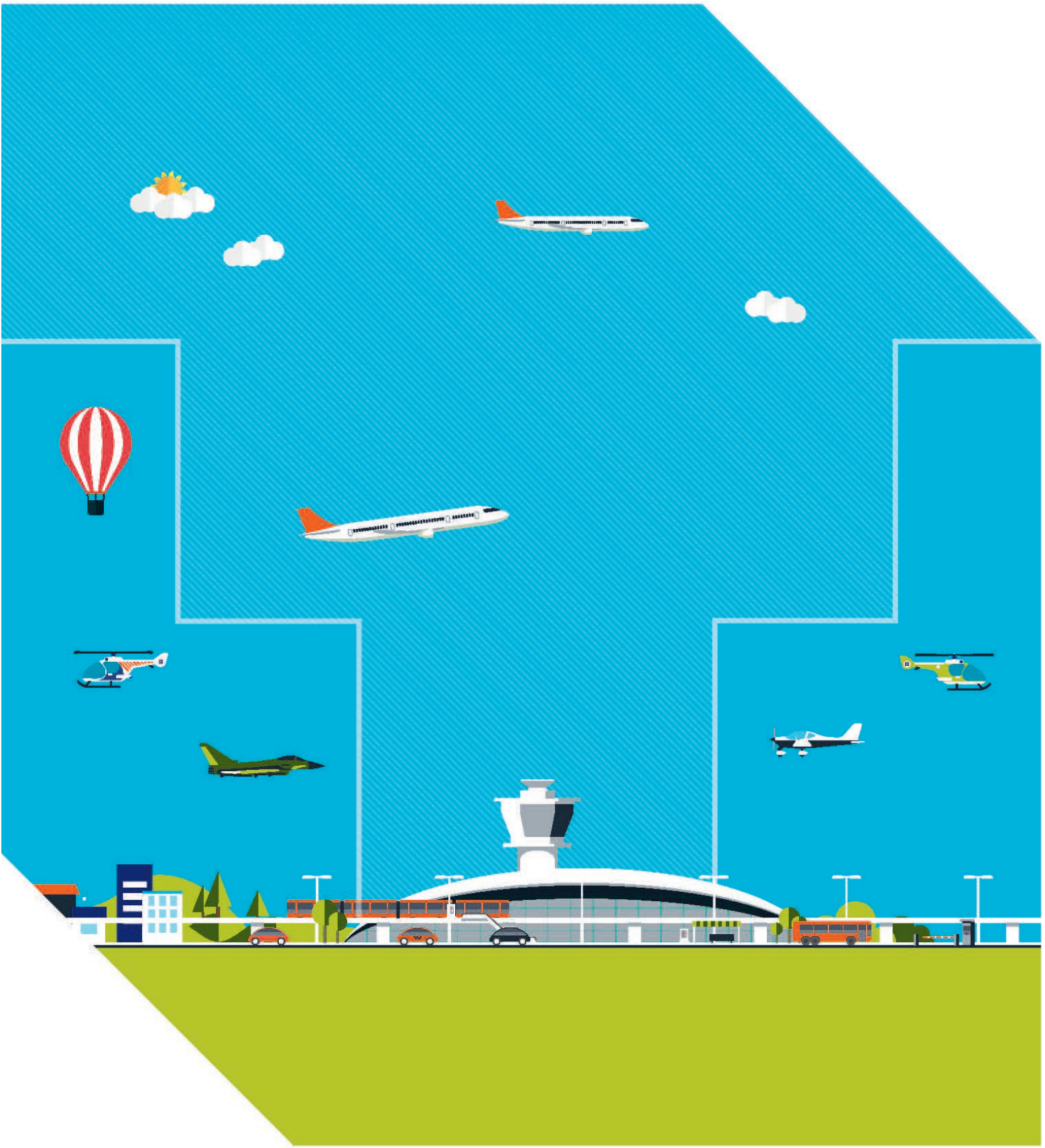
UK Civil Aviation Authority

Outcome of the consultation on a draft Airspace Modernisation Strategy 2022–2040

CAP 2404



Published by the Civil Aviation Authority, November 2022

Civil Aviation Authority
Aviation House
Beehive Ring Road
Crawley
West Sussex
RH6 0YR

First published November 2022

Enquiries regarding the content of this publication should be addressed to:
airspace.modernisation@caa.co.uk

The latest version of this document is available in electronic format at: www.caa.co.uk/cap2404

Contents

Executive summary

Overall approach to the refresh of the Airspace Modernisation Strategy (AMS)

- Having considered and taken into account the consultation responses, we have concluded that we should make no fundamental change to our overall approach. The responses have helped us focus the future direction of travel on specific areas where more work is needed (see page 8 for more details).

The consultation

- The CAA's 12-week public consultation on a draft refreshed AMS ran from 10 January to 4 April. This followed pre-consultation stakeholder engagement to establish an overall vision. We continued our stakeholder engagement once the consultation had closed through our AMS Co-Creation and Review Groups. We also produced an infographic (see Appendix A) targeted at users of Class G airspace, in particular the General Aviation community, to give a better visualisation of the future lower airspace concept.
- The consultation asked seven questions, inviting a mixture of multi-choice answers and free text.
- The draft on which we consulted extended the AMS coverage out to 2040. The consultation also sought views on improving the current governance structure.
- The draft AMS kept as its vision "Deliver quicker, quieter and cleaner journeys and more capacity for the benefit of those who use and are affected by UK airspace". It was structured around four strategic objectives:

  1. Maintain and enhance high aviation safety standards.

  2. Integration of diverse users and meet defence/security needs.

  3. Simplification – reduce complexity and improve efficiency.

  4. Sustainability – delivering the Government's key environmental objectives with respect to air navigation.

- We separated the AMS strategic objectives and AMS delivery plan into separate documents because the delivery plan will need more frequent updates.
- We introduced sustainability as an overarching principle to be applied through all modernisation activities, taking account of the latest government policy and environmental guidance, including better managing noise and helping achieve government commitments to net zero emissions.

- We structured the draft AMS to align with the ICAO[1] Global Air Navigation Plan (GANP). The GANP is the ICAO strategy driving evolution of the global air navigation system.
- Delivery 'elements' enable GANP and UK-specific modernisation requirements.
- The AMS would be used to assist in the development and prioritisation of UK airspace rulemaking activity (policy and legislation) to help ensure the timely and coordinated implementation of modernisation initiatives.

Who responded?

- We had 114 responses from a wide range of aviation stakeholders, many of them organisations. One third of responses were from the General Aviation community, and one fifth were from commercial industry. Just under two thirds of respondents were based in the South East.

Responses about our overall approach to the AMS refresh

- We received much useful feedback about our overall approach.
- Although we do not treat the consultation results as a referendum, in respect of our overall approach, of the 114 responses:
  - 54 said it was about right or only minor modifications were needed (47.5%)
  - 45 said major modifications were needed (39.5%)
  - 15 said they didn't know or chose not to answer the question (13%).
- The responses saying major modifications were needed came from:
  - central/local government – 5 of 10 responses (50%)
  - commercial aviation industry – 2 of 24 responses (8%).
  - General Aviation community – 14 of 38 responses (37%)
  - local organisations such as community action groups – 13 of 14 responses (93%)
  - national representative organisations such as non-governmental organisations – 1 of 7 responses (14%)
  - residents affected by aviation – 10 of 13 responses (77%).

  None of the eight responses from consultancies, elected political representatives or remotely piloted aircraft systems said major modifications were needed.
- We identified the following key themes when analysing free-text responses from those seeking major modifications:

[1] The International Civil Aviation Organization, a specialist agency of the United Nations responsible for international standards for civil aviation which the UK is bound by international treaty to implement. ICAO'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.

- Those from residents, local organisations, a national environmental campaign group and local government bodies were mostly expressing environmental concerns over the Government's environmental policy and its interpretation. As these matters concern Government policy, they were outside the CAA's remit and therefore the scope of this consultation (see page 27).[2]
- Those from the General Aviation community were principally concerned with airspace access, the CAA not properly taking into account the needs of non-commercial aviation, or the outcome of past CAA airspace change decisions (which were also out of scope of the consultation). We believe that most of these concerns arose because of misconceptions of proposed AMS concepts. For example, it is not the intent of the AMS to routinely increase controlled airspace because of a move to ICAO Flight Information Services, as some respondents assumed. We have produced an infographic (see Appendix A) to better clarify these concepts, targeted at users of Class G airspace, in particular the General Aviation community.
- Those from commercial industry were mainly focused on how to deliver the AMS and its elements, rather than disagreeing with the strategic approach. This was a theme in other responses too (see areas where more work is needed, below) – how it will be achieved, by whom and with what funding and resources.

- We agree that much work remains to be done as the deployment plans forming AMS Part 3 (deployment) are developed. We need to set the strategy first, and in that respect we did not see anything in responses that led us to make fundamental changes to the approach we proposed in the refreshed AMS. Most challenges were either outside the remit of the AMS (such as Government environmental policy), misconceptions of proposed lower airspace concepts, or they concerned delivery mechanisms that will form part of the next stages of the AMS.

Areas where there was general support

- The AMS refresh and/or airspace modernisation overall, as well as the vision, strategic objectives and future direction of travel, recognising their complexity.
- Continuing redesign of airspace used by commercial air transport that is already underway through the airspace change masterplan ('the masterplan'), coordinated by the Airspace Change Organising Group (ACOG).
- The nine delivery elements, although there were many detailed comments in response to questions 4 and 5 that we will take into account as the deployment plans forming AMS Part 3 are developed.

[2] We have published responses where we had permission to do so. Where relevant we have drawn published responses to the attention of the Department for Transport.

- Treating environmental sustainability as an overarching principle throughout the strategy.
- The broader focus that includes modernisation outside controlled airspace including a new Lower Airspace Service and bringing Flight Information Service into line with the ICAO/international approach; maximising access to airspace, including using flexibly managed airspace; and the safe integration of new types of user using the latest technology and innovation.
- More explicit alignment of the AMS and its deliverables with the ICAO GANP, currently achieved through compliance with retained EU legislation. This will be the means of ensuring the continued interoperability with other states through compatible standards. We will make clearer the UK's obligations as an ICAO-contracting state and the use of the AMS to ensure, from an airspace perspective, that they are properly discharged.
- The AMS will be the single roadmap to guide the CAA's approach to the development of its airspace policy and legislation (otherwise known as rulemaking).

Areas where we concluded that more work is needed

- We have grouped this under five headings:

  1: Demonstrating how environmental sustainability will be treated as an overarching principle, in line with the CAA Environmental Sustainability Strategy.[3]

  2: How to / who will deliver and deploy key aspects of airspace modernisation, including the role of ACOG, NATS and airports.

  3: Governance and leadership of the modernisation programme.

  4: Funding and resourcing the broader modernisation programme envisaged by the refreshed AMS.

  5: Improving the General Aviation community's perception of modernisation concepts.

1. Sustainability as an overarching principle

- Responses broadly supported treating sustainability as an overarching principle to be applied through all modernisation activities. However, many questioned what that actually means, how we would achieve it and against what policy criteria when trade-offs were required, some saying that government policy was unclear.
- While sustainability will form an overarching principle across the AMS delivery workstreams, airspace redesign (such as the masterplan programme) must adhere to government policy and guidance. Environmental impacts often involve trade-offs

[3] CAA Environmental Sustainability Strategy www.caa.co.uk/cap2360 and related Areas of Work www.caa.co.uk/cap2361.

between differing airspace objectives, such as increasing airspace capacity, reducing emissions and managing noise. Public policy informing such decisions is for elected representatives, not the CAA or industry.

- The refreshed AMS implements government policy but it is not the role of the AMS to develop or amend such policy. However, following the transfer of certain responsibilities of the Independent Commission on Civil Aviation Noise (ICCAN) to the CAA, the Department for Transport has commissioned technical advice from the CAA to inform government policy on trade-offs resulting from different airspace design options, including between noise and CO_2 emissions (for example, aircraft flying a longer routeing to provide noise respite). This is not an activity under the refreshed AMS, but under the CAA's Environmental Sustainability Strategy.
- Where there are no explicit environmental targets or priorities set by government or in legislation, we will apply the Environmental Sustainability Strategy and the proposed 'prioritisation principle'.[4] We will consult on the proposed prioritisation principle before we apply it to our decision-making, including on how that principle might shape, influence or otherwise impact the delivery of airspace modernisation.
- We will therefore amend the refreshed AMS:
  - To be clear where the CAA has a duty to take environmental factors into account when carrying out modernisation activities.
    - For example, the CAA has a duty, after maintaining a high standard of safety, to take into account the Government's Air Navigation Guidance.[5] That guidance sets out the Government's environmental objectives with respect to air navigation – on noise, climate change and air quality – which apply to all modernisation activities. Where elements of the AMS are being delivered through airspace change, the Air Navigation Guidance establishes a set of altitude-based priorities to be taken into account when

[4] The proposed prioritisation principle is part of our Environmental Sustainability Strategy. Where the CAA has discretion in how we take the environment into account, we propose to apply the following prioritisation of impacts:

- first, mitigating the impact of global warming, with a focus on carbon emissions; then
- mitigating noise impacts on local communities; then
- mitigating impacts on tranquil spaces and biodiversity; then
- mitigating impacts on air quality and on other environmental elements.

The CAA will consult with stakeholders and the public on the proposed prioritisation principle before we apply it to our decision-making. The CAA will keep this principle under review as science and government policy develop, and we will reconsult as necessary.

[5] *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*, Department for Transport October 2017. https://www.gov.uk/government/publications/uk-air-navigation-guidance-2017 https://www.caa.co.uk/media/p2kc0rum/additional-air-navigation-guidance-spaceflight.pdf

considering the potential environmental impact of airspace changes (see section 3.3 of the Air Navigation Guidance[6]).

- Where AMS elements are being delivered outside of airspace change and where the CAA has discretion in how we take the environment into account, the CAA will apply its Environmental Sustainability Strategy and the proposed prioritisation principle (subject to separate consultation). For example, prioritising (subject to safety) a deliverable in an AMS element which enables CO_2 emissions savings.

- To reference up front in Figure 1 of the AMS the overarching sustainability principle in the strategic objectives, and maintain a clear and consistent narrative on this principle through the document, including the nine delivery elements. As the deployment plans in Part 3 of the AMS are developed, we will, where necessary, strengthen relevant requirements or detail as to how the elements should be delivered, and with what aims, including environmental outcomes. In due course, as the Part 3 deployment plans are developed, we may need to consult on certain aspects of them.
- To state that we will continue to engage with government on its evolving environmental policy, principles and targets – including clarifying any relevant obligations under the Environment Act 2021 – and how these relate to the refreshed AMS.

2. Delivery model for airspace change

- In the current delivery model, it is mainly airports and air navigation service providers that sponsor airspace change proposals. The CAA oversees the process and adjudicates in a pure regulatory mode. This model is complex, with multiple interdependencies.
- Consultation responses have helped to evidence the problem statement and to inform a CAA review of the current delivery model while remaining cognisant of existing airspace change activities. A review of the CAA's CAP 1616 airspace change process is already underway.[7] The delivery model is not necessarily an AMS

---

6 The altitude-based priorities are a set of rules, incorporated in statutory guidance and used by the CAA. They are designed to ensure that potential noise impacts are prioritised over other factors such as carbon emissions in airspace change decisions (i.e. changes to flight routes) up to 7,000 feet above sea level.

7 The AMS sets the overarching strategy, direction and intent for modernisation. The CAP 1616 process is the CAA's tactical-level decision-making process that sponsors are required to follow when making specific proposals to change the UK's notified airspace design. It is overseen by the CAA's airspace regulatory team. The CAP 1616 process (and proposals or decisions under that process) was out of scope of the AMS consultation, and is subject to its own, separate, review. We will therefore consider any comments as part of that separate review. https://www.caa.co.uk/commercial-industry/airspace/airspace-change/review-of-cap-1616/.

issue to resolve, but the outcome will have a bearing on the delivery of the airspace modernisation programme.

3. Governance and leadership of the modernisation programme

- The consultation sought views on how effective the existing 2018 AMS governance structure had been, which was mostly focused on commercial air transport, controlled airspace and larger air navigation service operations. Many responses thought improvements in governance were needed.
- The 15 initiatives from 2018 that the refreshed AMS absorbed into nine delivery 'elements' already have established owners – for example, masterplan airspace change sponsors and NERL (NATS (En-route) plc). These will continue. We continue to work on deployment plans that will form a future Part 3 of the AMS, based on the outcome of the consultation on the strategy (including question 5) and delivery elements in AMS Parts 1 and 2.
- The refreshed AMS has a broader focus, in particular around integration – for example, seamless integration of operations by beyond visual line of sight remotely piloted aircraft systems and advanced air mobility; use of electronic conspicuity; a Lower Airspace Service to better support both self-management of piloted VFR (Visual Flight Rules) aircraft and remotely piloted aircraft systems in Class G (uncontrolled) airspace; flight intention information-sharing to facilitate increased VFR access to Class D airspace, improved Class G airspace structure, etc.
- Not all of these sit readily with the current AMS delivery, governance and resourcing/funding structures. The consultation asked what changes were needed to deliver the AMS, and floated some ideas, but made no firm proposals because we were still consulting on the content, particularly the delivery elements.
- Work to develop these structures will need to be undertaken, involving multiple stakeholders, in parallel with the work to evolve the new areas of focus themselves. We will publish a revised AMS governance structure, but in a programme as complex as this, the governance will continue to evolve over time. Ensuring that membership of the ongoing, core AMS governance groups is broadly reflective of airspace's diverse set of stakeholders will form part of next phase of activity. We are now working on what immediate changes are needed.
- Some of this has already happened, for example we have set up:
  - A CAA internal Airspace Modernisation Assurance Group, reporting to a refreshed CAA Airspace Programme Board, which coordinates across the CAA on the implications of development or deployment of CAA activities and resources, including responding to the ICAO GANP, and takes decisions on AMS support fund applications.
  - A steering/working group in support of airspace integration, reporting to the Airspace Modernisation Assurance Group, to develop a concept of operations

and roadmap for coordination with related workstreams, and helping to inform work on service delivery and charging.

- A review of the broader AMS governance structure groups' Terms of Reference to ensure consistency and identify any overlaps.

- At a strategic level, the recently formed CAA Sustainability Panel will provide guidance and challenge on our approach to airspace modernisation.
- Looking further ahead beyond publication of the refreshed AMS, the governance structure will be kept under constant review.

4. Funding and resourcing the broader modernisation envisioned by the AMS

- Many responses questioned or commented on how some delivery elements supporting the envisioned new integrated airspace would be funded, either seeking a user-pays approach or government funding.
- Existing users tended to say they should not fund, through current charges, work which was essentially for the benefit of new entrants.
- Where a delivery element has genuine stakeholder support, a standalone project will work through the detail of what the concept concerned looks like in practice, and to try to identify the funding stream to develop, implement and support it.
- This will not be achieved in time for publication of the refreshed AMS. It will need to be considered in parallel with other CAA activities, such as our economic regulation of NATS. Once proposals have been developed, we would expect to consult on them in due course.

5. Improving the General Aviation community's perception of modernisation concepts

- There were many negative responses from the recreational side of General Aviation, but these were varied; there was no overwhelming objection from multiple consultees to any one concept.
- There were various concerns about the 'right to roam', being funnelled between controlled airspace, impact of remotely piloted aircraft systems, or 'nothing in it for me'.
- Responses sought more detail on modernisation concepts, for example clarity about operating modes and frequencies for new services.
- Some appeared to misunderstand the modernisation concepts, for example they suggested that CAA was proposing national mandates for electronic conspicuity or flight plans, or that airspace reclassification or strict ICAO service provision required a significant increase in controlled airspace – none of which is the case.
- Working with the CAA's General Aviation Unit, we have drawn up a programme of further engagement with the General Aviation community. We will:

  - Produce a targeted infographic (see Appendix A) for the key elements listed below.
  - Elaborate on each element with additional detail including operating frequencies, modes, prospective procedures etc, with the caveat that these elements form part of a strategy and the detail will come with operational deployment.
  - Articulate how each element contributes to the AMS vision for future General Aviation and other Class G user operations.
  - Seek and act upon feedback received from the General Aviation community.
- The key elements are:
  - Radio Mandatory Zones in lieu of the current Aerodrome Traffic Zone, regardless of the licensed status of that airfield.
  - Surveillance Mandatory Zones (TMZs) in support of Flight Information Services provision for operations in Class G, including Global Navigation Satellite System (GNSS) approaches and beyond visual line of sight (BVLOS) remotely piloted aircraft system integration.
  - Enhanced airspace sharing arrangements through switchable airspace.
  - FIS-B (Flight Information Service – Broadcast) and TIS-B (Traffic Information Service –Broadcast) deployment.
  - UK Flight Information Services replacement
  - Flight plan data – voluntary submission and sharing of the intention of flight data.
  - Electronic obstruction beacons.

Missing drivers for change

- We did not identify any completely new drivers from the responses to question 2.
- In response to comments we will modify the text relating to one driver for modernisation (*meeting the demand for airspace, more sustainably).* We will explain that exploiting appropriate technology improvements will improve airspace efficiency and resilience to disruption and thus contribute to delivering government policy, including the environmental objectives set in relation to the CAA's air navigation functions.
- Under another driver (*encouraging aviation innovation to support UK economic growth)* we will note that it is important not to overlook the impact new types of airspace user may have on existing airspace users.

Missing stakeholders

- Some respondents identified additional stakeholders benefiting from or impacted by airspace modernisation which we will reference in Chapter 2 of the AMS Part 1 where practical. This included economic, societal or environmental impacts from new

types of aerial vehicle and related infrastructure; organisations responsible for public open spaces; State activities such as search and rescue or law enforcement; and other functions or organisations with a specific remit like weather information or wind turbines.

Document clarity and structure

- Some responses said the AMS was difficult to read or too complex. This is something that we take very seriously. The airspace modernisation programme is inescapably complex and, given the necessarily technical nature of the delivery elements, for it to have meaning we have to use technical language in some places. We will therefore review the document to ensure we are using plain English as far as we can, and that we have explained any unavoidable technical terms. We are planning to produce more accessible, simplified material to explain airspace modernisation and the masterplan, or to provide an overview with links to suitable explanatory material. An example is the targeted infographic for users of Class G airspace, in particular the General Aviation community (Appendix A).
- We have decided to keep the document in three parts because this more clearly separates the strategy from the delivery and deployment. Although this introduces some repetition in Part 2, this is to provide necessary context, and it means we can continue to change Part 2 as the means of delivery evolves without knock-on effects on Part 1.

Next steps

- Following consultation with the Secretary of State, we will publish a refreshed AMS 2023–2040 Part 1 (Strategic objectives and enablers) and Part 2 (Delivery elements). Part 1 will include an appendix about the AMS governance structure.
- We will continue work on delivery, including the existing programme and AMS Part 3 deployment plans, and in particular how to fund, deliver and oversee the broader modernisation envisaged by the refreshed AMS. In due course, as the Part 3 deployment plans are developed, we may need to consult on certain aspects of them. We have yet to determine the form of Part 3, but we envisage it as an online collection of plans that will be constantly evolving, rather than a single document.

Chapter 1

The consultation

Purpose of this document

1.1 Having carried out pre-consultation stakeholder engagement to establish an overall vision, the CAA ran a 12-week public consultation on a draft refreshed AMS from 10 January to 4 April 2022. The documents on which we consulted were AMS Part 1 Strategic objectives and enablers (CAP 2298a), and Part 2 Delivery elements (CAP 2298b) including a linked online database.[8]

1.2 This document sets out the outcome of the consultation. It has an executive summary of the changes we intend to make to the draft AMS and areas for further work, and two chapters:

- Chapter 1 summarises the consultation exercise, including its purpose and who responded.
- Chapter 2 summarises the questions we asked and our analysis methodology.
- Chapter 3 looks in detail at what the responses told us, including:
  - the key themes we identified from multiple-choice and free-text responses to the seven questions we asked
  - selected direct quotes from responses, where we have permission to publish
  - our conclusions from this analysis
  - the outcome of how we have taken this feedback into account in the refreshed AMS.

Next steps

1.3 In January 2023, following consultation with the Secretary of State, we plan to publish the refreshed Airspace Modernisation Strategy 2023–2040 as two documents:
CAP 1711 *Part 1 Strategic objectives and enablers*
CAP 1711a *Part 2 Delivery elements* (including a linked online database).[9]

1.4 We will continue work on delivery, including the existing programme and AMS Part 3 deployment plans, research activities in support of deployment, and in

[8] www.caa.co.uk/cap2298a and www.caa.co.uk/cap2298b. The consultation can be viewed at https://consultations.caa.co.uk/policy-development/draft-airspace-modernisation-strategy-2022-2040.

[9] These will in due course be available for download at www.caa.co.uk/cap1711 and www.caa.co.uk/cap1711a.

particular how to fund, deliver and oversee the broader modernisation envisaged by the refreshed AMS. In due course, as the Part 3 deployment plans are developed, we may seek stakeholder comments on certain aspects of them, although we will not necessarily do so in every case. The UK delivery elements will align with the ICAO GANP.[10]

1.5 We have yet to determine the form of Part 3. It will be collated in an online environment, depicting the development and deployment activities underway linked to the relevant plans, with progress reported through the AMS governance structure. Because it will be a collection of plans that is constantly evolving, we envisage that it will not form a single document.

1.6 We will continue to review and update the AMS in the light of ongoing developments, to measure progress against the delivery plans and in order to continue providing annual delivery reports to the Secretary of State.

1.7 These activities are subject to the oversight of the CAA's airspace modernisation oversight team. The output informs the CAA's annual progress report to the Secretary of State on the AMS, as well as the UK's progress reports to EUROCONTROL through the Local Single Sky implementation monitoring (LSSIP).[11]

Background

1.8 Four years ago, in December 2018, the CAA published an AMS Strategy to initiate a crucial programme of airspace modernisation to deliver a once-in-a-generation upgrade to a key piece of national infrastructure. The strategy is required by Direction 3(e) of the Air Navigation Directions to the CAA from the Secretary of State to ''prepare and maintain a co-ordinated strategy and plan for the use of UK airspace up to 2040, including modernisation''.[12]

1.9 The purpose of refreshing the 2018 AMS is:

---

10 The building blocks of the GANP are known as Aviation System Block Upgrades (ASBUs). The AMS will follow the ASBU deployment framework, aligned with the ASBU 'threads'.

11 For example, UK LSSIP 2020 https://www.eurocontrol.int/sites/default/files/2021-03/eurocontrol-lssip-2020-uk-level1_0.pdf. 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. https://www.eurocontrol.int/service/local-single-sky-implementation-monitoring

12 The Civil Aviation Authority (Air Navigation) Directions 2017, as amended by the Civil Aviation Authority (Air Navigation) (Amendment) Directions 2018 and the Civil Aviation Authority (Air Navigation) (Amendment) Directions 2019. The CAA has published a consolidated version of the Directions.

- to extend the strategy's focus from 2024 out to 2040, as required by the Air Navigation Directions (the need for which we recognised in the 2018 AMS)
- to take 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[13], advanced air mobility (aerial taxis) and spacecraft
- to aim for simpler airspace design and supporting regulations
- to treat sustainability as an overarching principle to be applied through all modernisation activities, taking account of the latest government policy and environmental guidance
- to meet the UK's international obligations, aligning delivery of the AMS with the ICAO GANP and ensuring interoperability of the UK network with neighbouring air traffic management areas, including providing a clear strategic path for rulemaking activities, now that the UK has left the EU and the European Union Aviation Safety Agency

all without undermining the initiatives from the 2018 AMS, delivery of which will continue, and which are subsumed into the refreshed AMS.

1.10 The refreshed AMS therefore pulls together the ICAO GANP, the 2018 AMS initiatives and also new requirements that the CAA identified through stakeholder engagement in 2021–2022.[14]

1.11 As required by the Air Navigation Directions, before the refreshed AMS is published, the CAA will consult the Secretary of State about its preparation and maintenance and the detail to be included in the delivery and deployment plans. The CAA also reports to the Secretary of State annually on the delivery of the AMS.[15]

---

13 Remotely piloted aircraft systems (RPAS) may be referred to as unmanned aerial vehicles (UAV), uncrewed aircraft, drones, model aircraft or radio-controlled aircraft. For more information see https://www.caa.co.uk/consumers/remotely-piloted-aircraft/our-role/an-introduction-to-remotely-piloted-aircraft-systems/.

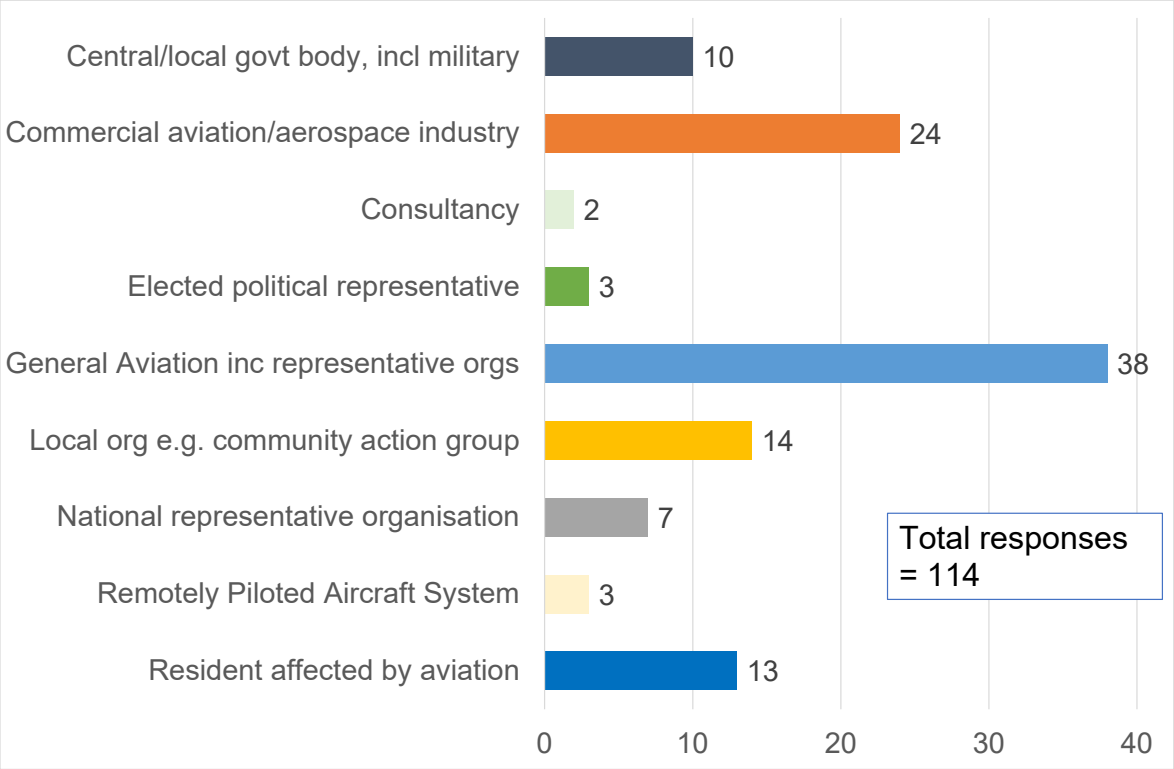
14 This engagement, which included numerous listening, feedback, requirements-gathering, co-creation and review group sessions, is described in CAP 2281 Airspace Modernisation – 2021 Progress Report www.caa.co.uk/cap2281.

15 These progress reports can be seen at www.caa.co.uk/cap1862 (2019), www.caa.co.uk/cap2016 (2020) and www.caa.co.uk/cap2281 (2021).

Who responded to the consultation exercise?

1.12 We had 114 responses in total, two thirds of which were from organisations and one third from individuals. We asked respondents to categorise themselves into one of ten categories. We asked that a respondent falling in more than one category choose the one that was most relevant to them answering about airspace issues. The results are shown in Figure 1.1.

Figure 1.1: Responses to the engagement exercise by category of respondent



1.13 Of the 114 respondents:

- The greatest number, 38, were from the General Aviation community, including representative organisations.
- 24 responses were from the commercial aviation/aerospace industry, including trade associations; of which 10 were from airports or air navigation service providers, six were from airlines, six were from commercial organisations related to new forms of airspace user, and two were from organisations representing flight crew.
- 14 responses were from local organisations, for example a community action group, airport consultative committee or forum.
- 13 responses were from residents affected by aviation.
- 10 responses were from a central/local government body including military.
- Seven responses were from a national representative organisation (excluding General Aviation organisations and industry trade associations), for example non-governmental organisations.

- Three responses were from an elected political representative, all of which were on behalf of parish councils.
- Three responses were from the remotely piloted aircraft system community
- Two responses were from aviation consultancies.
- There were no responses in the 'airline passenger' category (which is therefore not shown in any of the tables or figures in this document).

1.14 Three respondents in the 'General Aviation' category and one in the 'local organisation e.g. community action group' category appear to have submitted two responses each. Although we would normally remove duplicate responses, having reviewed these responses we noticed that the respondents answered the questions differently in each response. Given the small number involved we decided that removing responses from the tables and charts in this document would cause confusion and we have therefore included them all. However, this should be borne in mind when considering the number of responses shown in the chart above and the later analysis.

1.15 A more detailed list of respondents appears at the end of this chapter.

Geographic spread of responses

1.16 Of the 114 responses, 74 (65%) identified themselves as resident or based in the South East, the next two highest categories being East of England and the South West, both with nine responses (Table 1.1). We added a "non-UK" category to cater for the US Federal Aviation Administration and Ryanair. There were no responses categorised as Northern Ireland or the North East.

Table 1.1: Responses to the engagement exercise by geographic region

	South East	East of England	South West	East Midlands	North West	Scotland	Yorks and Humber	Wales	West Midlands	Non-UK
Central/local govt body, incl military	6	2				1				1
Commercial aviation/aerospace industry	19	2	1			1				1
Consultancy	1						1			
Elected political representative	1				1		1			
General Aviation	17	2	7	5	3	1	1	1	1	
Local organisation e.g. action group	12	2								
National representative organisation	4		1	1		1				
Remotely Piloted Aircraft System	3									
Resident affected by aviation	11	1			1					
Total	**74**	**9**	**9**	**6**	**5**	**4**	**3**	**1**	**1**	**2**

Stakeholder engagement

1.17 To help inform the content and strategic direction of the AMS refresh, we engaged extensively between November 2020 and November 2021 with around 150 individuals representing those using or impacted by the use of UK airspace and with an interest in modernisation. Having begun with listening and playback sessions, we published our AMS stakeholder engagement plan and process in June 2021.[16] We then held eight 'requirements gathering' workshops and, from a subset of the wider group, four 'co-creation' workshops on how to achieve the objectives ('ends') of the AMS, with a separate AMS review group to critique how we were interpreting the outputs. We followed these up with progress updates prior to the consultation launch.

1.18 Throughout 2021 the CAA in addition discussed or presented the development of the refreshed AMS at various stakeholder meetings or other forums, in particular those involving General Aviation given the broader focus of the refreshed AMS beyond commercial air transport and controlled airspace to include integration of other users. The CAA also maintained a continuous dialogue with the Department for Transport.

1.19 To encourage a wide engagement with the consultation itself, on the day of publication in January 2022, the CAA invited views from approximately 1,250 individuals and organisations through a direct email and a further 8,850 through the CAA's Skywise platform.

1.20 After the consultation closed, we continued our stakeholder engagement through our AMS Co-Creation and Review Groups. We have produced an infographic (see Appendix A) targeted at users of Class G airspace, in particular the General Aviation community, to clarify the AMS lower airspace vision. We plan to supplement this with further engagement.

List of respondents by category

General Aviation, including representative organisations (38)

- Aircraft Owners and Pilots Association
- Airspace4All Trust[17]
- British Gliding Association
- British Hang Gliding and Paragliding Association (BHPA)

[16] CAP 2175 *Airspace Modernisation Strategy Review: 2021 Stakeholder Engagement Plan and Process* www.caa.co.uk/cap2175.

[17] On behalf of British Balloon and Airship Club, British Gliding Association, British Hang Gliding and Paragliding Association, British Model Flying Association, British Microlight Aircraft Association, British Skydiving, Helicopter Club of Great Britain, Light Aircraft Association, PPL/IR Europe and Royal Aero Club of The United Kingdom.

- Large Model Association
- Light Aircraft Association
- The Bath, Wilts and North Dorset Gliding Club
- Three General Aviation businesses or organisations that preferred not to be identified
- 28 individuals.

Commercial aviation/aerospace industry including trade associations (24)

- Airlines UK
- Airport Operators Association
- ANRA Technologies UK Ltd
- Apian
- British Airline Pilots Association
- Edinburgh Airport Ltd
- Gatwick Airport Ltd
- Heathrow Airport Ltd
- Honourable Company of Air Pilots
- International Air Transport Association
- Joby Aviation
- NATS
- Oxford Aviation Services Limited
- Ryanair
- Vertical Aerospace
- Nine businesses which preferred not to be identified.

Local organisation for example a community action group, airport consultative committee or forum (14)

- Communities Against Gatwick Noise and Emissions (CAGNE)
- Heathrow Association for the Control of Aircraft Noise (HACAN)
- Plane Hell Action SE (PHASE)
- Richings Park Residents' Association
- Richmond Heathrow Campaign
- Stansted Airport Watch
- Teddington Action Group
- The Friends of Richmond Park
- Five local organisations that preferred not to be identified and one unofficial response on behalf of a local organisation.

Resident affected by aviation (13)

- Mottram St Andrew Parish Council
- 12 individuals.

Central or local government body including military (10)

- Essex County Council
- Federal Aviation Administration
- Heathrow Strategic Planning Group
- Local Authorities' Aircraft Noise Council (LAANC)
- Ministry of Defence
- St Albans City and District Council
- Four central or local government bodies that preferred not to be identified.

National organisation (excluding General Aviation organisations and industry trade associations), for example non-governmental organisations (7)

- Aviation Environment Federation's Airspace and Noise Community Forum
- Future Aviation Industry Working Group on Airspace Integration (FAIWG-AI)
- Met Office
- RenewableUK
- Royal Aeronautical Society
- Royal Mail Group
- Royal Town Planning Institute.

Elected political representative, for example councillor or MP (3)

- Prestbury Parish Council
- two parish councils which preferred not to be identified.

Remotely piloted aircraft system (3)

- Skyports
- Tethered Drone Systems Ltd
- Wing Aviation LLC.

Consultancy (2)

- Two aviation consultancies which preferred not to be identified.

Chapter 2

Consultation questions and analysis methodology

Overview

2.1 This chapter includes:

- a reminder of the seven questions we asked in the consultation
- the methodology we used to identify key themes from free-text responses to all seven questions we asked
- how we handled responses submitted by email rather than our online consultation platform
- how we handled material that was out of scope.

Consultation questions

2.2 Our consultation asked seven questions, five of which were in a multiple-choice format with space for supporting free-text comments giving views or supporting rationale, and two of which were free text only. The questions were:

Views on the overall strategy

Question 1: Do you agree with our overall approach in the refreshed Airspace Modernisation Strategy? *[multiple choice]*

☐ about right ☐ minor modifications needed
☐ major modifications needed ☐ don't know

If you wish, please explain your answer using the box below. *[free text]* You may, for example, want to consider whether our strategic vision for airspace modernisation out to 2040 is fit for purpose, and give us views on the four strategic objectives we have identified (safety, integration, simplification and sustainability).

Please note that we are not seeking views on matters of government policy, over which we have no direct control. For example, the CAA must follow government policy and guidance on environmental objectives setting out how aviation-related environmental impacts should be considered.

Nor are we seeking views on the CAP 1616 airspace change process, or on specific airspace changes or change proposals.

We will not take into account elements of responses to this consultation that we consider to be out of scope.

Question 2: Have we captured the drivers for change adequately in Part 1, Chapter 2? *[multiple choice]*

☐ yes ☐ no ☐ don't know

If no, please describe what is missing or needs amendment and how this might require a change to the draft strategy. *[free text]*

Question 3: Have we identified the right stakeholder groups in Part 1, Chapter 2? *[multiple choice]*

☐ yes ☐ no ☐ don't know

If no, please describe the missing group. *[free text]*

Views on the delivery 'elements'

Question 4: What are your views on the nine delivery 'elements'?

The nine delivery 'elements' are in Tables 4.1, 4.2 and 4.3 in Chapter 4 of Part 1 of the strategy, with more detail in Part 2 and the linked database. In Chapter 5, we also describe five illustrative use cases relating to different aspects of modernised airspace in the 2030s from the perspective of different stakeholders.

The delivery elements are:

☐ about right ☐ minor modifications needed
☐ major modifications needed ☐ don't know

If you think modifications are needed, or that something is missing, please explain this below. *[free text]*

Question 5: Part 3 of the AMS will cover who is responsible for deploying the delivery 'elements' and related activities, and how. At this early stage, what are your views on any requirements we should have for those tasked with the deployment of those elements and activities? *[free text]*

Views on AMS governance

The 2018 Airspace Modernisation Strategy, including its delivery and governance structures, was mostly focused on commercial air transport, controlled airspace and larger air navigation service operations. Our refreshed strategy proposes adding new areas of focus, in particular around integration, for example:
– seamless integration of beyond visual line of sight drone operations
– a Lower Airspace Service to better support both self-management of piloted VFR (Visual Flight Rules) aircraft and drone operators in Class G airspace
– flight progress information-sharing to facilitate increased VFR access to Class D airspace
– an improved Class G structure
and so on.

However, not all of these new areas of focus sit readily with the current strategy's delivery and governance, and by inference funding, structures.

Currently, aside from the UK Flight Information Service provided to meet ICAO obligations, and specific arrangements for the North Sea, aircraft outside controlled airspace are either:

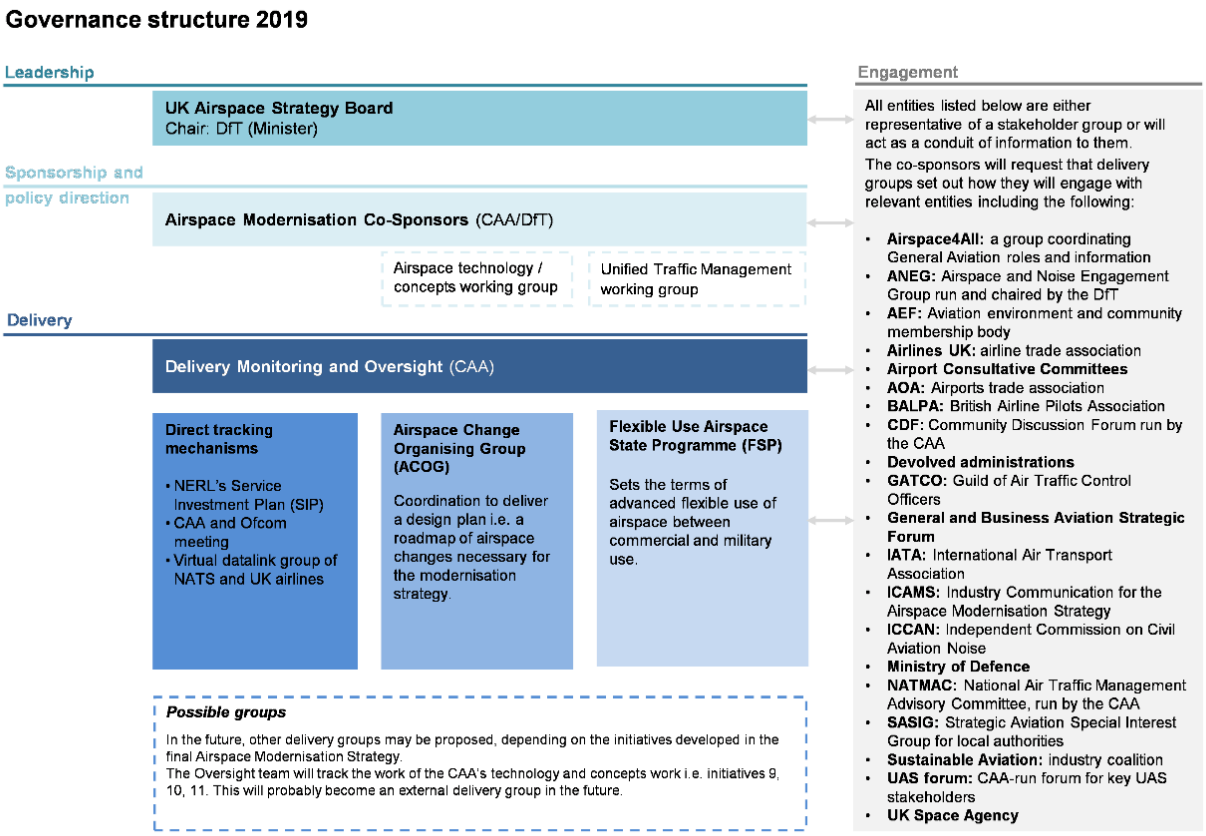
– not receiving a service (relying on a traditional 'see and avoid' means of deconfliction), or
– benefiting from navigation aids and/or air traffic services that are already established for commercial or military users.

The CAA recognises that there has to be a fair and equitable funding model for users of a modernised airspace.

We would expect to consult on this separately in due course, subject to advice from the Government. With this in mind you may want to tell us how we should alter the AMS governance structure in the meantime, including any thoughts on future approaches to funding. We have asked two questions below.

Question 6: How effective has the AMS governance structure been, for example in terms of overseeing delivery of the strategy, stakeholder engagement or transparency?

Below is the governance structure we last published in CAP 1862 in December 2019, which itself updated the original 2018 CAA/Department for Transport governance annex CAP 1711b. Further changes have occurred in the last two years.



The existing governance structure has been:

☐ effective ☐ generally effective but lacking in some areas
☐ wholly or mostly ineffective ☐ don't know

Please explain the reasons for your answer. We are particularly interested to know:

– whether it is clear to you who has been responsible for what
– whether we had the right delivery groups
– whether they have been properly funded.

Question 7: The refreshed strategy is broader in scope. What changes to governance are needed to deliver the broader strategy, including future approaches to funding?

We are particularly interested to know:

– whether the structure needs to change
– whether the co-sponsors need to do anything differently
– whether any new stakeholders not identified in the existing governance structure need to be added.

For example:

– to help with delivery of Part 2 of the strategy, we might consider introducing a Deployment Steering Group made up of industry representatives at operations director level
– to help deliver airspace integration we might consider introducing an Integration Steering Group overseeing separate working groups on beyond visual line of sight operations for drones, service provision, airspace structures etc.

Responses submitted by email

2.3 Of the 114 responses we received, 11 were submitted by email rather than through our consultation website (a further three submitted both a response via the consultation website and additional material by email). Six of the 11 email-only submissions were not arranged in our question format and so gave no answer to individual questions. Therefore, they are shown as 'not answered' in our analysis of answers to the multiple-choice questions. We consider the points they raised in our qualitative analysis of free-text responses. Where responses were arranged in our question format, we were able to analyse them in the same way as those submitted via the consultation website.

Methodology for analysing free-text responses

2.4 We used a basic qualitative research method to analyse the free-text responses. To identify key themes, three members of CAA staff each read around 20 responses in full, listing the topics, concerns and comments raised within them. These lists were then discussed and consolidated, creating a list of themes identified by unique tags. Two members of CAA staff then read all the responses and tagged sections of the free-text responses with appropriate themes. Where

specific recommendations or suggestions were made on technical issues or specific delivery 'elements', these were drawn to the attention of relevant subject-matter experts. Because some questions were very specific, we created a different list of themes for some questions and if necessary cross-referenced and/or moved response text between questions where that text related to (and was therefore more appropriately analysed under) a different question.

2.5 This method ensured that:

- every individual response was read from start to finish by one or more members of CAA staff
- the themes we discuss in Chapter 3 were generated by the respondents in their free text responses – they were not pre-identified by the CAA but are the key themes raised directly by the respondents themselves
- key themes emerging in each response were analysed quantitatively so that we could establish how many respondents, and of which stakeholder group, raised a particular topic or concern, and
- for each theme we could read the related extract from any responses tagged with that theme.

2.6 If a respondent raised the same theme in several questions, each instance was counted, but each theme was only counted once per question, per response. For example, if a respondent mentioned 'safety' once in response to a question, that counts as one instance; if they mentioned it three times in response to that question, it was still counted as one instance.

2.7 Stakeholder groups were not evenly represented in terms of numbers, so where there are differences of opinion between different groups, we have avoided focusing on the overall percentage of respondents favouring or criticising a particular aspect of the draft AMS. Instead, we consider how individual stakeholder groups have responded and whether they are split as a group or in disagreement with other groups.

Matters out of scope

2.8 A significant number of responses included comments that were out of scope of the consultation. Our consultation website set out clearly what we were seeking views on and what we were not:

What are we asking?

The CAA would like to hear your views on a draft of our refreshed Airspace Modernisation Strategy 2022–2040, which will replace the existing Airspace Modernisation Strategy (CAP 1711) that was published in December 2018.

The strategy will now be in three parts, plus an annex. We are seeking your views on drafts of **Part 1** CAP 2298a and **Part 2** CAP 2298b, and on what changes are needed to the annex explaining the strategy's governance structure, currently CAP 1711b. (Part 3 will be published later on, once we have heard views on these.)

What are we not asking?

Please note that we are not seeking comments on matters of government policy, over which we have no direct control. For example, the CAA must follow government policy and guidance on environmental objectives setting out how aviation-related environmental impacts should be considered.

Nor are we seeking views on the CAP 1616 airspace change process, or on specific airspace changes or change proposals.

We will not take into account elements of responses to this consultation that we consider to be out of scope.

2.9 We have read all comments that were out of scope of the consultation. We have published them where we had permission to do so, and where relevant drawn published responses to the attention of the relevant CAA department or the Department for Transport.

Chapter 3

Analysis of the responses

3.1 In this chapter we consider in detail what the responses told us. You can read individual responses, where we had permission to publish them, on our consultation website.[18]

3.2 This chapter includes:

- an analysis of responses to the five multiple-choice questions
- an analysis of free-text responses to each question (we have grouped questions 4 and 5 and questions 6 and 7 together)
- the areas where there was broad support for the strategy
- the key themes we identified from responses telling us that more work was needed, which we have grouped under eight headings
- direct quotes from responses, where we have permission to publish
- our conclusions from this analysis, how we will take this feedback into account in the refreshed AMS, and what principal challenges remain.

Question 1: Do you agree with our overall approach in the refreshed Airspace Modernisation Strategy?

Overview

3.3 Below we summarise the responses to the multiple-choice questions and our analysis of the accompanying free-text comments.

3.4 Overall, we did not see anything in the responses that led us to make fundamental changes to the approach we proposed in the refreshed AMS. As explained below, there were some significant challenges. The majority of those challenges were either outside the remit of the AMS and this consultation (such as Government environmental policy); arose from a misunderstanding of our proposed lower airspace concepts (for example, suggesting that we had proposed significantly increasing the volume of controlled airspace, which was not the case); or they concerned delivery mechanisms, where we recognise that much work remains to be done, but this will form part of the next stages as the deployment plans forming AMS Part 3 (deployment) are developed. We needed to set the overall strategy first.

[18] https://consultations.caa.co.uk/policy-development/draft-airspace-modernisation-strategy-2022-2040

Multiple-choice responses to question 1

3.5 This multiple-choice question invited a response of **about right** / **minor modifications needed** / **major modifications needed** / **don't know** as to whether the respondent agreed with our overall approach.

3.6 The outcome is shown in Figure 3.1 and Table 3.1 below. Although we do not treat the consultation results as a referendum, in respect of our overall approach, of the 114 responses:

- 54 said it was about right or only minor modifications were needed (47.5%)
- 45 said major modifications were needed (39.5%)
- 15 said they didn't know or chose not to answer the question (13%).

3.7 In terms of specific category of respondent, the 45 responses saying major modifications were needed came from:

- central/local government – 5 of 10 responses (50%) – five were from local government bodies, of which two were parish councils, two were organisations largely comprising local authorities with a focus on Heathrow's environmental impacts, and one did not wish its name to be published
- commercial aviation industry – 2 of 24 responses (8%)
- General Aviation community – 14 of 38 responses (37%)
- local organisations such as community action groups – 13 of 14 responses (93%)
- national representative organisations such as non-governmental organisations – 1 of 7 responses (14%) – which was from a national environmental campaign group
- residents affected by aviation – 10 of 13 responses (77%)

(none of the eight responses from consultancies, elected political representatives or remotely piloted aircraft systems said major modifications were needed).

3.8 Further analysis of those 45 responses showed that, where reasons were given, those from residents, local organisations, a national environmental campaign group and local government bodies were mostly expressing environmental concerns over the Government's environmental policy and its interpretation, rather than the overall approach of the AMS itself. (We discuss the free-text themes in the next section, including sustainability and the interpretation of government policy.)

3.9 One of the five local government body responses saying major modifications were needed was primarily concerned with the delivery of AMS technical concepts relating to new types of airspace user. The other five of the 10 local

government body responses said the overall approach was about right or minor modifications were needed.

3.10 There were in total 38 responses from the General Aviation community, expressing mixed views; 16 said the overall approach was about right or minor modifications were needed, and, as noted above, 14 said major modifications were needed. Analysis of those 14 responses showed that, where reasons were given, concerns were principally around airspace access, the CAA not properly taking into account the needs of non-commercial aviation, or the outcome of past CAA airspace change decisions (which were out of scope of the consultation). We believe the majority of these concerns arise because of proposed AMS concepts being misconceived. For example, it is not the intent of the AMS to routinely increase controlled airspace, as some respondents assumed.

3.11 Of the 24 commercial aviation industry responses, 20 said the approach was either about right or minor modifications were needed. Two said major modifications were needed, those being from NATS and Ryanair. Their comments were mainly focused on how to deliver the AMS and its elements (which will form part of the next stages as AMS Part 3 deployment plans are developed) rather than disagreeing with the strategic approach. None of the responses from consultancies, elected political representatives and remotely piloted aircraft systems (11 in all) said major modifications were needed.

Figure 3.1: Multiple-choice responses to question 1 (overall approach)

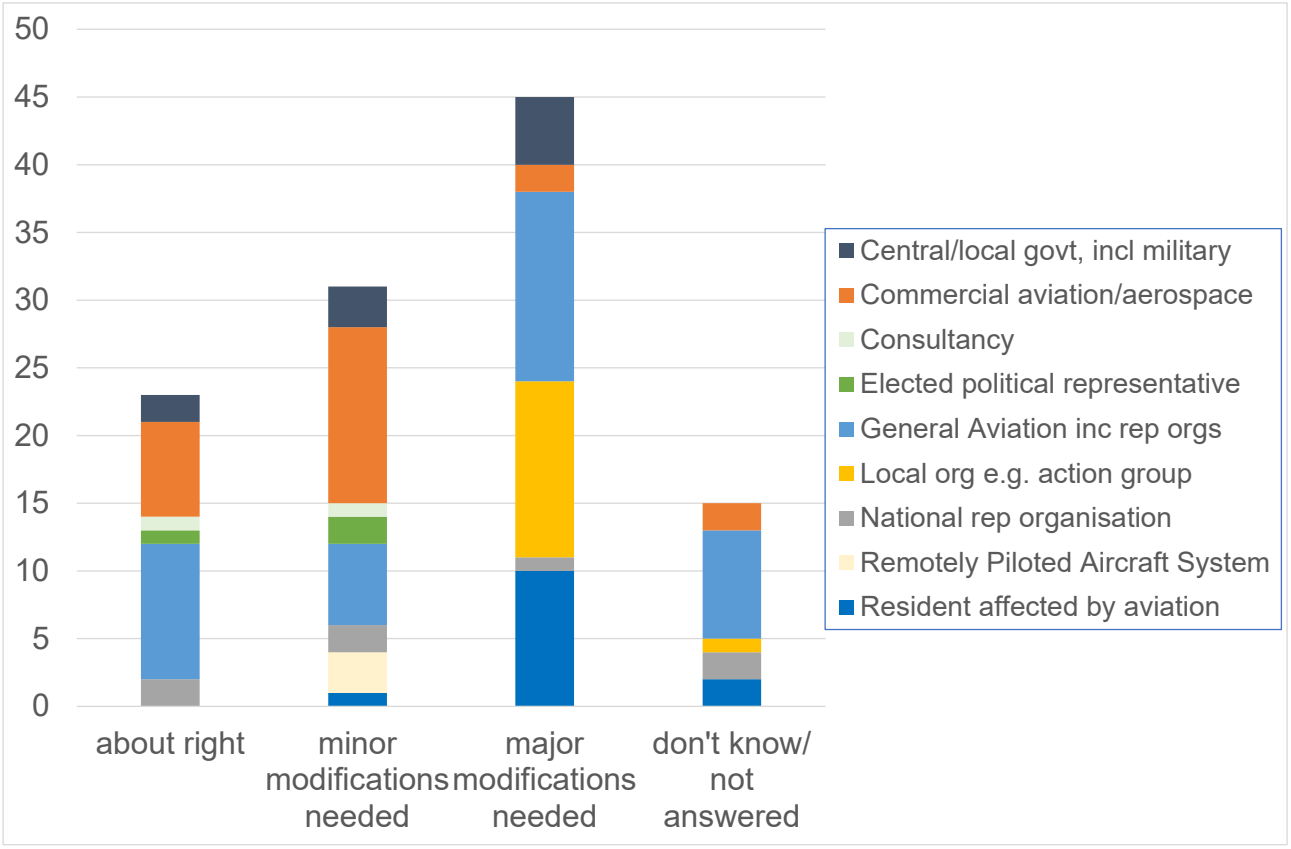


Table 3.1: Multiple-choice responses to question 1 (overall approach)

Respondent category	a about right	b minor mods needed	c a + b	d major mods needed	e don't know/ not answered	f total	g a + b / total
Central/local govt body, incl. military	2	3	5	5	0	10	50%
Commercial aviation industry	7	13	20	2	2	24	83%
Consultancy	1	1	2	0	0	2	100%
Elected political representative	1	2	3	0	0	3	100%
General Aviation community	10	6	16	14	8	38	42%
Local org e.g. community action grp	0	0	0	13	1	14	0%
National representative organisation	2	2	4	1	2	7	57%
Remotely Piloted Aircraft System	0	3	3	0	0	3	100%
Resident affected by aviation	0	1	1	10	2	13	8%
Total	*23*	*31*	*54*	*45*	*15*	*114*	47%

Note to Figure 3.1 and Table 3.1: One national organisation, the Aviation Environment Federation, did not answer question 1, but during subsequent engagement they asked us to treat their response as meaning 'major modifications needed' for the purposes of this table. Three other responses, from two local government bodies and one local organisation, also did not answer question 1, but their responses explicitly supported the AEF response. We have therefore amended all four responses to 'major modifications needed' in Figure 3.1 and Table 3.1. Our consultation website shows these four responses as originally submitted, i.e. as question 1 'not answered'.

Free-text responses to question 1

3.12 We invited respondents to explain their answer to question 1, using free text. We suggested that they may, for example, want to consider whether our strategic vision for airspace modernisation out to 2040 is fit for purpose, and give us views on the four strategic objectives we had identified (safety, integration, simplification and sustainability). Below we summarise these free-text responses to question 1, both in terms of where there was general support for the strategy and where more work is needed.

Areas where free-text responses showed general support for our overall approach

3.13 Analysis of the free-text responses showed that 38 respondents answering question 1 made an explicit positive comment in support of the overall approach, direction or vision of the refreshed AMS. Most of these were from commercial industry (18), General Aviation (10) and national organisations (3). (Many of these responses also suggested improvements, which we will take into account.)

3.14 The most common themes raised among these supportive comments were:

- that the refreshed AMS sets out a long-term strategic direction out to 2040
- support for the overall vision and the four strategic objectives

- that sustainability was an overarching principle applied through all modernisation activities, with some responses saying that this was key, after safety
- that the refreshed AMS was incorporating the latest developments in technology and innovation to facilitate modernisation, for example:
  - enabling integration of new and existing users, including future-proofing
  - exploiting greater aircraft capability
  - moving to performance-based navigation (although some community groups opposed this)
  - use of electronic conspicuity, although some General Aviation respondents said this must not be mandated[19]
  - welcoming the greater focus on lower airspace, including a new Lower Airspace Service and bringing Flight Information Service into line with the ICAO/international approach and maximising access to airspace, including using flexibly managed airspace.

3.15 Other supportive themes mentioned were:

- that the strategy would require strong commitment and management from those involved in delivery
- consistent alignment with ICAO standards and recommended practices /procedures, while incorporating existing modernisation initiatives
- good quality and extensive CAA pre-engagement with stakeholders on drafting a refreshed AMS, which should continue
- our proposal to use the AMS to drive relevant UK rulemaking activity now that the UK has left the EU.

3.16 There was limited comment about the restructuring of the document separating the main strategy (Part 1) from the delivery elements and deployment plan (Parts 2 and 3), in the form of some support but also some concerns around repetition, complexity and clarity. There were specific questions about the nine delivery 'elements' which attracted some very detailed answers, but overall the impression was that these captured all the key areas with appropriate detail, albeit complex.

Quote

"Heathrow welcomes the value of the refreshed Airspace Modernisation Strategy (AMS) and would firstly like to acknowledge and thank the considerable efforts that have contributed to the update, including the inclusive methods deployed to gather input into the content through pre-consultation working groups."
[response from Heathrow Airport]

[19] The draft refreshed AMS did not propose mandation.

Quote

"AMS Parts 1 and 2 provide a valuable enhancement to the 2018 AMS, with due consideration given to the evolution of airspace users and technological developments. NATS supports many aspects of the AMS:
** Safety as the highest priority*
** A single integrated airspace for all*
** Progression towards automation*
** The requirement for electronic conspicuity*
** Incorporation of the previous set of AMS milestones agreed in 2018*
** Alignment with the ICAO GANP structure"*
[response from NATS]

Quote

"We broadly agree with the Vision and Approach using Ways, Means and Ends. We broadly agree with the listing of Policies on which to base the Strategy."
[response from Richmond Heathrow Campaign]

Quote

"The draft AMS does indicate CAA intent for a more efficient and positive future for all airspace users."
[response from British Gliding Association]

Areas where free-text responses suggested that more work was needed on our overall approach

3.17 The responses to question 1 differed considerably between stakeholder groups. In each case we have looked at the free-text responses to understand the views of respondents and whether we should in the light of those make appropriate changes to the AMS. Where free-text responses were suggesting that more work was needed on our overall approach, our analysis grouped individual comments by theme, and under the following eight specific headings.

- A: Overall policy approach
- B: Delivery and deployment: who, how and with what resources
- C: Sustainability
- D: Airspace integration and deployment technology
- E: Alignment with ICAO or Europe
- F: Airspace structure or access
- G: Airspace change process (CAP 1616)
- H: Document clarity and consultation engagement

A: Overall policy approach

3.18 Under this heading we include negative comments about the direction or vision of the refreshed AMS or what it has not taken into account.

Responses	Detail	CAA comments
33	Responses with this theme came mostly from commercial industry (12), General Aviation (11), local organisations (4) and national organisations (3). The strongest theme concerned the timeline of the AMS and its implementation; seven responses from across the respondent categories stressed that there needed to be more urgency in the delivery of the AMS, with greater use of existing technologies. A few responses were concerned that extending the AMS out to 2040 would further delay implementation of existing initiatives where progress so far had been modest at best. One respondent suggested extending it to 2050 to align with the Net Zero target and the Jet Zero Strategy. Three responses suggested that, post-COVID-19, a more up-to-date assessment of the need for modernisation was required. Four responses suggested that we prioritise the AMS strategic objectives. Some responses suggested that the AMS was missing strategic objectives: resilience to disruption (3 responses), noise reduction (2) and supporting innovation (1). Also, three responses suggested that simplification should be replaced by efficiency, which was more appropriate to the objective. One commercial industry and one national organisation response said that the AMS needed to more clearly define tangible outcomes, and to include a holistic overview of how it will be delivered. Two General Aviation responses said that the strategy lacked an implementation plan. One national organisation and one remotely piloted aircraft system response said that with a focus on interoperability, comprehensive, clearer regulation and policy guidance was needed on the technologies, communications and cybersecurity aspects. Seven responses expressed concern that the differing needs of all types of non-commercial aviation are not fully represented in the AMS, or that certain aspects will have a more negative impact on particular types of General Aviation.	The CAA and Department for Transport as co-sponsors have repeatedly reaffirmed our commitment to the airspace modernisation programme, which is long overdue and which will become more pressing as traffic levels recover. We acknowledge the necessity, but also the challenges, of regaining the programme's momentum. We acknowledge that the Government's Jet Zero Strategy runs to 2050, and the AMS will both complement it and continue to evolve. However, it is appropriate for the AMS to stay with 2040, because: – the CAA has been given a duty by the Secretary of State in the Air Navigation Directions to prepare and maintain its AMS up to 2040 – the masterplan commissioned from ACOG by the co-sponsors of airspace modernisation therefore also adopts 2040, the timescale written into Condition 10a of the NERL air traffic services licence – the Aviation System Block Upgrades (ASBU), designed to meet the objectives of the ICAO GANP, with which the AMS is aligned, are sequenced in five-year blocks; furthest in the future is currently GANP Block 4, which extends only from 2033 to 2038. In addition, the CAA reviews the AMS regularly, including the current timescales for the strategy, in order to report to the Secretary of State annually on its delivery and to measure progress against the delivery plans. In the engagement sessions prior to drafting the refreshed AMS we repeatedly heard concerns that existing modernisation initiatives should not be undermined or changed, which we have fully taken on board. A number of responses suggest that more information is needed on delivery and deployment, in particular how it will be achieved, by whom and with what funding and resources. We acknowledge that much work remains to be done, but this will come as the deployment plans in AMS Part 3 are developed; we need to set the strategy first. We did not see any indication that fundamental change to our overall strategic approach in the AMS is needed. Work on the

Responses	Detail	CAA comments
		fundamentals needed for developing an integrated airspace is underway. The refreshed AMS treats sustainability as an overarching principle to be applied through all modernisation activities. We make this clearer by including it in the strategic objectives shown in AMS Figure 1. Resilience to disruption is already noted as part of the simplification objective. We recognise the desire for reducing aviation's noise impacts. The strategic objectives state that airspace modernisation will deliver the Government's key environmental objectives with respect to air navigation as set out in the Government's Air Navigation Guidance. We explain more under 'sustainability' below. Our choice of 'simplification, including efficiency' as a strategic objective was to recognise calls for less complexity while integrating all users into the limited airspace resource. We have a statutory duty under section 70 of the Transport Act 2000 when exercising our air navigation functions "to secure the most efficient use of airspace consistent with the safe operation of aircraft and the expeditious flow of air traffic". We undertook extensive pre-engagement with General Aviation stakeholders prior to the consultation and will continue with this engagement to explain how we have taken these views into account.

Note: In this and subsequent tables, while each response may have multiple themes, multiple mentions of the same theme within a given response to question 1 are counted only once.

Quote

"…The 2018 AMS initiatives must be delivered as a priority in order to modernise the majority of UK controlled airspace via FASI. The AMS must maintain focus on, and further enhance, the current objectives relating to current airspace users in parallel with development of the airspace infrastructure to accommodate new airspace users. Without an initial focus on the current airspace structures for current users, the evolution of airspace for new users will be built on a foundation of sub-optimal efficiency and flexibility." [response from NATS]

Quote

"The planned timescale is too long and should identify quicker wins from 'low hanging fruit' for more immediate attention."
[response from member of the General Aviation community]

Quote

"Many of the issues raised in our letter are ones we have been seeking to engage on constructively for a long time. We are disappointed that no meaningful progress has been made and that in some cases the Department appears to be uninterested in seeking solutions that all parties might be able to support. Without change in these areas we do not believe the programme is fit for purpose and we are not able to support it." [response from Aviation Environmental Federation Airspace and Noise Community Forum]

Quote

"We fully agree that 'safety, integration, simplification, and sustainability' is the correct overall objective, however, moving the strategy end date out to 2040, we feel this increases the risk that many of the urgent needs to improve the current system are also slipped to a later date. […] We must move away from the 'last-mover' principle and step up the pace of change." [response from easyJet]

Quote

"The above CAA and FAIWG-AI aims will not be met if the elements within the AMS and implementation plan are not driven with urgency. The time in which to deliver the change to support these markets is very short. It will require resource, regular senior review and a willingness to break through the inertia across industry and public agencies. Therefore, if there is one single message that we wish the CAA to take away from this consultation, it is that the strategy needs to be delivered and maintained with urgency." [response from Future Aviation Industry Working Group on Airspace Integration (FAIWG-AI)]

Quote

"It is important to ensure that the objectives are listed according to priority, and that is made explicit. For example safety is always (1), but what would be (2) so we as users do not have to second-guess against competing objectives. [We propose] that this should be: 2) Environmental Sustainability 3) Efficiency of the airspace which by default would drive 4) Integration of diverse users" […] …there is a need for an explicitly stated 5th objective for the CAA to support innovation and make that an objective." [response from a commercial industry association]

Quote

"Simplification could simply be replaced by Efficiency. Whilst Simplification can drive a range of benefits - including better efficiency and most significantly improved safety outcomes - it should not be an objective in and of itself. Rather the Transport Act Section 70 includes efficiency (among the four primary objectives of the legislation) and we believe that this is a more appropriate descriptor ie simplicity may drive efficiency." [response from Gatwick Airport Ltd]

Quote

"There appears to be some inconsistency regarding priorities for action. While safety is correctly identified as the first priority, the order of priority of the other objectives is inconsistently referenced and applied. We believe that the CAA should adhere to the following order of priority: safety, sustainability, simplification and integration. Our rationale for this is that, after safety, the government's objectives are focussed on the environment (e.g., jet zero and climate change targets). However, we caution against singling out the environmental sustainability objective as something the modernisation programme will deliver. It would be prudent to couch this objective in similar terms to the others as something that the programme should deliver."
[response from the Royal Aeronautical Society]

Quote

"Detail within the draft AMS suggests a disconnect between those positive AMS concepts and what ATC experts are inputting into the strategy. For example, much of the draft AMS delivery appears to be predicated on aircraft using an ATC service, which is counter to the view that the strategy should where possible be facilitating the removal of the need to be tied to an ATC service." [response from British Gliding Association]

B: Delivery and deployment: who, how and with what resources

3.19 Although this theme was often raised in response to question 1, we have addressed these comments under questions 6 and 7 later in this document, since they concern issues of delivery and governance. Examples were how to fund the programme; equitable charging for airspace use under the user-pays model; whether state-sponsored change is needed; and whether ACOG's role should be broadened, clarified or better governed.

C: Sustainability

3.20 Environmental impacts were by far the most commented on topic – they were mentioned by 49 of the 114 responses to the consultation. Four responses from that 49 said that the overall approach to the AMS was **about right**. (See also our analysis of question 2 below where environmental impacts were cited as a missing driver for airspace modernisation.) Table 3.2 below shows the number of responses mentioning a theme under this heading and Table 3.3 below shows how we broadly categorised those themes.

Table 3.2: Themes relating to sustainability by respondent category

Respondent category	Noise impacts	Non-noise impacts	ICCAN transfer	Over-arching principle	Trade-offs/ shared benefits	Environ-ment Act 2021	*Total*
Central/local govt body, incl military	2	3	-	2	3	2	*12*
Commercial aviation industry	2	7	1	2	7	-	*19*
Consultancy	-	-	-	-	-	-	*0*
Elected political representative	2	2	-	1	1	-	*6*
General Aviation community	-	2	-	-	-	-	*2*
Local org e.g. community action grp	8	7	4	6	6	6	*37*
National representative organisation	1	2	-	2	1	-	*6*
Remotely Piloted Aircraft System	-	1	-	-	-	-	*1*
Resident affected by aviation	6	6	-	3	4	1	*20*
Total	*21*	*30*	*5*	*16*	*22*	*9*	*103*

.

Table 3.3: Summary of typical comments made for themes relating to sustainability

Theme	Typical comments relating to themes in Table 3.2
Noise impacts	Concern expressed about government policy on noise / noise impacts / impacts on health including requiring more evidence / metrics used / altitude-based priorities in the Air Navigation Guidance / impacts of introducing performance-based navigation / dispersal and respite / cumulative impacts / night flights / noise preferential route swathes / compensation
Greenhouse gas impacts	Concern expressed about emissions / climate change / more explicit reference to Net Zero
Other environmental impacts	Concern expressed about local air quality / area of outstanding natural beauty or public space / visual intrusion / tranquillity / unspecified environmental impacts
ICCAN transfer	Negative comment about the transfer of ICCAN (Independent Commission for Civil Aviation Noise) responsibilities to the CAA / suggesting conflicts of interest within the CAA / unfinished ICCAN work
Overarching principle	'Overarching principle' not properly incorporated in AMS / all levels of AMS deployment must include sustainability responsibility / unclear what 'overarching' means or how it impacts design or the delivery elements / need to include benefits of advanced air mobility and interaction with wind turbines as part of overall energy system / relation to and obligations under applicable law and policy need referencing. AMS does not comply with obligations and will fail in the medium-long term / environmental sustainability should be a separate delivery element / more explicit language focusing on reducing impacts rather than managing, minimising, taking into account etc / in defining sustainability as a strategic objective, the AMS positions it as an 'end', whereas it is a boundary condition that the CAA must adhere to under the Air Navigation Guidance.
Trade-offs/ shared benefits	Clarity required on the application of trade-offs, including Air Navigation Guidance wording, or priority of objectives (from government or CAA) / modernisation benefits not shared with communities, trade-offs inappropriate, focus is on capacity increases over environment and community health / Air Navigation Guidance does not make provision for the CAA to make "trade-offs", as stated in AMS para A18 / AMS should capture more than the Air Navigation Guidance (climate adaptation, net zero) / need to acknowledge safety/sustainability indicators from other industries/sectors
Environment Act 2021	Specific mentions of the omission of, or need to align or comply with, obligations in the Environment Act 2021 such as strengthening the framework and stakeholder liaison in respect of the management of local air quality.

Quote

"For sustainability to be a true overarching principle, there must be a description of how each delivery element is responsive to sustainability." [response from NATS]

Quote

"…we do not believe that the legislative and regulatory processes through which modernisation is currently being progressed will deliver the Government's aircraft noise policies. Instead our analysis suggests that the programme is currently systematically biased in favour of achieving the outcomes the industry is seeking (primarily more capacity and lower costs) at the likely expense of achieving the outcomes communities are seeking (primarily reduced noise and emissions) in a manner and to an extent that is not consistent with the Government's own policies. […] In our view there is a clear contradiction between government policy and the draft modernisation strategy and the masterplan.

Government policy says that, as a general principle, "the industry must continue to reduce and mitigate noise as airport capacity grows". It is clear that modernisation will increase potential airport capacity. In some cases, such as Belfast International, Gatwick, Glasgow and Manchester it will increase actual airport capacity because those airports have no capacity restrictions. Even at airports with capacity caps the planning system has generally failed to deliver this policy principle when airports grow. Because the planning system cannot be relied upon to deliver this key policy, the Government should take additional steps to ensure it is achieved in the context of airspace modernisation, as well as more generally.

Neither the CAA's draft strategy nor ACOG's masterplan reference or acknowledge this key element of government policy. Neither document provides any evidence that the policy will be delivered in the context of airspace modernisation. And neither body has explained what steps they will take to ensure it is delivered. […] We recognise that neither the CAA nor ACOG control airport capacity or set policy. However, we are surprised that both bodies feel able to publish documents containing proposals the implementation of which would be likely to result in breaches of government policy. In our view they are not policy compliant in this respect."

[response from Aviation Environment Federation's Airspace and Noise Community Forum]

Quote

"Over the last 20 years, there has been (and continues to be) a rapidly increasing public demand, seen in every developed country, for reducing the environmental impact of all economic activity and especially transport. For aviation this includes noise and its impact on mental health and biodiversity; aircraft CO_2 emissions and their impact on climate change and biodiversity; and aircraft NOx emissions and their impact on air quality. The aviation industry has continually been 'behind the curve' of this trend and, in our view, the refreshed AMS is still behind it. The AMS contains more on environmental impacts than previous documents, and we understand the complexity of delivering such a momentous change in UK airspace. However, the

AMS and its process/governance still gives insufficient weight to environmental considerations with the result that the AMS process will fail to ensure compliance with Air Navigation Guidance 2017 (ANG17). Aviation has an implicit 'licence to operate' granted by the public who give it their acceptance and support. In return, the AMS should be an opportunity for the industry to provide real environmental benefits, as a good in itself and to strengthen public support. If the refreshed AMS is to last, it must recognise this societal shift, adapt to it, and get ahead of it. If the AMS does not do this, it is unlikely to have public acceptance and will require substantive revision within 5–10 years of its implementation." [response from The Friends of Richmond Park]

Quote

"Para 2.38 helpfully highlights the issue of trade-offs and notes "the policies informing those decisions are a matter for elected representatives, not the CAA or industry." We wholeheartedly agree, however we note that the lack of clarity in the Air Navigation Guidance (ANG) about how such trade-offs should be made present a risk to successful delivery of the FASI deliverables within the AMS […] This means that in practice individual ACP sponsors are required to develop and commit to a view of how trade-offs are to be addressed. The elected representative's input is at the end of the process to determine whether a sponsor's interpretation was appropriate. This can work for local developments, but in our view, it is not appropriate for changes that are of the scale of airspace modernisation and part of national policy. It also puts change sponsors in the position of needing to engage with stakeholders on how they think trade-offs should be made, when in fact we believe that the basis of the trade-off should be clear at a policy level. It is acknowledged that the issue of 'trade offs' are not necessarily resolvable within the refreshed AMS and are a matter for national policy and guidance, and that further information will be required, including from sponsors, before trade-off proposals can be made. We suggest two potential resolutions:
1. Greater clarity from SoS (or the DfT/CAA as the bodies with delegated responsibilities) on the way trade-offs should be made by providing greater clarity in ANG or elsewhere at a formative stage in the programme (ahead of stage 3), and/or
2. Involvement in the airspace change process of the SoS (or the DfT/CAA with delegated responsibilities) so that an opinion on whether the right trade-offs are being provided in the formative stages of the work."
[response from Heathrow Airport]

CAA comments regarding sustainability

Government environmental policy

3.21 Responses expressing environmental concerns about the Government's environmental policy and its interpretation were outside the CAA's remit and therefore the scope of this consultation. The refreshed AMS implements government policy but it is not the role of the AMS to develop or amend such policy. We have passed such responses to the Department for Transport.

3.22 The closure of ICCAN and the transfer of certain of its responsibilities to the CAA was a decision by the Department for Transport.[20] Following this transfer, the Department for Transport has commissioned technical advice from the CAA to inform government policy on trade-offs resulting from different airspace design options, including between noise and CO_2 emissions (for example, aircraft flying a longer routeing to provide noise respite). This is not an activity under the refreshed AMS, but under the CAA's Environmental Sustainability Strategy.

3.23 We will continue to engage with government on how its evolving environmental policy, principles and targets inform the AMS.

Sustainability as an overarching principle

3.24 Responses broadly supported the principle of treating sustainability as an overarching principle to be applied through all modernisation activities. However, many questioned what that actually means, how we would achieve it and against what policy criteria when trade-offs were required, some saying that government policy was unclear. Some responses said that for sustainability to be an overarching principle, government policy requires that airspace modernisation must reduce industry's environmental impacts year on year.

3.25 While sustainability will form an overarching principle across the AMS delivery workstreams, airspace redesign (such as the masterplan programme) must adhere to government policy and guidance. Environmental impacts often involve trade-offs between differing airspace objectives, such as increasing airspace capacity, reducing emissions and managing noise; policies informing such decisions are for elected representatives, not the CAA or industry.

3.26 Where there are no explicit environmental targets or priorities set by government or in legislation, we will apply the CAA's Environmental Sustainability Strategy and the proposed 'prioritisation principle'.[21] We will consult on the proposed prioritisation principle before we apply it to our decision-making, including on how

---

20 https://www.gov.uk/government/speeches/independent-advice-to-government-on-civil-aviation-noise

21 CAA Environmental Sustainability Strategy www.caa.co.uk/cap2360 and related Areas of Work www.caa.co.uk/cap2361. The proposed prioritisation principle is part of our Environmental Sustainability Strategy. Where the CAA has discretion in how it takes the environment into account, it proposes to apply the following prioritisation of impacts:

- first, mitigating the impact of global warming, with a focus on carbon emissions; then
- mitigating noise impacts on local communities; then
- mitigating impacts on tranquil spaces and biodiversity; then
- mitigating impacts on air quality and on other environmental elements.

The CAA will consult with stakeholders and the public on the proposed prioritisation principle before we apply it to our decision-making. The CAA will keep this principle under review as science and government policy develop, and we will reconsult as necessary.

that principle might shape, influence or otherwise impact the delivery of airspace modernisation.

3.27 We will therefore amend the refreshed AMS:

- To reference up front in Figure 1 the overarching sustainability principle in the strategic objectives, and maintain a clear and consistent narrative on this principle through the document, including the nine delivery elements.
- To strengthen, where necessary, relevant requirements or detail as to how the elements should be delivered, and with what aims, as the deployment plans in Part 3 of the AMS are developed.
- To be clear where the CAA has a duty to take environmental factors into account when carrying out modernisation activities.
    - For example, the CAA has a duty, after maintaining a high standard of safety, to take into account the Government's Air Navigation Guidance.[22] That guidance sets out the Government's environmental objectives with respect to air navigation – on noise, climate change and air quality – which apply to all modernisation activities. Where elements of the AMS are being delivered through airspace change, the Air Navigation Guidance establishes a set of altitude-based priorities to be taken into account when considering the potential environmental impact of airspace changes (see section 3.3 of the Air Navigation Guidance[23]).
    - Where AMS elements are being delivered outside of airspace change and where the CAA has discretion in how we take the environment into account, the CAA will apply its Environmental Sustainability Strategy and the proposed 'prioritisation principle' (subject to separate consultation). For example, prioritising (subject to safety) a deliverable in an AMS element which enables CO_2 emissions savings.

Trade-offs

3.28 As many responses recognised, a key policy issue is how to achieve the benefits of modernised airspace while addressing its environmental impacts, and how to factor those into the CAA's decision-making on the necessary trade-offs[24]

---

22 *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*, Department for Transport October 2017. https://www.gov.uk/government/publications/uk-air-navigation-guidance-2017 https://www.caa.co.uk/media/p2kc0rum/additional-air-navigation-guidance-spaceflight.pdf

23 The altitude-based priorities are a set of rules, incorporated in statutory guidance and used by the CAA. They are designed to ensure that potential noise impacts are prioritised over other factors such as carbon emissions in airspace change decisions (i.e. changes to flight routes) up to 7,000 feet above sea level.

24 A trade-off is the choice or decision to resolve a conflict, and could be between two sponsors of separate

between differing airspace objectives, such as increasing airspace capacity, reducing emissions per flight and managing noise. Our consultation (at paragraph 2.43) repeated the Government's view that the aviation sector could achieve Jet Zero without the Government needing to intervene directly to limit aviation growth. The consultation (at paragraphs 2.49 and 2.50) was also clear that while airspace modernisation can be expected to have environmental benefits *per flight*, the creation of more airspace capacity, while not directly generating more air traffic, can, where planning decisions allow it, facilitate further traffic growth.

3.29 Some responses to the consultation challenged us on this point and remind us that we are obliged to manage stakeholder expectations in this area. While sustainability forms an overarching principle across the breadth of the delivery workstreams forming a part of the AMS, any airspace redesign must adhere to the latest policy and guidance framework set by the Government.[25] Environmental impacts often involve trade-off decisions; as we say above, the policies informing those decisions are a matter for elected representatives, not the CAA or industry. This was a topic raised in many responses, most seeking greater clarity. As noted above, one piece of work set out in the CAA's Environmental Sustainability Strategy will lead to CAA advice to government on a proposed set of options to help in prioritising trade-offs between different policy interests more clearly, including between additional capacity, CO_2 emissions and noise.

3.30 Subject to operational constraints (including safety), the design of airspace, and the CAA's airspace decisions, do not specify, or limit future increases in, the volume of air traffic using a piece of airspace at any given point in time. The volume of air traffic using an airport may however be addressed by land-use planning conditions, where relevant. The Government reaffirmed its position recently.[26]

---

airspace changes, or between two objectives (such as achieving noise reduction and achieving fuel efficiency).

25 Principally the *Air Navigation Guidance 2017*, Department for Transport, October 2017 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/918507/air-navigation-guidance-2017.pdf, and *UK Airspace Policy: A framework for balanced decisions on the design and use of airspace*, Department for Transport, February 2017 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/588186/uk-airspace-policy-a-framework-for-balanced-decisions-on-the-design-and-use-of-airspace-web-version.pdf

26 During a House of Lords debate of the Air Traffic Management and Unmanned Aircraft Bill 2021, the Aviation Minister responded to a proposed amendment that sought to constrain the use of airspace with regard to the number and type of aircraft: "The Government believes that it is right that any restrictions on noise should be imposed on the airport itself, and that it is not appropriate or practical to restrict the use of

3.31 The AMS cannot be used to cap capacity. It can help to reduce aviation's environmental impacts, but other factors in combination will determine the net impact. These factors could be planning restrictions, technology improvements, and commercial and operational decisions by industry (such as airline route networks and how they are incentivised, airline choice of aircraft fleet and type deployed on a route, industry operating procedures, and so on).

Government Jet Zero Strategy

3.32 After our consultation had closed, the Government set out its ambition for CO_2 emissions reduction in its Jet Zero Strategy. The Jet Zero Strategy's Systems Efficiency chapter notes that moving to best-in-class aircraft, operations and airspace modernisation could deliver 12–15% of CO_2 savings by 2050. The adopted strategy does not alter the AMS, which will complement it. In the strategy and the accompanying consultation response document, the Government reaffirmed its view that that the sector can achieve Jet Zero without the Government needing to intervene directly to limit aviation growth, with knock-on economic and social benefits.[27]

Environment Act 2021

3.33 Some responses recognised the importance of new obligations under the Environment Act 2021 but queried how they relate to the refreshed AMS.

3.34 The Environment Act 2021 entered into force on 17 November 2021, although there are provisions of the Act which are not yet in force. The Act provides a legal framework for environmental governance and brings in measures for the improvement of the environment in relation to waste, resource efficiency, air quality, water, nature and biodiversity, and conservation.

3.35 It does so by providing the Government with powers to set new binding targets, including for air quality, water, biodiversity and waste reduction. The Department for Environment, Food and Rural Affairs consulted on its proposed targets earlier in 2022. It has not yet published its final targets.

3.36 The Act also requires ministers to have due regard to the Environmental Principles Policy Statement when making policy. The Department for Environment, Food and Rural Affairs has published its draft Environmental

airspace around an airport for these purposes, because to do so would add great complexity to the day-to-day management of airspace." *Hansard House of Lords debates,* 22 March 2021, vol 691, col 735 https://hansard.parliament.uk/commons/2021-03-22/debates/A525AF4C-243E-45B7-85B8-7B6B6FDE6794/AirTrafficManagementAndUnmannedAircraftBill(Lords)

27 *Jet Zero Strategy: delivering net zero aviation by 2050* and *Jet Zero consultation: summary of responses and government response*, Department for Transport July 2022. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1095952/jet-zero-strategy.pdf

Principles Policy Statement. It contains five environmental principles: the integration principle; the prevention principle; the rectification at source principle; the polluter pays principle; and the precautionary principle. These principles are regarded as playing an important role to support environmental improvement plans (for example the 25-Year Environment Plan[28]) and to delivering on the Government's net zero commitment to tackle climate change.

3.37 Other changes made by the Environment Act 2021 require the Government to review the National Air Quality Strategy[29] at least every five years and report annually to Parliament on the progress made to deliver air quality objectives in relation to England. Changes are also made in relation to Local Air Quality Management Frameworks.

3.38 Many of the obligations in the Environment Act 2021 are directed particularly at the Government. The CAA will continue to engage with the Government on its evolving environmental policy, principles and targets, including on how they may lend weight to the CAA's own environmental policies and inform the refreshed AMS.

ICAO guidance on local air quality

3.39 The draft AMS noted that because of the effects of atmospheric mixing and dispersion, emissions from aircraft above 1,000 feet are unlikely to have a significant impact on local air quality. Several responses drew attention to ICAO guidance referencing 1,000 metres rather than 1,000 feet.[30] However, most air quality impacts occur below 1,000 feet with a very rapid drop-off in impact with greater altitude.[31] Because commercial aircraft will not turn below 500 feet, airspace design will therefore materially impact air quality only between 500 and 1,000 feet.

D: Airspace integration and deployment technology

Theme	Responses	Detail	CAA comments
Airspace integration	31	Responses mentioning this topic came from commercial industry (15), General Aviation (7), national organisations (4), central or local government (2) and remotely piloted aircraft systems (2). All were either supportive of the concept, seeking clarity or making suggestions. Many responses saw it as essential to accommodate new types of airspace user, supporting integration rather than segregation as the preferred approach for doing so.	We recognise the need to develop an integrated airspace in a planned way while keeping pace with improving technology. Although we recognise the pace of developments, change has to be delivered safely and will inevitably take more time than some would like.

28 https://www.gov.uk/government/publications/25-year-environment-plan

29 https://www.gov.uk/government/publications/the-air-quality-strategy-for-england-scotland-wales-and-northern-ireland-volume-1

30 ICAO Doc. 9889 Airport Air Quality Manual, Second Edition, 2020 (Chapter 4)

31 The ICAO guidance (paragraph 8.1.4) states that "1,000 ft is the typical limiting altitude for ground-level NO_2 concerns". There is a similarly rapid drop-off in impact with greater altitude for particulate emissions.

Theme	Responses	Detail	CAA comments
		But there were also concerns as to how to achieve it, and without unduly impacting existing airspace users. Others urged the CAA to set out how it would treat users equitably and suggested focusing on aircraft equipage and performance rather than the novelty of the airspace user. Some responses stressed the critical importance of new technology, including for safety reasons, and how quickly it was developing, requiring a bold approach including firm and ambitious timelines, with appropriate transition arrangements. Collaboration and sharing were seen as key. Some responses pointed to novel types of aircraft bringing new issues such as low-level flying that might require different airspace/data solutions and safety considerations, as well as better integration with land use.	The CAA has established an Integration Steering Group within the AMS governance structure which is focused on the development and delivery of the airspace integration concept. The steering group will stand up working groups as required and has a direct link to the Future Aviation Industry Working Group. Integration in the constrained areas of UK airspace is a complex task and requires all stakeholders to be open to new ways of operating to ensure operations are safe.
Electronic conspicuity	20	This theme arose in responses to question 1, i.e. the CAA's overall approach rather than specific AMS delivery elements. Seven responses generally took a negative view, all from General Aviation, mostly concerned about any mandatory equipage requirement, that more clarity was needed as to what is proposed, including a well-defined roadmap, or that it is not a practical solution for some General Aviation sectors. There were 13 responses that were generally positive about the concept. These were from commercial industry (8), central or local government (2), General Aviation (2) and national organisations (2). Some of the 13 were explicitly supportive of mandation or widespread usage (generally or in particular circumstances). Some again mentioned the need for a roadmap, as well as harmonisation and future-proofing.	Funded by the Department for Transport, the CAA has set up the Surveillance Standards Task Force on airborne technical standards and interoperability, chaired independently by the Egis consultancy, in support of the AMS. The use of electronic conspicuity will enable the integrated airspace operation required to support the complex mix of future users. The AMS is also informed by, and informs, work by the CAA Innovation teams, which act as the initial interface with the UKRI (UK Research and Innovation) Future Flight Challenge workstreams and with many new entrants to the airspace. The draft AMS does not suggest widescale mandation of electronic conspicuity. The intention was to articulate the tangible benefits that many users, as well as the overall airspace system, could realise (such as easier access to controlled airspace) through the wider-scale adoption of common electronic conspicuity standards and equipment, interoperable across multiple stakeholder groups. Following the outcomes of the Surveillance Standards Task Force, we await a Ministerial steer to start the implementation phase.
Other technical	10	Responses to question 1 mentioning technical issues in general terms came from General Aviation (3), commercial industry (2), national organisations (2) and remotely piloted aircraft systems	The AMS refresh has delivered a clearer long-term modernisation ambition aligned with global

Theme	Responses	Detail	CAA comments
		(2). They mostly made high-level observations about deploying appropriate technology supported by appropriate policy and regulation to realise the 2040 vision for airspace. (Many more responses to questions 4 and 5 made detailed technical comments on the specific delivery elements.) One General Aviation organisation said that many of the AMS proposals had potential for unacceptable unintended consequences, most notably implying solutions that would greatly increase controlled airspace by around 300% that would have a severe detrimental impact on the General Aviation sector. Others from General Aviation and remotely piloted aircraft systems said the AMS was missing the detail on underpinning technologies for the operational concepts, and failed to consider the evolution of modern aircraft performance or what training would be needed to transition. One airport noted that solutions would be industry-led, but without some guidance this carried some risk of misalignment. A national organisation said that regulatory and policy guidance on technologies, communications and cybersecurity was needed in support of growing usage of novel aircraft in lower airspace. Another observed that environmental benefits will not be achievable when airspace modernisation changes are first made because supporting aircraft and avionics capabilities will still be evolving.	developments and ambitions where appropriate. As a strategy it will not be able to provide all the answers for all relevant technology solutions; that will fall to the ongoing development and deployment work. There will be changes to the way we utilise the UK's available airspace; the integration of a complex mix of different user needs will require some flexibility from users to ensure everyone can be safely accommodated. Technology deployments will, where possible, utilise standards developed through international cooperation to ensure consistent and interoperable deployment.

Quote

"The roadmap or policy for electronic conspicuity is fundamental to the development of this strategy but not sufficiently mature. It is ill defined. It is contradictory with itself and with other parts of the strategy. It calls for functions which are impossible. It interposes unnecessary ground elements between aircraft. It does not define what it is trying to achieve within the strategy and it is impossible for the reader to understand what is actually required or proposed. A clear and well-defined road map would have been a useful starting point and is still needed. Further work needs to be undertaken urgently to provide clarity of intent and a visible pathway to resolution."
[response from Airspace4All Trust]

Quote

"Model aircraft in the strategy documents are lumped in with RPAS as a type of remotely piloted aircraft system. The use case of model aircraft is different to the use case for RPAS described in the strategy, in that model aircraft (except in very rare circumstances) fly in a fixed volume of airspace VLOS from the pilot who does not move during the flight. The model aircraft do not go anywhere or cross different airspace during the flight." [response from Large Model Association]

Quote

"We also agree it is important that airspace modernisation considers the potential future use and growth of unmanned aircraft, i.e., drones, in the UK's airspace. However, it will be important to ensure that commercial aviation, and the economic benefits it brings to all nations and regions of the UK, is not negatively impacted by accommodations made for the currently nascent UA sector, either by additional delays or cost implications to the overall programme." [response from Airlines UK]

Quote

"NATS supports universal compatible Electronic Conspicuity as this enables the integration of all airspace users into one common airspace, where conflict management no longer relies on 'See & Avoid' but rather 'Detect & Avoid' supported by appropriate ground services." [response from NATS]

Quote

"The inclusion of lower airspace and the integration of new airspace users in the refreshed strategy is essential and therefore welcomed by the FAIWG-AI group. We believe that integration, not segregation is the solution we should strive towards."
[response from Future Aviation Industry Working Group on Airspace Integration (FAIWG-AI)]

Quote

"We also support the principle of integrating new and existing airspace users and overall, we support the focus of the AMS on future technologies and transformation."
[response from an airline]

Quote

"- IFR/VFR integration of operations should be more clearly articulated. There are several references to future digitalisation and automation within traffic management. In reality, flights are conducted in VMC or IMC and how the planned technical solutions are proposed to enable this integration should be better explained.
- There is a lack of clarity on what the strategy for VFR operations below FL100 is. This airspace most used by unpressurised GA but is also the airspace which in the future is anticipated to be under demand by UAS / UAM / RPAS operations which also want access to this airspace. New technologies are on the horizon or being developed to enable this integration. As this technology develops, there is a potential for GA and drones to share the same solutions – especially CNS – which could eventually lead to a level of autonomous management for manned and unmanned traffic long term – i.e. out to 2040. However, it is also not clear what the pathway is for integrating drones. This and the sharing of technologies could be considered further since harmonising the systems between GA and drones in the period between 2030 and 2040 could improve the safety of the airspace."
[response from Aircraft Owners and Pilots Association]

E: Alignment with ICAO or Europe

Responses	Detail	CAA comments
12	Responses with this theme came mostly from commercial industry, central or local government, organisations with connections to new types of airspace user, and General Aviation. There was general support for alignment with ICAO GANP and for collaboration / technical harmonisation as needed with regimes in other countries and EUROCONTROL, and some opposition to bespoke arrangements in the UK around Flight Information Services and airspace classification. Respondents suggested that the AMS be explicit that international standards are at its core, that it should commit to the ICAO Aviation Trust Framework regarding data sharing, and that such standards should accommodate the needs of new types of airspace user (not just crewed aircraft) which may have different requirements around data format and precision etc. We were reminded that ICAO has since revised the target dates shown for GANP Airspace System Block Upgrades.	The more explicit alignment of the AMS with ICAO (which is currently achieved through compliance with retained EU legislation) will be the means of ensuring the continued interoperability with other states through compatible standards, as noted above under D: Airspace integration. We will make clearer the UK's obligations as an ICAO-contracting state and the use of the AMS to ensure, from an airspace perspective, that they are properly discharged. We will take account of other comments made. We acknowledge that reducing UK 'differences' from ICAO will require some policy commitment from the co-sponsors.

Quote

"The strategy does not currently detail how it will achieve interoperability with other systems such as those defined in SESAR and in US Airspace, beyond compliance with the ICAO updates to ASBUs. Whilst the UK has the ability to define its own path, it is essential that the commercial opportunities in the UK can be exploited by companies from around the world. The UK needs to strike the right balance between the ability to make sovereign decisions and enable a faster pace of innovation and not becoming isolated in UK-only approaches to implementation."
[response from Skyports]

Quote

"We strongly believe that linkage to the ICAO GANP and the use of ASBUs is the only sensible way ahead. Aviation is a global business and requires the UK to take such an international approach. We should seek to align with ICAO as closely as possible and take the opportunity to eradicate some of the idiosyncrasies that we file as differences. For example, there are still 40 individual differences filed to Annex 11 on Air Traffic Services. The CAA should take the opportunity to address issues such as why we have our own definition of ATS services whilst the rest of the world use Flight Information Service. We also believe that it would be opportune to review the relevance of LARS in today's airspace environment. As an aside, we strongly believe that the UK should continue to develop its links and influence within EUROCONTROL as the UK is no longer a member of EASA."
[response from Royal Aeronautical Society]

F: Airspace structure or access

Responses	Detail	CAA comments
14	Responses on these themes came from General Aviation and the Honourable Company of Air Pilots. These were generally comments about the inability to access airspace, controlled airspace being too extensive and in need of simplification and the CAA not properly taking into account the needs of non-commercial aviation. It was suggested that concepts described in the refreshed AMS would lead to a significant increase in controlled airspace and costly on-board equipment that some aircraft will not be able to install. Also that airspace should be controlled only where it supports modern descent and climb requirements; whereas, currently, legacy airspace that is never used remains inaccessible to General Aviation, forcing it into compacted routes that compromise safety. There were some specific comments in relation to the use cases, in particular around flight plans and electronic information sharing. One response suggested the AMS include the development of an airspace design 'playbook' to provide standard templates relating to Instrument Flight Rules traffic volumes and associated modernised policy positions against which airspace change proposals could be assessed. Another response said that previous input from the General Aviation community about future airspace structures had been ignored.	We would like to clear up any misunderstanding that the refreshed AMS seeks to increase the amount of controlled airspace, when the opposite is true. Among the aims of the AMS are: – that controlled airspace which already exists and needs to remain is easier to access, with on-going review by the CAA classification review team – to find ways to tactically disestablish and re-establish controlled airspace only as and when it is needed to service the need for separation of traffic by air traffic control – for any new controlled airspace to be the minimum size necessary to safely contain the air traffic control operation. There will be changes to the way we utilise the UK's available airspace. The integration of a complex mix of different user needs will require some flexibility from users to ensure that everyone can be safely accommodated. Technology deployments will, where possible, utilise standards developed through international cooperation to ensure consistent and interoperable deployment. The integration challenge described by the AMS can be addressed through greater use of technology, both current and some we will not yet have realised. There are likely to be costs associated with these modernisation deployments. The AMS will aim to minimise these through better articulation of the vision and management of the development and deployment phases, rather than the piecemeal approach to date. The AMS use case for a General Aviation flight described the gathering, sharing and monitoring of electronic flight data that is already available from the flight planning apps or software General Aviation pilots are increasingly using. It did not mean filing a conventional paper flight plan. We will clarify this and use a different term such as 'planned intention of flight'. The SWIM (system-wide information management) concept is key to data services and information flow and depends on interoperable systems. This will require more research work to understand how to achieve the aspiration described, but the minimum levels of SWIM required to move towards early-stage integration of all types of airspace user are relatively straightforward. The CAA does not automatically equate the adoption of ICAO Flight Information Service (FIS) with the need for every air navigation service provider currently providing UK FIS deconfliction services to IFR traffic in Class G airspace to require a Class C/D Control Zone (CTR). The expectation as a starting assumption is that air navigation service providers will manage their traffic in Class G using ICAO FIS. Any perceived need for a CTR will require an airspace change proposal in accordance with CAP 1616. To ensure that the General Aviation sector has a good understanding of the concepts behind the AMS such as those mentioned above, after the consultation closed we produced an infographic (see Appendix A) targeted at users of Class G airspace, in particular the General Aviation community, to clarify the AMS lower airspace vision. We plan to supplement this with further engagement.

Quote

"[The] Trust is concerned that as currently written AMS:
[…]
• stated position is that EC will be mandated for ALL
• implies that solutions would greatly increase CAS (by c300%)
[…]
The strategy sets out a bold vision of the future, integrating the requirements of all airspace users and new entrants in a simplified and efficient airspace structure. But as the details of what is intended emerge later in the documents, we actually see increased segregation, the widespread deployment of controlled airspace at lower levels and complex procedures which together with a muddled mandate for transponders would bring much of general aviation to a standstill. Safety would be diminished." [response from Airspace4All Trust]

Quote

"Across the UK most CAS is too big and was designed to offer protection to aircraft of the time. Aircraft performance is radically improved now which should allow for shrinkage of volumes. With the introduction of PBN tracks designed using RNP should allow lateral reductions in the width of routes. However the CAA's existing containment policy wrt airspace design has not been modernised and is therefore a potential blocker." [response from a member of the General Aviation community]

G: Airspace change process (CAP 1616)

Responses	Detail	CAA comments
18	These responses came from commercial industry (9), local organisations (3) and General Aviation (3). They covered stakeholder engagement; the relationship with the land planning process; the way environmental impacts are assessed and trade-offs made in airspace change decisions; whether the process should be brought within the AMS and whether it was holding back AMS delivery; post-implementation review of a change; flightpath changes as a result of airline commercial decisions; airspace changes for remotely piloted aircraft system trials; and the adaptation of the process specifically to facilitate new advanced air mobility operations and future-proofing new airspace designs.	We appreciate that modernisation will to a large part be deployed through the airspace change process and that there is, therefore, an innate linkage. Nevertheless, the consultation was about the strategy for modernisation, not the airspace change process. We clearly stated that the airspace change process (and proposals or decisions under that process) were out of scope, it being a separate function from the AMS. We also noted that the airspace change process is subject to its own, separate, review. We will therefore consider these comments as part of the separate CAP 1616 review.

H: Document clarity and consultation engagement

Theme	Responses	Detail	CAA comments
Document clarity	15	These responses referred to the AMS as being difficult to understand or navigate, or it being too complex, wordy or unwieldy. They came from local organisations such as community action groups (6) or local residents (2), General Aviation (5), commercial industry (3) and central or local government (2). Some respondents may have been unclear about what our questions were asking. For example, 23 of 52 responses saying we had not captured the drivers for change adequately (see our analysis of Question 2 below) did not tell us what was missing.	The airspace modernisation programme is inescapably complex. This gives rise to lengthy documents, which we have separated into three parts in order to better delineate the strategy from delivery and deployment. We acknowledge that this creates some repetition, but it also makes a complex strategy easier to understand. Given the necessarily technical nature of the delivery elements, for it to have meaning we have to use technical language in some places. We have nevertheless reviewed the document to ensure we are using plain English as far as we can, and that we have explained any unavoidable technical terms. We read all free-text comments. Where comments seemed to be more appropriately analysed under a different question, we did so, to ensure that the views were captured properly. We will use the CAA website to better present the technical concepts the AMS proposes. We are planning more accessible, simplified material to explain airspace modernisation, the AMS and the masterplan (or to provide an overview with links to suitable explanatory material). We have also produced a targeted infographic (see Appendix A) giving a better visualisation of the future lower airspace concept. We plan further engagement with the General Aviation community to explain these concepts.
Consultation engagement	13	These responses made reference to a need for better CAA engagement regarding the consultation. They came from local organisations such as community action groups (3), General Aviation (5), commercial industry (2), central or local government (2) and a national organisation (1). Four specifically asked for a non-technical summary.	

Quote

"…this is a public consultation but it is both hard to digest because of the technical language and processes, and it is not 'relatable' at the local community or personal level given that it is at such strategic and detached scale." [response from Heathrow Strategic Planning Group]

Quote

"…The consultation is very difficult to navigate being split between three separate documents. A non-technical summary is required to help consultees understand what the strategy actually comprises." [response from Local Authorities' Aircraft Noise Council]

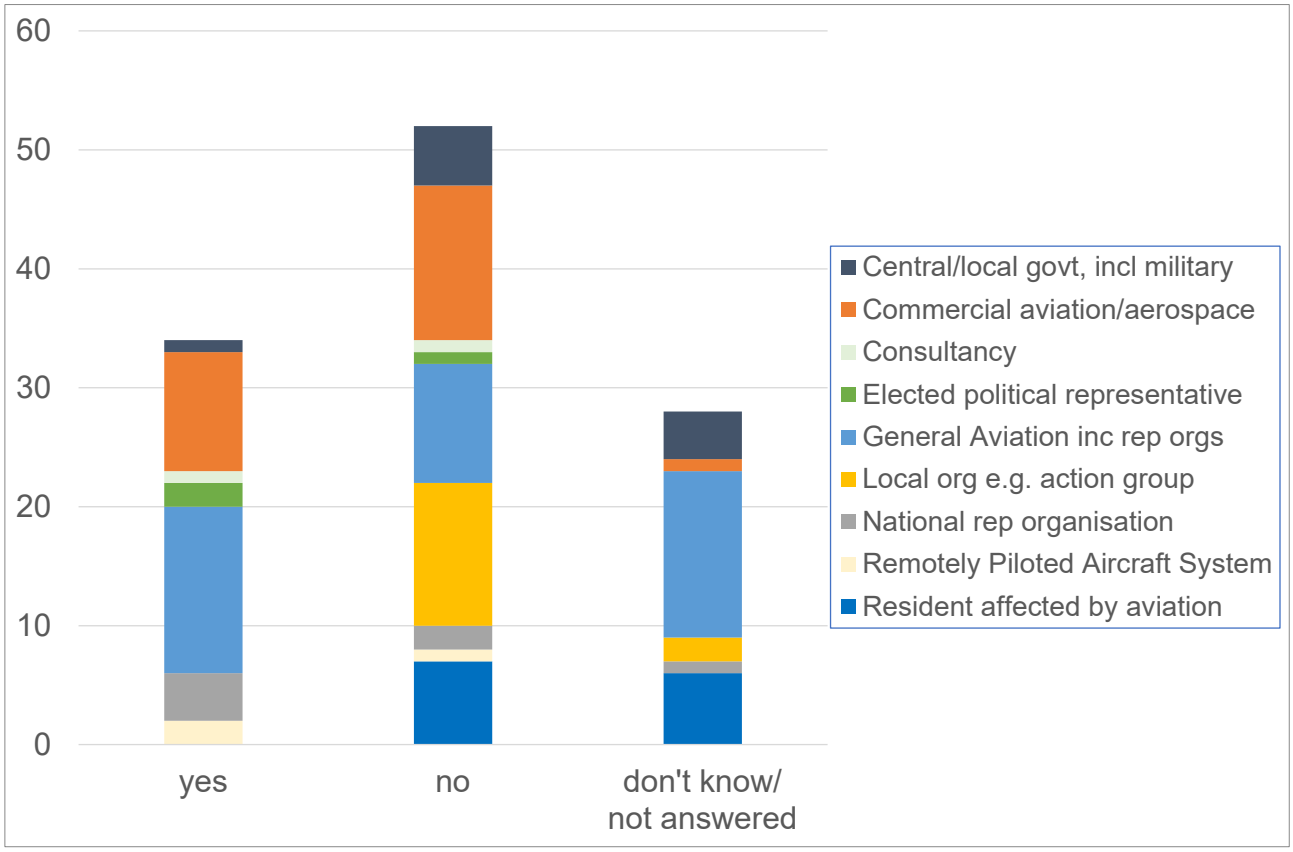
Question 2: Have we captured the drivers for change adequately in Part 1, Chapter 2?

Multiple choice responses to question 2

3.40 The draft AMS set out four drivers for change: meeting the demand for airspace, more sustainably; encouraging aviation innovation to support UK economic growth; international obligations; and facilitating defence and security objectives. The multiple-choice question invited a simple **yes / no / don't know** response.

3.41 As shown in Figure 3.2, 34 responses said **yes,** we had captured the drivers for change adequately and 52 said **no**. There were also 19 responses saying **don't know** and nine that did not answer the question.

Figure 3.2: Multiple-choice responses to question 2 (drivers for change)



3.42 However, of the 52 responses that answered **no** to the multiple-choice question, as many as 23 did not actually tell us in the free-text box what was missing from the drivers.

3.43 Within each category of respondent, answers were in most cases fairly evenly divided between **yes** and **no**. There was at least one **no** response from every category. There were zero **yes** responses from either local organisations (for example community action groups) or from residents affected by aviation. Two-

thirds of local organisations answering **no** added a free-text response mentioning the environment or noise as drivers that were missing. Nearly half of residents affected by aviation said **don't know** or did not answer. Of those residents answering **no**, only two provided a free-text comment about drivers for change. (We analysed other comments under a more relevant question.) Responses from the commercial aviation industry (13 saying **no,** 10 saying **yes** and one saying **don't know**) were broadly divided, as was General Aviation (14 saying **yes**, 14 saying **don't know** and 10 saying **no**).

Free-text responses to question 2

3.44 Question 2 asked respondents answering **no** (i.e. that we had not captured the drivers for change adequately) to describe what was missing or needed amendment, and how this might require a change to the draft AMS. There were 34 responses in total that had comments relevant to drivers for change.

3.45 More than 50% of those who answered **no** highlighted the environment or noise concerns as being inadequately captured. There was some confusion between what constitutes a driver for change and what is an objective of the AMS. Mentions of the Environment Act 2021 were often wrapped into an overall concern for the environment, rather than specifically the drivers. However, most were consistent in suggesting that the first driver for change ('meeting the demand for airspace, more sustainably') did not adequately reflect the 'overarching principle' of sustainability that the refreshed AMS applies to all modernisation activities.

3.46 Seven respondents requested further detail on how technology is driving airspace change, integration and innovation. These included four mentions of DVOR (all from airports, in the commercial category).

3.47 Four respondents (three commercial, one remotely piloted aircraft system) answered **yes** but nevertheless provided suggestions for other possible drivers and/or where we should consider adding more detail.

3.48 Table 3.4 below lists the missing drivers that responses identified, along with a summary of each:

Table 3.4: Missing drivers suggested by responses to question 2

Missing driver	Responses	Detail	CAA comments
Environmental impacts	12	Local and national organisations, residents and an airline felt that the drivers for change required more detail or explicit mention of the need to reduce aviation's environmental impact. Four responses suggested that the Environment Act 2021 needed to be considered under this section.	There were no additional drivers identified by the responses. The draft AMS already had a strategic objective of *Environmental sustainability – airspace modernisation will deliver the Government's key environmental*

Missing driver	Responses	Detail	CAA comments
Managing noise impacts	7	While in some cases recognising that the AMS *objectives* address noise, six suggested that reducing noise should be an explicit *driver* for change. One suggested we add 'recognising and meeting public demand to use technology to reduce noise impacts'.	*objectives with respect to air navigation as set out in the Government's Air Navigation Guidance and, in doing so, will take account of the interests of all stakeholders affected by the use of airspace.* The draft AMS also already had as a driver *meeting the demand for airspace, sustainably.* We have more prominently linked the two by reinforcing that in meeting the demand for airspace, there is a crucial associated driver that airspace modernisation will, as an overarching principle, deliver the Government's key environmental objectives with respect to air navigation with additional references to exploiting appropriate technology improvements, and improving airspace efficiency and resilience to disruption. Where existing technology needs replacement or upgrade or new technology is replacing it, the AMS will aim to utilise development and deployment oversight activities to manage the transitions.
Efficiency	2	Two responses from commercial industry recognised the draft AMS mentions operational efficiency, but requested that it be emphasised further.	
Resilience	3	Three commercial aviation industry responses suggested that building resilience in the airspace system (in times of disruption, failures, or in case of cybersecurity threats) should be a driver for change.	
DVOR	4	Four airport responses felt that modernising old technology was inadequately referenced as a driver. This refers to the rationalisation of DVOR (Doppler VHF Omnidirectional Range – a conventional ground-based radio navigation aid) which requires changes to instrument flight procedures to adopt performance-based navigation.	
New types of airspace user (such as remotely piloted aircraft systems, advanced air mobility, spacecraft etc)	5	A range of respondents (commercial industry, General Aviation, remotely piloted aircraft system, and a national representative organisation) highlighted that although new types of airspace user are recognised in the drivers, the AMS should draw out further the forecasted changes in demand arising from new entrants, as well as the impact on existing users and airspace rules, including a new approach to managing airspace. Also that economic benefits from new entrants were not just to aerospace but extended more widely to the wider economy and the transport network generally, as well as down to businesses at the local level.	We will strengthen the references in the existing driver *meeting the demand for airspace sustainably*, and in the text *benefits and impacts of airspace modernisation.*
Economically sustainable	3	Responses from commercial industry and remotely piloted aircraft systems suggested adding a driver that the programme had to be economically sustainable to succeed, or that more detail was required to highlight potential opportunities for economic growth.	These are valid *conditions* of the modernisation programme that are already in the AMS, but they are not *drivers* for modernisation.
Regulatory framework	5	Two airlines suggested that regulatory timelines should be aligned with European states. One	

Missing driver	Responses	Detail	CAA comments
		response suggested that the regulatory framework should not hinder or block technological progress and two responses that it should be reviewed for remotely piloted aircraft systems.	

Quote

"We believe reduction in the environmental harm from the no-growth scenario should be a driver. The polluter should pay so that if growth is to be a driver of AM then this should only arise as the industry reduces the environmental harm from noise, CO2 and air pollution (with the latter taking account of both aircraft and airport surface access). We are not proposing new policies but expeditious implementation of existing policies such as Air Navigation Guidance 2017 (although we do have some reservations with this policy…)
[…] The draft Strategy fails to address properly the noise impact from satellite based PBN. An airport such as Heathrow currently has 30 flight paths to and from the airport (east and west). London's population density is such that PBN cannot be used for the most part to avoid communities; therefore, due to PBN's lateral precision, flight trajectories will be highly concentrated over some local communities. Aggregate noise impact may reduce as concentration replaces dispersion, but the impact on those affected will be unsustainable. We have yet to see any proposal that mitigates this impact. Multiple flight paths could in theory share the noise either through spreading the flights across the flight paths or by alternating use with periods of respite. For example, for every flight path another could be created on either side. But in the case of Heathrow that would triple the number of trajectories to say 90. At least three issues arise. Firstly, there is insufficient airspace for at least 20km from the airport to achieve meaningful noise separation and mitigation of noise impact. Secondly, having to incorporate 90 trajectories and probably more for Heathrow plus PBN trajectories for each airport the aircraft visit globally, is probably beyond the technical capacity of even the most modern of computer database systems, let alone the those used by older aircraft, some of which are up to 25 years old. Thirdly, increasing flight path complexity puts an increased load on Air Traffic Control, risks safety and is contrary to the AMS aim of simplicity. […] The CAA, DfT and industry have not provided communities with sufficient evidence of how the noise impact from PBN flight path concentration and curved approaches can be mitigated. We realise that PBN may have net benefits at some airports with different population densities to those around Heathrow and also is proving useful in en-route airspace. This PBN dilemma needs resolving before the Strategy is finalised."
[response from Richmond Heathrow Campaign]

Quote

"We support that 'meeting demand more sustainably' is the primary driver for change. The new Strategy strikes a more appropriate balance in the narrative of the environmental drivers that comprise sustainability in this context, in particular in respect of carbon and noise.
International obligations are briefly mentioned but perhaps this element could be strengthened to acknowledge the international standards to which operators, including UK operators, are required to comply around the globe. It is important for the UK to develop its airspace in a manner cognisant of those international standards, to ensure that UK operators are not disadvantaged and where possible to take advantage of international standards where developments facilitate objectives consistent with UK aspirations.
While we agree that encouraging aviation innovation is a significant driver little is discussed about the need for modernising legacy technology, such as the DVOR rationalisation programme, which doesn't seem to get a mention. Yet this is a significant driver and is likely to be for several years to come and no doubt will be followed by the transition from other existing legacy technologies."
[response from Gatwick Airport Ltd]

Quote

"The four drivers for change fail to include the need to reduce and mitigate noise harms and other adverse environmental impacts. This must be rectified."
[response from Stansted Airport Watch]

Quote

"The drivers in the AMS cover demand, economic growth, international obligations, and defense and security. We agree that demand from new airspace users (2.61) is likely to be very significant. For this demand to be realised and managed successfully, there needs to be a recognition that traditional or legacy approaches to managing airspace will no longer be valid for multiple drone flights and therefore new approaches based on safe automation are needed.
Economic growth details the benefits to UK leadership in the aerospace sector. However, it should be noted that a successful modernisation strategy will create opportunities for economic growth down to the local and individual levels. For example, fast and competitively priced delivery by drone will benefit local SMEs and businesses. Greater attention to the business potential for merchants, proprietors, and customers deserves detail in this approach.
To that end, by 2040, a proper modernisation of the airspace will complement a multi-modal transportation reform. Airspace modernisation will relieve inefficiencies in surface and maritime transportation systems to create a better national transportation network. The benefits afforded to surface and maritime transportation as a result of a careful airspace modernisation should be well understood in this strategy."
[response from Wing Aviation, LLC]

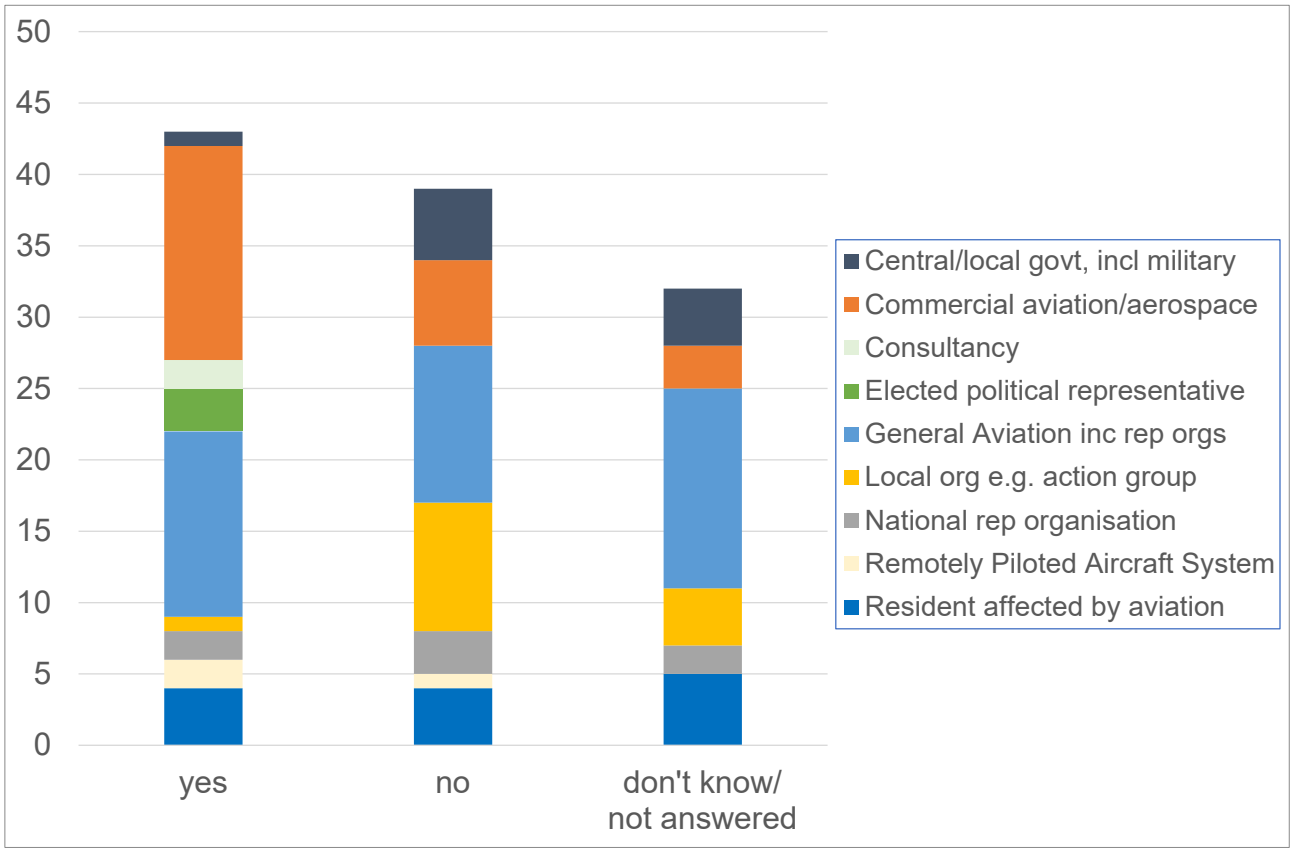
Question 3: Have we identified the right stakeholder groups in Part 1, Chapter 2?

Multiple choice responses to question 3

3.49 Chapter 2 of the draft AMS (page 35, 'benefits and impacts of modernisation') discussed the benefits and impacts of airspace modernisation from the perspective of individual stakeholders, under the headings: UK economy; passengers and shippers; climate change impacts; communities impacted by aircraft noise; aircraft operators; airport operators; air navigation service providers; and government.

3.50 This multiple-choice question invited a simple **yes** / **no** / **don't know** response as to whether we had identified the right stakeholders. As shown in Figure 3.3, 43 responses said **yes** and 39 said **no**. There were also 20 responses saying **don't know** and 12 that did not answer the question.

Figure 3.3: Multiple-choice responses to question 3 (stakeholder groups)



3.51 Several groups had a clear majority agreeing the correct stakeholders had been identified: commercial aviation industry, consultancies and elected political representatives. Central or local government and local organisations such as community action groups generally disagreed or did not answer the question. Other categories of respondent were more divided.

Free-text responses to question 3

3.52 Question 3 asked respondents answering **no**, we had not identified the right stakeholder groups, to describe the missing group using free text. The question was clear that by missing group, we meant missing from Chapter 2 of AMS Part 1 (which concerned the benefits and impacts of modernisation from different stakeholder perspectives).

3.53 Of the 39 respondents who answered **no**, 19 made free-text comments that did not relate to the question. Instead, they referred to the consultation process or our engagement, the AMS governance structure, or delivery of the AMS. We still took these comments into account, but under a more relevant question, providing they were in scope of the consultation overall. Two respondents (one commercial industry, one remotely piloted aircraft system) answered **yes**, but still provided suggestions for other missing stakeholders.

3.54 Table 3.5 lists the missing stakeholders suggested by respondents, along with a summary of each.

Table 3.5: Missing stakeholders suggested by responses to question 3

Missing stakeholder group	Responses	Detail	CAA comments
Manufacturers	5	Four commercial industry and one remotely piloted aircraft system response identified aircraft and/or equipment manufacturers as missing.	The relevant part of Chapter 2 specifically concerned those benefiting from or impacted by modernisation rather than those involved in delivery. In the context of delivery, we have engaged about the refreshed AMS with ADS, the trade organisation representing more than 1100 UK businesses in the aerospace, defence, security and space sectors.
General Aviation	4	Four General Aviation responses suggested that a more granular or comprehensive definition of General Aviation was warranted.	Page 17 of the draft AMS already recognises the wide range of activity that General Aviation encompasses, and we referenced a much longer ICAO description. We will expand the reference in the description of stakeholders but will keep the reference to recreational flying because we hope that sector will particularly benefit.
Owners/ managers of open spaces	3	Two local organisations and one central government body said that those owning, running, maintaining, using etc public open spaces or infrastructure could be affected by flightpaths.	We will add a reference.

Missing stakeholder group	Responses	Detail	CAA comments
UK public	2	One national organisation and one remotely piloted aircraft system response said the public should be viewed not just as passengers and that there were societal benefits from new vehicle types.	We have broadened the potential benefits to the UK economy and to the public to reference how new types of airspace user could bring benefits, whether economic, societal (for example, medical, search and rescue or police activity) or environmental (by replacing more polluting modes).
Communities	2	One resident said that the impacts on all communities, not just those close to airports, needed to be identified. One local organisation said that communities impacted by aircraft noise as a result of the AMS programme were not referenced.	Environmental impacts on communities are already described.
Other	8	Various stakeholders were identified as either missing entirely or needing further detail on benefits and impacts: air navigation service providers with responsibility for weather information; State activities (such as search and rescue, law enforcement); advanced air mobility infrastructure; wider UK economy/business/ society; NHS; software developers; insurers; scientific research communities; wind turbines; road and rail.	We will include additional references where appropriate. This AMS chapter summarises who is impacted by airspace modernisation and why, but is not intended to reference every stakeholder involved.

Question 4: What are your views on the nine delivery 'elements'?

Question 5: Part 3 of the AMS will cover who is responsible for deploying the delivery ‘elements’ and related activities, and how. At this early stage, what are your views on any requirements we should have for those tasked with the deployment of those elements and activities?

How we will take into account responses to questions 4 and 5

3.55 Question 4 specifically sought views on the nine delivery elements we set out in the draft AMS. We have taken those views into account as summarised below. Question 5 was more forward-looking: it sought views on any requirements we

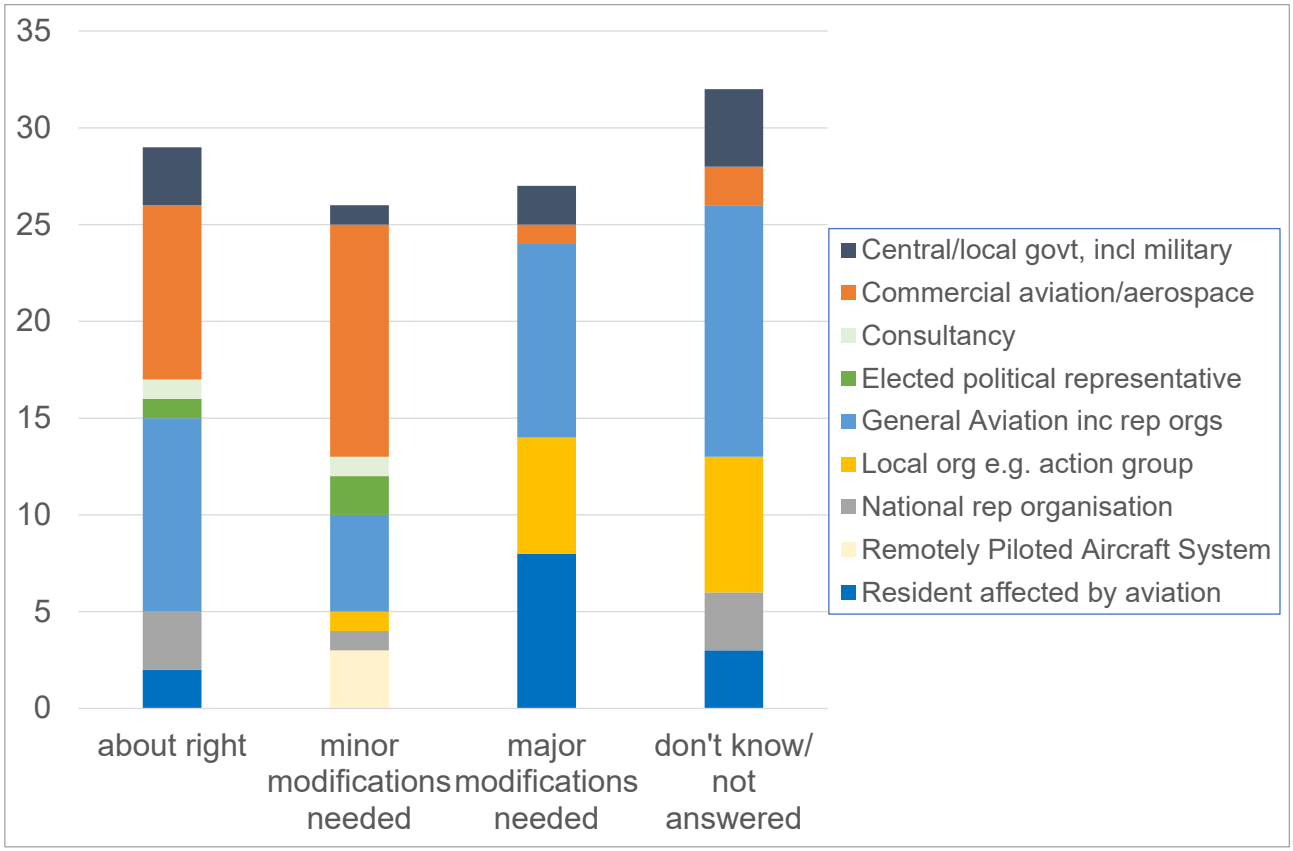
should have for those tasked with the deployment of those elements and activities. These will be set out in the deployment plans forming Part 3 of the AMS, which are still being developed, and which were not part of the consultation.

3.56 Part 3 will include development and deployment projects from across industry, including the CAA. For example, the redesign of UK airspace in accordance with the airspace change masterplan being developed by ACOG, and rollout of the new lower airspace concepts facilitating greater integration of airspace users. The airspace change masterplan already has its own programme of consultation and engagement, largely run by ACOG, while other projects may require further consultation as concepts and proposed solutions are developed. The purpose of question 5 was to give us information that will inform the development of Part 3 using the outcome of the consultation on the strategy and delivery elements in AMS Parts 1 and 2.

Multiple choice responses to question 4

3.57 This multiple-choice question invited a response of **about right** / **minor modifications needed** / **major modifications needed** / **don't know** as to views on the nine delivery 'elements'.

Figure 3.4: Multiple-choice responses to question 4 (delivery elements)



3.58 As shown in Figure 3.4 above, there was broad support (i.e. **about right** or **minor modifications needed**) for the overall approach, except from residents affected by aviation and from local organisations such as community action groups. Just over half of respondents in those categories said **major modifications needed**, and these all expressed concerns about the approach to environmental impacts.

3.59 All responses in the consultancy, elected political representative and remotely piloted aircraft system categories said **about right** or **minor modifications needed**, as did 21 of 24 responses from commercial industry, with only one (NATS) saying **major modifications needed** (and that response expressed support for the nine delivery elements in broad terms). General Aviation gave us mixed responses, with 15 saying **about right** or **minor modifications needed**, 10 saying **don't know**, three not answering the question. 10 General Aviation responses said **major modifications needed**, all raising similar issues around airspace structure, access and electronic conspicuity as in responses to question 1.

3.60 Overall, a significant number of responses said **don't know** (19) or did not answer the question (13).

Free-text responses to questions 4 and 5

3.61 We have considered free-text answers to these two related questions. Comments were extensive, in total running to 50 or more A4 pages of text. They were a mixture of general comments about concepts, specific comments about individual delivery elements or use cases, and comments about the detail of what will eventually form deployment plans that will become Part 3 of the AMS.

3.62 We have summarised in Table 3.6 below which of the delivery elements attracted support, comments or questions.

Table 3.6: Summary of comments on delivery elements

Delivery element	Comments from respondents			
	Supportive	Other comment	Question	Total
Aircraft-based navigation				
ABN/1 Trajectory-based operations	3	5	n/a	**8**
ABN/2 Terminal redesign	n/a	9	1	**10**
ABN/3 Network management	2	3	1	**6**
ABN/4 Integration	2	9	4	**15**
Airspace management				
AM/5 Airspace management	1	4	2	**7**
AM/6 Data services	3	7	1	**11**
AM/7 Future surveillance and spectrum	1	4	n/a	**5**
AM/8 Integration of communications, navigation, surveillance & spectrum	n/a	3	n/a	**3**
AM/9 Aircraft capabilities	2	7	2	**11**
Total	**14**	**51**	**11**	**76**

3.63 Because many of the comments were very detailed and in relation to specific elements, it is not practical to record them all, but we have summarised a selection of them below and also included some direct quotes. All the consultation responses have been read and taken into account, and all responses (except seven where publication permission was withheld) were published in full on our consultation website.[32]

Question 4 responses

Examples of topics raised by respondents	CAA comments
The CAA must provide stakeholders a holistic overview of how delivery will be achieved and when, rather than having to wait for AMS Part 3 to determine whether the plan is credible or achievable. This is necessary if the CAA is to adequately discharge its duties to develop, maintain, oversee and report on the AMS.	The consultation was about the strategy, which we needed to set first. The deployment plans will be developed as AMS Part 3 through industry engagement and consultation, where necessary, to ensure that the plans are credible.
The AMS must include definition of roles and responsibilities around network-centric collaboration and compromise between stakeholders. Also, roles for real-time airspace management; seeking changes at the ICAO level such as airspace safely facilitating High-Altitude	

[32] In some cases respondents asked for their identity to be withheld, but their responses to the questions were published. https://consultations.caa.co.uk/policy-development/draft-airspace-modernisation-strategy-2022-2040.

Examples of topics raised by respondents	CAA comments
Platform Systems; and defining who is to provide a revised lower airspace service, delivered through a combination of voice and digital data, aligned with ICAO services.	
There needs to be a clearer mechanism for keeping the AMS refreshed, setting out a timeline for review focusing on Parts 2 and 3 rather than Part 1 which should largely remain a constant.	AMS Part 1 will align with ICAO assembly update cycles of the GANP. AMS Parts 2 and 3 are necessarily living documents. Part 2 provides the short- to medium-term focus of deployment activities that requires the 'buy-in' of stakeholders. Part 3 is more a collation of plans to aid monitoring and oversight activities and already has a strong governance framework that needs to enable that collation of plans. As part of AMS governance, we will consider establishing an industry modernisation steering group to help achieve the right focus on AMS Parts 2 and 3.
The delivery elements must explicitly include the standards and regulatory needs, whether ICAO standards or UK regulations.	We agree, although this is a work-in-progress. The AMS will be the high-level driver for detailed rules and regulations with a relevant programme of change captured within the AMS Part 3.
Aspects of the programme, for example around deployment of technologies, is better placed in the AMS than in retained EU legislation. This will allow for a more holistic view to be taken across various integrated aspects of the strategy rather than more cumbersome or rigid legislation.	
Smaller air navigation service providers or airports do not have the funds to deliver the technologies, change management and other ongoing costs associated with deploying the concepts in the refreshed AMS, such as lower airspace or airport collaborative decision-making. Any cost burden must offer value for money.	We agree that funding considerations, including for delivering lower airspace changes, will be an important part of developing deployment plans.
Performance-Based Navigation design/containment policy results in more controlled airspace than traditional procedures (for example, Glasgow and Edinburgh). An innovative and flexible containment policy is needed to minimise controlled airspace, otherwise segregation will continue to increase. Also, aircraft using RNAV departures replicated from old procedures are flying lower, using more fuel and with an increased environmental impact compared with legacy procedures with controller intervention.	The utilisation and deployment of Performance-Based Navigation procedures is a significant part of the ICAO GANP and the UK modernisation ambition. Policies will need to be updated to reflect the increased accuracy of these procedures and to utilise this in delivering improved ground tracks along with better climb and descent profiles that reduce the controlled airspace requirement.
Some stakeholders expressed concerns around the environmental impacts of Performance-Based Navigation which features in most of the nine delivery elements.	Using accurate navigation capability is an important element of airspace modernisation in terms of potential CO_2 and noise improvements as well as more capacity to address predicted demand from airspace users.
The Environment Act 2021 and legally binding targets for emission reductions are not included in the draft at the strategic or tactical level. In respect of Air Quality DEFRA needs to have a formal role in the deployment to the delivery elements. Risks to local environment, including noise, air quality etc must be assessed as an integral part of the AMS and mitigated by the promoter and be overseen by an	We will continue to engage with government on its evolving environmental policy, principles and targets – including clarifying any relevant obligations under the Environment Act 2021 – and how these relate to the refreshed AMS. The AMS strategic objectives state that airspace modernisation will deliver the Government's key environmental objectives with

Examples of topics raised by respondents	CAA comments
accredited body that is alternative to and is independent of Government.	respect to air navigation as set out in the Air Navigation Guidance. We explain more under 'sustainability' on page 41. In addition to our environmental assessments of individual airspace change proposals, at the strategic level, the CAA will carry out a Strategic Environmental Assessment and Habitats Regulations Assessment of the airspace change masterplan that forms part of AMS deployment.
Environmental sustainability must be a separate delivery element because the existing nine elements are strategic objectives (safety, integration and simplification) that benefit the industry. There is no mention of how the fourth objective – sustainability or improving aviation's environmental impacts – will be achieved other than a reference in element 2. There is a disconnect between Figure 4.1 and the content of the actual delivery elements.	The nine elements are what must be delivered in terms of the modernisation of airspace from an operational and technical perspective (the 'ways') in order to achieve the strategic objectives (the 'ends'), of which sustainability is one. We do not see any need to change the way the AMS is structured. We have outlined on page 41 how we are addressing sustainability as an overarching principle.
The five use cases raise substantial issues for General Aviation and appear to demonstrate a lack of full appreciation of the nature of operations within the sector.	There has been some misunderstanding of the lower airspace concepts we proposed. To address thjs we have produced an explanatory infographic (see Appendix A) targeted at users of Class G airspace, in particular the General Aviation community, giving a better visualisation of the future lower airspace concept. We plan to supplement this with further engagement.
Electronic conspicuity vision and delivery within the AMS is an important part of the future for General Aviation, but it must be built on a clear and real benefit to all airspace users. The draft AMS lacks a clear pathway forward. There should be no inference that electronic conspicuity would be mandated. Cooperative-only surveillance solutions will require a full mandate on carriage of electronic conspicuity equipment or state-sponsored airspace change to reclassify large volumes of airspace to provide a known environment. The introduction of Radio/Transponder Mandatory Zones should be considered under a state-sponsored airspace change. Concerns were expressed about possible mandates for aircraft equipment that recreational pilots cannot afford when the beneficiaries will be new types of airspace user. Also concerns that without every aircraft and air traffic unit using the same equipment standards, a fractured system will result encouraging reliance on systems that do not show the full picture. Access to airspace is key to diverse aviation users, however with many gliders or smaller aircraft not possessing traditional transponders, allowing new technologies to give access to the new form of Transponder Mandatory Zone is critical.	Within an integrated airspace, detect and avoid requires some form of electronic conspicuity of airspace users. Users want access to as much airspace as possible, but we recognise that some are reluctant to invest in (or have genuine difficulty installing) more equipment. Initial use of electronic conspicuity by ground operations has been enabled through the use of Flight Information Display to support Flight Information Service with further enabling for air traffic controllers through an update to the Manual of Air Traffic Services (CAP 493) in progress. We will include in the AMS a clear statement that the UK intends to enable stand-alone cooperative surveillance in the provision of separation services. To deliver further interoperability of electronic conspicuity systems, the Egis report commissioned by the Department for Transport outlines a roadmap of development and the use of aviation spectrum to deliver interoperable electronic conspicuity with necessary integrity and accuracy. There is no proposal for a 'state-wide' electronic conspicuity mandate or for routinely increasing the amount of controlled airspace. The means of delivering alignment with ICAO on Flight Information Service will be determined as part of deployment planning, for example, the establishment of Radio Mandatory Zones in lieu of an Aerodrome Traffic Zone where no air

Examples of topics raised by respondents	CAA comments
	traffic control service is provided, but there are local operational considerations that impact that decision.
Regarding use case 2 and service provision to support beyond visual line of sight remotely piloted aircraft systems and advanced air mobility, lessons should be learned from the introduction of the current UK Flight Information Service. The disparity between pilots' understanding of a Flight Information Service as delivered in Europe and the USA has led to at best misunderstanding and in some cases increased workload that has had an impact on safety margins. If ICAO Flight Information Service is to be introduced it must be done universally.	We will clarify that the intention is to adopt ICAO Flight Information Service with/without surveillance in lieu of the current suite of UK Flight Information Services. Beyond visual line of sight operations by remotely piloted aircraft systems are likely to be accommodated in an additional airspace overlay which will provide ICAO Flight Information Service with surveillance enhancement.
There are only three elements deviating from or doing more than the ICAO GANP Airspace System Block Upgrades: 1. air traffic service use of electronic conspicuity information for service provision and airspace management 2. UK Space-Based Augmentation System initiative 3. Electronic conspicuity on aircraft <5700kg (including remotely piloted aircraft systems, advanced air mobility and high-altitude platform systems) There is scope for greater innovation in airspace management enabling more airspace capacity that is sustainable and integrated.	Alignment with ICAO Standards and Recommended Practices and global air navigation safety and security plans are the State commitment as a signatory to the Convention on International Civil Aviation (also known as the Chicago Convention). Differences can be lodged by a State and will continue to be a tool utilised by the UK where a good rationale exists. Our stakeholder engagement post-consultation explained this rationale for alignment. We also explained the concepts around lower airspace and why that would not result in extensive increases in controlled airspace volumes.
Tables 4.2/4.3 list the nine elements but omit some solutions mentioned elsewhere in the draft AMS or database, such as Alternative Position Navigation and Timing, Advanced Flexible Use of Airspace, System-Wide Information Management, autonomous flight and remotely piloted aircraft systems. SWIM is a key enabler for the flexible use of airspace described in Use Cases 1 and 2.	We agree; accurate and timely collation and dissemination of information is a cornerstone of the modernisation ambition. This is delivered through the System-Wide Information Management concept, embraced globally, but it requires a definition in the context of UK airspace modernisation.
It is unclear whether a single Transition Altitude includes outside controlled airspace and if so who will sponsor and fund this. Transition Altitude changes are not specifically identified as a means of increasing the safety and efficiency of the airspace. Provision for the use of Geometric Altitude and true North will future proof the design.	Transition Altitude will be addressed in developing Part 3 deployment plans. A single Transition Altitude means one regardless of airspace classification. If adopted by ICAO, Geometric Altitude and true North will be part of the GANP with which the AMS is aligned.
There could be more reference to the contribution of the various delivery elements to system and network resilience.	We agree and will address these.
'MET' information services could be referenced more widely as an enabler for some delivery elements. It enables consistent situational awareness among airspace users and air traffic management, aiding the safe management of airspace and appropriate separation of diverse users. Meteorological data should also be referenced in the use cases.	
The technology to support Trajectory-Based Operations is not currently available network-wide for all airlines and aircraft types. It	We acknowledge this, but the AMS is a vision out to 2040 aligned with ICAO.

Examples of topics raised by respondents	CAA comments
would be misguided to implement systems/procedures that exclude or penalise major operators.	
The approach leans too heavily on the adoption of datalink.	Datalink is a method of transferring data; SWIM is how the data is produced, written and read in a way that can be read and used by all. The implementation plan for this element will explain this in more detail.
The timescale for provision of Satellite/Ground Based Augmentation System services to allow satellite-based vertical approach guidance seems over-optimistic, given the UK's loss of EGNOS safety-of-life signals and the time required to set up a replacement.	We acknowledge the concern; we are working with the Department for Transport on what is achievable from a range of options.
Avoid safety risks of squeezing General Aviation into narrow corridors between controlled airspace. Also concerns expressed about the impact of new entrant users on existing users more widely, given existing constraints on capacity.	Safety is the priority. The aim of the refreshed AMS is to use airspace more flexibly to improve access and integrate airspace users.
It is essential to establish for lower airspace a coherent framework of services that complement each other, including delivery processes. Once that is established who implements and delivers those services going forward is much less of an issue.	We agree – Part 1 of the AMS sets the strategy first and deployment plans can then be developed. The aim is a service designed specifically for lower airspace users rather than as a secondary service of an airfield.
It should be explicit in the AMS that by TMZ it means the future vision – i.e. a transponder *or* electronic conspicuity mandatory zone.	We will clarify this.
The draft AMS terminology suggests only limited integration by saying remotely piloted aircraft systems and advanced air mobility operations will 'normally' be accommodated within the airspace classification.	We need to allow for abnormal situations such as emergencies and security needs, as applies today.
Use case 2 implies that for remotely piloted aircraft systems, a service from an air navigation service provider is required. This might initially be the case to allow for better integration, but the 2040 ambition should explore automated uses of airspace to ensure that the costs of remotely piloted aircraft system operations are kept low.	We will clarify that an air navigation service provider could be an automated service providing the information necessary to enable safe and efficient flight. It could be the operator of the remotely piloted aircraft system.
It should be made clear that a flight plan remains optional including to transit controlled airspace.	We will clarify that by 'flight plan' we mean 'intent data', not a traditional commercial air transport flight plan. Such data will enable access and crossing. It would be as automated as possible using planning software.
Much of the operational deployment of remotely piloted aircraft systems under element 3 could be achieved well before the 2030 timeframe suggesting a limited ambition given the pace of innovation.	The 2030 timeframe is an end state. There should be intermediate delivery of capability well before then.
Remotely piloted aircraft systems will require low-level routes which, when active, will be closed to General Aviation, while the military will need more airspace to provide mandated routes to/from military airfields. To redress this increase, other lower-level controlled airspace should be reduced through more efficient planning/ containment of approach/departure routes and control zones.	The AMS is not proposing to routinely increase the amount of controlled airspace. On the contrary, by introducing flexibility in the use of existing controlled airspace, there would potentially be less. In isolated cases new controlled airspace might be created but again this would only be 'switched on' when it was required. We have produced an infographic (see

Examples of topics raised by respondents	CAA comments
However, the AMS does not feature the necessary policy and guidance to facilitate this.	Appendix A) targeted at users of Class G airspace, in particular the General Aviation community, giving a better visualisation of the future lower airspace concept. We plan to supplement this with further engagement.
Use case 2 states that air traffic control service would be provided only in controlled airspace with ICAO Flight Information Service outside of controlled airspace, when not co-provided with an air traffic control service. The impact will be to increase low-level controlled airspace by some 300% by requiring control zones around those airfields.	
The AMS comprehensively addresses network air navigation service provider requirements and aircraft capabilities but less so for airport operations. Element 2 partly addresses this but misses reducing fuel burn and creating capacity. There is an extensive shopping list of technology upgrades within elements 5 to 9 but it is less clear how these are contributing to an improved airspace system.	The Government has now adopted its Jet Zero Strategy in which it makes clear its support for sustainable traffic growth. As noted on page 45, we will reflect this in the AMS. We will add more detail to element 2 (terminal airspace redesign). AMS Part 2 includes various airport-related sub-elements such as network integration, arrival and departure routes, safety on the ground (runway infringements, low visibility operations, etc) and arrivals/departures/surface management.

Question 5 responses

3.64 Many responses to Question 5, from a variety of stakeholder categories, concerned governance issues such as roles, responsibilities, timelines, and in some cases funding. We have mostly addressed these under questions 6 and 7.

3.65 Some had strong views that the structure for delivery needed to be reviewed.

Examples of topics raised by respondents	CAA comments
There were a number of requests for organisations to be involved in future development.	We have noted these.
There must be clarity over timelines and milestones for implementation and how it will be funded, given the long lead-in times required for equipment procurement and personnel training. Pan-industry working groups should continue to develop the delivery elements and related activities.	We agree with these sentiments. These will form part of the deployment planning. For example, work is already underway on airspace integration. We have established an Integration Steering Group to focus on the many issues that airspace integration poses. Initially this is focused on the evolution of remotely piloted aircraft systems (in particular beyond visual line of sight) integration and the capabilities of the remotely piloted aircraft systems needed to enable this. The second area of focus is the use of electronic conspicuity to enable integration by providing greater flexibility around the need for volumes of controlled airspace and how that enables access for airspace users while still delivering a safe operation. The integration programme is a long-term evolution of our airspace structures and the services provided. It aims to address
The deployment plan should include a high-level rulemaking plan of regulatory requirements established by the CAA incorporating the emergence of relevant ICAO standards at the expected timings and industry plans coherent with those milestones.	
Part 3 needs to factor in feasibility studies to ascertain the deliverability of what is proposed in Parts 1 and 2. This should be undertaken in collaboration with industry stakeholders, who will have the ability to assess technical, operational and economic feasibility of specific delivery elements.	
There should be a well-defined technology roadmap linked to delivery periods; ensuring that the technology that needs to be put in place is deployed prior to the need being realised.	

Examples of topics raised by respondents	CAA comments
In assessing progress against the AMS, Key Performance Indicators or Measures of Success / Effect could be identified across many of the delivery elements as an integral part of the programme.	the need for a specific Lower Airspace Service delivering Flight Information Services as defined by ICAO.
The AMS needs to be explicit on how advanced air mobility will be integrated into UK airspace given its expected reliance on Instrument Flight Rules, including at low altitudes and in both controlled and uncontrolled airspace.	
Design of Radio/Transponder Mandatory Zones should not follow old doctrines but be more akin to what is needed for an airfield.	
Although the integration of all airspace users should be an aspiration, priority considerations must be safe and protected departure and arrival routes, especially where using Instrument Flight Procedures, and the need for a stabilised approach.	
Delivery of elements should be supported by government and industry but made as competitive and accessible as possible such that disruptors such as innovators, small/medium-sized enterprises and non-traditional aerospace and aviation entities can contribute to the delivery of various elements and bring new thinking and approaches. Delivery entities will need: – capability and technical expertise to ensure safe delivery – speed and flexibility to keep the UK competitive and ensure modernisation keeps pace with new technologies and industrial advances – consideration of all diverse airspace users to facilitate integration via interoperability and simplification.	We agree. The AMS will be supported by the Department for Transport and CAA as co-sponsors of airspace modernisation. The UK already allows anyone to establish themselves as an air navigation service provider to deliver air traffic services within a volume of airspace. For remotely piloted aircraft systems, that model is how the fractional deployment of service provision for beyond visual line of sight operations in specific volumes of airspace is likely to be achieved.
The current airspace structure is too fractured and its piecemeal evolution has resulted in poor design. Airspace is a state asset yet airports and air navigation service providers are given the responsibility of 'getting it right'. The State needs to take ownership of the broader airspace environment and set clear guidance as to where an airport qualifies for an appropriately 'protected' airspace in its immediate vicinity.	Airspace modernisation is intended to address issues around airspace design. We had a number of comments about the current model for delivering airspace change. Consultation responses have helped to evidence the problem statement and to inform a CAA review of the current delivery model while remaining cognisant of existing airspace change activities. The delivery model is not necessarily an AMS issue to resolve, but the outcome will have a bearing on the delivery of the airspace modernisation programme.
Rather than relying on airports, should airspace change be delivered by those that can do it in the most cost-effective way?	
Given ACOG does not have a role in relation to space and airspace for remotely piloted aircraft systems, for terminal redesign there should be a separate element specific to these.	ACOG's role relates only to coordinating the airspace change masterplan and not to terminal airspace redesign or integration. The deployment plans in Part 3 will consider the airspace structure for all airspace and how to deliver it.
ACOG has not been explicitly commissioned to consider the needs and integration of advanced air mobility in UK airspace given that the initial use of these aircraft will be in major conurbations.	
There is a need to ensure that airspace is migrated to the future vision in an integrated way. There is a need for overall coordination of the plan to realise delivery of the AMS, akin to the role of ACOG in coordinating the FASI elements.	

Quote

"[We support] the outlined delivery structure for airspace modernisation in the UK, including the identification of clear deliverables and accountabilities. The information provided is very detailed but we note that the detailed descriptions of each element are not mapped against clear timelines – which the CAA notes are under development in Part 3 of the strategy. It is essential that these delivery plans are developed as a matter of urgency following the consultation to offer stakeholders a better view of what can be expected and when." [response from commercial aviation industry]

Quote

"Without everyone using the SAME electronic conspicuity, or requirement for every unit to be able to detect all different EC technologies, it is a fractured system encouraging pilots to rely on systems that don't show the full picture."
[response from a member of the General Aviation community]

Quote

"The Use Cases – in particular 3 and the operational deployment of RPAS – much of this could be achieved well before the 2030 time frame and before the end of this decade, it shows limited ambition given the pace of innovation and will only serve to stifle innovation, investment and RPAS business growth and in particular tethered RPAS solutions." [response from Tethered Drone Systems Ltd]

Quote

"The timeline is unrealistic. The GA use case is described in the 2030's, which is only 8 to 17 years away. There appears to be a disconnect between those formulating the strategy and those charged with day to day regulation of airspace, standards, ATM etc. As evidence for this, consider...
- the lamentably slow pace of implementation of GNSS approaches OCAS (to be a key part of the GU Use case); - the negligible simplification of airspace which has occurred in the last 15 years; - the recent introduction of complex pieces of airspace to accommodate CAT to the determent of GA; - the failure of the CAA to adequately promote use of EFB's / GNSS navigation aids in the testing regime of PPLs (it has only recently been addressed in the training regime...)."
[response from a member of the General Aviation community]

Question 6: How effective has the AMS governance structure been, for example in terms of overseeing delivery of the strategy, stakeholder engagement or transparency?

Question 7: The refreshed strategy is broader in scope. What changes to governance are needed to deliver the broader strategy, including future approaches to funding?

3.66 We asked two questions about governance of the AMS.

3.67 Question 6 was backward looking – seeking views on how effective governance had been since the strategy was published in 2018. A simple multiple-choice question invited a choice of four responses: **effective** / **generally effective but lacking in some areas** / **wholly or mostly ineffective** / **don't know**. Respondents could also comment in free text.

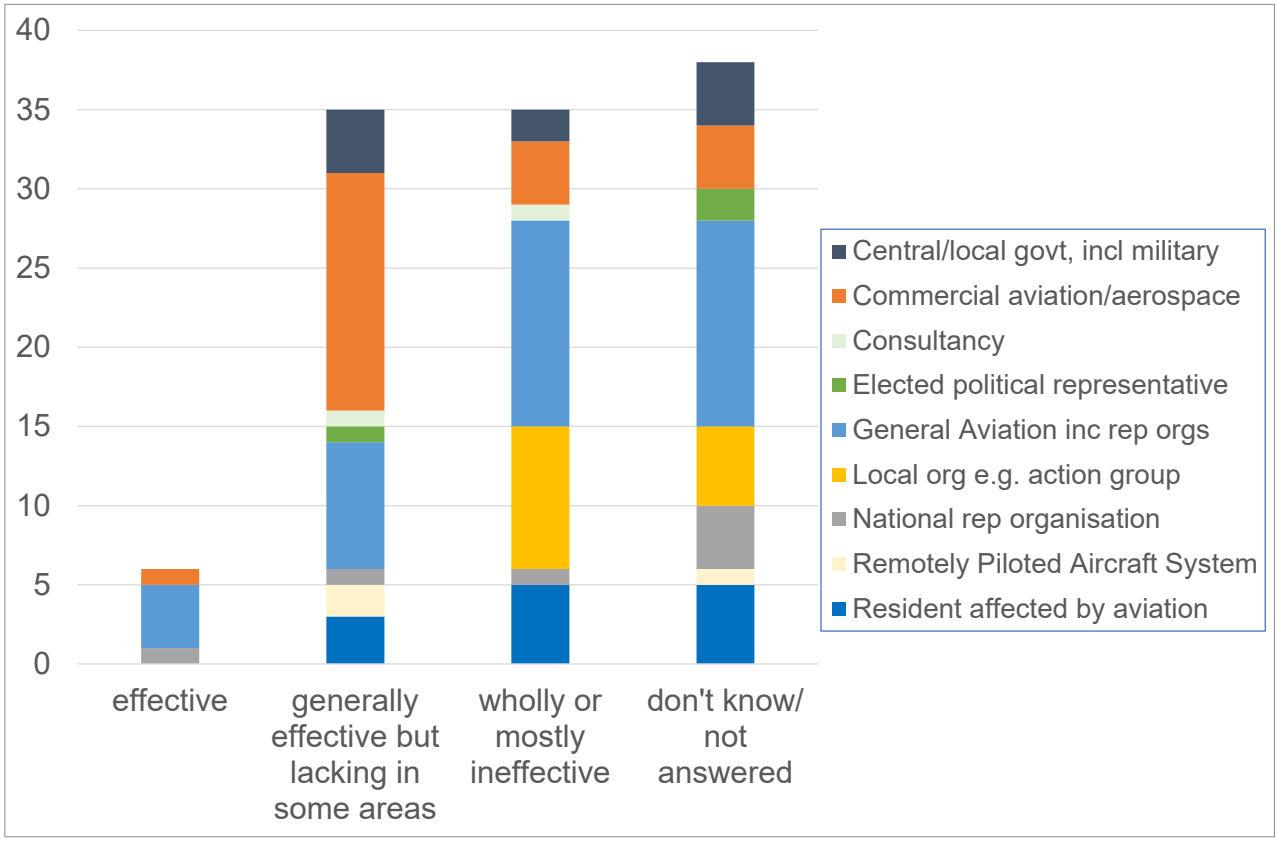
3.68 Question 7 was forward looking – seeking views on how the governance needed to change to accommodate the broadened scope of the AMS, and touching on the potentially controversial area of who would pay for the introduction of new airspace concepts in this broadened strategy for modernisation. Answers to this question were free text only.

Multiple choice responses to question 6

3.69 As shown in Figure 3.5 below, only six responses said that the governance structure had been **effective**, four of which were from General Aviation. There were 35 responses saying **generally effective but lacking in some areas**, and an equal number saying **wholly or mostly ineffective**. A significant number of responses said **don't know** (23) or did not answer the question (15).

3.70 15 of 24 commercial industry responses said **generally effective but lacking in some areas**, as did four of 10 central/local government body responses, two of three remotely piloted aircraft systems responses, and one of the two consultancy responses. Nine of 14 responses from local organisations such as community action groups said **wholly or mostly ineffective**, and none said **effective** or **generally effective**. Other categories gave mixed responses. For example, from General Aviation as well as the four responses saying **effective**, we had eight saying **generally effective but lacking in some areas**, 13 saying **wholly or mostly ineffective**, nine saying **don't know** and four not answering the question.

Figure 3.5: Multiple-choice responses to question 6 (governance structure)



Free-text responses to question 6

3.71 Question 6 asked respondents to explain the reasons for their answer about the effectiveness of the current governance structure. The question said that we were particularly interested to know whether it was clear who had been responsible for what; whether we had the right delivery groups; and whether they have been properly funded.

3.72 From our analysis we identified the following themes in the responses to question 6, which were mentioned around 150 times in 79 responses:

- Supportive of current governance
- Lack of faith in current governance
- Effective implementation requires executive authority / resourcing
- Current governance lacks clarity or transparency
- Current governance ineffective in stakeholder engagement
- Governance must include sustainability responsibility
- ACOG role
- ICCAN
- No regular review of governance

3.73 A number of responses made suggestions or enquiries in relation to a specific part of the governance structure. Some responses said that they were unfamiliar with some or all of the current governance.

Theme	Responses	Detail	CAA comments
Supportive of current governance	15	These responses, which came mainly from commercial industry (eight) and central or local government (three), made positive comments about the existing governance structure.	
Lack of faith in current governance	12	This theme includes responses saying they lacked faith in the governance structure, thought it not fit for purpose, or mentioned slow progress or criticism of the CAA. They were made by six categories of respondent, mainly General Aviation, commercial industry, local organisations and residents. One response said that it was unclear how progress is being managed or incentivised, and there appeared to be little visibility of progress against plan. Another said there were no active working groups developing/progressing content. One response noting slow progress said that sponsors had no guarantee of getting through the airspace change process as well as not having any commercial value in the outcome. One response said most of the delivery elements were not new and that the UK had not delivered them. A number of responses were critical of the CAA's role.	We have taken on board comments about the current governance structure. As a first step, now that the UK has exited the EU, within the CAA we have made the AMS the primary driver for responding to the ICAO GANP, coordinating through an internal Airspace Modernisation Assurance Group. We are in the process of ensuring alignment with the recently published UK National Aviation Safety Plan www.caa.co.uk/cap2393 to ensure consistency of approach and the ability to recognise and prioritise significant areas of risk. We will continue to review the AMS governance involving external bodies. We will consider establishing an industry modernisation steering group to help direct the short- and medium-term development of deployment activities; and also how to reinvigorate existing entities and structures, such as the National Air Traffic Management Advisory Committee (NATMAC). We plan to publish a revised AMS governance structure as an appendix in the refreshed AMS. However, in a programme as complex as this, the governance will continue to evolve over time. The Department for Transport has committed to carrying out a review of the Airspace Strategy Board.
Effective implement-ation requires executive authority / resourcing	9	Nine responses, including five from commercial industry and two from national organisations, commented on the need for a more proactive strategic management role, with the Department for Transport and CAA properly resourced and with appropriate executive authority to manage the delivery of the modernisation programme with clearer targets and delivery schedules. One response said this was needed to support the significant diversity of technology and operational use cases that are dependent on their approval, support and regulatory development. One response said there had been a growing disconnect between the aviation industry and the regulator and that proper resourcing was needed to ensure a forward thinking rather than reactive approach.	
Current governance lacks clarity or transparency	17	17 respondents from eight categories of respondent, including seven commercial and three General Aviation, said that the current governance structure was unclear and lacked maturity, variously citing clarity around process, accountability, transparency, engagement, accessible information-sharing and communication of decisions and how they are made and where the executive authority lay. In terms of specific groups, they mentioned a lack of clarity over ownership, responsibilities and interactions: what each group is there to govern, what it is empowered to do (decide, approve, recommend, etc) and how it fits with the other groups. Two responses sought clarity on the delivery method and said it was difficult to assess success or lack of it, or what the agreed outputs were. One said the structure was entirely top-down, suited for informing and 'consultation' without provision for "bottom up" engagement and communication. Transparency was needed around terms of reference for individual delivery groups, as it was	

Theme	Responses	Detail	CAA comments
		unclear how feedback is taken on board. One response noted CAA involvement at multiple layers and in multiple groups made it difficult to discern who represented what and overall accountability; a myriad of listed groups were not integrated, and neither were key groups, such as ICAMS, instead reliance being on each group to coordinate with other groups independently leading to inconsistencies, gaps and lack of ownership in the AMS process. Two responses said that the diagram of interactions between the engagement group and all of the leadership, sponsorship and delivery groups did not explain how this actually functioned. Two responses singled out how environmental impacts were represented, and one the interests of remotely piloted aircraft systems. One response advocated a review of ACOG governance and the Airspace Strategy Board.	
Current governance ineffective in stakeholder engagement	24	11 General Aviation responses said there was not enough General Aviation representation because some General Aviation organisations or sectors were missing, or that the needs of non-commercial aviation have been ignored, or that governance was too focused on commercial air transport or high-end General Aviation. Five other responses said that future flight innovators such as remotely piloted aircraft systems and advanced air mobility had not been involved to date making it more challenging to take account of the needs of all future airspace users. One General Aviation organisation and one commercial response said they had not been engaged in relevant aspects. One central/local government body said more bottom-up engagement was needed, in particular with local authorities. One commercial response sought the ability to influence the masterplan directly and another said governance was insufficiently agile. One local organisation said it needed resource to understand technicalities of airspace change, two others sought a better balance between industry groups and managers of public open spaces, local planning authorities and community groups. One commercial organisation said air traffic controllers and pilots were not given the opportunity to engage with the Strategy Board or a sub-group.	In regard to the refresh of the AMS, during pre-consultation engagement and the consultation itself, the CAA has engaged with many representatives of General Aviation, commercial air transport, air navigation service providers, 'new entrants' (such as beyond visual line of sight remotely piloted aircraft systems, space launch, advanced air mobility etc) and environmental groups in an open and transparent manner. Much of their input formed large parts of the proposed AMS. We have continued this engagement post-consultation. Ensuring that the memberships of the ongoing, core AMS governance groups is broadly reflective of airspace's diverse set of stakeholders will form part of next phase of activity.
Governance must include sustainability responsibility	8	Eight responses, mainly residents and local organisations, said that representation in respect of sustainability and environmental impacts was unclear or must be better integrated into the governance structure.	At a strategic level, the recently formed CAA Sustainability Panel will provide guidance and challenge on our approach to airspace modernisation.
ACOG role	15	These responses directly referenced the role of the Airspace Change Organising Group (ACOG), which is a key part of the governance structure given the fundamental role ACOG plays in airspace modernisation. Comments about ACOG's role came mostly from commercial industry, national organisations, local organisations and local government. Some respondents noted the importance to modernisation of the masterplan, and the need for commitment to the programme and mechanisms for timely resolution of conflicts. Two sought more transparency	We recognise that the current delivery model for airspace change is complex, with multiple interdependencies. Consultation responses have helped to evidence the problem statement and to inform a CAA review of the current delivery model while being cognisant of existing airspace change activities. The delivery model is not necessarily an AMS issue to resolve, but the outcome will have

Theme	Responses	Detail	CAA comments
		around the CAA's masterplan acceptance process and one thought arrangements were convoluted. Some respondents were supportive of ACOG's achievements so far, but one said it had yet to see concrete deliverables. One respondent questioned whether ACOG's setup and governance enabled it to develop a complex masterplan with multiple stakeholders and another questioned whether it could be impartial in advising on trade-offs. Two respondents suggested an independent co-ordination function, including independent funding, and another suggested a review of ACOG's function. Two respondents were concerned about the interface between airports and ACOG and airports' inability to influence the masterplan, one suggesting engagement groups might help. Three respondents were concerned that ACOG had no representation of communities or local authorities. One suggested a review of the ACOG Steering Committee terms of reference. In terms of future delivery of a broader strategy, three commercial industry respondents thought that changes to governance would be needed as a result of the broader AMS. They suggested that ACOG's remit should be extended to other delivery elements, in particular to consider the needs and integration of new types of airspace user in the masterplan.	a bearing on the delivery of the airspace modernisation programme. We have been transparent in consulting on and developing the process for assessing / accepting the masterplan into the AMS (see CAP 2156a / CAP 2156b). As part of coordinating the airspace change programme and developing the masterplan, ACOG will be engaging a range of stakeholders throughout each iteration. During 2022 ACOG set up a Community Advisory Panel to help shape its public engagement and for Panel members to give and receive feedback related to the masterplan. www.caa.co.uk/cap2312b (para 203) and https://www.acog.aero/airspace-masterplan/engaging-stakeholders/ The ACOG Steering Committee is not part of AMS decision-making; that rests with the CAA and Department for Transport as co-sponsors of airspace modernisation. https://www.acog.aero/about-acog/acog-steering-committee/ ACOG is a separate and impartial unit within NERL, as required by Condition 10a of NERL's air traffic services licence.
ICCAN	8	Eight responses, of which five were local organisations, made a negative comment about the closure of ICCAN (the Independent Commission for Civil Aviation Noise) and the transfer of its responsibilities.	This was a decision by the Department for Transport. The CAA has taken on some ICCAN roles.
No regular review of governance	3	Three responses from different respondent categories suggested that the governance structure should build in a mechanism for it to be regularly reviewed in light of developments, technological or otherwise.	As part of the governance structure, the CAA maintains a regular dialogue with the Department for Transport including matters of governance. The CAA is also required to formally report to the Secretary of State annually on the delivery of the AMS. We will include in this report any recommendations for changes in the light of stakeholder feedback.
Specific suggestions	28	There were 28 responses which made a suggestion or enquiry in relation to a specific part of the governance structure. A few examples are: that academic research could inform and prioritise the UK's research and train future technologists, engineers, pilots and researchers to help deliver the vision; that windfarm developers, commercial pilots and air traffic controllers should be involved; and questions concerning the status of the airspace technology delivery group mentioned in 2018, and which General Aviation organisations should be included.	We will take these into account as we develop a revised AMS governance structure.

Quote

"We are not convinced that the current governance structure is effective. While acknowledging the difficulties created by Covid, ACOG appears to have delivered little in terms of tangible change. In light of this, it may be appropriate to reassess the future role of ACOG in delivering airspace modernisation."
[response from the Royal Aeronautical Society]

Quote

"It is clear that AMS Governance has been impacted by COVID and the speed at which many of the affected parties in the UK have been able to re mobilise. However since its creation, the tracking of the various initiatives has felt fragmented. It is not entirely clear how progress is being managed or incentivised, and there appears to be little visibility of progress against plan. If there is, it is not being communicated down effectively. The 3 delivery strands shown in the diagram appear to work in silos."
[response from an airport]

Quote

"The governance structure has not been effective in protecting the environment and people affected by aircraft operations. The structure has concentrated on the maximum possible amount of aviation being squeezed into the minimum amount of space. An example is ACOG which has been publishing on social media the "advantages" of airspace modernisation without any consideration at all of the well documented detrimental environmental effects."
[response from Teddington Action Group]

Quote

"Funding for research and development has heavily relied on personal business investment and highly competitive funding schemes such as SESAR, Future Flight and CPC in which larger, more traditional aviation companies are advantaged. Collaborative research remains a priority in order for a fair and equitable commercial environment, that is not dominated by existing traditional airspace stakeholders, to be created. Yet the AMS funding available is not nearly proportionate enough to the investment required to advance this prerogative, especially when the integration of new (and therefore often smaller and non-traditional) airspace organisations and users will bring significant economic benefits to the UK." [response from Apian]

Quote

"General Aviation appears to be treated as some kind of distasteful nuisance, rather than recognising the importance of it as a grass roots function, nurturing and growing aviation talent and enthusiasm."
[response from a member of the General Aviation community]

Quote

"…but there is a perception from members that in terms of governance there is lack of clarity in its process, visibility, engagement and communications of decisions and how they are arrived. There are currently an array of groups covering similar ground which are being passed information to slightly different stakeholders as informs, but there are no active working groups developing/progressing content."
[response from Airport Operators Association]

Quote

We believe the current AMS governance structure could be improved. It never had the chance to fully bed-in and it is unclear where the governing responsibilities lie.
- The Airspace Strategy Board, Delivery Monitoring and Oversight and ACOG explicitly do not include decision-making in their respective terms of reference; additionally, the co-sponsors only 'support' decision-making.
- CAA involvement is crucial but involvement at multiple layers and in multiple groups (delivering / monitoring / regulating ACPs) makes it difficult to discern who is representing which aspect and where overall accountability sits.
- There is a myriad of groups and associations on the right-hand side that are not integrated into the structure but have inconsistent connections to all levels of the structure.
- The structure does not integrate key groups, such as ICAMS, but instead relies on each group coordinating with other groups independently. This leads to inconsistencies, gaps and lack of ownership in the AMS process. It also makes it difficult to discern whether and what the delivery groups deliver. Parallel processes have been created, causing duplication, e.g. reporting via DMO and NERL SIP.
[response from NATS]

Free-text responses to question 7

3.74 Question 7 asked respondents to explain the reasons for their answer about the effectiveness of the current governance structure. The question said that we were particularly interested to know whether the structure needed to change, whether the co-sponsors needed to do anything differently, or whether any new stakeholders not identified in the existing governance structure needed to be added. We gave two examples:

- to help with delivery of AMS Part 2, we will consider introducing an industry modernisation steering group made up of industry representatives at operations director level
- to help deliver airspace integration we might consider introducing an Integration Steering Group overseeing separate working groups on beyond visual line of sight operations for remotely piloted aircraft systems, service provision, airspace structures etc.

3.75 From our analysis we identified the following themes in the responses to question 7, which were mentioned around 130 times in 69 responses:

- Stakeholder involvement
- Provider of airspace structure and service
- Governance must include sustainability responsibility
- Steering groups and working groups
- Funding – more work needed
- Funding – by existing users.

Theme	Responses	Detail
Stakeholder involvement	21	Nine General Aviation responses said that General Aviation should be better represented and the many diverse elements of General Aviation involved or kept informed; one General Aviation response suggested a particular organisation. One commercial industry respondent suggested an advanced air mobility group, and another suggested more representation at a delivery group level for 'new airspace users', to fairly and efficiently coordinate the delivery of remotely piloted aircraft system and advanced air mobility advancements, and also highlighted that the end customer, such as the NHS, could be involved. Two airport responses suggested involving aircraft manufacturers (and potentially remotely piloted aircraft system and spacecraft manufacturers) so aircraft design aligns with the AMS delivery elements. One local government response, four local organisations and one resident suggested that DEFRA, the Office for Environmental Protection and/or the Environment Agency should have a role in overseeing the sustainability aspects of delivery elements. One local government response said the basis for engagement with local authorities should be future-proofed so that those not yet impacted by 'Future Flight' are represented. Two central/local government responses, one local organisation and one resident raised a number of related points, variously suggesting that there should be more engagement with or representation of local communities; local authorities and land-use planning; or managers of public open spaces; that such engagement should be verified independently; and that future consultation on the AMS should not just be with industry. In respect of the entities listed in the governance structure that would be engaged with about the AMS, one national organisation, one commercial organisation, one local government body, one remotely piloted aircraft system and one General Aviation respondent gave us suggestions. There were also 10 responses mentioning future stakeholder engagement on the refreshed AMS in response to question 1. They came mainly from central/local government, General Aviation or commercial industry. There was an expectation that engagement would continue in development and delivery of the refreshed AMS. There were mentions of specific stakeholders and collaboration.
Provider of airspace structure and service	10	These responses questioned who would provide the airspace structure and service, or made suggestions for a centralised or executive body. Six were from commercial industry, three from General Aviation and one from a consultancy. One commercial response said that Government must play a more active, leadership role, including engagement with local communities. Rather than a Deployment Steering Group, perhaps ACOG could be expanded to cover other delivery elements; more groups will not resolve the financial and decision-making flaws of the current approach. Two commercial responses and one consultancy said that steering groups had limitations and what was needed was an executive decision-maker able to remove obstacles (a 'controlling mind' for optimisation of UK airspace) with accountability for outcomes that may not suit all stakeholders. One commercial response said that the governance structure should operate equitably for all FASI sponsors, and that the body responsible for co-ordination should be truly independent (including

Theme	Responses	Detail
		for example, funding and facilities provided centrally via CAA or Department for Transport) enabling airports to input more meaningfully to the masterplan. One commercial response said that the UK's competitive aviation market model was a challenge to delivering airspace integration and out of step with other European countries; the UK may need to consider centralising surveillance services/service provision. One commercial response advocated simplicity in governance, for example expanding ACOG's role to the integration of new users thus giving the clarity and accountability for the delivery of airspace modernisation currently missing from the AMS. Two General Aviation responses noted that airspace concept developments were running ahead of the technology, policies and tools needed to do the actual delivery of modernisation, and that there was no governance of this, as changes had to be individually sponsored and ACOG's role was limited to airport airspace change proposals. One commercial response supported our proposed method for legislating, and the use of Citizen Space for consultation alongside Acceptable Means of Compliance and Guidance Material.
Governance must include sustainability responsibility	5	These responses from local organisations, local government and a resident said that despite sustainability being an overarching principle, the governance structure fails to contain any processes to ensure this, or that many of the organisations involved were not properly equipped to address the environmental challenges or quality of life impacts of airspace changes. One response suggested various additional entities that could be included to ensure the overarching principle on sustainability (social and economic as well as environmental) is adhered to. One response asked about the remit for the replacement for ICCAN.
Steering groups and working groups	25	These responses came from commercial industry (10), national organisations (five), and six other categories of respondent (one or two). Responses from two national organisations, one remotely piloted aircraft system and three commercial industry responses agreed with a Deployment Steering Group, with suggestions being made around membership and for an additional implementation programme management team with clearly defined roles and responsibilities. One commercial response said this sounded overly commercial-centric and suggested a group for incentivising innovation and experimentation by existing users with enabling technologies. There was support for an Integration Steering Group from three commercial respondents. There was also support from one national organisation and one remotely piloted aircraft system, both suggesting this oversees five different working groups and includes commercial, legal and risk experts as well as engineers. One remotely piloted aircraft system said any steering group should include the full range of remotely piloted aircraft systems. Two local organisations opposed any more steering groups made up of industry representatives and one elected representative said a broader membership was needed than just industry. Another commercial response suggested a governance structure based on low-level, mid-level and upper-level airspace, and working groups for each of the nine delivery elements, rather than separate ones covering integration. One response suggested an airport group alongside ACOG. A General Aviation response suggested three steering groups relating to a change of approach procedures and to Class G airspace. Four national organisations, two commercial respondents, two General Aviation respondents and one local government body expressed interest in joining a steering group or being involved.
Funding – more work needed	21	There was general agreement across a range of respondent categories that funding needed to be addressed if the broader scope of the refreshed AMS and critical deliverables were to be successfully implemented. One commercial response said that funding viability for the long-term development programmes required clear timescales for the strategic steps. One commercial response said that there are risks to the modernisation programme if funding issues, certainly in the medium term, are not resolved satisfactorily. Another commercial response said that funding for areas such as advanced air mobility should be revisited once the industry better understands the parameters it has to operate within over the short, medium and long term. One commercial response identified in particular CNS concepts, including migration to space-based CNS, electronic conspicuity and a cooperative surveillance capability. One national

Theme	Responses	Detail
		organisation said that the detailed areas requiring action seem to be correctly identified, but there was a lack of clarity as to who will pay for what, such as electronic integration. One commercial response said airspace infrastructure such as national flight information service, distress and diversion, etc could be funded through licensing charges where airspace restrictions were imposed that caused a negative impact on some users; this would incentivise fewer restrictions and support future airspace flexibility. One commercial response stressed the need for a cost-efficient programme in the current operating environment, and that the CAA must ensure there is as much alignment as possible with European and global airspace modernisation programmes, ensuring a timely investment in, and cost-efficient rollout of required technologies. One commercial response suggested the creation of a specific group to deal with economic matters related to the charging scheme, in particular allowing airlines to monitor investments, capital expenditure and other cost elements. One General Aviation response said a funding strategy and associated oversight group was needed. One commercial response said that funding should be available for industry stakeholders to be involved in working groups, and one local organisation said that Government should fund independent technical/professional advice for impacted communities.
Funding – by existing users	10	Four commercial responses expressed concern that airports were unable to fund the early stages of the programme owing to Covid, and a possible future impasse in funding if no further public money was available to move the programme forward. Two of these suggested exploring alternative funding mechanisms including an extension to government support. One said that the CAA needed proper funding to provide the necessary resource to develop the vision. One local organisation said that industry (the polluter) and beneficiaries must fund modernisation, not the taxpayer. Three commercial responses noted the beneficiaries of airspace modernisation included new types of airspace user such as remotely piloted aircraft systems or spacecraft, saying they should not rely on charges paid by commercial airlines. Two of these asked how those new users will contribute to funding it, and one said it should be funded by government, CAA or NATS itself. Two commercial responses referred to the 'user pays' principle and said this should be applied fairly and equitably across all airspace (including prospective) users, particularly those operating for commercial interests. Two commercial responses sought greater oversight of the way in which investments are made and transparency of costs, including the AMS Support Fund, so that any sums recovered through user charges is clear and justified. Two General Aviation responses said existing users that did not benefit should not incur the cost of re-equipping to accommodate new airspace users, and that it should come from government or industries wanting to introduce new devices.
Specific suggestions	13	Suggestions about other specific aspects of governance were made in five responses from commercial industry, three from central or local government bodies, two from remotely piloted aircraft systems, and one each from General Aviation, an elected representative and a local organisation. A few examples are: creation of a specific group to monitor deployment of the various elements; formalise annual reviews of the AMS and its implementation; strengthen environmental representation to look for quick wins on environmental efficiency; and better integrate airspace and land-use planning to address the impacts of aviation on the ground.

Quote

"Any steering groups tasked with implementing the changes need to involve more than industry specific personnel. If the strategy is genuinely wanting to balance the economic benefits with the environmental impacts then a wider representation would be required." [response from an elected political representative]

Quote

"HACAN remain concerned that ACOG is an industry-only body with no community or environmental representatives on their board. There is an absence of accountability in both the AMS governance structure and the wider UK aviation sector. In particular, it is felt that the governance structures have limited understanding in addressing quality of life impacts. Nor are many of the organisations involved properly equipped to address the environmental challenges of airspace changes."
[response from Heathrow Association for the Control of Aircraft Noise]

Quote

"…the governance structure should be set up to operate in a fair and equitable manner for all FASI ACP sponsors, and […] the body responsible for co-ordination should be truly independent (including funding arrangements and provision of facilities). […] This would provide mitigation to de-risk the programme and enable all Airspace Modernisation ACP sponsors to work with the Co-sponsors and ACOG to deliver an optimal modernised airspace that meets the objectives set out in the strategy. The ability for ACP sponsors to be able to input into the Masterplan and activities that ACOG is leading is paramount to ensuring that any outcomes are fully understood and achievable by all sponsors. For example, ACOG funding and facilities could be provided centrally via CAA or DfT, and processes put in place to ensure that airport sponsors are able to provide meaningful input to, and have opportunity to review, ACOG deliverables before they are finalised. Recognising the number of sponsors and the need to keep processes simple, this may be best provided through one or more working groups (e.g., a delivery working group and delivery oversight group made up of representatives of airports identified as significant in the plan or who volunteer, plus AOA to represent the interests of remaining airports)."
[response from Heathrow Airport]

Quote

"With regards to the wider governance of the programme, we have maintained from the start our concerns with the Airspace Strategy Board, which we do not believe is strategic, or the right size, or with the right people as members. […] It needs to become a delivery vehicle and have as members people who are 100% determined to see airspace modernisation succeed, as quickly as possible, rather than a forum through which no end of grievances are heard." [response from Airlines UK]

Quote

"ECC considers that Government needs to think about the role that local government will play, particularly in the new aviation technologies, and therefore there is a need to consider local government involvement in some of the stakeholder groups."
[response from Essex County Council]

Quote

"You have identified the right group but many of the actual changes that will be made (cf Chapter 5) are being driven by ATS groups rather than pilot groups. As a result we seem to be designing and airspace fit for controllers rather than an airspace fit for aircraft. This reflects the work within the former AMS Focus Groups where all the "official" attendees were former civil or (mainly) military ATC controllers. Please get more aviators involved at the development stage so that the real and practical outcomes are identified at the earliest stages."
[response from a member of the General Aviation community]

Quote

"There is no doubt that the competitive nature of UK aviation will be a challenge to delivering airspace integration as the commercial nature of the business means that there is little spare capacity and where a stakeholder is not profitable, it will go out of business. The services provided within class G airspace are primarily only there because industry has a need to provide a level of safe operation but if this becomes too expensive then the industry will not provide it unless it is mandated. Most mainland European countries have a centrally funded ANSP provision with only one or two ANSPs (Germany has a few more) whereas the UK has about 61 ANSPs with approximately 30 providing air traffic controllers who all compete against each other as they are employed by an airport primarily and would not be there without the airport (NERL is an exception where they are paid through en-route charges). If the concepts being explored in the draft AMS are to work efficiently and cost effectively, there may need to be consideration of centralising surveillance services/service provision as this would make the delivery of change and integration of airspace users much easier."
[response from Oxford Aviation Services Ltd]

.

Quote

"we believe that the CAA should ensure the AMS's integration objective is adequately reflected in ACOG's next masterplan iteration. A clear statement of intent to commission new work from ACOG to fulfil this objective is therefore required. We would expect this work also to require additional funding for NERL in its next funding settlement (NR23). In addition, the assessment criteria for the acceptance of the next masterplan should require clarity on how the objective of integration is being achieved." [response from Vertical Aerospace]

CAA response to comments about the AMS governance structure

3.76 The consultation sought views on how effective the existing 2018 AMS governance structure had been, which was mostly focused on commercial air transport, controlled airspace and larger air navigation service operations. Many responses thought improvements in governance were needed.

3.77 The 15 initiatives from 2018 that the refreshed AMS absorbed into nine delivery 'elements' already have established owners – for example, masterplan airspace

change sponsors and NERL (NATS (En-route) plc). These will continue. We continue to work on deployment plans that will form a future Part 3 of the AMS, based on the outcome of the consultation on the strategy (including question 5) and delivery elements in AMS Parts 1 and 2.

3.78 The refreshed AMS has a broader focus, in particular around integration – for example, seamless integration of operations by beyond visual line of sight remotely piloted aircraft systems and advanced air mobility; use of electronic conspicuity; a Lower Airspace Service to better support both self-management of piloted VFR (Visual Flight Rules) aircraft and remotely piloted aircraft systems in Class G (uncontrolled) airspace; flight intention information-sharing to facilitate increased VFR access to Class D airspace, improved Class G airspace structure, etc.

3.79 Not all of these sit readily with the current AMS delivery, governance and resourcing/funding structures. The consultation asked what changes were needed to deliver the AMS, and floated some ideas, but made no firm proposals because we were still consulting on the content, particularly the delivery elements.

3.80 Work to develop these structures will need to be undertaken, involving multiple stakeholders, in parallel with the work to evolve the new areas of focus themselves. We will publish a revised AMS governance structure, but in a programme as complex as this, the governance will continue to evolve over time. Ensuring that membership of the ongoing, core AMS governance groups is broadly reflective of airspace's diverse set of stakeholders will form part of the next phase of activity. We are now working on what immediate changes are needed.

3.81 Some of this has already happened, for example we have set up:

- A CAA internal Airspace Modernisation Assurance Group, reporting to a refreshed CAA Airspace Programme Board. The Assurance Group coordinates across the CAA on the implications of development or deployment of CAA activities and resources, including responding to the ICAO GANP, and takes decisions on AMS support fund applications.[33]
- A steering/working group in support of airspace integration, reporting to the Airspace Modernisation Assurance Group, to develop a concept of operations and roadmap for coordination with related workstreams, and helping to inform work on service delivery and charging.
- A review of the broader AMS governance structure groups' Terms of Reference to ensure consistency and identify any overlaps.

[33] https://www.caa.co.uk/commercial-industry/airspace/airspace-modernisation/airspace-modernisation-strategy-support-fund/airspace-modernisation-strategy-support-fund/

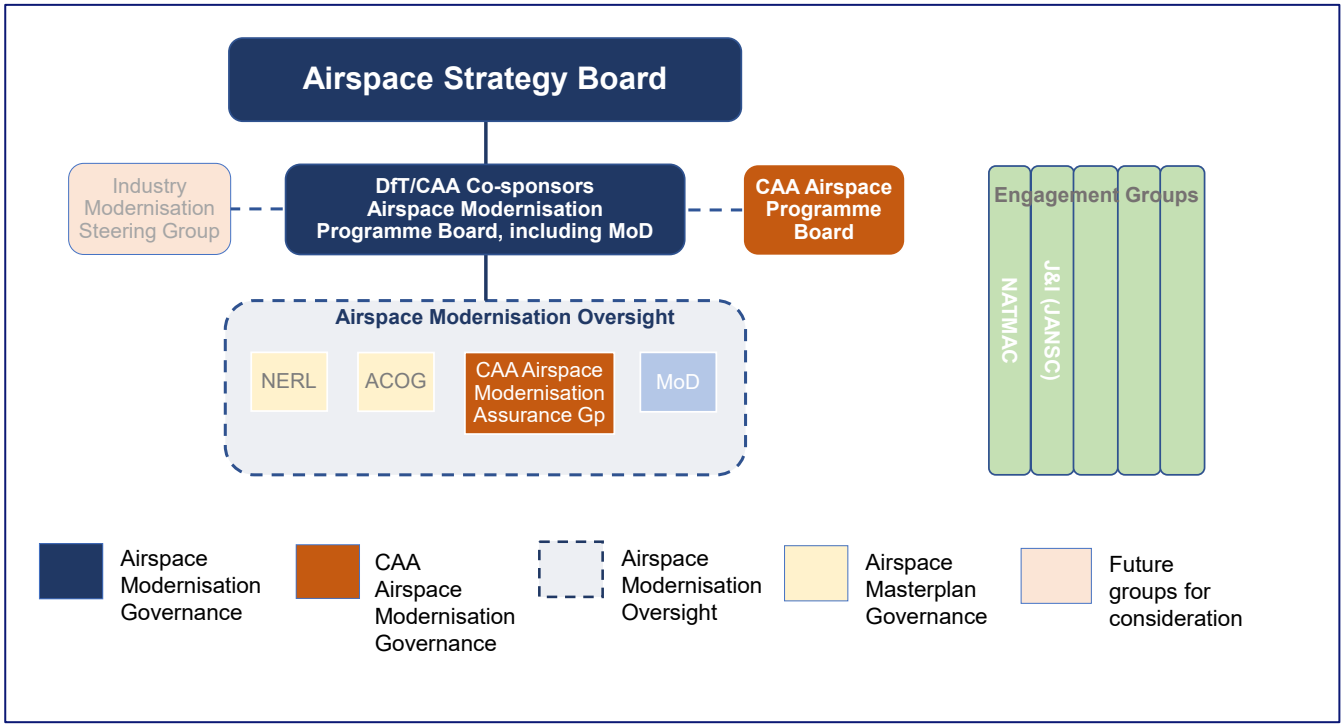
3.82 At a strategic level, the recently formed CAA Sustainability Panel will provide guidance and challenge on our approach to airspace modernisation. We will also work with the Government to ensure that tasks related to its Future of Flight Plan are allocated to the appropriate governance forum.

3.83 Looking further ahead beyond publication of the refreshed AMS, the governance structure will be kept under constant review.

Updating the AMS governance structure

3.84 Figure 3.6 shows the overall governance structure we currently envisage (note that the Department for Transport has committed to carrying out a review of the Airspace Strategy Board).

Figure 3.6: Envisaged airspace modernisation governance structure



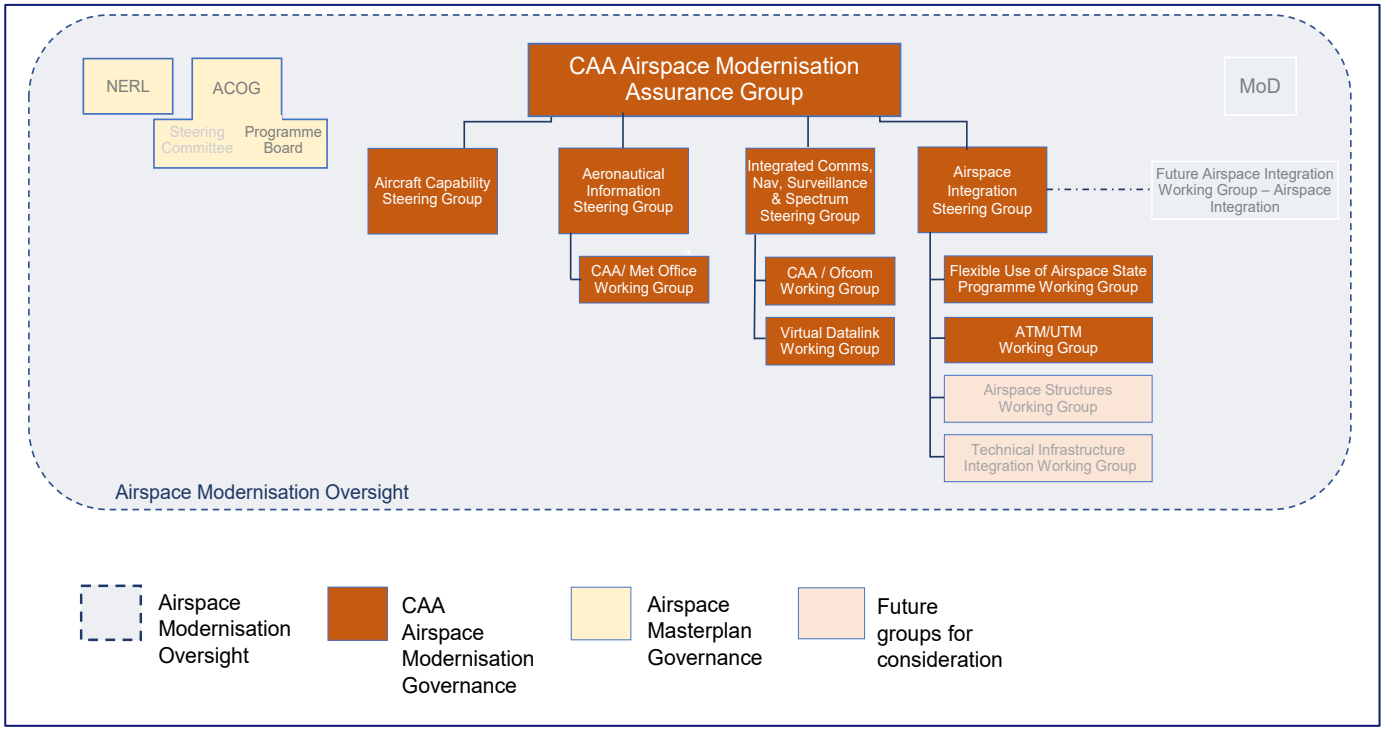
Notes:
The governance structure was last published in CAP 1862 in December 2019, which itself updated the original 2018 CAA/Department for Transport governance annex CAP 1711b. Further changes have occurred in the last three years.

The Department for Transport has committed to carrying out a review of the Airspace Strategy Board.

J&I = Joint and integrated air traffic services
JANSC = Joint Air Navigation Services Council (see Direction 14 of the Air Navigation Directions 2017, as amended)
NATMAC = National Air Traffic Management Advisory Committee

3.85 Reporting to the CAA Airspace Modernisation Assurance Group we expect there to be four steering groups covering different aspects of modernisation. Although we will not go as far as creating a steering group for each element, we will consider introducing an additional industry modernisation steering group, made up of industry representatives at operations director level, to help direct the short- and medium-term development of deployment activities. Figure 3.7 shows more detail of what the airspace modernisation oversight governance encompasses and in particular CAA internal governance. Other groups may be added to the CAA internal governance as the AMS evolves.

Figure 3.7: Envisaged CAA airspace modernisation oversight and internal governance



Alternative models for airspace change

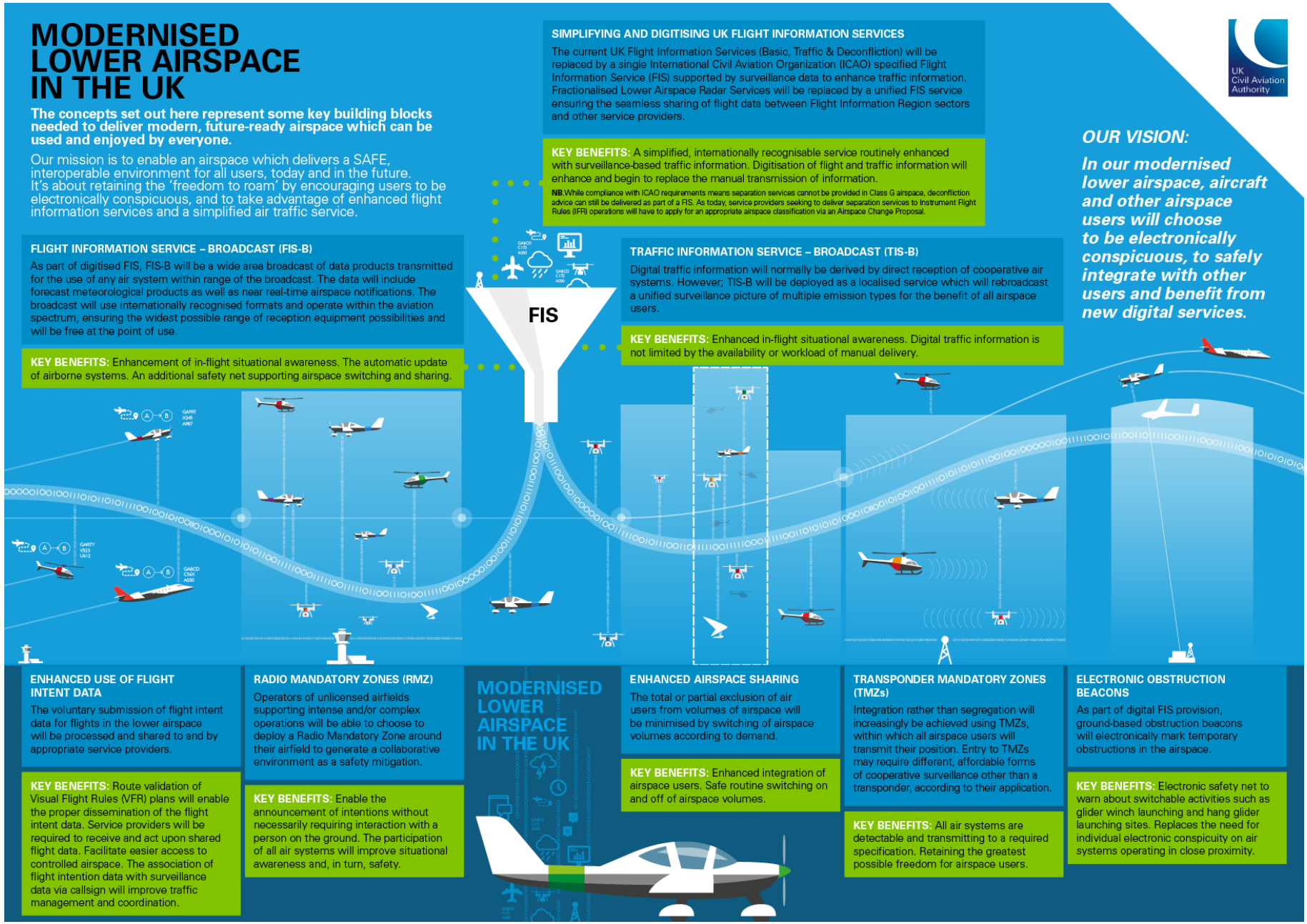
3.86 The AMS sets the overarching strategy, direction and intent for modernisation. The CAP 1616 process is the CAA's tactical-level decision-making process that sponsors are required to follow when making specific proposals to change the UK's notified airspace design. The CAP 1616 process (and proposals or decisions under that process) was out of scope of the AMS consultation, and is subject to its own, separate, review. We will therefore consider any comments as part of that separate review.[34]

34 https://www.caa.co.uk/commercial-industry/airspace/airspace-change/review-of-cap-1616/.

3.87 In the current delivery model, it is mainly airports and air navigation service providers that sponsor airspace change proposals. The CAA oversees the process and adjudicates in a pure regulatory mode. This model is complex, with multiple interdependencies.

3.88 Consultation responses have helped to evidence the problem statement and to inform a CAA review of the current delivery model while remaining cognisant of existing airspace change activities. After the consultation closed, we initiated bilateral contact with the FASI airport change sponsors that commented on the coordination of that programme, seeking a more detailed understanding of their consultation comments. This will be used to inform the need, if any, for changes to that programme's coordination.

3.89 The delivery model is not necessarily an AMS issue to resolve, but the outcome will have a bearing on the delivery of the airspace modernisation programme.


MODERNISED LOWER AIRSPACE IN THE UK
The concepts set out here represent some key building blocks needed to deliver modern, future-ready airspace which can be used and enjoyed by everyone.
Our mission is to enable an airspace which delivers a SAFE, interoperable environment for all users, today and in the future. It's about retaining the 'freedom to roam' by encouraging users to be electronically conspicuous, and to take advantage of enhanced flight information services and a simplified air traffic service.
SIMPLIFYING AND DIGITISING UK FLIGHT INFORMATION SERVICES
The current UK Flight Information Services (Basic, Traffic & Deconfliction) will be replaced by a single International Civil Aviation Organization (ICAO) specified Flight Information Service (FIS) supported by surveillance data to enhance traffic information. Fractionalised Lower Airspace Radar Services will be replaced by a unified FIS service ensuring the seamless sharing of flight data between Flight Information Region sectors and other service providers.
KEY BENEFITS: A simplified, internationally recognisable service routinely enhanced with surveillance-based traffic information. Digitisation of flight and traffic information will enhance and begin to replace the manual transmission of information.
NB. While compliance with ICAO requirements means separation services cannot be provided in Class G airspace, deconfliction advice can still be delivered as part of a FIS. As today, service providers seeking to deliver separation services to Instrument Flight Rules (IFR) operations will have to apply for an appropriate airspace classification via an Airspace Change Proposal.
UK Civil Aviation Authority
OUR VISION:
In our modernised lower airspace, aircraft and other airspace users will choose to be electronically conspicuous, to safely integrate with other users and benefit from new digital services.
FLIGHT INFORMATION SERVICE – BROADCAST (FIS-B)
As part of digitised FIS, FIS-B will be a wide area broadcast of data products transmitted for the use of any air system within range of the broadcast. The data will include forecast meteorological products as well as near real-time airspace notifications. The broadcast will use internationally recognised formats and operate within the aviation spectrum, ensuring the widest possible range of reception equipment possibilities and will be free at the point of use.
KEY BENEFITS: Enhancement of in-flight situational awareness. The automatic update of airborne systems. An additional safety net supporting airspace switching and sharing.
FIS
TRAFFIC INFORMATION SERVICE – BROADCAST (TIS-B)
Digital traffic information will normally be derived by direct reception of cooperative air systems. However; TIS-B will be deployed as a localised service which will rebroadcast a unified surveillance picture of multiple emission types for the benefit of all airspace users.
KEY BENEFITS: Enhanced in-flight situational awareness. Digital traffic information is not limited by the availability or workload of manual delivery.
ENHANCED USE OF FLIGHT INTENT DATA
The voluntary submission of flight intent data for flights in the lower airspace will be processed and shared to and by appropriate service providers.
KEY BENEFITS: Route validation of Visual Flight Rules (VFR) plans will enable the proper dissemination of the flight intent data. Service providers will be required to receive and act upon shared flight data. Facilitate easier access to controlled airspace. The association of flight intention data with surveillance data via callsign will improve traffic management and coordination.
RADIO MANDATORY ZONES (RMZ)
Operators of unlicensed airfields supporting intense and/or complex operations will be able to choose to deploy a Radio Mandatory Zone around their airfield to generate a collaborative environment as a safety mitigation.
KEY BENEFITS: Enable the announcement of intentions without necessarily requiring interaction with a person on the ground. The participation of all air systems will improve situational awareness and, in turn, safety.
MODERNISED LOWER AIRSPACE IN THE UK
ENHANCED AIRSPACE SHARING
The total or partial exclusion of air users from volumes of airspace will be minimised by switching of airspace volumes according to demand.
KEY BENEFITS: Enhanced integration of airspace users. Safe routine switching on and off of airspace volumes.
TRANSPONDER MANDATORY ZONES (TMZs)
Integration rather than segregation will increasingly be achieved using TMZs, within which all airspace users will transmit their position. Entry to TMZs may require different, affordable forms of cooperative surveillance other than a transponder, according to their application.
KEY BENEFITS: All air systems are detectable and transmitting to a required specification. Retaining the greatest possible freedom for airspace users.
ELECTRONIC OBSTRUCTION BEACONS
As part of digital FIS provision, ground-based obstruction beacons will electronically mark temporary obstructions in the airspace.
KEY BENEFITS: Electronic safety net to warn about switchable activities such as glider winch launching and hang glider launching sites. Replaces the need for individual electronic conspicuity on air systems operating in close proximity.