HM Government

Aviation 2050
The future of UK aviation

A consultation

Cm9714

December 2018

Aviation 2050
The future of UK aviation

A consultation

Presented to Parliament by the
Secretary of State for Transport
by Command of Her Majesty

December 2018

Cm 9714

The Department for Transport has actively considered the needs of blind and partially sighted people in accessing this document. The text will be made available in full on the Department's website. The text may be freely downloaded and translated by individuals or organisations for conversion into other accessible formats. If you have other needs in this regard please contact the Department.

Department for Transport
Great Minster House
33 Horseferry Road
London SW1P 4DR
Telephone 0300 330 3000
Website www.gov.uk/dft
General enquiries: https://forms.dft.gov.uk

© Crown copyright 2018

This publication is licensed under the terms of the Open Government Licence v3.0 except where otherwise stated. To view this licence, visit nationalarchives.gov.uk/doc/open-government-licence/version/3

Where we have identified any third party copyright information you will need to obtain permission from the copyright holders concerned.

This publication is available at www.gov.uk/government/publications

Any enquiries regarding this publication should be sent to us at AviationStrategy@dft.gov.uk

ISBN 978-1-5286-0932-6

CCS1218200688 12/18

Printed on paper containing 75% recycled fibre content minimum

Printed in the UK by the APS Group on behalf of the Controller of Her Majesty's Stationery Office

Contents

Foreword 6

About this document 8

Executive summary 12

1. The role of aviation in a changing world 18

2. Build a global and connected Britain 32

3. Ensure aviation can grow sustainably 48

4. Support regional growth and connectivity 86

5. Enhance the passenger experience 108

6. Ensure a safe and secure way to travel 132

7. Support General Aviation 150

8. Encourage innovation and new technology 166

9. Next steps in developing an Aviation Strategy 180

Annex A: Legislation to enforce the development of airspace change proposals 182

Annex B: Slot allocation – the case for change 188

Annex C: Potential carbon abatement measures 190

Annex D: Proposed Public Service Obligation (PSO) assessment criteria 193

Annex E: Glossary 195

Annex F: Photo credits 197

Foreword

Aviation has long been at the heart of the United Kingdom's economic success. From its earliest days, flight has helped forge international trade links and created vital domestic connections enabling our country to flourish.

Today we have the largest aviation network in Europe and the third largest in the world, an industry that contributes at least £22 billion to the UK economy, along with over 230,000 jobs.

The industry is also growing at a rapid rate to meet rising demand. Passenger numbers have been increasing for seven consecutive years, and it's estimated that UK passenger traffic could soar from 284 million last year to 435 million by 2050.

As Aviation Minister I have been hugely impressed by the sector's ambition and innovation.

In recent months we've seen the opening of a new terminal building at Luton Airport, the launch of new flights between Manchester and Mumbai, and Birmingham Airport's announcement of a £500 million expansion plan to boost capacity and improve facilities.

In London and the South East our airports are nearly full, and earlier this year we supported the crucial Northwest runway at Heathrow after achieving an overwhelming parliamentary majority for the Airports National Policy Statement.

Clearly this growth benefits the UK. A thriving aviation sector is tangible evidence of economic confidence, growing tourism, increased trade, and business investment. Our regional airports and the connections, jobs and investment they provide spread these benefits across the country.

As we leave the European Union, the UK's future prosperity depends on our ability to reach out to the rest of the world, to forge new trade links, to connect and compete.

However we can't take future success for granted. The aviation sector faces global challenges; rising demand coupled with changing customer expectations, technological change and tight profit margins in a fiercely competitive market.

We need to keep asking some fundamental questions. How can we manage the impact of growth on the environment – particularly carbon emissions, air quality and noise? How can we continue improving the passenger experience? How can we develop a global and connected UK with more trade opportunities? And how can we harness the benefits of innovation and new technology?

We need a long-term plan for sustainable growth to ensure the industry's continued success, to 2050 and beyond. That is the starting point for our new Aviation 2050 strategy.

In developing Aviation 2050 we've worked closely with a wide variety of industry, community and environmental partners, and generated a wealth of information and opinion on almost every aspect of aviation.

This consultation lays out the proposals that will form the next stage of that process as we seek to address the challenges facing the sector over the coming decades.

As this consultation makes clear, the government supports aviation industry growth. However growth must be coupled with steps to mitigate environmental damage such as carbon emissions, noise and air quality. We must also minimise the impact of growth on local areas and make journeys to and from airports cleaner, smarter and quicker.

As the aviation sector grows and changes, so do the needs of passengers.

Airlines and airports have already carried out some impressive work on improving the experience of passengers. However there is more work to do, particularly in the case of passengers with additional needs. Airports face rising numbers of requests for assistive services and six in ten disabled travellers say they find flying and using airports difficult.

The Aviation Strategy includes proposals for a Passenger Charter – a clear set of standards for how airports and airlines treat consumers. These measures clearly set out the level or service that all passengers can expect to receive at all stages of their journey, including a focus on the needs of disabled travellers. The government is examining what more it can do to improve air passengers' journeys, for instance by introducing improvements to reduce delays at the border and dealing with disruptive passengers.

This consultation paper considers a host of other issues – all of which must be tackled to ensure the industry enjoys the same levels of success in future.

These range from how best to seize technological opportunities so we stay at the forefront of aerospace design and manufacture to maintaining our excellent aviation safety and security record.

The development of Aviation 2050 is not a process the government can undertake on its own. We need to listen to what the industry, passengers and communities have to say, and work in partnership to get this right.

This document seeks views on our proposed approach ahead of the publication of the final Aviation 2050 strategy next year.

This is your opportunity to shape the future of aviation in the United Kingdom, so it works for passengers, communities and industry.

I look forward to hearing your views, and to working with you to ensure that aviation continues to benefit our country.

Baroness Sugg
Aviation Minister

About this document

Background

The government is developing a long term Aviation Strategy to 2050 and beyond, the aim of which is to achieve a safe, secure and sustainable aviation sector that meets the needs of consumers and of a global, outward-looking Britain.

The objectives of the strategy are to:

- help the aviation industry work for its customers
- ensure a safe and secure way to travel
- build a global and connected Britain
- encourage competitive markets
- support growth while tackling environmental impacts
- develop innovation, technology and skills

The first step in the process of developing the strategy was the publication of an initial call for evidence in July 2017 on the strategy's aims and objectives.[1] The government then published a 'next steps' document in April 2018 which set out some of the specific issues to be considered as part of the policy development process.[2]

This document

Structure

This document forms part of the government's final consultation on the policy proposals for the Aviation Strategy. It is structured around the original objectives of the strategy, updated to reflect the feedback that the government has received to date on their relevance and priority. Each chapter relates to a strategic theme, such as ensuring aviation can grow sustainably, and contains specific policy proposals in bold text. Further detail on some of the policy issues can be found in the annexes.

1 Department for Transport (2017): Beyond the horizon – the future of UK aviation. A call for evidence on a new strategy

2 Department for Transport (2018): Beyond the horizon – the future of UK aviation. Next steps towards an Aviation Strategy

Consultation questions

The government is seeking feedback on the policy proposals in this document and any suggestions for additional proposals that could be considered. The objective of this consultation is to inform the content of the final strategy document by considering proposals based on their:

- strategic case – overall impact and effectiveness
- implementation – how they can be delivered and their feasibility
- burdens – any new or additional regulatory and financial implications
- overall acceptability – to passengers, the public, industry and other stakeholders

There are seven generic consultation questions which relate to the strategic theme addressed by each chapter (chapters 2-8): These are as follows:

- how could the policy proposals be improved to maximise their impact and effectiveness in addressing the issues that have been identified?
- how should the proposals described be prioritised, based on their importance and urgency?
- are you aware of any relevant additional evidence that should be taken into account?
- what implementation issues need to be considered and how should these be approached?
- what burdens, both financial and regulatory, are likely to need to be managed and how might those be addressed?
- are there any options or policy approaches that have not been included in this chapter that should be considered for inclusion in the Aviation Strategy?
- looking ahead to 2050, are there any other long term challenges which need to be addressed?

Additionally, there are specific questions that relate to one or more specific policy issues at the end of each chapter. There are also specific questions on the government's approach to airspace modernisation and public service obligations at Annex A and Annex D respectively.

How to respond

Consultation period

The consultation period will run until 11 April 2019. Please ensure that your response reaches us before the closing date. If you would like further copies of this consultation document, it can be found at https://www.gov.uk/dft#consultations or you can contact AviationStrategy@dft.gov.uk or telephone 0300 330 3000 if you need alternative formats (Braille, audio CD, etc).

Responding

Please use the online form at https://aviationstrategy.campaign.gov.uk to respond to this consultation. Alternatively, consultation responses can be emailed directly to: AviationStrategy@dft.gov.uk

If responding by post please send to:

Aviation Strategy
Department for Transport
33 Horseferry Road
London
SW1P 4DR

When responding, please state whether you are responding as an individual or representing the views of an organisation. If responding on behalf of a larger organisation, please make it clear who the organisation represents and, where applicable, how the views of members were assembled.

Consultation principles

The consultation is being conducted in line with the government's consultation principles. Further information is available at https://www.gov.uk/government/publications/consultation-principles-guidance

Guidance

If you have any comments about the consultation process please contact:

Consultation Co-ordinator
Department for Transport
Zone 1/29 Great Minster House
33 Horseferry Road
London
SW1P 4DR

Email: consultation@dft.gsi.gov.uk

Confidentiality and data protection

The Department for Transport (DfT) is carrying out this consultation on a range of policies to transform the Aviation sector in the UK. The consultation is being carried out in the public interest to inform the development of policy. DfT is the data controller for your personal information. As part of this consultation DfT is asking for your name and email address. This is in case it needs to ask you follow-up questions about any of your responses. You do not have to provide this personal information. If you do provide it, you consent to DfT using it only for the purpose of asking follow-up questions. DfT may contract a third party to analyse the responses it receives to the consultation. If you provide your contact details, DfT may share this information with a contractor in case they need to contact you regarding your consultation response.

This consultation document has been developed in collaboration with other government departments and partner agencies. Consultation responses may be shared with these other bodies, but will not include personal details on respondents. This will aid in the facilitation of future government policy development and legislation.

You can withdraw your consent to be contacted at any time by emailing: AviationStrategy@dft.gov.uk

DfT's privacy policy has more information about your rights in relation to your personal data, how to complain and how to contact the Data Protection Officer. You can view it at: https://www.gov.uk/government/organisations/department-for-transport/about/personal-information-charter

To receive this information by telephone or post, contact us on 0300 330 3000 or write to Data Protection Officer, Department for Transport, Ashdown House, Sedlescombe Road North, St Leonards-on-Sea, TN37 7GA.

Your personal information will be kept securely on a secure IT system within DfT and destroyed within 12 months after the consultation has been completed.

Executive summary

The UK has the largest aviation network in Europe and the third largest in the world. Aviation directly contributes at least £22 billion to the economy and supports around half a million jobs. The government supports the growth of aviation and the benefits this would deliver, provided that growth takes place in a sustainable way, with actions to mitigate the environmental impacts.

The UK has a rich aviation history and the government recognises the importance of aviation to the whole of the UK. Aviation creates jobs, encourages our economy to grow and connects us with the rest of the world as a dynamic trading nation. It is also important for maintaining social and family ties. This is why the government supports the growth of aviation and the benefits this would deliver, provided that growth takes place in a sustainable way, with actions to mitigate the environmental impacts.

Despite its strengths, UK aviation faces many challenges which it will need to overcome to take advantage of the opportunities the future holds, and to realise the benefits of sustainable growth while remaining at the forefront of innovation.

Challenges include:

- global change and shifting markets
- impact of competition on business models
- increasing passenger demand
- changing expectations of passengers
- effects of international climate change
- making the most of new technology

In order to remain competitive on the global stage, and to safeguard its role as one of the leading aviation and aerospace sectors, the UK must be well positioned to take advantage of new opportunities, while managing the potential economic, political and environmental headwinds along the way. This is the motivation behind a new aviation strategy: Aviation 2050, which will be based around the following strategic themes.

Build a global and connected Britain

Aviation is important for the government's goal of building a global and connected Britain. The UK already plays a prominent role on the world stage with the biggest international aviation network in Europe and currently the third largest in the world. Through the Aviation Strategy the UK will be equipped to build new connections in rapidly growing aviation markets, and to use the leverage we have internationally to pursue our objectives on environmental measures and liberalisation.

The government is working to:

- improve standards globally
- maintain and improve the UK's connectivity
- support UK aviation exports, including overcoming barriers

Ensure aviation can grow sustainably

Demand for aviation has grown significantly since 2010 and the government welcomes growth in the sector, but this growth must be sustainable. Achieving this requires a partnership between the government, the regulator, the industry and other interested parties to work within a comprehensive policy framework to better manage the environmental impacts of the sector.

The consultation:

- outlines the government's preferred approach for developing a framework for sustainable growth and the respective roles for the government and the industry
- makes the case for making the most efficient use of infrastructure, including by considering the system for slot allocation at airports and continuing to support the industry in improving resilience
- describes the approach being taken to modernise airspace to deliver capacity and environmental benefits

- sets out a robust policy framework and package of measures to reduce the harmful effects of aviation on the environment, such as carbon emissions, air quality and noise
- sets out the government's expectations that communities living close to airports should benefit directly from growth

Support regional growth and connectivity

Airports are vital hubs for local economies, providing connectivity, employment, and a hub for local transport schemes. The government wants to see, through the Aviation Strategy, that these benefits are maximised, by ensuring that:

- markets are functioning effectively for consumers and local communities
- airports are delivering the connectivity that regions need to maximise their potential
- the industry continues to provide high quality training and employment opportunities
- barriers to the air freight industry are reduced

The government recognises the importance of rebalancing the UK economy through economic growth of the regions and ensuring that the UK remains competitive after we leave the European Union. Airports have a crucial role to play as hubs for growth within and beyond the region in which they are situated. The government is committed to working with the industry to develop appropriate and practical policies that support the industry's ambitions. The Aviation Strategy consultation focuses on:

- regional connectivity
- regional transport hubs
- supporting freight
- regional employment, training and skills

Enhance the passenger experience

All passengers should have a positive experience of flying. The industry is responsive to the needs of consumers but improvements can be made for passengers with additional needs and when things go wrong. The government is consulting on a new Passenger Charter to promote good practice in the sector, create a shared understanding of the level of service that passengers should expect, and communicate roles and accountabilities clearly. The government proposes to take necessary action to improve the experience at the border and tackle problems caused by disruptive passengers. It will also consider strengthening the Civil Aviation Authority's range of enforcement powers across the consumer agenda.

This Aviation Strategy consultation:

- sets out the proposed standards that could be included as part of a new Passenger Charter for aviation
- sets out a range of new measures for passengers with additional needs
- outlines measures to tackle the problem of disruptive passengers associated with alcohol

- describes the government's approach to improving the operating model at the border to enhance the passenger experience
- details proposals for simplifying and improving complaints and compensation procedures
- sets out the government's proposals for ensuring that consumers have timely access to the information they need to make informed choices

Ensure a safe and secure way to travel

The UK is a global leader in aviation security and safety, with one of the best and safest aviation systems in the world. The government and the CAA share knowledge and expertise with other nations, encouraging them to adhere to international standards and implement improvements with the industry to make the skies safer for everyone.

In order to maintain the UK's safety record the consultation focuses on:

- addressing the concentration of safety risks
- targeting emerging safety risks
- improving data and reporting
- addressing global variations in safety standards

In addition, through its Aviation Security Strategy, the government has committed to a major programme of work in partnership with industry to get ahead of the threat to aviation.

Support General Aviation

The General Aviation (GA) sector covers non-scheduled civil aviation. It includes, amongst other things, business jets, pilot training, emergency service flights, air displays and aerial photography as well as private flying. The aircrafts involved include single and multi-engine fixed wing aeroplanes, helicopters, gliders, balloons, microlights, paragliders and model aircraft. This Aviation Strategy consultation sets out how the government proposes to enable, facilitate and encourage growth in GA, and indicates where it thinks that GA itself should seize the initiative and capitalise on those opportunities. The consultation focuses on:

- how the government proposes to reduce regulation
- the government's proposals for a strategic network
- support for new and existing commercial activities
- airspace
- safety
- safeguarding of aerodromes

Encourage innovation and new technology

Innovation is key to delivering the outcomes of the Aviation Strategy. The government recognises the important role that technological advances and new business models play in economic growth, especially in industries such as aviation and aerospace.

The government wants to capture the benefits of innovation for consumers, by unlocking mobility and offering new options on how people and goods can move around; and for the aerospace and aviation sectors, to maintain the UK's global leadership, help support jobs, increase productivity, and boost our trade and export capabilities.

The consultation:

- sets out some of the main areas of opportunity for innovation in aviation – automation, electrification and digitalisation and data sharing
- identifies some of the barriers to innovation and how these can be addressed by the government in its enabling role, working in partnership with the sector
- proposes measures to better align policy and investment

1. The role of aviation in a changing world

Aviation has an important role to play in the future of our country. It is key to helping to build a global Britain that reaches out to the world. It underpins the competitiveness and global reach of our national and our regional economies. There are many challenges that aviation faces, such as meeting rising passenger demand while addressing environmental impacts, and making the most of new technologies. The government supports the growth of aviation, provided that this is done in a sustainable way.

Introduction

1.1 The UK has a rich aviation history, from being at the forefront of the birth of international air transport in the 1920s and the post-war development of the global aviation framework, to the liberalisation of aviation markets and development of innovative new technologies today. Aviation in the UK has consistently demonstrated the ability to adapt, innovate and lead in a changing world.

1.2 The government has been clear about the importance of aviation to the whole of the UK. Aviation creates jobs across the UK, encourages our economy to grow and connects us with the rest of the world as a dynamic trading nation. It also helps maintain international, social and family ties. This is why the government supports the growth of aviation, provided that this is done in a sustainable way and balances growth with the need to address environmental impacts.

1.3 The government has, in recent years, taken action to capitalise on the UK aviation sector's record of success and build for the future. It established the Airports Commission to examine the scale and timing of any requirement for additional capacity, designated the Airports National Policy Statement (NPS) for airport expansion in the South East and expressed support for a third runway at Heathrow Airport.[3] The government has also consulted on plans to modernise our airspace. It has stated that it supports airports throughout the UK making best use of their existing runways, subject to environmental issues being addressed. The government also introduced new noise policies in 2017 aimed at helping to manage the impacts of growth on local communities, and led the way in pushing for a historic global climate change deal for international aviation in 2016.[4]

3 Airports Commission (2015): Final Report

4 ICAO Carbon Offsetting and Reduction Scheme for International Aviation

1.4 The government also consulted on the objectives and scope of a new and ambitious Aviation Strategy in 2017, providing a long-term vision for aviation to 2050 and beyond. This strategy must be based on a clear understanding of international and domestic aviation. It is therefore important to understand the global trends that will set the context for what the world will look like in 2050 and the social and economic forces that will shape the future of aviation.

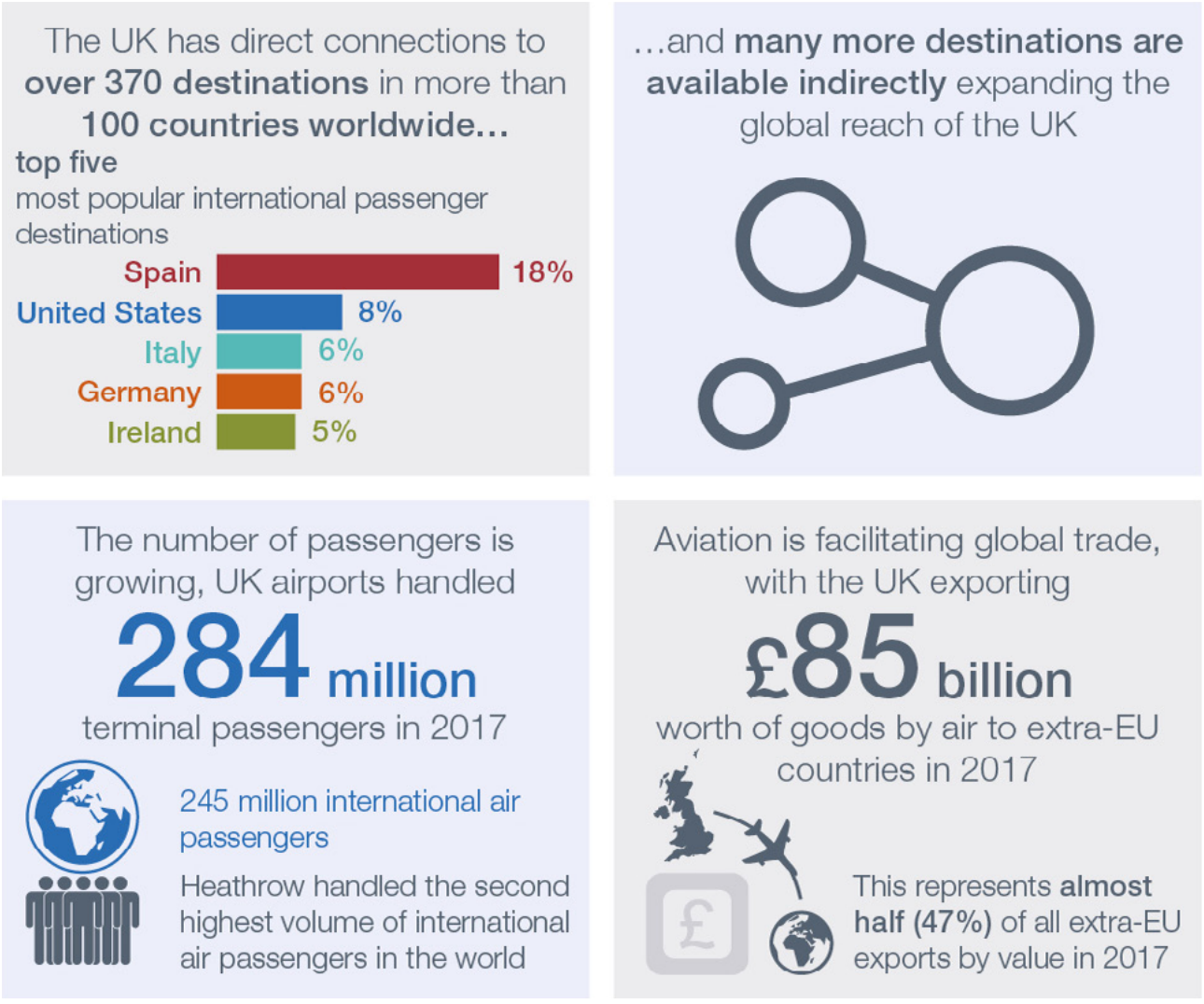


Figure 1 UK aviation in context
Source: Department for Transport analysis of Civil Aviation Authority (2017): Airport Data, HMRC: Overseas Trade Data 2017

The value of aviation

Air travel benefits our lives and opens us up to the world

1.5 Air travel benefits most of us, either directly or indirectly. For many people, it is the means by which they can enjoy a well-earned holiday. It is important for maintaining social and family ties with loved ones who may be based across the world. Business air travel also brings trade and investment to the UK, generating prosperity.

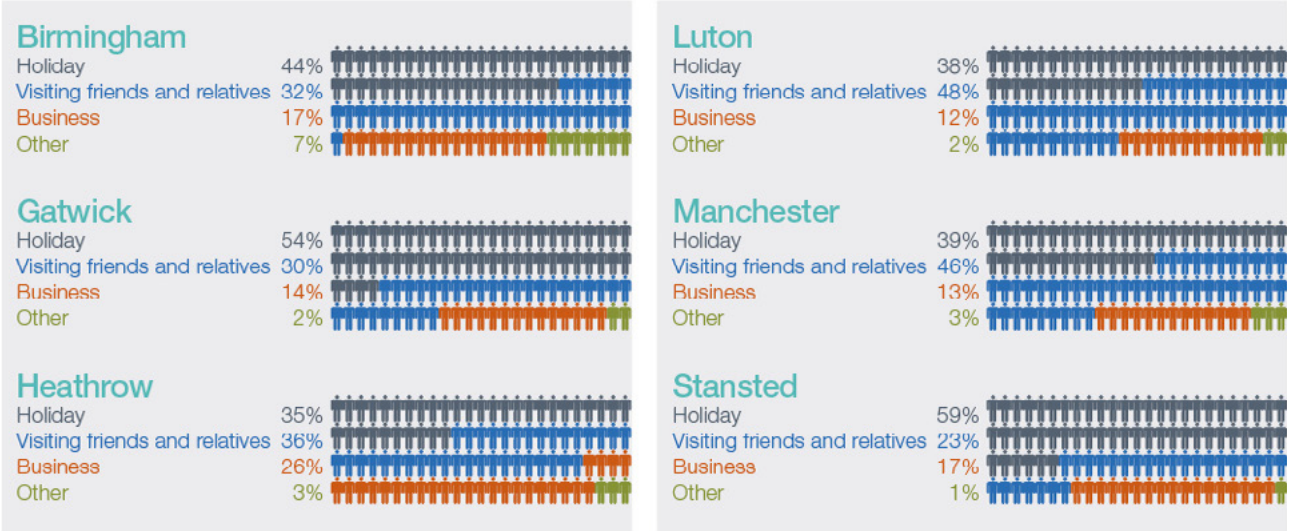


Figure 2 Passenger reasons for travel at selected UK airports
Source: Department for Transport analysis of Civil Aviation Authority: Departing Passenger Survey 2017

1.6 Aviation is also an increasingly important facilitator of our modern lifestyles and the means by which many of the goods that we buy online are flown in to the country before arriving at our doorsteps, as well as the medicines and other vital products that we rely upon. Aviation is, in its own right, a passion that is enjoyed by many. It is also an industry that is at the cutting edge of the development of new and exciting technology, from drones to electric planes and to the edges of space itself.

1.7 Aviation is also vital to how the UK is connected to the global economy. The UK's aviation network is connected to a vast number of international locations accessible through airports across the country. This helps to maintain important social and cultural links and is vital for facilitating an environment for businesses to engage in international opportunities.

Economic contribution

1.8 Aviation forms an important part of the global supply chain, the means by which many businesses are able to operate, export and grow. An effective transport system is an important enabler of sustained economic success, with benefits for the wider economy.

Connectivity:

- the UK is one of the best connected countries in the world with over 370 direct connections in over 100 countries

Productivity:

- aviation directly contributes at least £22 billion to the UK economy each year[5] – with around £14 billion from air transport and £8 billion from aerospace, with the UK having the second largest aerospace industry in the world
- the industries most associated with business travellers generate some of the largest contribution to the UK economy due to the high value of the industries they tend to work in[6]

Jobs:

- aviation is estimated to directly provide over 230,000 jobs and consists of around 4,500 businesses;[7] this generates employment right across the country, especially in aircraft manufacture, aircraft maintenance and air freight
- the North West and South West each account for 12% of direct jobs provided by aviation and there are large concentrations of aviation businesses in the Midlands, Wales and Scotland[8]
- airports themselves continue to be a major source of local employment and help to attract related industries in their area, generating employment beyond the proximity of other local industry and businesses

Tourism:

- there was both a record number of visits to the UK in 2017 and a record number of visits abroad by UK residents; the most frequent reason for visits to and from the UK is holidays[9]
- tourism contributed £68 billion to the UK economy in 2016[10]
- inbound tourism by air makes up 80% of foreign holiday spending[11]

5 Department for Transport analysis of Office for National Statistics: GDP low level aggregates

6 Department for Transport (2018): Business passengers, dynamic surveying for aviation

7 Department for Transport analysis of Office for National Statistics: Annual Business Survey (2017)

8 Department for Transport analysis of Office for National Statistics: Annual Business Survey (2015)

9 Office for National Statistics: Travel Trends 2017

10 Office for National Statistics: The UK Tourism Satellite Account (UK-TSA) 2016

11 Office for National Statistics: Travel trends estimates, Overseas visits to the UK 2017

Challenges and opportunities for the future

1.9 Aviation plays a vital role in the economy, but the government and the industry cannot afford to be complacent, or to imagine that without action aviation will continue to bring these benefits. Despite its strengths, UK aviation faces challenges to overcome in order to take advantage of the opportunities of the future. These include how to realise the benefits of sustainable growth and remain at the forefront of innovation.

Global change and shifting markets

1.10 Globally, conflict and instability will always be major risks to economic growth. There remains a significant global terrorist threat, including to the UK and our people and interests overseas. Protectionist economic policies and travel restrictions could also have a potential impact on global passenger numbers and freight movement. The UK is committed to continuing to advance the case for free trade and open access to aviation markets, especially as it leaves the European Union (EU), and it will continue to use its membership of international aviation organisations to do so.

1.11 The UK needs to be well positioned to take advantage of the expected changes to the global economy, which could more than double in size between now and 2050.[12] Emerging economies, such as Brazil, India, Indonesia and Mexico are likely to be leading global players by the middle of the century. Europe's share of global GDP is likely to fall as these new economies become even more important. Much of the African market continues to have significant potential, with the African Union considering setting up a single aviation market for the continent. The UK looks set to maintain its place amongst the leading global economies.[13]

1.12 Infrastructure development is key to unlocking growth potential. China is rapidly expanding its transport infrastructure and plans to build 66 new airports over the next five years. Beijing's second international airport will have seven runways and will process 72 million passengers a year when it opens in 2019.[14]

1.13 China's investment reflects the eastward shift in global aviation markets. The International Air Transport Association (IATA) expects 8.2 billion passengers to travel by air in 2037, more than doubling the 4 billion air travellers in 2017.[15] The biggest source of this demand will be the Asia-Pacific region, which is expected to have more than half of the new passengers over the next 20 years.[16]

12 PWC (2017): The world in 2050

13 as above

14 CAPA Centre for Aviation: Beijing Daxing International Airport

15 IATA (2018): 20-Year Air Passenger Forecast

16 as above

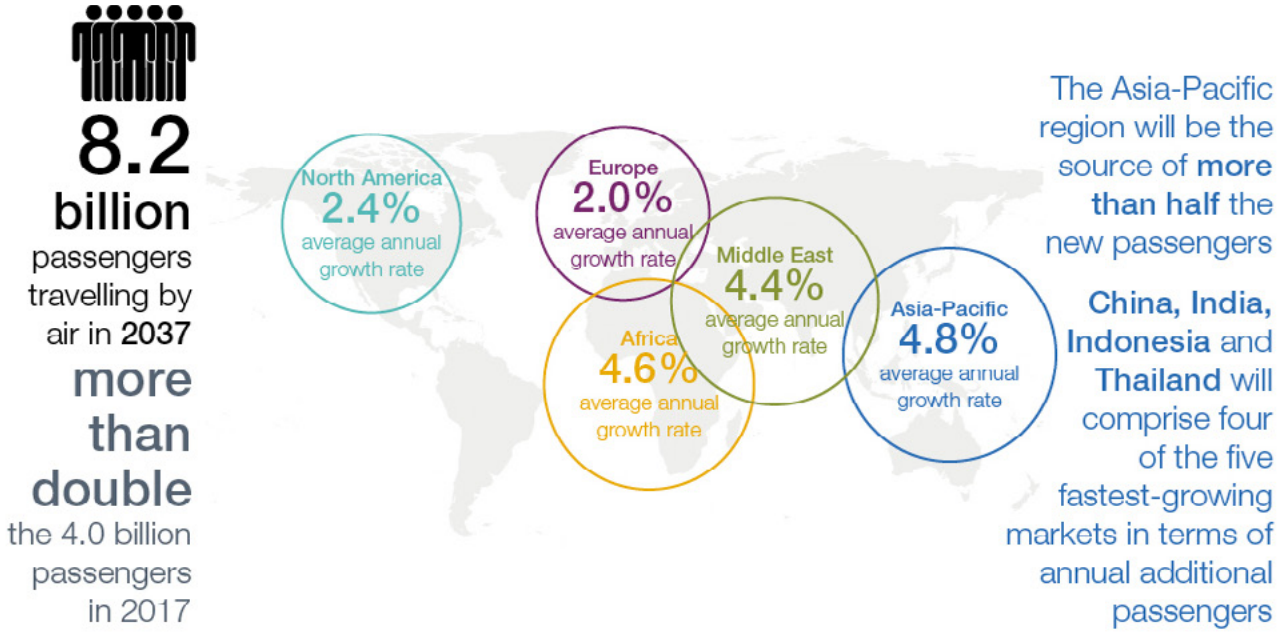


Figure 3 Global shift in aviation markets
Source: International Air Transport Association (2018): 20-Year Air Passenger Forecast

1.14 China now looks set to displace the United States (US) as the world's largest aviation market as early as 2022. India will rise to third place by 2025, with Indonesia fourth by 2030. The last decade has also seen the rise of the major Middle Eastern hubs as the region continues to tap into the potential of its strategically important geographical position. In 2017, Dubai handled the most international passenger traffic in the world, with 87.7 million international passengers, while Doha handled 35.3 million international passengers, both more than double the number of passengers handled a decade ago.[17] The UK is well positioned to consolidate its position as the largest aviation market in Europe supported by the designation of the Airports National Policy Statement for a third runway at Heathrow, and the expected level of growth and extra connectivity this will bring.[18]

Impact of competition on business models

1.15 Globally, aviation is in a strong position and continues to attract high levels of investment, particularly in the burgeoning aircraft leasing industry. Despite this, aviation remains vulnerable to economic and political headwinds. In a fiercely competitive environment there are risks to airlines from any rising costs, such as those associated with exchange rate fluctuations or volatile oil prices. The effect is likely to be felt by low-cost carriers in particular and those with the tightest margins. In Europe, we have seen Alitalia, Air Berlin, Monarch and most recently Primera Air become insolvent in recent years. There may also be further consolidation and alliances amongst airlines. In the US a wave of consolidation in recent decades has yielded fewer and larger airlines. It is too early to tell whether a similar market consolidation is underway in Europe, but we can expect to see business models continue to evolve.

17 Department for Transport analysis of ICAO: Airport Traffic

18 IATA (2018): 20-Year Air Passenger Forecast

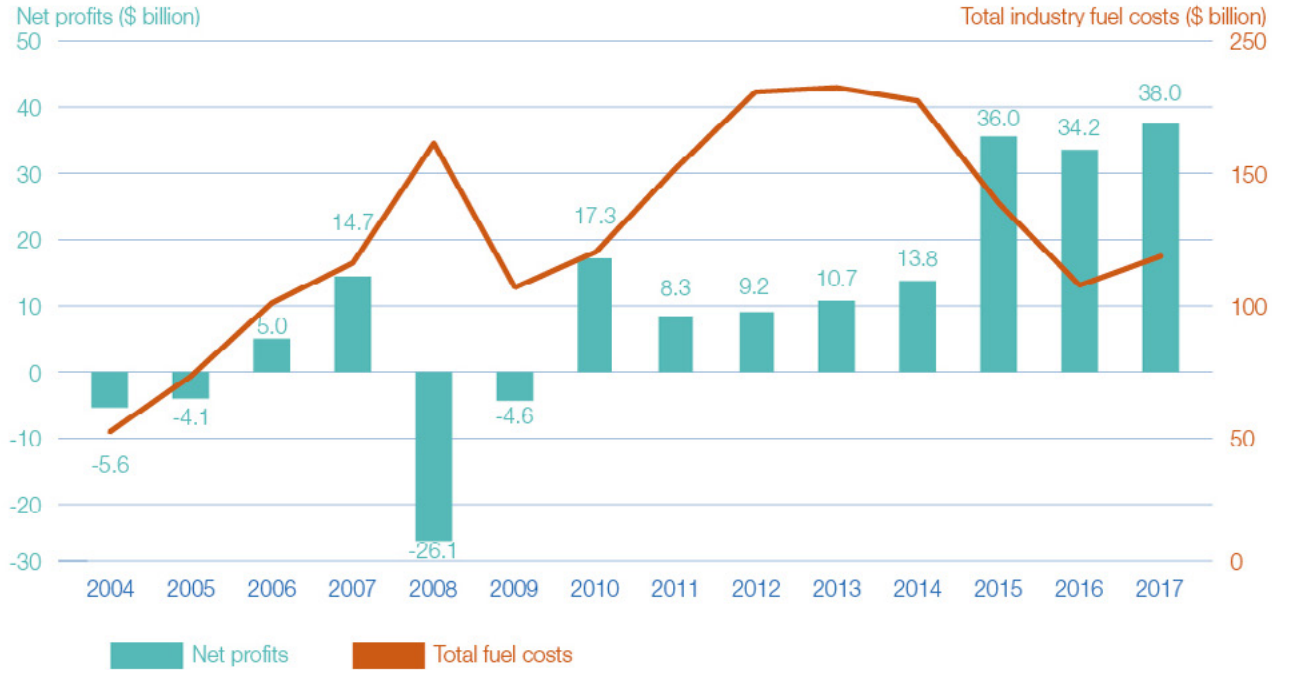


Figure 4 Fuel costs and net profits for global commercial airlines
Source: IATA (2018): Economic performance of the airline industry

1.16 The emergence of low-cost carriers was arguably the most significant market trend in the last 40 years, helping to drive down prices for passengers and provide greater choice. It is likely that we will continue to see intense competition driving new and innovative business models. This could include more low-cost, short-haul routes but also an extension of the low-cost model to longer routes.

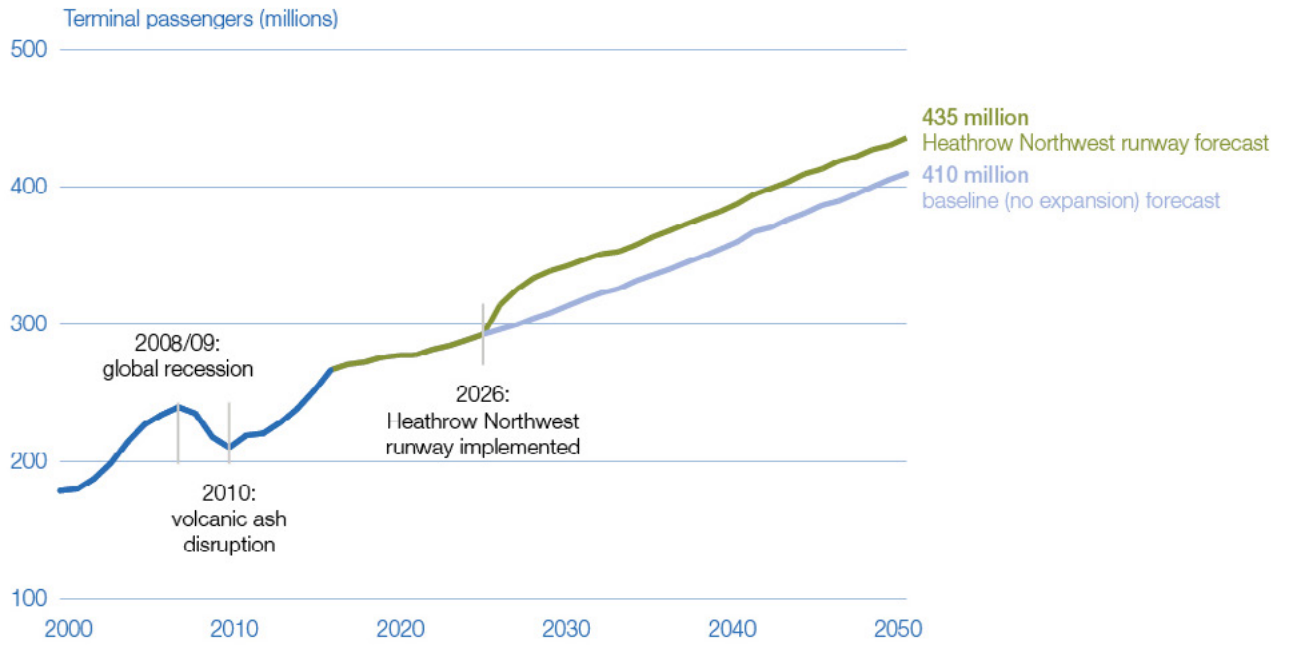


Figure 5 Trends in passenger numbers at UK airports and forecast to 2050
Source: Department for Transport analysis of Civil Aviation Authority: Airport Data, Department for Transport (2017): UK aviation forecasts

Increasing demand

1.17 Globally, over 4 billion passengers flew in 2017. The global demand for air passenger services has grown significantly, with passenger numbers increasing by 7.2% between 2016 and 2017 and an overall increase of 65% in the decade since 2007.[19] This growth has been supported by broad improvements in global economic conditions and by lower airfares, which continue to be a strong driver of passenger demand.

1.18 We are continuing to see record numbers of passengers arriving at and departing from UK airports, with 284 million terminal passengers at UK airports in 2017. These numbers have more than doubled since 1997 and continue the steady increase in passenger numbers since 2010, following the global financial crisis in 2008.[20] Government forecasts show that the demand for aviation will continue to rise significantly and annual UK passenger numbers are likely to increase to 435 million by 2050.[21]

1.19 There were record quantities of freight handled by UK airports in 2017, highlighting the growing importance of aviation to the transport of freight. Globally, air freight grew more than twice as fast as overall global trade during 2017 – the widest margin of outperformance since 2010.[22] The changing nature of the goods and services we trade means that aviation freight is becoming increasingly significant to the economy, transporting high value, high tech products, medicines and just in time deliveries.

19 ICAO (2018): Air Transport Statistical Report

20 Department for Transport analysis of Civil Aviation Authority: Airport Data

21 Department for Transport (2017): UK aviation forecasts, central forecast under Heathrow Northwest runway

22 IATA (2018): Annual Review

1.20 This highlights the need for further capacity – delivered sustainably and in a way that benefits the whole country. The London airport system will be almost entirely full by 2030 without expansion. The Airports Commission estimated that failing to address the need for extra airport capacity could cost passengers £21-23 billion in the form of fare increases and delays, and potentially £30-45 billion to the wider economy.[23]

1.21 This is why the government is supportive of the development of a third runway at Heathrow Airport, which could deliver up to £74 billion worth of benefits to passengers and the wider economy.[24] It is also supportive of airports throughout the UK making best use of their existing runways, subject to environmental issues being addressed. However, there is a need for clarity on what the future framework will be for providing additional capacity to meet demand, while managing environmental and community impacts.

Changing expectations of passengers

1.22 It is likely there will be close to 10 billion people in the world by 2050.[25] The UK population is estimated to reach more than 76 million by 2046. We will also be living for longer with close to a quarter of the UK population estimated to be aged 65 or over by the middle of the century.[26] Population growth brings with it increasing demand for transport, including for aviation. It will also bring about demographic changes that the industry will need to respond to. This includes the increase in demand for special assistance services for older passengers and passengers with reduced mobility.

1.23 We can expect to see changes in consumer expectations of aviation. A generation that has grown up with low-cost travel is likely to be more receptive to business models providing low-cost, long-haul routes. With more information becoming available, passengers may also be more discerning about their travel choices and may take account of additional factors when making a booking, such as an airline's punctuality and compensation record, and environmental factors. We can also expect to see changes in the way that consumers expect to interact with aviation businesses through the use of technology or social media. Consumers are also likely to have higher expectations of the level of service they should receive.

23 Airports Commission (2017): Final Report

24 Department for Transport (2017): Updated Appraisal Report, Airport Capacity in the South East

25 United Nations (2017): World Population Prospects

26 Office for National Statistics (2017): Overview of the UK population

Environmental impacts

1.24 The transport sector, including aviation, must do its fair share to tackle the problem of climate change, both domestically and internationally. By 2050 climate change is likely to have had more noticeable effects. By far the most abundant of the greenhouses gases responsible for rising global temperature is carbon dioxide (CO_2). UK aviation accounts for around 7% of the UK's total greenhouse gas emissions, but its share of emissions is likely to continue to increase as other sectors, such as energy and manufacturing, decarbonise more quickly.[27] This means that aviation could represent a 25% share of the UK's greenhouse gas emissions by 2050.[28]

1.25 The 2015 Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC) committed to keep the global temperature rise to well below 2°C this century and to pursue efforts to limit the temperature increase to 1.5°C.[29] The Intergovernmental Panel on Climate Change (IPCC) have said that limiting warming to 1.5ºC will require rapid, far-reaching and unprecedented changes in all aspects of society, including transport.[30] Efforts to meet the Paris target, or any successor agreement, are therefore expected to include continued efforts to reduce aviation's share of global CO_2 emissions. The recently agreed global carbon offsetting measure for aviation (CORSIA) is the first worldwide scheme to address CO_2 emissions in any single sector and demonstrates the international ambition for aviation to play its part in tackling climate change.

1.26 Disturbance from aircraft noise has negative impacts on the health and quality of life of people living near airports and under flightpaths. There is also evidence that the public is becoming more sensitive to aircraft noise, to a greater extent than noise from other transport sources, and that there are health costs associated from exposure to this noise.[31] The government is supporting the industry to deliver airspace modernisation and has also established a new Independent Commission on Civil Aviation Noise (ICCAN), but efforts to reduce and manage noise impacts must continue.

Making the most of new technology

1.27 New technologies will be at the forefront of growth and represent some of the greatest opportunities for the future. There is potential for design-led sectors such as aerospace to be at the forefront of global economic growth for the rest of the 21st century. We could see significant changes in the design and types of aircraft occupying our skies. The development of artificial intelligence (AI) technology and rising levels of automation have the potential to raise productivity and increase the growth of the aerospace sector. AI based innovations are already making an impact throughout the travel journey – from the facilitation of smarter suggestions in search and booking, to the introduction of digital concierge services.

---

27 Department for Transport analysis of Department for Business, Energy and Industrial Strategy: Final UK Greenhouse Gas Emissions National Statistics 2016

28 Committee on Climate Change (2015): Advice on the fifth carbon budget

29 Paris Agreement under the United Nations Framework Convention on Climate Change, 2015

30 IPCC special report on the impacts of global warming of 1.5 °C

31 Civil Aviation Authority (2017): Survey of noise attitudes 2014, aircraft

1.28 Electrification provides a significant opportunity for aviation to decarbonise, but it remains a significant challenge for aviation, not least the integration of heavy batteries into aircraft. However, the pace of progress in battery technology is enabling new power concepts across all transport modes, including aviation. It is possible that by 2050 we will see some form of hybrid engine technology in use in new aircraft designs that will allow for cruising between destinations using electric power. Hybrid aircraft could potentially start operating on routes of up to 1,000km by 2035, the equivalent of flying from London to Geneva. This could be transformational in the quest to balance growth in aviation with reducing environmental impacts.

1.29 Automation could revolutionise transport. Driverless transport is likely to be widespread by the middle of the century. For aviation, this will inevitably mean an element of greater automation even if there is still a human element in the cockpit. The increased automation of aircraft over recent years has had clear safety benefits, reducing the likelihood of accidents caused by human factors. Nevertheless, automation presents a public acceptance challenge which the industry will need to overcome, but the benefits could be significant in helping airlines to maintain their competiveness.

1.30 Digitalisation is already transforming our transport system. In aviation we have seen concepts such as remote digital control towers become a reality, allowing far greater fields of view to improve safety and enable airport growth. Improvements to data sharing are expected to bring billions of pounds' worth of benefits to the transport sector over the next few decades as industries use data to transform passenger services. But this is not without risk. The prospect of cyber-related disruption and attacks on the aviation industry is very real. There have already been serious and sophisticated cyber attacks on airlines. Such attacks are likely to continue and the government will need to work closely with the aviation industry to manage and mitigate these risks.

1.31 Commercial spaceflight could be a reality by 2050 and the UK wants to play a key role through the development of horizontal and vertical spaceports. These will provide facilities for lucrative satellite launches, as well as the development of our nascent space tourism industry. This is expected to bring significant crossover benefits between space and aviation, spearheading new aircraft design and aerospace technology. The Space Innovation and Growth Strategy (SIGS) set the goal of growing the UK space sector to £40 billion of annual turnover by 2030, representing 10% of the global market, and to grow UK space-related exports to £25 billion by 2030.[32]

1.32 These new technologies and industries will bring about changes in the skills required for successful aviation and aerospace. There will continue to be importance placed on key science, technology, engineering and manufacturing (STEM) roles but we can expect to see an evolution in the nature and types of these jobs as technological advances continue.

32 UK Space (2013): Space Innovation and Growth Strategy 2014-2030, Space Growth Action Plan

What this means for Aviation 2050

1.33 Together, these trends present significant opportunities to be exploited, but also challenges to overcome and manage. Global and domestic trends show that with the right economic conditions, the year-on-year growth in passenger numbers and air freight can be expected to continue. There are also signs of change in the market which could which transform business models and the offer for consumers. Meeting this increased demand will require a new partnership between the government, the industry, the regulator and communities that balances the economic benefits of growth with its impact on communities and the environment.

1.34 The eastward shift in aviation markets and the growth in new technologies mean that aviation could look very different to how it does today, both globally and domestically. To remain competitive on the global stage, and to safeguard its role as one of the leaders in both aviation and aerospace, the UK must be well positioned to take advantage of these new opportunities, while managing the potential economic, political and environmental headwinds along the way.

1.35 This is the motivation behind a new Aviation Strategy which will:

- **build a global and connected Britain** – further expanding and liberalising our connectivity to new and existing global markets, promoting our successful aviation and aerospace industries, and leading by example on the global stage on open trade, the environment and security
- **ensure that aviation can grow sustainably** – moving beyond an artificial 'choice' between growth and environmental protection by building a new partnership that actively supports sustainable growth with actions taken to mitigate environmental impacts
- **support regional growth and connectivity** – ensuring aviation enables all regions of the UK to prosper and grow, providing jobs and economic opportunities and a meaningful contribution to the life of communities up and down the country
- **enhance the passenger experience** – ensuring all passengers have the best possible experience of UK aviation, working with industry to promote the existing and widespread best practice, but also driving up standards and enforcement in areas where improvement is needed
- **ensure a safe and secure way to travel** – maintaining and further building the UK's position as one of the safest and most secure aviation systems in the world, and work closely with international partners to support improvements in both safety and security overseas, in order to protect the interests of UK citizens around the world
- **support General Aviation (GA)** – ensuring that government has appropriate and proportionate policies to build on the success of GA
- **encourage innovation and new technology** – to be at the forefront of research and development, and exploiting the possibilities of new aviation technologies

1.36 The rest of this document sets out the government's proposed policy approaches to meet these objectives and seeks feedback on the options it has identified.

Build a global and connected Britain

2. Build a global and connected Britain

Aviation is vital to the government's goal of building a global and connected Britain. The government wants the UK to be best placed to build new connections in rapidly growing aviation markets, and to use our international influence to lead the way on liberalisation, security and safety standards, and environmental measures including robust, environmentally effective emissions reduction measures.

Introduction

2.1 Aviation is vital for building a global Britain that is outward looking and is connected to the world. The UK plays a prominent role in aviation on the world stage. We have the biggest aviation network in Europe and currently the third largest in the world. We also have the second largest aerospace industry in the world and manufacture some of the most advanced aviation technology. The UK is a leading provider of components within the global supply chain for aviation products.

2.2 Our influence on the world stage has brought clear benefits, both for the UK consumer and consumers around the world. As a founding member of the International Civil Aviation Organisation (ICAO) and a leading voice today, we have played a key role in creating the frameworks that aviation relies upon. The government wants to use that voice to continue to support the development of international standards that are fit for the future, working through international institutions and with international partners.

2.3 Aviation makes a significant contribution to the UK economy, and the government believes that continuing to expand our global connectivity through open, liberal arrangements with others will increase that contribution even further.

2.4 The goods and services that support aviation are valuable UK exports and the government wants to work with the aviation industry to remove barriers, so that UK companies who want to compete in the global market are able to do so.

2.5 This chapter sets out:

- the global leadership role that the UK intends to maintain through working collaboratively through international institutions and partnerships
- the importance of furthering global connections
- the potential for expanding the UK's global exporting success in aviation

Global leadership – working to improve standards

2.6 As the global air transport network continues to expand with rapidly growing new markets and new destinations emerging, the UK wants to ensure air travel is safe, secure, and environmentally sustainable and can adopt new technologies and business models to continue to respond effectively to consumers' needs.

2.7 The international nature of air travel means that the development and adoption of common international standards is critical. Differences in standards may make travelling to some destinations more complex and potentially risky for consumers and result in significant regulatory burdens and costs for business. The government is committed to fostering the development and convergence of rigorous international standards to facilitate UK and global trade, and to ensure consumers are safe and secure wherever they travel.

2.8 Given the scale of its aviation industry and industry expertise, the UK has an important role to play in delivering change but cannot, and should not, deliver this alone. International partnerships and effective engagement in international institutions will be critical to ensure no country is left behind.

2.9 The UK is already a global leader in the setting of international standards, particularly in our priority areas of safety, security and the environment. We work closely with individual countries and within international organisations such as ICAO, the European Civil Aviation Conference (ECAC) and EUROCONTROL to achieve this.

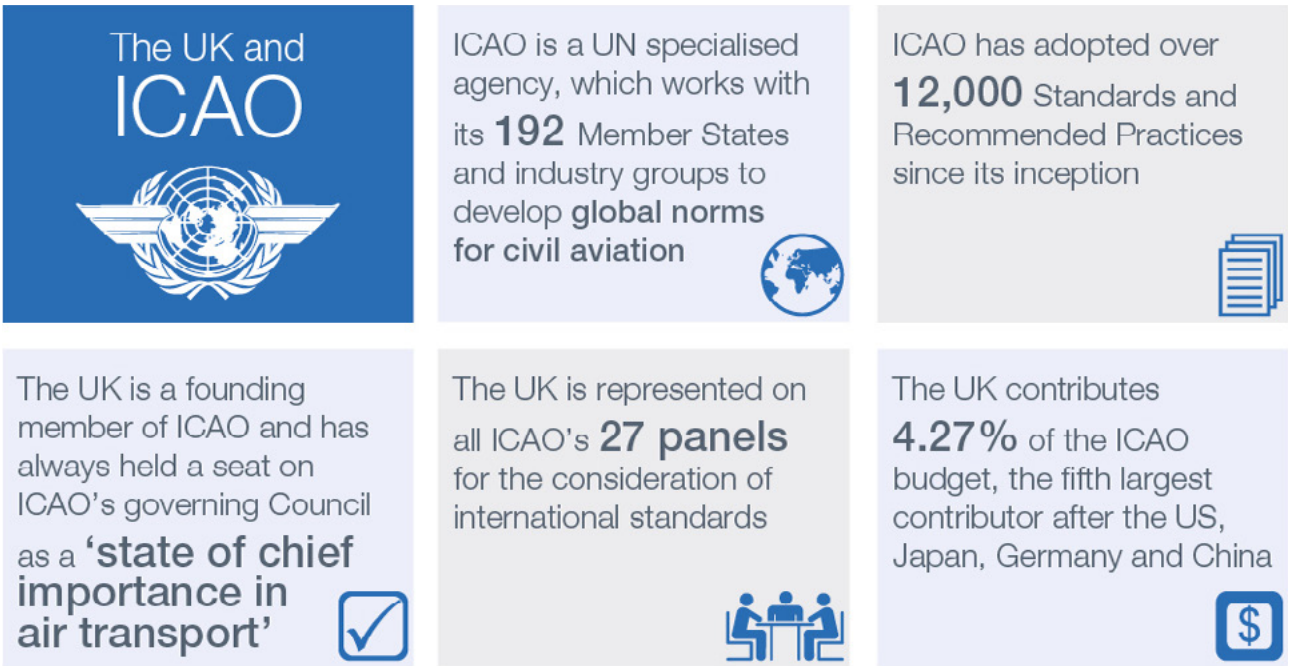


Figure 6 The UK and ICAO

2.10 **The government will continue to support the development of robust international standards that are aligned to the interests of the UK.**

Environment

2.11 Effective international environmental technology and operational performance standards are essential to ensuring air travel becomes increasingly sustainable (see chapter 3 for further details). The government proposes to work with international partners to:

- **continue to lead efforts to negotiate for robust, environmentally effective emissions reduction measures that minimise market distortions and address aviation's emissions in the most cost-effective way**
- **support and strengthen the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) and negotiate for a long term goal for international aviation climate emissions, ideally by ICAO's 41st Assembly in 2022, that is consistent with the temperature goals of the Paris Agreement**[33]

Security

2.12 Given the size of the UK's aviation network and the interconnectedness of global aviation, it is imperative that we ensure all states have robust aviation security frameworks in place, to make the skies safe for everyone. The UK is committed to delivering improvements to global aviation security, and the government believes that ICAO is the best international forum through which to do this.

33 CORSIA is aimed at limiting international aviation emissions to 2020 levels (carbon neutral growth).

2.13 The government proposes to work with international partners to:

- **support the effective implementation of the Global Aviation Security Plan,** which aims to increase cooperation between and within States
- **provide more targeted support and expertise through ICAO to facilitate the universal implementation of agreed international security standards** through the Universal Security Audit Programme
- **lead global action to keep aviation safe from potential threat posed by hostile insider actors**

Trade

2.14 Liberalisation of air traffic rights provides greater flexibility for airlines in terms of number and frequency of routes and destinations, as well as removing restrictions to business models, such as 'principal place of business'. Consumers benefit from the removal of restrictions through greater choice and increased competition with lower prices. The government proposes to continue to work with international partners to:

- **work through ICAO to build consensus on the merits of liberalisation and to encourage worldwide liberalisation**
- **ensure that our air services agreements allow commercial flexibility and do not impose unnecessary administrative burdens on industry**

Technology and innovation

2.15 The government wants the aviation industry to continue taking innovative steps to grow and increase its sustainability, while ensuring passengers and freight fly safely and securely. The government proposes to work with international partners to:

- **develop a more agile international regulatory framework that is based on performance-based standards.** It will not be possible for global standards to keep pace with rapid developments in technology if they are overly prescriptive

2.16 The UK recognises the need to pay due regard to existing governance, but the government believes that the UK can provide additional support to ICAO in encouraging more agile processes for standard-setting, particularly in relation to new and emerging technology. The government proposes to:

- **encourage the efforts of ICAO to embed a greater culture of transparency and accountability. This will be beneficial to the effective delivery of international standards**

2.17 The UK recognises that the industry, rather than regulators or government, is at the forefront of technological developments for aviation. ICAO has proved increasingly receptive in recent years to engaging with industry. The government wants to:

- **encourage ICAO to work on a close and regular basis with industry in order to learn from their expertise and assess the social and environmental impacts of regulation**

Bilateral leadership

2.18 The UK also takes bilateral action on safety and security issues. A key theme of our bilateral work focuses on the importance of sustainable capacity building and promoting a positive security and safety culture to support the shared objectives of the UK and ICAO's principle of No Country Left Behind (NCLB).[34] Key activities undertaken by the UK include:

- State Safety Partnerships: The UK's State Safety Partnership programme provides targeted safety interventions and support to build capacity within states where UK passengers may be exposed to risk. Over time, this allows the states to build their own capability to manage safety risks effectively
- Security capacity building: Since 2016, the UK has spent over £10 million on our overseas capacity development programme. Our emphasis is on providing expertise, training and support, covering a wide range of subject areas and threats

Global connections

2.19 The UK has three objectives in improving global connections:

- maintain and improve the UK's connectivity
- seek more liberalised arrangements
- improve transparency of aviation arrangements

34 The No Country Left Behind (NCLB) initiative highlights ICAO's efforts to assist States in implementing ICAO Standards and Recommended Practices (SARPs). The main goal of this work is to help ensure that SARP implementation is better harmonized globally so that all States have access to the significant socio-economic benefits of safe and reliable air transport

Maintain and improve the UK's connectivity

2.20 Maintaining and improving air connectivity to Europe, established global trading partners and emerging markets is crucial to supporting UK businesses and passengers. The UK will need to continue to respond to changing political and economic developments over the next 30 years.

Establishing an ambitious new relationship with the European Union (EU)

2.21 The government seeks an arrangement with the EU that is as liberal as possible, to allow airlines the maximum flexibility to continue to evolve and innovate. In November, the government published the Political Declaration, setting out the framework for the future relationship between the UK and the EU. For aviation, the UK and EU have agreed that passenger and cargo connectivity will be ensured through a Comprehensive Air Transport Agreement, which will provide for market access for UK and EU airlines. It will also include provisions to facilitate cooperation on aviation safety, security and air traffic management, as well as arrangements for investment in airlines.

2.22 The UK remains committed to maintaining high standards of aviation safety and security. To support this, the government has agreed with the EU to make arrangements for close cooperation between UK authorities and the European Aviation Safety Agency (EASA).

2.23 Both the UK and EU have also been clear that arrangements will be put in place to ensure that flights between the UK and the EU can continue regardless of the broader agreement. In its technical notices, published in September, the UK set out the approach that the UK would take in the unlikely event of a no-deal scenario. The EU also published its plans for aviation contingency preparations. These publications make clear that both sides will bring forward measures that will allow UK and EU operators to continue flying to each other's territories on a reciprocal basis, regardless of the outcome of the wider negotiations.

Extending global connectivity

2.24 Air services largely operate within a framework of bilateral and multilateral agreements which determine the terms under which airlines can operate between countries. The UK's current approach to air services agreements favours as much liberalisation as possible, if it is in the UK's national interest. Where this requires limits or restrictions on freedoms available or the number of flights, the government will work to negotiate the best possible outcome that is acceptable to all parties.

2.25 To date, the UK has updated its air services agreements by identifying opportunities that may arise, or in response to specific requests from industry. These include recently signed air services agreements with China and India.

Air Services Agreements with China and India

The UK signed updated air services agreements with India in February 2017 and China in December 2017. These agreements allow UK airlines to access more East Asian destinations, more frequently than before.

These agreements have opened up access to markets with 2.5 billion combined residents, providing increased opportunities for trade and travel.[35] The benefits are significant – there were 406,000 inbound visits to Britain from China in 2017, up 32% from the previous year, with total expenditure by Chinese tourists in the UK at around £759 million (up 35% from the previous year).[36]

Since signing these agreements new routes have been announced including Shanghai-London Gatwick and Manchester-Mumbai, by China Eastern and Jet airways respectively, providing greater choice for consumers.

2.26 Most recently, the government has been focusing on rapidly growing markets and emerging economies, including those where there are significant passenger benefits.

Air Services Agreement with Brazil

The UK signed an updated air services agreement with Brazil in October 2018.

This agreement has opened up access to a market with over 200 million residents, providing increased opportunities for trade and travel.[37] The potential benefits are significant – there were 244,000 inbound visits to Britain from Brazil in 2017, up 31% from the previous year, with total expenditure by Brazilian tourists in the UK at around £263 million (up 34% from the previous year).[38]

2.27 In addition to new agreements, it is also important for the UK to maintain connectivity with established markets. In preparation for its departure from the EU, the UK has successfully concluded new, bilateral, air services arrangements (to replace existing EU-negotiated agreements) with a number of countries, including the US and Canada, to ensure that the UK maintains connectivity with key freight and passenger markets and remains one of the world's leading aviation hubs for both travelers and businesses.

Seek more liberalised arrangements

2.28 The current framework of bilateral and multilateral agreements can sometimes place limitations on market access. This can then stifle supply, competition and innovation to the detriment of consumers, industry and the economy at large. While there has been a worldwide trend for liberalising air services arrangements, progress is slow, and there are signs that current progress might not continue. The UK has been at the forefront of liberalisation, and we have the opportunity to continue our leadership in this area, shaping the direction of air services arrangements over the coming decades.

35 Central Intelligence Agency: The World Factbook

36 Office for National Statistics: Overseas visits to the UK (2017)

37 Central Intelligence Agency: The World Factbook

38 Office for National Statistics: Overseas visits to the UK (2017)

2.29 Benefits of air transport liberalisation include:

- greater connectivity – liberalisation opens up the possibility of routes to new destinations and increases in frequency
- better services and lower prices – increased competition resulting from liberalisation leads to lower prices and better service for consumers
- increased tourism – for instance, improved access to regional airports allows more tourists to visit those regions, spreading economic benefits across the UK
- increased trade and investment – air services are a catalyst for international trade and investment and liberalisation can only improve matters

2.30 A key objective of the government's negotiation strategy for air services is therefore to continue to seek more liberalised arrangements, both for new agreements and to exploit opportunities to press for the same when an opportunity arises with respect to existing agreements. The government proposes to focus on the following areas:

- air traffic rights
- airline ownership and control
- interchange (short-term leasing of aircraft between airlines)

Air traffic rights

2.31 The government proposes to:

- **fully liberalise air traffic rights to remove restrictions to freedoms, frequencies, destinations and carriers.** The more liberal the traffic rights, the more flexibility airlines have. Full liberalisation provides the greatest benefits for the UK, as airlines are no longer constrained by arbitrary restrictions to their operations
- **seek multilateral agreements where possible,** allowing for greater liberalisation between those countries

Airline ownership and control

2.32 The government proposes to:

- **modernise the obsolete restrictions on airline ownership by focusing on a company's primary place of business when determining an airline's access to international traffic rights,** rather than the nationality of the ownership and control of the company. The government believes that international traffic rights available to the UK should be available to any airline that is a UK registered company, is regulated by the CAA and has its principal place of business in the UK

2.33 Traditional airline ownership and control restrictions based on nationality are a notable impediment to international air services. The government believes that such restrictions are obsolete; what matters is that an airline is safe, secure and properly regulated, not the nationality of the owner. The government believes that a new global standard is needed.

2.34 Ownership and control restrictions constrain airlines' ability to raise capital. Such restrictions are sometimes used tactically by other countries to restrict market access – typically to protect incumbent and/or state-subsidised airlines. In contrast, foreign ownership is commonplace in other sectors, for instance in car manufacturing where foreign investors have helped to revitalise the industry and make it internationally competitive.

Interchange

2.35 The government proposes to:

- **facilitate the use of interchange arrangements by ensuring a safe regulatory framework** that can be reflected in air services agreements and other relevant agreements

2.36 Interchange – the short-term leasing of aircraft between airlines – offers promising economic and operational benefits, but also needs to be considered carefully from a regulatory perspective, especially when it comes to safety. Airlines are moving to greater flexibility of aircraft fleets and establishing multiple Air Operator Certificates (AOCs) in different jurisdictions. The key question for governments is how to maintain regulatory oversight of aircraft being operated in a mix of jurisdictions from a variety of AOCs and registries.

2.37 The government proposes:

- **to work with the CAA to design a framework that allows UK airlines to put in place interchange arrangements with other airlines, and to operate air services using aircraft on an interchange basis.** This should also allow for foreign airlines operating to/from the UK to do the same.

2.38 To deliver these policies, the government proposes to:

- **continue to work through ICAO to build consensus on the merits of liberalisation and to encourage worldwide liberalisation**
- **liberalise our air services agreements with other countries and explore opportunities to create our own multilateral agreements with like-minded countries to further liberalisation**
- **work with our international partners to ensure that our air services agreements allow commercial flexibility and do not impose unnecessary administrative burdens on industry**
- **systematically review all air services agreements within 10 years of negotiation, with a view to liberalising them further, where appropriate**

Improving transparency

2.39 The government wishes to support the aviation industry to deliver the benefits of connectivity and liberalisation to UK consumers and businesses. Ensuring that information is easily accessible to the industry and seeking their ongoing feedback on priorities for negotiation is key to achieving this. The government therefore proposes to:

- **publish key aspects of the UK's air services agreements online, such as traffic rights, capacity/frequencies and code-share arrangements**

Airline competition

2.40 Recent years have seen a growth in airline alliances and joint ventures. Such arrangements can generate efficiency gains, potentially bringing air fares down. Consumers can also benefit through more choice, optimised airport connections and shared frequent flyer programmes (FFPs). Conversely, it could be argued that alliances and joint ventures stifle competition and, for instance, that FFPs can deter consumers from switching between airlines (and therefore pose a barrier to entry for new airlines). The government currently has no real evidence about the impact of alliances and joint ventures on consumers or on other airlines and would welcome views on this point.

Global industry – supporting exports

2.41 As set out in the government's Exports Strategy, the UK has a global reputation for innovation, a skilled workforce and a well-regulated economy. The UK has strengths in aviation across a number of different activities and should seek to capitalise on its world leading expertise, including in:

- the design, manufacture and assembly of aerospace products (such as wings, engines, aircraft) as well as their maintenance, repair and overhaul
- the operation of an aviation network (such as airport operations, baggage handling, security screening, airspace management, regulation etc.) and its facilitation of further sectors including international trade in goods, global business, and tourism
- the regulatory framework
- delivering services in the design, master planning and construction of airports
- the operation of airports, including cutting-edge initiatives in air traffic control and the movement of people
- autonomous transit systems
- security and specialist equipment supply

2.42 Recent export successes in these areas include security screening systems, baggage handling systems, runway security radar equipment, and ground support vehicles. UK aviation expertise is a key competitive advantage that the government will nurture and invest in over the long-term.

2.43 The government's Industrial Strategy sets out in detail how the government intends to back the aerospace sector and its strengths in productivity and innovation to secure a share of the growing global market.

Industrial Strategy

The Industrial Strategy sets out the government's commitment to strengthening the foundations of productivity – ideas, people, infrastructure, business environment, and places – and to meeting the Grand Challenges that will position the UK to succeed in the face of world-changing economic trends.

On aviation, it acknowledges the importance of the UK's aviation network and explains that the government is developing a new Aviation Strategy to build on our strengths to create a safe, secure and sustainable aviation sector for a global, outward looking UK.

2.44 The UK already has a significant share in the global market for aviation exports, in both air transport services and aerospace goods.

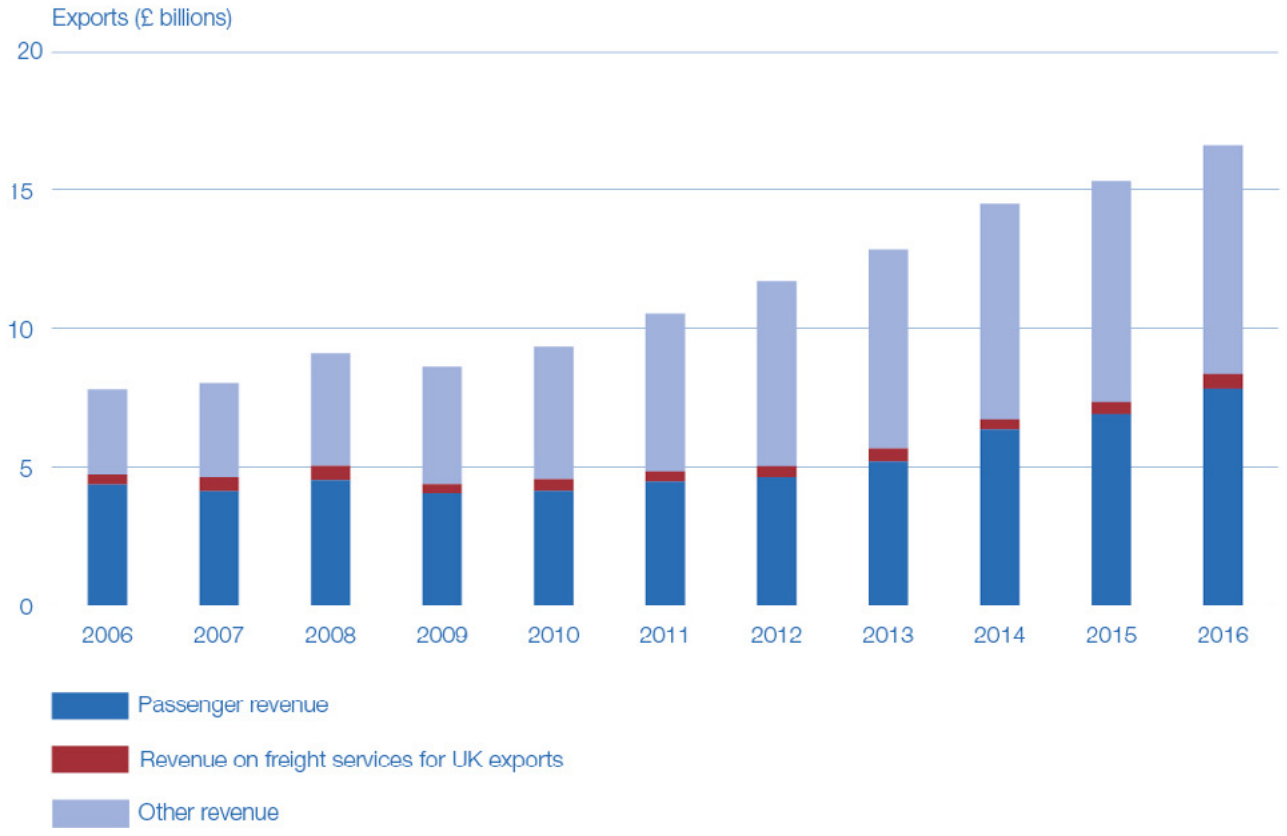


Figure 7 UK air transport services exports
Office for National Statistics: Pink Book 2018, Chapter 3 Trade in Services

2.45 Given the scale of the UK's aviation network, the UK has also built a global reputation for innovation and a skilled workforce with specialist knowledge in the activities that support the performance of aviation, across a breadth of diverse activities. These activities include amongst others:

- the operation of airports, including leading-edge initiatives in air traffic control
- architectural and engineering services in the design, master planning and construction of airports

- security and specialist equipment supply and their associated consultancy and training services
- design and production of baggage handling systems and ground support vehicles

2.46 Globally, there is a significant market opportunity within transport infrastructure as a whole. Transport infrastructure is the largest component of planned infrastructure spend globally (around $5 trillion). There are $3 trillion of planned infrastructure projects in emerging markets, driven by rapid urbanisation and availability of funding, $400 billion of which is on airports.[39] Within developed markets, countries have continued to increase expenditure, driven by the need to improve ageing infrastructure.

Tackling barriers to aviation-related exports

2.47 There are a range of barriers that UK companies may face when considering exporting their goods or services, including maintaining an awareness of global opportunities, understanding the route to market, gaining access to the supply chain of the prime contractor, and the confidence and/or capacity to compete with companies overseas. These issues may be particularly pertinent for small businesses.

2.48 UK companies may also face practical barriers such as customs procedures, so-called 'non-tariff' barriers and local regulations. Abroad, the transport infrastructure sector is competitive, dominated by government-backed multinationals. At home, we have worked to promote an open, liberal UK market for the benefit of consumers, meaning that UK companies face increased international competition. UK companies often participate in consortia when bidding for and undertaking large and complex projects internationally, which helps to mitigate risk and improve competitiveness.

2.49 In August 2018, the government published its Export Strategy, which sets out the four ways the government can help to break down the barriers to export, each supported by a set of resources and initiatives:

- ensure no viable UK export fails for a lack of finance or insurance from the private sector
- connect UK businesses to overseas buyers, international markets, and each other
- help businesses access the right information, advice and practical assistance
- encourage and inspire businesses that can export but have not started or are just beginning

2.50 The Aviation Strategy will support the Industrial Strategy and Export Strategy by considering how the government can best support the specific needs of businesses whose activities are connected to aviation as they consider exporting internationally.

39 Fitch Solutions: Investment Trends in Global Transport

2.51 UK firms can build consortia to offer complete supply chain products for international contracts and increase the prospects of UK success. The government can then help by leveraging its networks, relationships and influence to help UK businesses to connect more successfully with international companies, customers, markets, and each other. This UK firm-led consortia approach can be particularly helpful for small and medium-sized enterprises (SMEs), given the additional barriers they face to competing overseas.

2.52 The government will continue to work with industry, through Infrastructure Exports:UK (IE:UK) and other fora, to take a strategic approach to UK engagement overseas.

Case study – Infrastructure Exports:UK

Infrastructure Exports:UK (IE:UK) is an industry led group co-chaired by the Minister of State for Trade and Export Promotion, which aims to increase the UK share of global infrastructure projects by engaging foreign customers and engaging at the pre-competitive stages of projects to shape demand for collaborative UK solutions. The main board is supported by subsector working groups. The aviation working group includes leading strategic advisors, design engineers, contractors and aviation companies and organisations such as the British Aviation Group (BAG), NATS and CAA International (CAAi). To date the group has focused largely on global opportunities related to airport build projects.

2.53 The government has been considering the extent to which an even greater 'Team UK' approach would add value across the span of business activities connected to aviation, which includes a wide range of products and services not always recognised as airport infrastructure. These products and services, such as aircraft tagging, ground handling, security services and others, are often served by small and medium-sized enterprises (SMEs) which may have limited resource and industry representation to strengthen their ability to export as widely as larger firms.

2.54 The government wants to make sure that all parts of this diverse sector, including SMEs, are supported to tackle the barriers they may face when exporting. The government proposes:

- **to work closely with the British Aviation Group to set up a new Aviation Exports Board, which will bring together all relevant parts of the sector**

2.55 The board will provide a forum for discussing barriers that companies are experiencing and how the government can help to remove those barriers. The government welcomes views from industry on areas that this new board could focus on.

Free trade agreements

2.56 As set out in the 'Preparing for our Future UK Trade Policy' white paper, the government is developing the UK's independent trade policy to forge new and ambitious trade relationships with our partners around the world. The government has recently conducted four public consultations on potential future trade agreements with the USA, Australia, New Zealand and on the UK's potential accession to the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP).

2.57 Trade agreements do not apply to air services such as traffic rights or services directly related to traffic rights. However, they can cover a range of auxiliary services, such as aircraft repair and maintenance services, the selling and marketing of air transport services, computer reservation system (CRS) services, ground handling services, and airport operations. Therefore, as we develop our new trading arrangements, international trade agreements will provide a significant opportunity for the UK to address barriers to trade in these areas and to support the industry as a whole.

Consultation questions

Consider the policy proposals in this chapter and answer the following either for the chapter as a whole; groups of policies within the chapter and/or individual policies:

1. **How could the policy proposals be improved to maximise their impact and effectiveness in addressing the issues that have been identified?**
2. **How should the proposals described be prioritised, based on their importance and urgency?**
3. **Are you aware of any relevant additional evidence that should be taken into account?**
4. **What implementation issues need to be considered and how should these be approached?**
5. **What burdens, both financial and regulatory, are likely to need to be managed and how might those be addressed?**
6. **Are there any options or policy approaches that have not been included in this chapter that should be considered for inclusion in the Aviation Strategy?**
7. **Looking ahead to 2050, are there any other long term challenges which need to be addressed?**
8. **How should the UK use its global leadership and international influence to further the aims of the UK aviation sector?**
9. **What should the UK's priorities be for strengthening existing connections and establishing links with emerging markets?**

Ensure aviation can grow sustainably

3. Ensure aviation can grow sustainably

Aviation provides significant economic and social benefits to the UK. It is an industry that contributes at least £22 billion to our economy, supports half a million jobs, serves 284 million passengers and transports over 2 million tonnes of freight a year. Forecasts show that demand for aviation will continue to rise in the period up to 2050. The government welcomes the industry's future expansion. However, its growth must be sustainable – with affected communities supported and the environment protected. It is therefore vital that the government, the regulator, the industry and other interested parties work in partnership to achieve this shared goal.

Introduction

3.1 Demand for aviation has grown significantly since 2010. Passenger numbers have increased by 35%, with a record 284 million passengers passing through UK airports in 2017. Growth in passenger numbers since 2010 in the six London airports[40] is the equivalent of a new airport the size of Gatwick. Some of the highest growth rates are outside the south east at airports such as Manchester (57%), Edinburgh (56%), Doncaster Sheffield (53%), Leeds Bradford (50%) and Bristol (44%).[41]

3.2 Industry has responded to this demand. Airlines have sought to fully utilise their existing aircraft and have used larger aircraft, which has meant aircraft movements have only increased by 13% to support 35% growth in passengers.[42] They have also invested in newer, cleaner and quieter aircraft. Airports have invested record amounts in their own infrastructure and have worked with national and local government to improve road and rail access to their airports.

3.3 Even with these improvements there are challenges that need to be addressed. Growth can have significant environmental impacts which affect local communities and increase emissions. There are also significant infrastructure constraints which require urgent attention, such as the need to modernise our airspace, improve transport links to airports and consider whether new runways are required. Therefore, while the government supports continued growth in aviation over the next 30 years, it also believes that the UK must be more ambitious on environmental protection to ensure that growth is sustainable.

40 Heathrow, Gatwick, London Luton, London Stansted, London City, London Southend

41 Department for Transport analysis of Civil Aviation Authority: Airport Data

42 Department for Transport analysis of Civil Aviation Authority: Airport Data

3.4 This chapter:

- outlines the government's preferred approach for developing a framework for sustainable growth and the respective roles for government and the industry
- makes the case for making most efficient use of the infrastructure available, including by considering the system for slot allocation at airports and continuing to support the industry in improving resilience
- describes the approach being taken to airspace modernisation to deliver additional capacity and environmental benefits
- sets out a robust policy framework and package of measures to address the harmful effects of aviation on the environment, such as carbon emissions, air quality and noise
- sets out the government's expectations that communities should benefit directly from growth

A partnership for sustainable growth

3.5 The government's forecasts show that demand for aviation will continue to grow in the period to 2050.[43] The government intends to discuss its modelling approach with stakeholders in the first half of 2019, which will inform future decisions on whether there is a case for additional runways.

3.6 The government accepted the independent Airports Commission's conclusion that there is a need to increase capacity in the South East of England by 2030 by constructing one new runway and supports a new Northwest runway at Heathrow Airport, through the designation of the Airports National Policy Statement (NPS).[44,45] This sets out the requirements that an applicant will need to meet in order for development consent to be granted. The government has also expressed support for other airports making best use of their existing runway capacity, subject to economic and environmental issues being addressed.[46]

43 Department for Transport (2017): UK aviation forecasts

44 Airports Commission (2015): Final Report

45 Department for Transport (2018): Airports National Policy Statement

46 Department for Transport (2018): Making best use of existing runways

Airports NPS

In June 2018, following a vote in Parliament, won with a significant majority, the Secretary of State designated an Airports NPS, which paves the way for vital new capacity at our major international hub – Heathrow Airport. The designation of the Airports NPS marks a significant step forward. It provides the primary basis for decision making on development consent applications for a Northwest runway at Heathrow Airport. It clarifies what is required to enable the development of much needed additional airport capacity that is essential for trade and economic growth, while setting clear requirements to mitigate the impacts on local communities and the environment. Following an application for development consent and a public examination by the independent Planning Inspectorate, this could see building work start in 2021 and a third runway operational by 2026.

3.7 The government is supportive of growth that is sustainable and will provide the necessary framework for this to happen.

3.8 This will require a partnership approach between the government, the regulator, the industry and other interested parties to ensure that necessary conditions are met in respect to infrastructure, community investment and environmental measures.

3.9 The partnership for sustainable growth which the government is proposing is a long-term policy framework which will need to be flexible enough to respond to new information, developments and changing circumstances, while providing sufficient long-term confidence for the industry and communities.

3.10 The government's expectation is that the new framework would apply to all airport and airline operations within the UK, although many policies would need to be tailored to the local circumstances. For example, there could be different policies applied depending on whether an airport was continuing to grow within existing planning approvals, was bringing forward a new planning application to make best use of existing runways, or in future was potentially seeking permission for a new runway. Until any framework is adopted as government policy, planning applications should continue to be considered against existing policy.

Figure 8 Partnership for sustainable growth

Future growth

3.11 The government believes that forecasted aviation demand up to 2030 can be met through a Northwest runway at Heathrow and by airports beyond Heathrow making best use of their existing runways subject to environmental issues being addressed. To ensure that this additional capacity delivers the full benefits for the consumer and industry while minimising the negative impacts on local communities, the government proposes to work in partnership with the industry to deliver on a number of policy areas, as set out in this chapter.

3.12 Additional growth in passenger demand will lead to a number of airports facing capacity constraints. The Airports Commission noted that while there may be a demand case beyond 2030, there is not necessarily a corresponding environmental or commercial case. While the government is not at the point of making a decision on long term need, it wants to seek views on how best to make any future decision, should that be required.

3.13 The government will need to consider whether there is a need for further runways. Based on the current evidence, the government believes that any new framework for growth could accommodate additional runways beyond 2030 if a needs case is proven and suitable conditions are met in respect of sustainability. As part of this, the government proposes to:

- **ask the National Infrastructure Commission (NIC) to include airport capacity in future national infrastructure assessments to determine whether there is a needs case for further runways**

3.14 If a need is identified, the government has options for how to reach a decision on location, subject to the grant of the necessary planning permission or development consent. This could be through a NIC sector study; an independent commission (like the Airports Commission); or an aviation NPS to either set out the criteria any development consent application would need to meet, or by naming airport(s). At this stage the government's preferred approach is an NPS to set out the criteria but not name specific airports, so leaving it to industry to determine whether and when to bring forward applications.

Modernising our airspace for the future

Airspace modernisation objective

The overall objective for airspace modernisation is to deliver quicker, quieter and cleaner journeys and more capacity for the benefit of those who use and are affected by UK airspace. This will be determined within the following parameters:

- create sufficient airspace capacity to deliver safe and efficient growth of commercial aviation
- progressively reduce the noise of individual flights, through quieter operating procedures and, in situations where planning decisions have enabled growth which may adversely affect noise, require that noise impacts are considered through the airspace design process and clearly communicated
- use the minimum volume of controlled airspace consistent with safe and efficient air traffic operations
- in aiming for a shared and integrated airspace, facilitate safe and ready access to airspace for all legitimate classes of airspace users, including commercial traffic, General Aviation and the military, and new entrants such as drones and spacecraft
- not in conflict with national security requirements (temporary or permanent)

3.15 The UK's airspace is an essential, but invisible, part of our national transport infrastructure, and is also some of the most complex in the world. However it has not undergone significant change since the 1950s, and this outdated infrastructure is struggling to keep pace with the growing demand for aviation, which can lead to delays. The situation will deteriorate further in the coming years as demand for air travel continues to rise, resulting in delays for passengers of 30 minutes on every 1 in 3 flights by 2030 if no action is taken.[47] This would be very damaging for passengers, business, the economy, communities and the environment.

3.16 In 2017 the government published the Strategic Case for Airspace Modernisation.[48] Although the government recognises that redesigning airspace will affect different people in different ways, this set out the major benefits that airspace modernisation can deliver, through the introduction of technology enabling more efficient flight paths that can be optimised to reduce noise for local communities, deliver more carbon efficient routes or reduce delay for passengers.

3.17 As a result of modernisation, we can also expect to see a large reduction in, or the elimination of, planes queueing in holding stacks over the UK, with any remaining stacks operating at higher altitudes. These changes will bring reductions in carbon emissions and noise benefits to those living underneath the holding stacks and reduce emissions.

3.18 The government believes that airspace modernisation is necessary and will provide leadership to support this. The aviation industry must now come together to deliver the benefits through a coordinated modernisation programme. The government and CAA have committed to co-sponsor airspace modernisation and will work collaboratively with the industry, local communities, General Aviation, environmental groups, the Ministry of Defence (MOD) and other key stakeholders to support this delivery in a way that balances the objectives of each stakeholder group.

Interaction with noise policy

3.19 The government recognises that while airspace modernisation will bring noise benefits for many people, it could create increased noise for others. New technology will allow more efficient use of airspace and offer the ability to increase capacity, though at some airports existing conditions limit the number of aircraft or passenger movements. Where an airport has reached that limit, any additional airspace capacity created through modernisation can only be used if and when planning approval is given for the increase.

47 Department for Transport (2017): Upgrading UK airspace, strategic rationale

48 As above

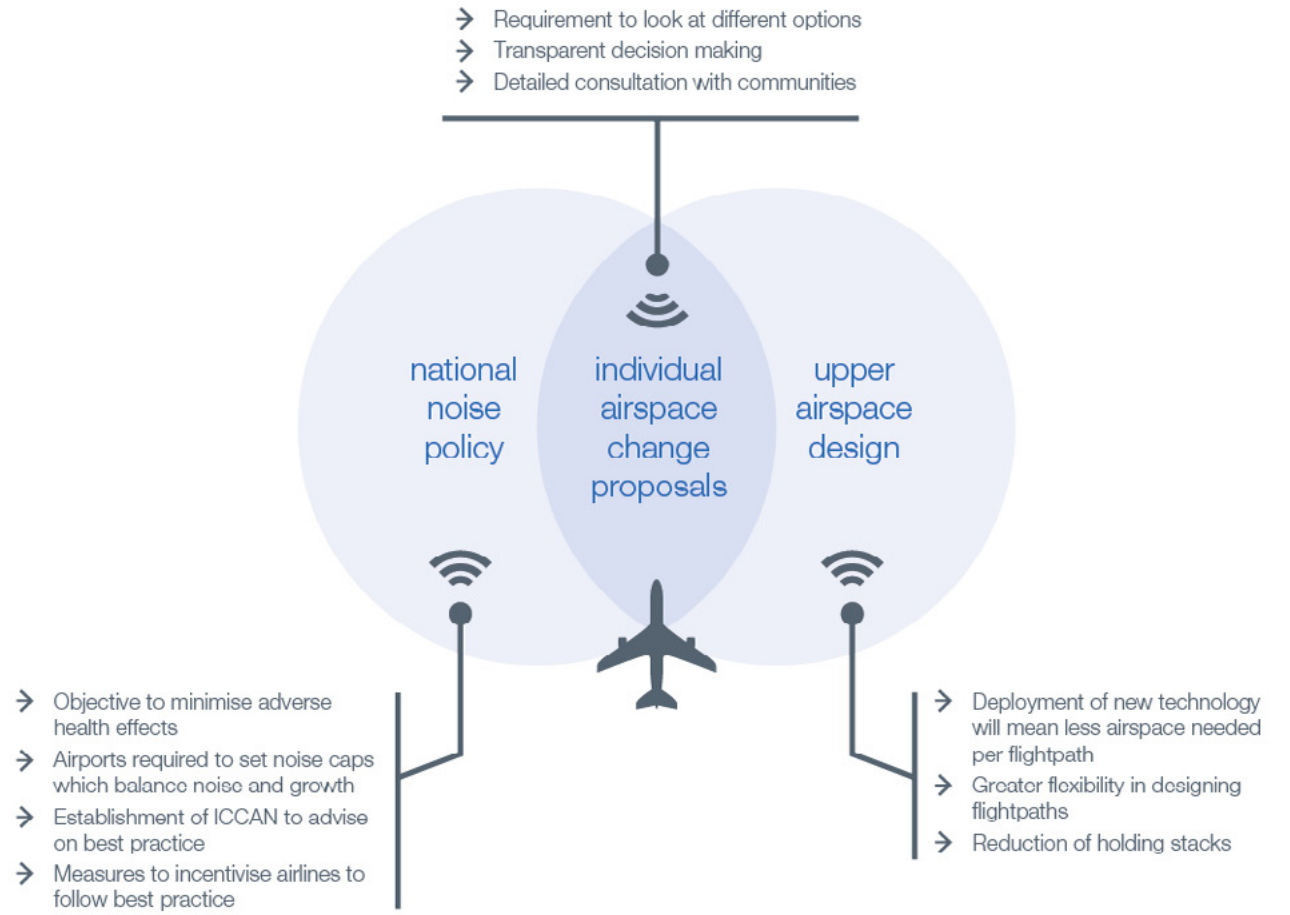


Figure 9 Implementation of noise policies

3.20 Individual airspace change proposals at a lower level (below 7,000ft) are usually brought forward by airports. These individual airspace changes must comply both with national noise policy and be integrated with upper level (above 7,000ft) airspace design, which is led by NATS.

3.21 The introduction of Performance Based Navigation (PBN) is a key technology change needed to achieve the aims of airspace modernisation. PBN improves the accuracy of where aircraft fly and provides opportunities to better avoid noise sensitive areas. This means that while overall noise impacts may reduce, noise may become more concentrated for some. The government's policy is that decisions over whether modernised airspace leads to concentrated routes avoiding populated areas, or utilises multiple routes to provide respite, should be based on local circumstances and informed by consultation with local communities.

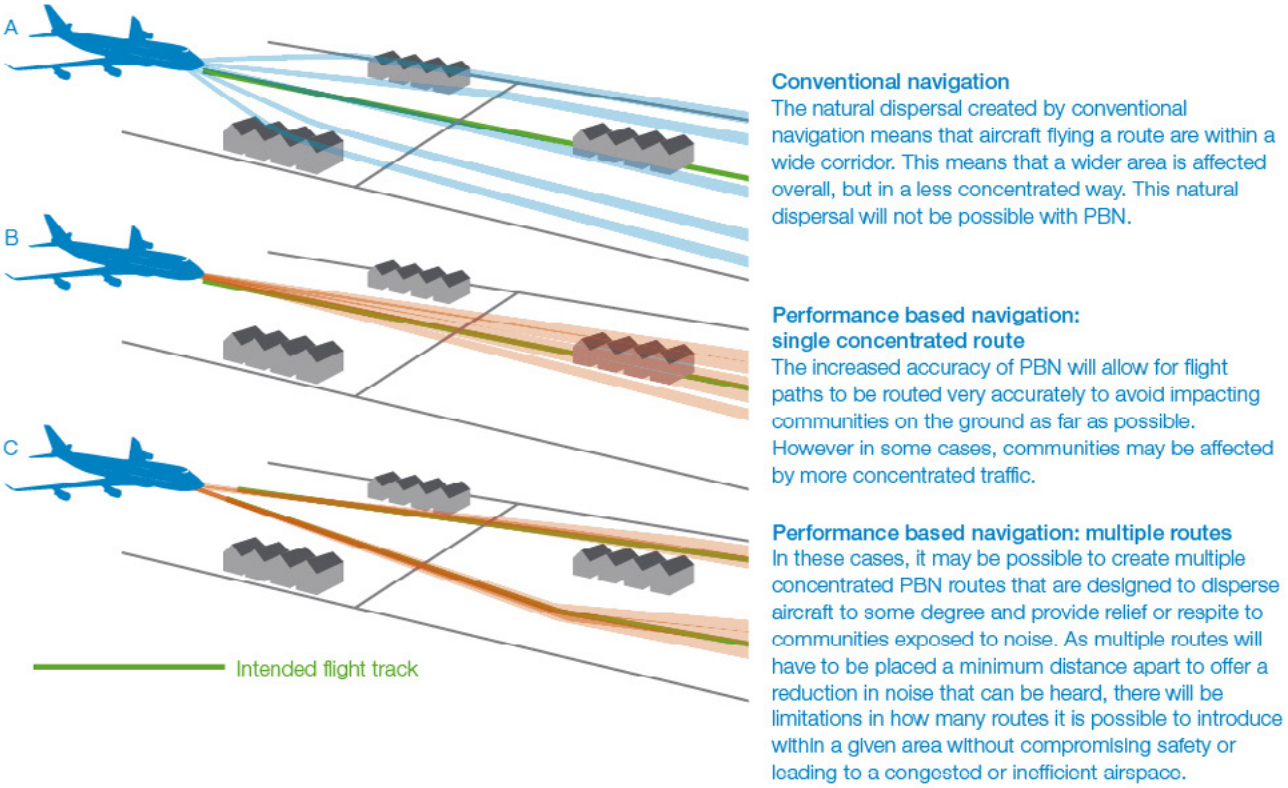


Figure 10 Potential effect of performance based navigation
Source: UK Airport Policy: A framework for balance decisions on the design and use of airspace

Current regulatory framework for airspace change

3.22 The airspace modernisation programme includes numerous individual airspace changes at both the local and national level. Changes to the design of UK airspace are proposed by an airspace change sponsor, usually an airport (for lower level airspace) or air traffic control (for upper level airspace). The CAA will make a decision on whether to approve the airspace change proposals brought forward following assessment of the sponsor's evidence and consultation through its new airspace change process, introduced in January 2018. The government believes it is essential that communities are able to understand the technical detail contained within airspace change consultations so that they can engage fully with them. The government proposes to:

- **ask ICCAN to consider how they can best support communities in engaging with the airspace change process**

Coordination of airspace changes in the south of the UK

3.23 Although airspace modernisation is a national programme and there are other drivers for modernisation such as defence requirements, the government recognises that there is a particular and immediate challenge in the south of the UK to coordinate multiple airspace changes across different airports in order to modernise our highly congested airspace. NATS has produced a feasibility report into airspace modernisation in the south of the UK, which has been assured by the CAA. These documents have been published alongside this green paper.

3.24 The NATS report advised that there is sufficient airspace to meet airports' potential future demands for airspace subject to the introduction of new technology. NATS also advised that through the implementation of this new technology it can deliver major per flight noise reductions and carbon benefits, as well as radically reducing the need for stacking over the UK.

3.25 NATS has also identified a group of at least 8 and up to 15 airports in the south of the UK, who should work closely together and with NATS to develop their airspace change proposals because of the high degree of interdependence of airspace at those airports.

3.26 The level of interdependence creates a risk that a single airport, if behind schedule could hold up the entire programme. To address this risk, the government is:

- **consulting on proposed legislation which would give the Secretary of State the power to direct airports or air navigation service providers (ANSPs) to take forward airspace changes where they are unable or unwilling to do so**

3.27 Full details of the consultation on the legislation to do this can be found in Annex A. The progression of this will be subject to legislative time in Parliament.

Airspace Modernisation Strategy

3.28 The CAA published a final Airspace Modernisation Strategy (AMS) in December 2018 to replace the existing Future Airspace Strategy. This strategy will then be updated regularly with an annual progress report. The AMS sets out the initiatives that the aviation industry must deliver to modernise UK airspace, such as the introduction of new technologies and the redesign of some areas of airspace. As part of this, DfT and CAA have asked NATS to work with key stakeholders to develop a coordinated implementation plan and timeline for airspace changes (or airspace change masterplan) that will be required in the future in the south of the UK. The masterplan will identify where airspace changes are needed to deliver improvements to: safety, capacity, noise, air quality, fuel efficiency, access to airspace for users including where controlled airspace is no longer justified or should be a different classification, military access, or to introduce new technology.

Governance, funding and resourcing

3.29 In order to deliver modernisation, robust governance and adequate funding and resources must be in place:

- DfT and the CAA have worked with NATS and the Infrastructure Projects Authority to design a new governance structure to oversee airspace modernisation; this includes the Aviation Minister chairing a new Airspace Strategy Board, bringing together a wide range of key stakeholders. Further detail on this will be set out in the CAA's Airspace Modernisation Strategy
- in line with existing policy, the aviation industry, through revenue from passengers, should fund the cost of upgrading aviation infrastructure, rather than this being subsidised by the general taxpayer; the government believes that the existing funding mechanisms in place are the most effective way to deliver this

- the government recognises there may be instances where a small airport requires financial support to carry out some aspects of an airspace change proposal. It considers that the UK unit rate could be a suitable means of funding for this[49]
- the aviation industry should work together to address existing skills shortages in key areas, such as airspace design, including through considering pooling and sequencing resources to ensure modernisation is delivered, to a high standard and on time

Efficiency

Balancing growth and resilience

3.30 Passengers rightly expect the aviation industry to minimise delays and cancellations where possible, provide comprehensive and timely information when they occur, and offer a simple and effective system for claiming compensation. Overall, flight delays, cancellations and lost luggage are the greatest cause of ongoing inconvenience. In qualitative research conducted by the CAA in 2016, a significant number of the consumers interviewed, when shown delay statistics, felt these to be lower than they expected and indicative of good performance. However, participants were very nervous about the possibility of more disruption arising from airports and airspace getting busier in the future.

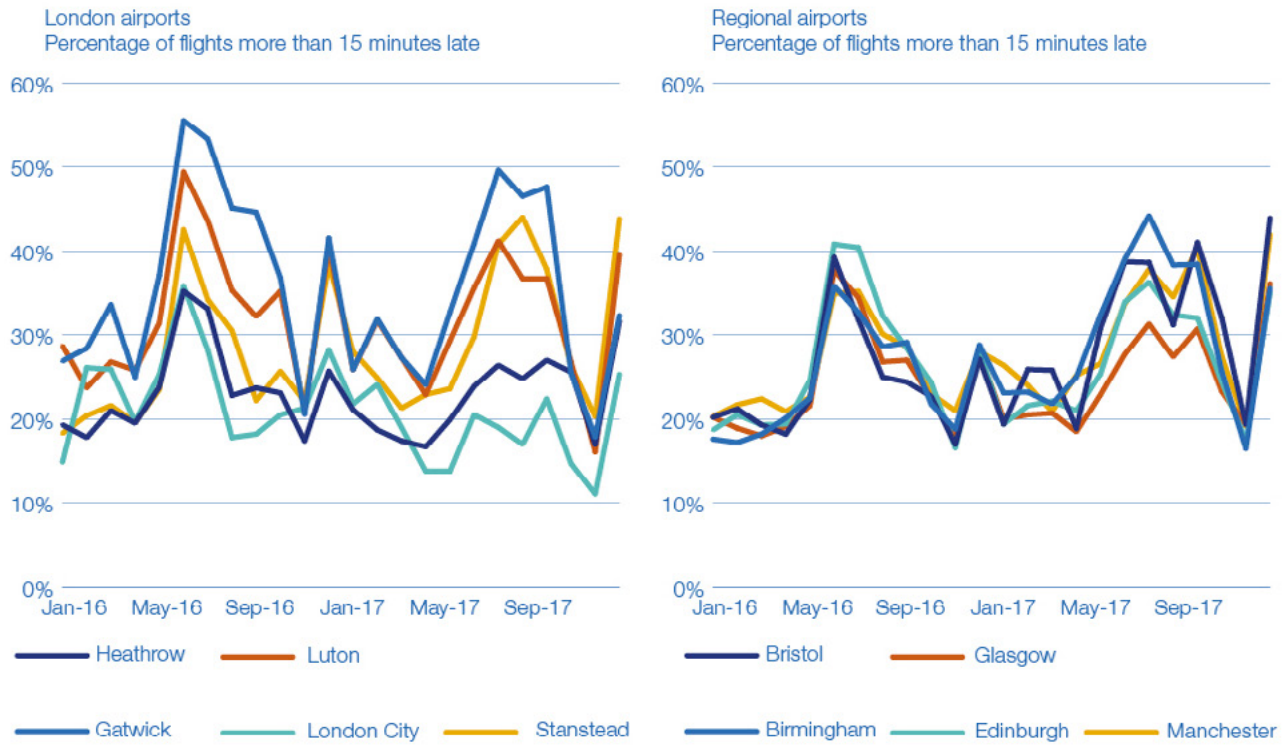


Figure 11 Punctuality at selected UK airports, 2016-2017
Department for Transport analysis of Civil Aviation Authority: Punctuality Data

49 Eurocontrol monthly adjusted unit rates

3.31 With demand for aviation forecast to grow, this issue will not improve unless action is taken. In the medium term, a Northwest Runway at Heathrow and the modernisation of airspace will help to reduce delays. However, in the short term, there is a need for the government, the regulator and industry to work together to ensure that growth in aviation does not come at the expense of a positive consumer experience in the future.

3.32 The CAA's recent resilience report highlighted a lack of collective responsibility for airport resilience in the UK.[50] It recommended the formation of a voluntary Industry Resilience Group (IRG), alongside consideration of the government's own role in resilience, particularly in the process of capacity declaration of air traffic movements at airports. The report also highlighted the need to balance using airports to their capacity – bringing greater competition and choice for consumers – with the benefits of improved punctuality.

3.33 The causes for delays and cancellations can be separated into two distinct groups:

- operational issues due to congested systems, such as runway, terminal or airspace capacity constraints. These issues, coupled with a minor disturbance, can exacerbate the effects on consumers due to the lack of flexibility in the schedule to recover
- individual events that are likely to cause major delays and cancellations, which can be either:
  - localised, such as fire, power cuts and flooding, or
  - international events such as air traffic control industrial action

3.34 The government recognises the work that the industry already does and commends the industry on acting swiftly on the CAA's report and forming an IRG. It also recognises that most airports have developed resilience and contingency plans for a number of scenarios.

The IRG's current priorities and successes include:

- coordinating cross border weather responses across European airspace
- ensuring airports and airlines have pre-planned actions to implement during weather disruptions
- developing plans for aircraft diversion due to weather disruptions
- ensuring airports across the South East receive live information from each other on specific performance metrics, such as delays, to improve situational awareness and performance
- embedding a culture of realistic airline scheduling using the knowledge of UK and EU demand

50 Civil Aviation Authority (2017): Operating Resilience of the UK's aviation infrastructure and the consumer interest

Operational issues

3.35 Although resilience is primarily an industry responsibility, it is important that the government proactively supports the industry in its efforts to improve resilience, encouraging all partners to work collaboratively towards a common goal of improving the service provided to consumers.

3.36 Capacity constrained airports have very little headroom to mitigate minor delays. The IRG has already made significant progress towards its key objective, which is to improve planning and operations in the UK aviation network to improive operating resilience and reduce delays and the associated costs to both industry and passengers.

3.37 To support the IRG, the government proposes working with the CAA and the industry to:

- **encourage airlines to plan manageable schedules when disruptive events are forecast (such as snow)**
- **consider how to support the identification and agreement of airports to accept diversions during disruptive events**

3.38 In the longer term, should the government need to play a greater role in improving resilience, it proposes to:

- **work with the industry to consider the circumstances in which government intervention would be appropriate and should be triggered**
- **agree who should have powers to intervene, such as the CAA, NATS or an independent body**
- **work with the CAA to consider how airports can be encouraged to consider resilience when declaring their capacity and whether declarations should be independently reviewed**
- **consider whether future planning approvals should include resilience conditions**

Individual events

3.39 The aviation industry should be identifying and planning for potential disruptive events. These could include disruptive weather, volcanic eruptions, solar weather, communications or IT failures, fire, flooding, power failures and fuel shortages. Gatwick and Heathrow airports have economic licence conditions mandating the preparation of resilience plans and the government is also aware that resilience and contingency plans are in place at some other airports. However, beyond these airports, the government does not have a process to ensure that airports have adequate plans in place for these types of events. Therefore, the government is proposing:

- **to work with the industry to develop resilience and contingency planning guidance that sets minimum standards for the industry**

3.40 This guidance will set expectations and encourage the sharing of best practice between airports on both operational issues and on individual events. Collaborating with industry on the scope, proportionality, applicability and assurance of this guidance will be key in ensuring its practical application.

Ground handling

3.41 One area that could have a resilience impact is ground handling. Ground handling covers a wide variety of services required by airlines in order to operate flights. These services include areas such as fuel freight handling, passenger check-in, catering, baggage handling, de-icing and transport within the airport itself. The provision of ground handling services is covered by EU regulations.[51]

3.42 Ground handling is either procured by the airline from a third-party or supplied by the airline itself. Over the last few years a focus on price competition and cost reduction may have come at the detriment of service quality at some airports. Airports with a number of airlines and ground handlers operating at them can see significant variation in service quality.

3.43 The government's understanding from engagement with the industry is that the ground handling market is competitive and the quality of ground handling is becoming a more important factor in the market rather than price alone, demonstrating the market is correcting itself. Therefore, the government does not believe there is a case to intervene, although it will continue to track developments.

3.44 The government considers that continued improvements to the way ground handling operates are within the gift of industry, and there are examples where industry parties are working positively together to drive these improvements. It encourages this best practice to be shared and adopted across the industry.

3.45 Concerns have also been expressed about consolidation in the ground-handling market, for example with Menzies Aviation's proposed acquisition of UK-based aircraft de-icing specialist Airline Services Ltd earlier this year. However, it is too early to judge whether any impacts from this acquisition are affecting competition. The government will keep this under review.

Case study: London Luton Airport

London Luton Airport has developed a 'Safety Stack' Forum which sets out detailed codes of practice and standards which all service providers operating at the airport – including the three ground-handlers – are required to sign up to be considered as stack partners and operate in the airport. The airport believes this work, alongside its proactive approach of sharing ground-handling best practice training, has led to improvements in both safety and performance.

Luton is the first airport to standardise ground-handling procedures and equipment. After working with handlers on requirements and specifications, the airport tendered for an external company to provide the requisite equipment and as a result of this standardisation, Luton believes the number of airside collisions and incidents have reduced.

Slots allocation

3.46 As more airports become constrained, it is even more important that the government considers how best use can be made of existing capacity and how to support fair and competitive growth of the industry in a way that ensures the best outcomes for the consumer.

51 Directive 96/67/EC

3.47 The current slot allocation process is set out in EU and UK legislation based on the guiding principles set out in IATA's Worldwide Slot Guidelines.[52,53] The guidelines were primarily designed for allocating slots at airports that are at, or are reaching, high levels of congestion but have been adapted as airports have become severely constrained. In a situation where significant new capacity is released at a highly constrained airport, such as the once in a generation opportunity presented by Heathrow expansion, it is the government's view that current regulations may not promote fair and competitive growth and are unlikely to produce the best outcome for the consumer.

The case for changing the current slot allocation system

3.48 The process by which slots are allocated can create various issues at a severely constrained airport where new capacity is due to be released:

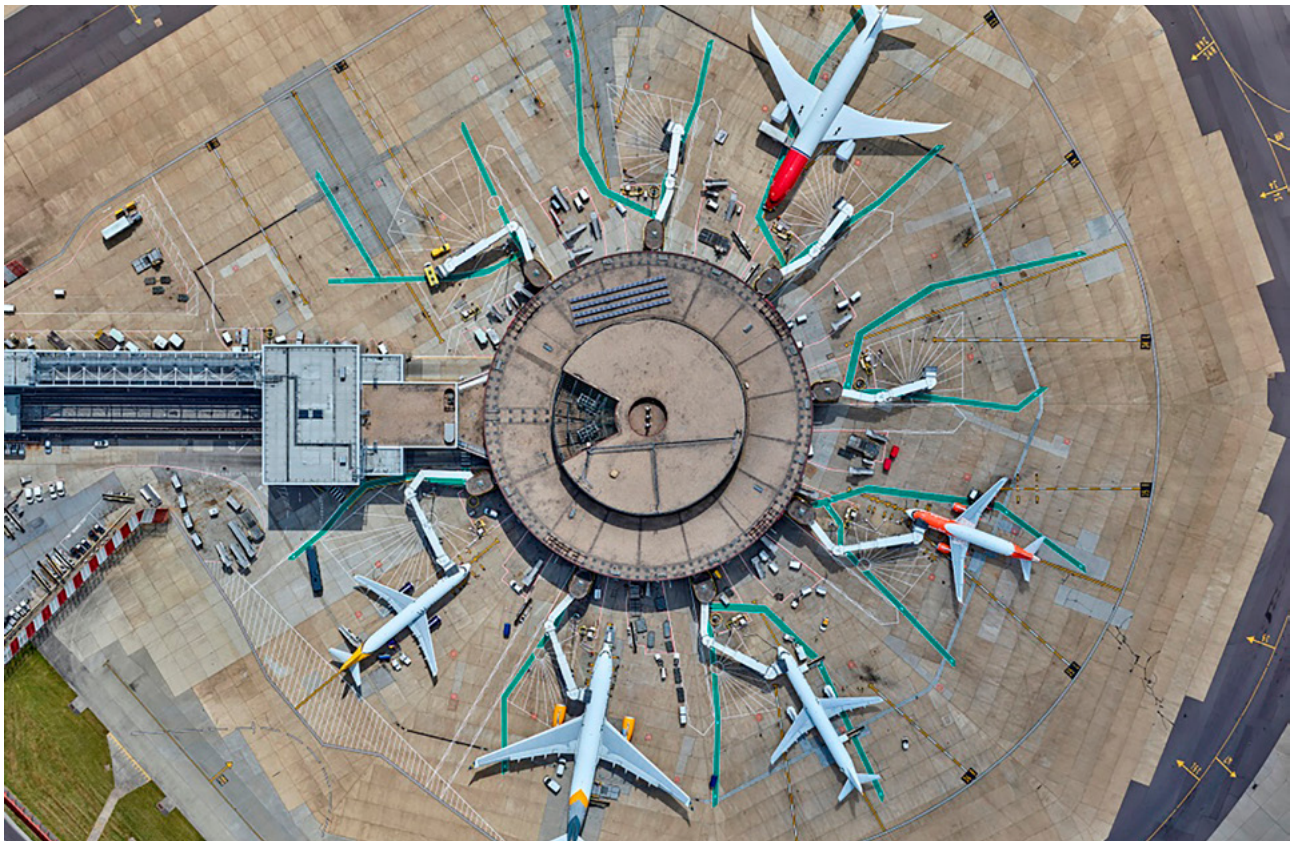
- slots are not allocated sufficiently far in advance of new capacity opening to allow airlines to scale up their operations
- not all elements of the current system are fully transparent, especially where more than one airline requests a slot
- there are incentives for airlines to obtain and retain as many slots as possible by slot hoarding, and by gaming the allocation system to gain revenue through the secondary market, prevent competition or by obtaining slots from subsidiary airlines
- the new entrant rule can make it challenging for both new entrants or small incumbents to acquire sufficient slots at initial allocation to operate at scale
- granting perpetual grandfather rights to incumbent airlines restricts long-term churn in the market by acting as a barrier to entry
- the secondary trading market may not be sufficiently transparent and liquid to operate as effectively as it could
- if incumbent airlines are given preference to re-time their existing slots, this offers them a competitive advantage over those seeking newly created slots

3.49 The current allocation system is not designed to stimulate a competitive market environment and has no means of taking into account broader objectives. Aspects of the allocation process have the potential to adversely impact consumer outcomes and growth at slot-constrained UK airports where new capacity is due to be released. This is particularly important in the context of expansion at Heathrow, but also potentially where significant new capacity is introduced at other congested airports. This is explained further in Annex B.

3.50 The Competition and Markets Authority (CMA) looked into the impact of the current allocation arrangement on competition from a theoretical perspective and found that the existing allocation system could weaken airline competition because new entrants might find it difficult to expand and existing airlines may have incentives to prevent competition by hoarding slots or gaming the system.

52 Regulation (EC) 95/93

53 IATA (2018), Worldwide slot guidelines



Opportunity for reform

3.51 Expansion at Heathrow Airport will be the first time a significant number of additional slots have been released at a severely congested airport in the UK. The government's expectation is that demand is likely to outstrip supply, especially at certain times of the day. Therefore it is crucial that the allocation process is right and working to ensure the best outcome for the consumer.

3.52 The government's primary objective for the allocation of newly released slot capacity is to facilitate effective competition between airlines to create efficiency. It also has secondary objectives to:

- improve domestic connectivity, though protecting slots to support at least 14 domestic routes
- improve connectivity to international destinations that are currently unserved or underserved

3.53 There are a variety of potential changes to the slot allocation system that could support these policies. However, there are also some underlying principles that will be common across all measures such as:

- ensuring that the slot allocation system is neutral, transparent and non-discriminatory
- continuing to have slot co-ordination carried out by an independent co-ordinator
- continuing to have slot co-ordination scheduling generally in line with industry standard timetables

3.54 The government proposes to:

- **work constructively with the industry, IATA and the countries the UK has aviation links with, to consider how to develop the existing slot allocation system to deliver the best outcomes for the consumer, in line with the principles above**

Developing possible options for reform

3.55 The options that have been developed fall under three headings: administrative system changes (which the government plans to implement in any circumstances); measures to enable effective competition and efficiency, and measures to increase connectivity.

3.56 **Administrative system changes:** To enhance the transparency of the slot allocation system, provide airlines with increased clarity and certainty and to ensure a process which is as legally robust as possible, the government intends to implement the following changes (subject to adherence to existing slot regulations) and invites industry views on how best to achieve this:

- **earlier allocation of slots at a severely constrained airport with new capacity to support operational planning (currently slots are allocated six months in advance)**
- **provide the slot coordinator with guidance on:**
  - **the definition of the 'airport system', clarifying which airlines are considered as 'new entrants' to facilitate increased competition**
  - **the objectives for allocation of newly-created slots, including competition and domestic and long-haul connectivity**
  - **whether airlines re-timing their existing slots into more desirable newly-created slots should be permitted and, if so, whether they should be given priority over new slots that are allocated**

3.57 **Effective competition:** The government is seeking views on the following measures and welcomes alternative measures from industry to meet its objective of facilitating effective competition and efficiency:

- **issuing guidance on secondary trading to increase transparency and ensure all interested parties are aware of which slots are being made available**
- **changing the existing 'new entrant' rule to allow new entrants or smaller incumbents to build presence at constrained airports**
- **considering market-based mechanisms for release of additional capacity.** This could include auctioning all slots or a limited number that would be most sought after. Revenue could be used to fund airport expansion subject to alignment with regulatory requirements. The government recognises that there are concerns relating to this option in the industry. The CMA found there was a strong theoretical case for market-based mechanisms such as well-designed auctions but also noted inherent risks and uncertainties:
- **selling slots for a predetermined price, depending on the time of day**
- **allocating a portion of new slots without 'grandfather' rights (or limiting the grandfather period) so that airlines cannot retain them for successive equivalent seasons resulting in slots being made available at the end of each season, or after a given period of time**
- **considering slot 'renting' so that more slots are returned to the pool rather than being used inefficiently, creating churn in the system**
- **allocating slots or 'bundles' of slots to airlines that will operate cleaner or quieter aircraft**
- **allocating a set of slots in 'bundles' designed to enable carriers to optimise operations**

3.58 **Increased connectivity:** The government also welcomes views on measures that improve domestic connectivity and international connectivity such as allocating slots or 'bundles' of slots, providing all or a certain proportion of them are used for domestic routes or new international routes (see Chapter 4).

3.59 Once further analysis and stakeholder engagement is complete, the government will:

- **also consider whether there is a need to propose an in-depth review of slot allocation by the competition authorities (CMA, CAA or a combination of both)**

Single airline dominance at airports

3.60 One airline holding a significant market share at an airport creates opportunities for that airline to exercise market power through, for example, influencing airport decision making, blocking entry to other airlines or increasing air fares. Where a certain route is only available from one airport, this could lead to exploitation of market power. The government proposes to:

- **prioritise competition between airlines as part of reformed slot allocation processes, including allocation of new slots at an expanded Heathrow airport**

3.61 As it stands, the government does not have evidence that warrants government intervention beyond slot reform, although it believes there is a case for more frequent monitoring to ensure airline competition continues to work for the benefit of the consumer.

3.62 The CAA already has concurrent powers with the CMA for airport operation services, although not for airline services or competition between airlines. The government proposes that:

- **the CAA takes on an enhanced role in the monitoring of airline services and competition, giving it the scope to intervene in some way if problems arise in the future, even if there are no current concerns**

3.63 This could take the form of greater cooperation with the CMA on airline services without concurrent powers, with the option of implementing full concurrent powers if the situation worsened in the future.

3.64 Given the importance of slot allocation in facilitating competition between airlines, the government is also interested in a role for the CAA in slot allocation, either in advising the slot coordinator Airport Coordination Limited (ACL) of the competition impacts of allocation, or monitoring allocations as part of its current duties, or in a more formal role compatible with its current duties.

3.65 As the ACL has long held the expertise to perform the slot coordination function for UK airports, the government would put effective guidance in place to ensure that decisions were taken in line with government objectives for slot allocation, including the release of significant new capacity at constrained airports such as Heathrow.

Safeguarding of land for growth

3.66 Several airports safeguard land for future developments. The safeguarded land can be a mix of airport, council and private ownership, depending on the individual airport's circumstances. It is prudent to continue with a safeguarding policy to maintain a supply of land for future national requirements and to ensure that inappropriate developments do not hinder sustainable aviation growth. The National Planning Policy Framework (NPPF) has restated the government's commitment to "identify and protect, where there is robust evidence, sites and routes which could be critical in developing infrastructure to widen transport choice".[54] The government believes that this provides

54 National Planning Policy Framework, July 2018

sufficient guidance for local authorities to consider the future needs of airports and their associated surface access requirements, when developing local plans.

Surface access

3.67 It is important to have good surface access links with airports. All proposed airport developments need to be accompanied by clear surface access proposals which demonstrate how the airport will ensure easy and reliable access for passengers, increase the use of public transport and minimise congestion, emissions and other local impacts.

3.68 Further details on surface access policies can be found in the Regional Transport Hubs section in Chapter 4.

Community engagement and sharing benefits from growth

3.69 Growth in aviation can benefit local communities. Airports create jobs for local residents, improve transport links and bring tourism and trade to the region. Airports should therefore create opportunities for communities to engage, particularly on issues which have the most direct impact on them such as road and rail access, airspace change and noise policy. All commercial airports and many larger General Aviation aerodromes are required to provide processes for consultation and engagement with those affected by their operations as well as users of the airport. In practice, this requirement is usually fulfilled through the existence of an airport consultative committee.

3.70 The government has produced guidance on how such committees should operate and it will continue to work closely with those committees to consider the scope for supplementary guidance. Communities should use those existing statutory mechanisms to engage with airports, noting that locally elected representatives sit on the committees. Representatives from residents' groups or amenity societies may also participate. In some cases, additional bespoke solutions tailored to the local circumstances may be needed to address noise management issues, such as those which have been created at Heathrow, Gatwick and Edinburgh airports. Such solutions may be particularly useful where there are major airspace changes under discussion and where local communities would benefit from help to understand the complex proposals. Local communities are encouraged to work with airports to discuss and develop such solutions where necessary.

3.71 In recognition of their impact on local communities and as a matter of good corporate social responsibility, a number of airports have community funds which exist to provide funding for local community projects. There is currently no national policy on such funds. In relation to the proposed Heathrow Northwest runway, the Airports NPS expects ongoing community compensation will be proportionate to environmental impacts.

3.72 The government believes all major airports should establish and maintain community funds, to invest sufficiently in these so that they are able to make a difference in the communities impacted and to raise the profile of these funds. The levels of investment should be proportionate to the growth at the airport. Community funds are complementary measures to ensure communities get a fair deal and do not substitute for noise reduction. The government proposes to:

- **produce guidance on minimum standards for community funds**

Reducing waste

3.73 The government has committed to achieving zero avoidable plastic waste by the end of 2042 and the aviation sector will need to play its part in achieving this.[55] The government has confirmed that it will introduce a deposit return scheme for drinks containers in England, aimed at boosting recycling rates and reducing littering, subject to consultation. It also supports the water industry's refill work which includes funding the upscaling of the City to Sea refill app, enabling the public to find their nearest free water refill point. There are around 14,000 refill locations across the UK.

3.74 Recycling is now part of many airlines and airports company policies and recycling is increasingly expected by passengers. Recycling also helps to reduce the industry's costs of waste disposal. Around half of the UK's international airports have water fountains enabling customers to refill their own water containers, with both Birmingham and Luton Airports promoting the use of their water fountains on Twitter.

3.75 Other examples of good practice adopted by airports:

- Bristol Airport has a liquid disposal point located before its security search area, encouraging passengers to dispose of liquids and take their empty bottles through security and re-fill at one of the airport's three airside water refill stations
- Heathrow Airport has publically committed to recycle all 13.5 million coffee cups used at the airport annually by the end of 2018. It is also working on an innovative project to find more environmentally friendly liquid and gel bags used at security screening
- Gatwick Airport has a biomass plant to treat waste from aircraft and converts this into energy to heat the airport's waste management site and power its water recovery system. This waste would otherwise be sent to landfill

55 Defra (2018): 25-year Environment Plan

3.76 The government is aware of the regulatory and other barriers hindering more widespread take-up of alternatives and reducing single-use plastics on flights, including the weight implications of non-plastic aircraft cutlery and waste regulations limiting aircraft recycling.

Thomas Cook noplaceforplastic campaign

Thomas Cook has launched the **noplaceforplastic** campaign to eliminate single-use plastic wherever possible throughout its supply chain. Focusing on its own hotels and airline, the company will substitute existing plastic items for sustainable alternatives.

By 2020 it will have:

- removed 70 million single use plastic items from across its business in the UK, on its aircraft and at its holiday destinations. This equates to 70 tonnes of plastic
- where possible, substituted disposable items with those made from recycled plastic, biodegradable or compostable options
- ensured when plastic is used it is recycled, where the facilities exist. It will work collaboratively with suppliers, governments and the wider travel industry to improve recycling and waste capabilities across its destinations
- worked to influence its customers, employees, suppliers and the wider travel industry to raise awareness of the issue

Tackling aviation's impact on climate change

3.77 UK aviation accounts for around 7% of the UK's total greenhouse gas emissions, an increase from around 5% in 2005.[56] International aviation's carbon emissions currently account for less than 2% of total global emissions, but these could increase by two to four times between now and 2050.[57] Aviation's share of emissions is likely to continue to increase as other sectors, such as energy and manufacturing, decarbonise more quickly. This means that aviation could represent 25% of the UK's greenhouse gas emissions by 2050.[58]

3.78 The government welcomes the sector's positive progress in responding to the challenge of addressing its impact on climate change. The government recognises the UK aviation industry's success in taking steps to de-couple the growth in emissions from the continued demand for air services. Between 2010 and 2016, international air transport movements within the UK grew by 20%, but international greenhouse gas emissions increased by only 7%.[59]

56 Department for Transport analysis of Department for Business, Energy and Industrial Strategy: Final UK Greenhouse Gas Emissions National Statistics 2016

57 European Commission (2017): Emission Database for Global Atmospheric Research (EDGAR), CO_2 Time Series 1990 – 2015 per region/country

58 Committee on Climate Change (2015): Advice on the fifth carbon budget

59 Department for Transport analysis of Civil Aviation Authority: Airport Data, Department for Business, Energy and Industrial Strategy: Final UK Greenhouse Gas Emissions National Statistics 2016

3.79 This achievement has been attributed to higher load factors (more passengers per flight), increased fuel efficiency and the greater demand for short haul flights as opposed to long haul. However, much more needs to be done, especially in the context of the continued strong growth in demand for air services.

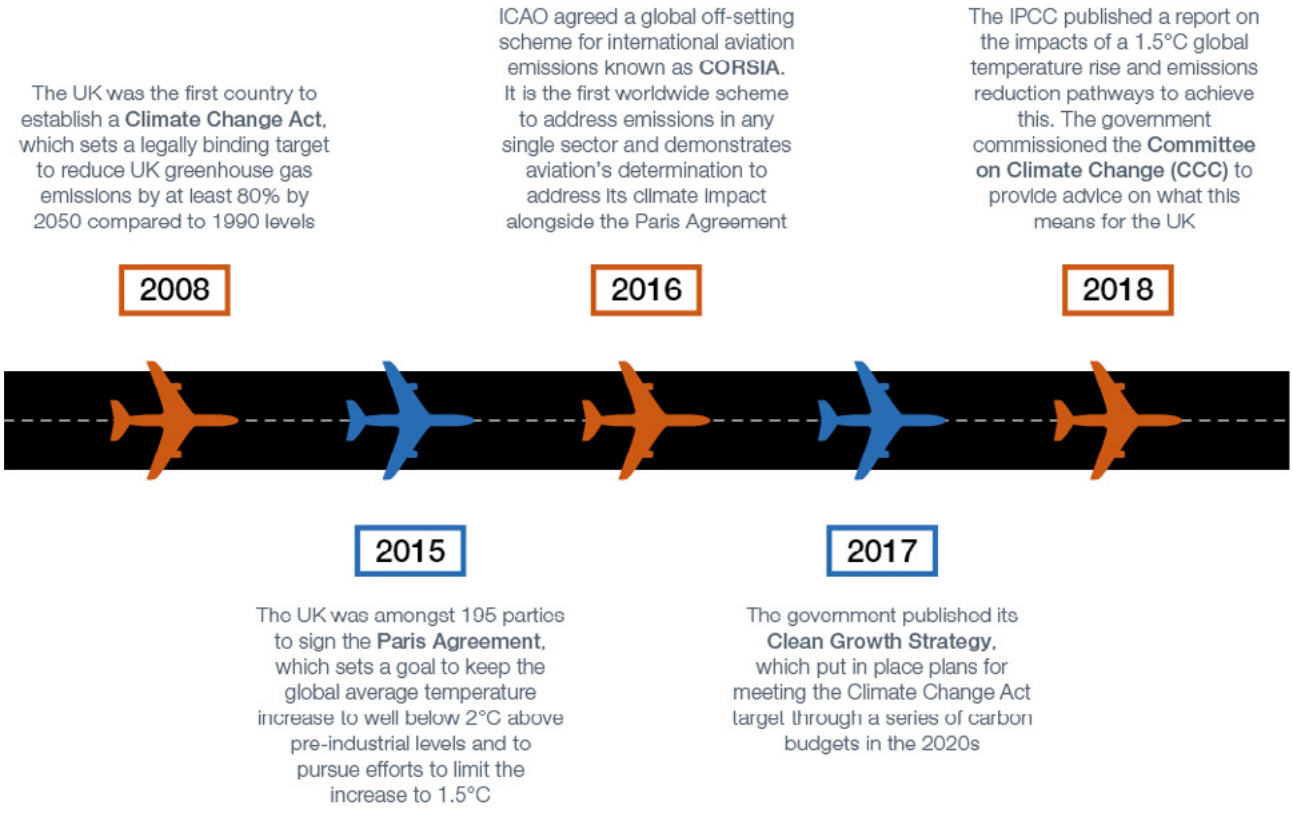


Figure 12 Reducing carbon emissions

3.80 The UK has played a key role in providing international leadership on tackling climate change through its domestic action, climate diplomacy and financial support and is among the most successful countries in the developed world for growing our economy while reducing emissions.[60]

3.81 The government aims to maintain this position as a world leader in aviation, aerospace and climate change policy. It is proposing a long term vision for UK aviation carbon emissions reduction and a pathway to achieve this by 2050. In developing this vision and pathway, the government recognises the following challenges:

- concerted global action requires consensus and takes time to achieve
- unilateral, national level action could put UK airlines at a competitive disadvantage compared to their global competitors and lead to carbon leakage (when emissions are moved elsewhere rather than reducing them), with no environmental gain[61]

60 Department for Business, Energy and Industrial Strategy (2017): The Clean Growth Strategy

61 Carbon leakage occurs when policies to reduce CO_2 emissions in a particular country or geographical area, leads to an increase in other countries or geographical area

- aviation, along with shipping, is a 'harder to reach sector' due to the nature of its assets, operations and likely long term reliance on liquid fossil fuel
- aircraft have a long life span and new technologies can take decades to develop, commercialise and be adopted through fleet development
- some operational and technological improvements have trade-offs with the sector's other environmental impacts, including noise and air quality

A 2050 vision for tackling emissions

3.82 The government is committed to setting a clear and appropriate level of ambition for the sector. In doing so, the government recognises that international action is the first priority for tackling international aviation emissions.

3.83 The government proposes to:

- **negotiate in ICAO (the UN body responsible for tackling international aviation climate emissions) for a long term goal for international aviation that is consistent with the temperature goals of the Paris Agreement, ideally by ICAO's 41st Assembly in 2022**

3.84 The government plans to negotiate for any long term goal to be set and reviewed in light of aviation's full climate impact, taking into account evolving evidence on non-CO_2 effects. In setting a global goal consistent with the Paris Agreement, ICAO should consider whether the IATA goal of a 50% reduction in net aviation emissions by 2050, relative to 2005 levels, is suitable, in light of latest scientific evidence.[62]

3.85 The government recognises that international action takes time, so will also consider appropriate domestic action to support international progress. The UK's trajectory to meeting its Climate Change Act 2050 target is set out in five-yearly carbon budgets that currently exclude emissions from international aviation. However, the Committee on Climate Change (CCC), established by the Climate Change Act as the independent advisory body on climate change, recommends that international aviation should be included by 2050.[63]

3.86 In order to implement the government's long term vision for addressing UK aviation emissions, the government will maintain its current policy not to mandate sector specific emissions reduction targets to ensure reductions are made wherever it is most cost effective across the economy.[64]

3.87 The government agrees with the current CCC advice that international aviation emissions should, for now, continue to be formally excluded from carbon budgets. The government proposes therefore, to continue using the CCC advice and leave 'headroom' for international aviation when setting carbon budgets so that the economy as a whole is

62 IATA: climate change

63 Committee on Climate Change (2009): Meeting the UK aviation target – options for reducing emissions to 2050

64 Department for Business, Energy and Industrial Strategy, (2017): Clean Growth Strategy

on a trajectory to meeting the 2050 Climate Change Act target (including international aviation). To set a clear level of ambition for the sector, the government proposes to:

- **accept the CCC's recommendation that emissions from UK-departing flights should be at or below 2005 levels in 2050**

Pathway to 2050

3.88 The UK has played a leading role in the aviation sector's action to address its impact on climate change and will continue to do so. At the international level, the UK was instrumental in reaching agreement in ICAO, on a global market-based measure for international aviation, known as Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), and the introduction of the first global commercial aircraft CO_2 standard. The government is committed to ensuring that CORSIA is successfully implemented as widely as possible and has volunteered to participate in the scheme from 2021. It proposes to:

- **continue to lead efforts in ICAO to negotiate for robust, environmentally effective emissions reduction measures that minimise market distortions and address the sector's emissions in the most cost-effective way**[65]

3.89 The UK aviation sector currently participates in the EU Emissions Trading System (EU ETS).[66] This 'cap and trade' system requires aircraft operators on routes within the

65 ICAO has defined a basket of measures to address aviation's climate impact, namely technological improvements, operational efficiencies, sustainable alternative fuels and market-based measures.

66 European Commission: Reducing emissions from aviation

European Economic Area to surrender enough allowances to equal the number of tonnes of CO_2 they emitted in the previous year. The government is:

- considering a range of options to manage emissions for these flights, including continuing to participate in the EU ETS after 2020 or a UK approach which is at least as ambitious as the current system

3.90 Domestically, industry continues to make use of operational measures to reduce emissions, such as reduced engine taxiing, reducing cabin weight and continuous ascent and descent together with technological improvements, such as more efficient engines. The government recognises the significance of sustainable fuels. It has introduced policies for and will continue to:

- support the development of sustainable aviation fuel through its inclusion in the Renewable Transport Fuel Obligation (RTFO) and £22 million funding in its Future Fuels for Flight and Freight completion[67]

The UK's first commercial scale waste-to-jet fuel project

A collaboration between the renewable fuels business Velocys, British Airways and Shell is developing the UK's first commercial scale waste-to-renewable jet fuels plant. The plant would convert hundreds of thousands of tonnes of residual waste per year into clean-burning, sustainable aviation fuel.

The jet fuel produced is expected to deliver over 70% greenhouse gas reduction and 90% reduction in particulate matter compared with conventional jet fuel. In June 2018, almost £5 million of funding was committed to deliver the first plant in the UK which included over £0.4 million government funding. The plant could be operational in the next few years and would be the first of many in the UK. It could attract several hundred million pounds of private sector investment and create hundreds of construction and long term skilled jobs.

67 Department for Transport (2017): Future Fuels for Flight and Freight Competition feasibility study

3.91 The aviation industry's investment in technology is primarily driven by the desire for greater fuel efficiency, which is resulting in emissions reductions. While this is embedded in the evolution of the sector, the government continues to provide support through joint investment with industry for research and development of £3.9 billon to 2026.[68] See Chapter 8 for further detail of the government's proposed approach to technology and innovation.

3.92 To gain a better understanding of available carbon abatement measures, the government has commissioned research into which measures are most likely to be viable in the period to 2050 and the possible carbon leakage and market distortion impacts of unilateral policy action. This research will assist in understanding the most cost-effective mix of measures that the government will expect to see industry adopting. The government proposes to monitor progress and will intervene through regulation if insufficient progress is made towards achieving the 2050 vision. The measures the government considers feasible in the next 10 to 15 years are presented in Annex C.

3.93 The government will expect a strengthening of existing good practice and the development and adoption of new technologies and measures from industry to show demonstrable progress to reducing emissions. This will be required to demonstrate that applications for future growth can be taken forward in line with the UK's climate change commitments. If progress is too slow, the government may need to consider further intervention at a later date.

Non-CO_2 emissions

3.94 Aviation also produces non-CO_2 emissions which have climate impacts, including gases and aerosol particles. The government has commissioned scientific advice on these non-CO_2 effects which shows that large scientific uncertainties remain and new effects have been identified. Uncertainties include the scale and impact of these effects and their warming effect relative to CO_2. Challenges include the feasibility of measures designed to mitigate these effects and the calculation of trade-offs with fuel burn.

3.95 The government continues to support work on non-CO_2 emissions, their trade-offs with CO_2 and possible mitigation measures, none of which are yet well enough understood to be able to form policy with confidence that aviation's total climate impact would be reduced. The UK will continue working through ICAO on measures to regulate aircraft non-CO_2 emissions and ICAO is shortly expected to agree the first regulatory standard for aircraft non-volatile particulate (soot) emissions. The government proposes:

- **to keep non CO_2 emissions under review and reassess the UK's policy position as more evidence becomes available**

68 Department for Business, Energy and Industrial Strategy press release: New aerospace technologies to get £365 million funding

3.96 To implement the government's long term vision and pathway for addressing UK aviation's impact on climate change, the government also proposes to:

- **negotiate in ICAO for standards for all engine emissions with climate effects. As scientific understanding improves, the government will expect ICAO to issue best practice guidance on operational mitigations for non-CO_2 effects**
- **consider the use of all feasible abatement options, particularly in-sector measures, to ensure effective action is taken at the national and international level.** This includes policies that may evolve over the long term such as technological developments, operational efficiencies, sustainable fuels, market-based measures, demand management and behavioural change
- **require planning applications for capacity growth to provide a full assessment of emissions, drawing on all feasible, cost-effective measures to limit their climate impact, and demonstrating that their project will not have a material impact on the government's ability to meet its carbon reduction targets**

3.97 The government will review the CCC's revised aviation advice due in spring 2019 (the first advice was published in 2009) and its advice on the implications of the Paris Agreement for the UK's long term emissions reduction targets, due to be published at the same time. Regular reviews thereafter will broadly align with the setting of carbon budgets. The reviews will ensure that government and industry action utilises evolving research and technological advancements and remains aligned to policy developments. The government also proposes to:

- **use CCC's reviews to monitor the sector's progress at the national and international level and to adjust its mix of policy measures and overall approach accordingly**

Sustainable journeys to the airport

3.98 The government's ambition is to put the UK at the forefront of the design and manufacture of zero emission vehicles, and for all new cars and vans to be effectively zero emission by 2040. To achieve this, the government is investing nearly £1.5 billion between April 2015 and March 2021, with grants available for plug-in vehicles and schemes to support charge point infrastructure. Along with the measures in the Road to Zero strategy, published in July 2018, this adds up to one of the most comprehensive support packages in the world for the transition to zero emission vehicles.

3.99 The government's expectation is that airports, through their surface access strategies, set targets for sustainable passenger and staff travel to the airport which meet, where possible, the ambitions set by the government and for these to be monitored by their respective Airport Transport Forums.

3.100 The government's analysis shows that by 2050, although there are expected to be 70% more surface access journeys as a result of increased aviation demand, developments already in the pipeline such as cleaner engine technology, electrification of cars, and

decarbonisation of rail electricity, could keep surface transport carbon emissions at similar levels to today unless airports also deliver more ambitious mode share targets.[69]

3.101 The government expects airports to make the most of their regional influence to provide innovative solutions and incentives against ambitious targets which reduce carbon and congestion and improve air quality.

Managing noise

The impact of aviation noise

3.102 The growth of the aviation sector brings many benefits but the government recognises that disturbance from aircraft noise has negative impacts on the health and quality of life of people living near airports and under flightpaths.[70]

3.103 There have been welcome improvements in aircraft noise performance. In 2016, despite a 13% growth in traffic, 20% fewer people experienced more than 10 daytime aircraft movements above 65 decibels compared to 2006, even though aircraft movement numbers fell only slightly over that period.[71]

3.104 The government commissioned the CAA to produce an analysis of noise at major UK airports. Over the last 30 years there has been a significant reduction in noise exposure around virtually all UK airports. However, a period of sustained growth following the recession of 2009, has meant that noise exposure has grown over the past five years at several airports. The results show that from 2006 to 2016, noise emission and noise area exposure have decreased, although in some cases, the number of people affected by noise has increased due to the growth in population within the noise contours. These forecasts are the most comprehensive ever undertaken in the UK. They show that by 2050, noise emission and noise area exposure are expected to reduce compared to today, even with anticipated growth and a new Northwest runway at Heathrow.

3.105 However, the government recognises that statistics showing past and future improvements in noise do not necessarily match the experience of some people living under flightpaths, for whom the benefits of quieter aircraft can be cancelled out by greater frequency of movements or the effects of concentrated traffic associated with more accurate navigation technology (see paragraph 3.19). The CAA's report also shows that the number of people affected will be higher as a result of population increases.

3.106 There is also evidence that the public is becoming more sensitive to aircraft noise, to a greater extent than noise from other transport sources, and that there are health costs associated from exposure to this noise.[72] The government is considering the recent new environmental noise guidelines for the European region published by the World Health Organisation (WHO).[73] It agrees with the ambition to reduce noise and to minimise

69 Department for Transport (2017): UK aviation forecasts

70 Civil Aviation Authority (2018): Noise Limits

71 Civil Aviation Authority (2018): Noise Limits

72 Civil Aviation Authority (2014): Survey of Noise Attitudes 2014, aircraft

73 Environmental Noise Guidelines for the European Region (2018)

adverse health effects, but it wants policy to be underpinned by the most robust evidence on these effects, including the total cost of action and recent UK specific evidence which the WHO report did not assess.

Current action

3.107 The government is supporting industry to deliver airspace modernisation (discussed above), which has the potential to deliver noise reduction through steeper departure angles, and much reduced use of holding stacks in southern England. More accurate navigation technology will give more choice in flightpath design, which can deliver noise benefits, although it will also mean changes to flightpaths.

3.108 Many people will benefit from this but any change to flightpaths will be challenging to deliver and have negative impacts on some, which is why the government has put in place a new airspace and noise policy to ensure the decision making process is fair and transparent. This includes:

- more transparent assessment of noise across a wider area
- assessment of different options, including multiple routes so that concentrated flightpaths are no longer the default option when designing airspace
- closing an existing loophole which allowed changes to air traffic control procedures which have impacts on noise to proceed without consultation with affected communities or CAA approval[74]

ICCAN

The government has established a new Independent Commission on Civil Aviation Noise. ICCAN will begin its work in January 2019 and will advise the government on best practice on noise mitigation, and how the needs of affected communities can best be served in the airspace modernisation programme. The government has committed to review ICCAN's powers within two years and this will include the possibility of putting it on a statutory footing.

3.109 The CAA has launched a new service which allows people to follow individual airspace change proposals at a postcode level.[75]

3.110 People find night flights the most disturbing and for many years the government has placed restrictions on these flights at Heathrow, Gatwick and Stansted airports. Many other airports have similar restrictions in place which have been agreed locally. The current night flights regime at these three airports expires in October 2022 and the government expects to begin the process to review the rules in the second half of 2019. In the Airports NPS the government has set out its expectation for a ban of six and a half hours on scheduled night flights at an expanded Heathrow.

74 Department for Transport (2017): Consultation Response on UK Airspace Policy: A framework for balanced decisions on the design and use of airspace

75 CAA airspace change portal

3.111 There are already examples of good practice in noise management across the industry:

- Heathrow has been trialling the use of steeper approaches and departures, and publishes a quarterly league table of airlines' environmental performance
- Gatwick has structured its landing charges to incentivise quieter aircraft and encourage the modification of the A320 family of aircraft to fix the so-called whine problem
- Birmingham Airport carried out a trial in 2016 to raise the height of noise preferential routes to reduce the overflight of communities
- London City has introduced new more stringent fines for breaches of noise limits and will be producing an annual league table of airline performance

3.112 The government expects the industry to show continuing commitment to noise reduction and mitigation as part of its contribution to the partnership for sustainable growth. The government has shown that it is committed to this by setting out in the Airports NPS its expectations that the developer put in place a comprehensive mitigations package. The proposals in this consultation are aligned with the principles in the NPS, but the implementation of those document principles must be proportionate to the local situation (recognising that the scale of the noise impacts at Heathrow is much greater than at other airports due to the number of movements and local population density). The picture below shows a noise monitor at Heathrow Airport.

Towards a stronger noise policy framework

3.113 The government sets the high level policy framework on aviation noise and also sets noise controls at Heathrow, Gatwick and Stansted. The current overarching policy, originally set out in the 2013 Aviation Policy Framework, is "to limit and, where possible, reduce the number of people in the UK significantly affected by aircraft noise as part of a policy of sharing benefits of noise reduction with industry in support of sustainable development."[76]

3.114 The government recognises that there has been uncertainty on how this policy should be interpreted, measured and enforced. The government intends to put in place a stronger and clearer framework which addresses the weaknesses in current policy and ensures industry is sufficiently incentivised to reduce noise, or to put mitigation measures in place where reductions are not possible.

3.115 The proposed new measures are:

- **setting a new objective to limit, and where possible, reduce total adverse effects on health and quality of life from aviation noise.** This brings national aviation noise policy in line with airspace policy updated in 2017
- **developing a new national indicator to track the long term performance of the sector in reducing noise.** This could be defined either as a noise quota or a total contour area based on the largest airports
- **routinely setting noise caps as part of planning approvals (for increase in passengers or flights).**[77] The aim is to balance noise and growth and to provide future certainty over noise levels to communities. It is important that caps are subject to periodic review to ensure they remain relevant and continue to strike a fair balance by taking account of actual growth and the introduction of new aircraft technology. It is equally important that there are appropriate compliance mechanisms in case such caps are breached and the government wants to explore mechanisms by which airports could 'pay for' additional growth by means of local compensation as an alternative to the current sanctions available
- **requiring all major airports to set out a plan which commits to future noise reduction, and to review this periodically.** This would only apply to airports which do not have a noise cap approved through the planning system and would provide similar certainty to communities on future noise levels. The government wants to see better noise monitoring and a mechanism to enforce these targets as for noise caps. The noise action planning process could potentially be developed to provide the basis for such reviews, backed up by additional powers as necessary for either central or local government or the CAA

76 Department for Transport (2013): Aviation Policy Framework

77 A noise cap (also known as a noise envelope) is any measure which restricts noise. In its crudest form this could be a simple movement cap, but the government proposes advocating caps which are based on setting maximum noise exposure levels (such as contour area or noise quota). Noise caps should also consider the effect of night flights, given the health costs associated with sleep disturbance. These costs need to balance the benefits of night flights and any restrictions should be proportionate to local circumstances.

3.116 Avoiding people being exposed to aircraft noise in the first place is preferable to taking action through mitigation. The CAA's forecasts show that the number of people exposed to levels of noise with potential health costs will continue to grow despite aircraft noise reducing. However, given the government's priority to provide new homes, it is unrealistic to expect that new homes will not be built in areas affected by aircraft noise to some extent.[78]

3.117 There is clear evidence that a factor in annoyance is the extent to which people expected aircraft noise prior to moving to the area. It is therefore important that people have access to suitable information when making decisions about moving.

3.118 The government is therefore proposing new measures for people moving near to airports:

- **developing tailored guidance for housebuilding in noise sensitive areas near airports**
- **improving flight path information for prospective home buyers so that they can make better informed decisions**

3.119 The government is also:

- **proposing new measures to ensure better noise outcomes from the way aircraft operate, by increasing uptake of best practice operating procedures and improving compliance with mandatory controls:**
  - extend CAA's information duties to allow CAA to require additional information, for example the use of 'low power-low drag' procedures (which delay the lowering of landing gear to reduce noise on approach to an airport)
  - introduce a new power to direct airports to publish information, such as league tables of airline noise performance
  - create minimum standards for noise monitoring around airports
  - define better targeted maximum departure noise limits which incentivise quietest performance across different aircraft types rather than a 'one size fits all' limit
  - require airports to make more use of sanctions available to them for breaches of noise controls, for example when airlines have poor track-keeping performance
  - hold 'coding-house' companies to account for airlines' performance where their programming of flight management systems is a cause of poor track-keeping
  - monitor and enforce the analysis and reporting on noticeable changes to volumes of traffic by flightpath in accordance with future guidance issued by the CAA on transparency and engagement, and consider limiting the extent of these changes

78 Civil Aviation Authority (2018): Noise limits

3.120 There is already reasonable compliance with noise controls at many airports and, in the first instance, the government proposes to seek voluntary compliance with these new measures. ICCAN has been asked to consider compliance and enforcement as a priority work area and in the longer term the government proposes to:

- **look into creating new statutory enforcement powers for ICCAN or CAA if other measures prove insufficient to drive the outcomes it wants**

3.121 The government is also:

- **proposing new measures to improve noise insulation schemes for existing properties, particularly where noise exposure may increase in the short term or to mitigate against sleep disturbance**

3.122 Such schemes, while imposing costs on the industry, are an important element in giving impacted communities a fair deal. The government therefore proposes the following noise insulation measures:

- **to extend the noise insulation policy threshold beyond the current 63dB LAeq 16hr contour to 60dB LAeq 16hr**
- **to require all airports to review the effectiveness of existing schemes. This should include how effective the insulation is and whether other factors (such as ventilation) need to be considered, and also whether levels of contributions are affecting take-up**
- **the government or ICCAN to issue new guidance to airports on best practice for noise insulation schemes, to improve consistency**
- **for airspace changes which lead to significantly increased overflight, to set a new minimum threshold of an increase of 3dB LAeq, which leaves a household in the 54dB LAeq 16hr contour or above as a new eligibility criterion for assistance with noise insulation**

Air quality

3.123 The government recognises that air pollution is the top environmental risk to health in the UK and it remains determined to improve air quality. A cleaner, healthier environment benefits people and the economy. The UK is compliant with ambient air quality legislation for most pollutants, but nitrogen oxides are an exception. Emissions of nitrogen oxides have fallen by almost 27% between 2010 and 2016.[79] However, much work remains to be done which is why the government created the Air Quality Plan to help achieve compliance as swiftly as possible.[80] The draft Clean Air Strategy also sets out the ambition to reduce the harm to health from air pollution by half.[81]

79 Defra (2018): Clean Air Strategy

80 Department for Business, Energy and Industrial Strategy press release: New aerospace technologies to get £365 million funding

81 Sustainable Aviation (2018): UK aviation and air quality

3.124 Pollutants associated with aviation come from airborne aircraft, from 'airside' operations such as taxiing and airside equipment, and from passengers and staff (and other airport users) travelling to and from airports. The latter, referred to as surface access, is the largest source and has the most significant effect on local air quality. Action to tackle such emissions from surface access transport modes is discussed in the section of this document on improving surface access to airports.

Airborne aircraft

3.125 Technological solutions to reduce exhaust emissions exist and airports and airlines are already implementing these in the UK. New aircraft are entering service which emit less, and current aerospace research and technology goals remain ambitious. For example, a Sustainable Aviation report refers to future goals targeting a 90% reduction in emissions of nitrogen oxides from new aircraft by 2050 (compared with 2000).[82] Work is ongoing to introduce sustainable and cleaner fuels which provide further air quality benefits. Sustainable fuels not only reduce lifecycle carbon dioxide emissions but also burn more cleanly with lower sulphur oxide and PM emissions. They can also reduce NOx emissions as they tend to burn at slightly lower temperatures.

Airside operations

3.126 More immediately, airports are introducing cleaner or zero-emission airside equipment to replace diesel versions. Heathrow Airport, for example, has invested £20 million installing fixed electrical ground power and pre-conditioned air at over two-thirds of gates so that aircraft do not need to run their on-board generators, avoiding on-stand aircraft emissions. In addition, more aircraft are now taxiing to and from runways without using all of their engines, reducing both emissions and noise. Manchester Airport has been exploring the feasibility of new electric, specialist equipment for loading and towing aircraft.

82 Sustainable Aviation (2018): UK aviation and air quality

Proposed measures

3.127 The government recognises the need to take further action to ensure aviation's contribution to local air quality issues is properly understood and addressed and is proposing the following measures:

- **improving the monitoring of air pollution, including ultrafine particles (UFP), in order to improve understanding of aviation's impact on local air quality.**[83] This will be achieved by standardising processes for airport air pollution monitoring and communication
- **ensuring comprehensive information on aviation-related air quality issues is made available to better inform interested parties.** This will be achieved through government guidance on the scope and content of airport air quality reports
- **requiring all major airports to develop air quality plans to manage emissions within local air quality targets.** This will be achieved through establishing minimum criteria to be included in the plans
- **validation of air quality monitoring to ensure consistent and robust monitoring standards that enable the identification of long-term trends.** This could be achieved by the government or a third party being given responsibility for overseeing aviation-related air quality monitoring at the national level
- **supporting industry in the development of cleaner fuels to reduce the air quality impacts of aviation fuels.** This will be achieved by international action to develop cleaner fuel standards and reviewing progress towards Renewable Transport Fuel Obligations by 2032

83 Ultrafine particles (UFP) are the smallest group of particles in the atmosphere and comprise a minor component of PM2.5 and PM10. UFPs are believed to contribute to the toxicity of airborne particulate matter but the magnitude of their contribution is currently unclear.

Consultation questions

Consider the policy proposals in this chapter and answer the following either for the chapter as a whole; groups of policies within the chapter and/or individual policies:

1. How could the policy proposals be improved to maximise their impact and effectiveness in addressing the issues that have been identified?
2. How should the proposals described be prioritised, based on their importance and urgency?
3. Are you aware of any relevant additional evidence that should be taken into account?
4. What implementation issues need to be considered and how should these be approached?
5. What burdens, both financial and regulatory, are likely to need to be managed and how might those be addressed?
6. Are there any options or policy approaches that have not been included in this chapter that should be considered for inclusion in the Aviation Strategy?
7 Looking ahead to 2050, are there any other long term challenges which need to be addressed?

The partnership for sustainable growth is a long-term policy framework and will need to be flexible enough to respond to new information, developments and changing circumstances, while providing sufficient long-term confidence for the industry and communities.

8. To what extent does the proposed partnership for sustainable growth balance realising the benefits of aviation with addressing environmental and community impacts?
9. How regularly should reviews of progress in implementing the partnership for sustainable growth take place and are there any specific triggers (for example, new information or technological development) that should be taken into account?

Support regional growth and connectivity

4. Support regional growth and connectivity

Airports are vital for local economies, providing domestic and global connectivity, employment opportunities, and a hub for local transport. The government wants to maximise these benefits through markets that operate for consumers and local communities. It wants to support airports that deliver the connectivity regions need, an industry that provides high quality training and employment opportunities to all, and a freight sector unburdened by unnecessary barriers.

Introduction

4.1 Airports can directly support thousands of jobs and generate economic benefits beyond the airport fence. Core and specialist aviation services, freight companies, logistics hubs and aerospace investment are often located close to airports, creating jobs in the local area. Regional airports also act as wider magnets attracting non-aviation businesses due to the air connections the airport offers but also the strong road and rail access links that support the airport. They act as a gateway to international opportunities for the regions of the UK.

4.2 The government recognises the importance of rebalancing the UK economy through the economic growth of the regions and ensuring that the UK remains competitive after we leave the EU. Through the Industrial Strategy, the government has set out its ambition to create a geographically-balanced economy that works for everyone.[84] This will be supported by local enterprise partnerships, mayoral combined authorities, the Northern Powerhouse, the Midlands Engine and the devolved administrations.

4.3 The government has also confirmed that it is supportive of airports beyond Heathrow making best use of their existing runways, subject to proposals being assessed in light of environmental and economic impacts.[85]

4.4 Airports have a crucial role to play in their regions. They are hubs for growth within and beyond the region in which they are situated. Local airports, such as Newquay, Norwich and Prestwick serve their immediate catchment area, offering domestic and short-haul destinations. Regional airports, such as Bristol, Belfast International, Newcastle and Glasgow, serve larger catchments and offer extensive short-haul network and some key long-haul routes, providing their regions with access to global markets. National airports, to which passengers are willing to travel further, offer an extensive range of short and long-haul destinations.

84 Department for Business, Energy and Industrial Strategy (2018): Industrial Strategy

85 Department for Transport (2018): Airports National Policy Statement

4.5 The UK is served by a number of national airports that have influence well beyond their local catchment area, such as Edinburgh and Manchester. These airports are offering an increasing number of direct long-haul flights which can benefit a wide geographic area through more choice for passengers and encouraging more exports.

Manchester Airport directly provided around 23,000 jobs and £1.4 billion to the North West economy in 2016, with more than 500 destination cities served, directly or indirectly, on at least a weekly basis. It is the only airport outside of the South East with direct flights to Singapore, Washington and Mumbai.[86] The introduction of long-haul flights can have significant benefits to the surrounding region. Evidence commissioned by the Greater Manchester Combined Authority estimates that the introduction of the Manchester to Beijing service in 2016 has increased export values from Manchester Airport to China to £1.29 billion, with 115 jobs also created through 11 inward investment projects from China, and a 38% increase in inbound tourism.[87]

Regional connectivity

4.6 The UK aviation market operates predominately in the private sector. Airports invest in their infrastructure to attract passengers and airlines, while airlines are well placed to deliver services to their customers by responding to demand for different routes.

4.7 A study on regional air connectivity has demonstrated that domestic and international air connectivity is strong across the UK. Analysis showed that 97% of the population of the UK is within two hours of an airport offering a direct connection to one or more major destinations on a daily basis.[88]

4.8 Heathrow Airport acts as an important hub for regional airports to facilitate connections onto long-haul destinations. However, there has been a fall in domestic air connectivity into Heathrow in recent years due to the lack of capacity, with more profitable routes squeezing out domestic connections.[89] This has partly been offset by improvements in rail and road connectivity throughout the UK and increased direct connectivity from regions to overseas destinations, including foreign hub airports.

4.9 The government recognises the value of domestic air connectivity and an expanded Heathrow will provide an unprecedented opportunity to strengthen and develop these links, enabling all UK regions to develop new business, tourism and cultural links across the globe.[90]

86 Greater Manchester Combined Authority (2018): a strategic economic asset for Greater Manchester

87 The Manchester China Forum (2018): The China Dividend Two Years In

88 York Aviation (2018): Regional Connectivity Review

89 Department for Transport analysis of Civil Aviation Authority: Airport Data

90 Heathrow Airport Limited (2018)

4.10 It is important that government intervention is driven by evidence to ensure market distortion is kept to a minimum as supporting regional air routes can have unintended negative effects on the market as a whole. These include distorting competition between airports which are close together or subsidised routes replacing commercially viable routes. Moreover, it is important that road and rail links throughout the UK are properly accounted for in any assessment of total domestic connectivity. Air connectivity is just one facet of the overall connectivity package on offer, and should act as a supplement to, instead of a substitute for, other modes.

4.11 The Airports NPS requires Heathrow to demonstrate it has worked constructively with airlines to protect and strengthen existing domestic routes and to develop new domestic connections currently unserved, to ensure 14 UK airports have links to an expanded Heathrow.[91] The government anticipates that around 15% of additional capacity will be used to serve domestic connections.

4.12 To help deliver this, Heathrow has announced a 50% increase in the discount for domestic passengers and has committed to a £10 million Route Development Fund to support the introduction of new routes.[92] Alongside the large increase in slots that expansion will deliver, these measures will create the commercial opportunities for airlines to provide enhanced domestic connectivity.

4.13 Airlines have responded positively to these commitments, and both easyJet and Flybe have published indicative routes that they would expect to serve from an expanded Heathrow.

4.14 If new capacity coupled with the commercial incentives offered by Heathrow do not deliver on these expectations, then the government proposes to consider ring-fencing slots at appropriate times of day, and where appropriate, support routes through Public Service Obligations (PSO).

Ring-fencing slots

4.15 The expansion of Heathrow is arguably a special case as it will be the first time a significant number of new slots become available at a severely constrained UK airport. Chapter 3 makes the case for change in the allocation process for slots and sets an objective to improve domestic connections where there is large scale airport expansion, such as the new runway at Heathrow. To achieve this, the government is seeking views on:

- **providing guidance to the independent slot coordinator, ACL, on how allocation of this limited pool should be handled.** This could include priority for new routes over existing routes, relative improvements in capacity, load factors, or lower fares
- **ring-fencing suitable time slots to ensure that at least 14 UK airports can have routes to an expanded Heathrow**

91 Department for Transport (2018): Airports National Policy Statement, new runway capacity and infrastructure at airports in the South East of England

92 Heathrow Airport Limited (2018) press release: Heathrow offers bigger discount for UK fliers

Public service obligations (PSOs)

4.16 There can be both economic and social reasons for the government to support regional air connectivity. In some cases a regional air route may be the only viable way for a community to access the wider country, such as those connecting the islands of Scotland with the mainland. The government proposes to:

- **continue to provide policy support for lifeline services that connect regions**

4.17 Existing government interventions in regional air connectivity, primarily through PSOs, have had mixed results. By and large the cases put to the government have been poor value for money – the fact that no airline is willing to run the route implies that demand is low and therefore conventional economic benefits are minimal. New research has found limited evidence for wider economic impacts improving the value for money of PSOs under the current appraisal framework.[93] The exception is where capacity constraints at hub airports lead to an inability for commercially viable domestic services to expand to meet demand. There is a stronger case for the government to intervene in such cases. Enhancing an existing domestic route into a hub airport or fostering new routes can improve productivity across the UK, contributing to a rebalancing of the economy.

4.18 The government believes that reserving slots at appropriate times at Heathrow will secure hub connectivity for the UK's nations and regions for the long term. This will deliver economic benefits across the country, without the distortionary effects of PSOs.

4.19 However, to ensure that there is a complementary policy to support the government's overall objectives until a new runway at Heathrow is delivered, the government proposes that it should update its current interpretation of the EU regulations to:

- **continue to support PSOs to London for routes vital for social or economic development that are in danger of being lost, but that funding contributions should increasingly be provided locally**
- **expand the scope of PSOs to support routes into airports, such as Manchester or Edinburgh, where this is justified through evidence of onward connectivity benefits that open up long-haul opportunities for international trade and tourism. These will be assessed on an 'airport to airport' basis, with a preference for routes without a government funding requirement**

93 Peak Economics (2018): Wider Economic Impacts of Regional Air Connectivity

The UK government supports three PSO air routes to London that would have been lost without direct financial support. The first two were established in 2014 and supported air routes from Dundee to Stansted and Newquay to Gatwick. On the latter, DfT has recently agreed a four year extension and to move the route to Heathrow from April 2019. This will give passengers a choice of more than 200 destinations across 85 countries.

The third was established in 2017 to support two daily return flights between City of Derry Airport in Northern Ireland and Stansted. Thus allowing, for the first time in a number of years, daily return trips to be made from Londonderry to the capital.

Without the government's financial support, all three routes would have been unable to operate financially and would therefore reduce the connectivity to these regions, which is needed for local growth.

4.20 Once Heathrow is expanded, if ring-fencing slots and the commercial incentives offered by Heathrow do not support at least fourteen domestic routes, the government proposes to:

- **consider imposing PSOs into Heathrow where this is justified through evidence of onward connectivity benefits. These will be assessed on an 'airport to airport' basis**

4.21 The government expects that significant direct financial support for PSOs into Heathrow following expansion is unlikely to be required, due to the commercial incentives in place for airlines to run routes into the UK's primary hub airport.

4.22 One of the key challenges of the current PSO process is that it does not include a robust, transparent methodology for assessing applications including incorporating the non-monetised impacts of PSOs, such as the strategic benefits of these routes and unintended impacts on the rest of the transport network. As a consequence the government is:

- **proposing a new two-stage process for assessing applications in order to improve transparency and effectiveness**

4.23 In the first stage, applications will be judged against a number of pre-requisite criteria, designed to assess their compliance with regulatory requirements set out in Article 16 of Regulation (EC) No 1008/2008. Passing all of these criteria will move the application to stage 2.

4.24 Stage 2 will then assess the application against a range of criteria, set out at Annex D, enabling the government to make more nuanced assessments on a case-by-case basis. This could include consideration of proposals that do not require government funding, and a thorough examination of cross-model alternatives to the proposed air route. Stage two will not be judged on a pass/fail basis but will instead inform the strategic case to support the traditional economic appraisal. A review and evaluation process, to monitor benefits realisation and value for money considerations, will also be introduced.

Start-up aid

4.25 The government is considering how the previous round of 'start up aid' has performed. Start-up aid was aimed to help address market failure by providing a limited, time-bound subsidy for routes that appear to have commercial opportunity but are not viable under current conditions. This has some benefits compared to PSOs, with a short-term financial boost providing the market with information it needs on route characteristics, and builds up passenger demand to a commercially sustainable level.

4.26 An internal review of the previous start-up aid scheme found limited success. The government considers that greater success could have been achieved from a different application and assessment process. Therefore, while the government is unwilling to commit further funding support for Start-up aid at this stage, it would welcome views on how both the process and assessment could be improved, to maximise the successful outcomes.

Air Passenger Duty (APD)

4.27 The government recognises that the aviation industry has expressed concerns about the impact of APD on the commercial viability of some flights within the UK, particularly for airports outside the South East of England. However, passenger growth at UK airports across the regions is strong, with total terminal passenger numbers handled by UK airports increasing by 35% between 2010 and 2017.[94]

4.28 In line with ICAO rules, the UK does not tax fuel used for international or domestic flights and no VAT is imposed on ticket prices. Without APD, aviation would be relatively under-taxed compared to other sectors, with a £3.4 billion loss to the public purse.[95]

4.29 APD is the policy responsibility of HM Treasury and, like all taxes, it remains under review. The government is establishing a technical working group to consider the practical and legal challenges to changing short-haul APD in Northern Ireland but there are no plans to formally consult wider on APD.

4.30 The economic competitiveness of the UK's regions and nations remains a priority for the government, which recognises the benefits which new air routes can bring, both in terms of better connecting UK regions to each other and providing connections to the rest of the world.

4.31 Industry is welcome to submit evidence which shows the impact APD may have, for example on international competitiveness or route economics, as part of this green paper consultation.

94 Department for Transport analysis of Civil Aviation Authority: Airport Data

95 Office for National Statistics: Central government receipts – air passenger duty 2017

Regional transport hubs

4.32 Increasingly airports are becoming regional transport hubs which support multiple businesses, labour markets, and population centres. Their development needs to be planned in that context and included in relevant regional, spatial, and economic development strategies.

4.33 The government already recognises the economic benefits that airports can have on the local area with both Manchester and Luton Airports, and Newquay Aerohub being designated Enterprise Zones, to act as catalysts to encourage economic growth and development in the region.

4.34 Existing government policy states that airports are recommended to produce and keep updated master plans and airport surface access strategies.[96] Airports with more than 1,000 passenger air transport movements a year are also advised to hold airport transport forums (ATFs) which develop and oversee implementation of plans for future surface transport provision.

4.35 Over half of airport surface access strategies have not been updated in the last five years, and government does not currently have a role in monitoring or enforcing the appropriateness, effectiveness, or environmental impact of airports' plans through ATFs. The industry's view is that ATFs do not have the authority to hold airports to account.

96 Department for Transport: Aviation Policy Framework 2013

4.36 The call for evidence and subsequent industry engagement has highlighted:

- that airports are 'unique' multi-modal transport hubs and should be recognised and treated as such. The government and local bodies should take a more active role in their development and exploiting the benefits they can deliver
- the need for a more structured approach to the planning of surface transport provision to airports as both national and local decision making processes are currently seen to be fragmented, complex, and poorly understood
- public transport operating hours may not be synchronised with airport operating hours. This can create difficulties in attracting and retaining staff and providing passengers with a range of transport options
- a perception that surface transport providers and operators are, generally, not fully aware of airport needs and do not respond as effectively as they could. There is a need for a more visible and cohesive approach

4.37 To meet these challenges the government is proposing a number of measures:

- **formalise the position of ATFs, setting a requirement for membership to include relevant local and national transport providers, and a duty to co-operate with local government in the development of surface access strategies.** These strategies should enable the ATFs to contribute to the delivery and monitoring of the mode share and environmental targets contained within them. In addition, emerging innovative transport service providers should be actively encouraged to participate
- **update the 2013 Aviation Policy Framework Guidance to help airports in completing surface access strategies and master plans, by providing consistency in requirements and structures that align with future regional and national transport strategies.** There would also be a requirement to reflect the international gateway and transport hub role of an airport
- **work with our transport service providers to assist ATFs in understanding and working within existing surface transport planning processes and develop an associated manual in partnership with the Airport Operators Association (AOA).** This will include setting out clearly the relevant infrastructure investment and franchise timetables, to ensure that aviation stakeholders are clear when, and with whom, they need to engage. This will help to ensure their views are considered by the government, Network Rail and Highways England when decisions are made. The manual would be held by DfT and updated annually

4.38 Airports are also in a unique position to be integrated transport information and ticketing hubs, developing online, app and face to face facilities that integrate information and ticketing processes for passengers. Integrated ticketing can refer to a ticket for the whole journey or encompass multiple tickets.

4.39 As part of its terminal development project, Luton Airport is developing a 'travel hub' as part of its arrivals area where passengers can easily be assisted by surface transport providers to make the best choices for their onward journeys. Manchester Airport are planning a similar approach to their Ground Transport Interchange.

4.40 The government encourages airports to lead in the development of integrating service offerings with surface transport providers – with regular engagement forming part of the remit of ATFs, and consideration of ticketing solutions included as part of their surface access strategies.

Funding

4.41 Funding of airport surface transport investment decisions should be taken on a case-by-case basis as they can impact on an airport's competitive position by giving the airport an unfair advantage over its nearby competitors, such as through the reduction of journey times or increased catchment areas. The government needs to ensure decisions are undertaken in a proportionate manner and include State Aid implications, while recognising the potential to exploit the benefits of such investments and the improvements they have to offer.

4.42 The government's current policy position, set out in the 2013 APF, is that 'the provision and funding of surface access infrastructure and services to airports is primarily the responsibility of the airport operator but where there are significant non-airport user benefits from changes and enhancements to the infrastructure and services government would consider making a funding contribution to reflect these'.

4.43 The government's view is that there is no clear evidence it should change this position. However, it will continue to review and update the current appraisal methodology to enable ongoing assessment of the validity of its funding policy, for instance in taking into account shared strategic benefits, such as onward connectivity.

4.44 Through the current Roads Investment Strategy (RIS) the government has already committed to improving road access to several airports. Going forward, RIS will review the boundaries of the strategic road network, with the intention of providing a consistent regime. Other infrastructure programmes such as the Transforming Cities Fund will also play an important part. Similarly, rail market-led proposals, as set out in the Department's new guidance, provides an opportunity for schemes not necessarily identified by the government to be progressed by third parties.[97] This may provide opportunities for airports to invest more flexibly in their infrastructure and improve services. The market-led proposals guidance should be read in conjunction with the Rail Network Enhancements Pipeline[98] (RNEP), which sets out the department's new approach to rail enhancements.

97 Department for Transport (2018): Rail market-led proposals

98 Department for Transport (2018): Rail Network Enhancements Pipeline

Supporting freight

4.45 Air freight is a major part of aviation. It connects UK exporters to new markets across the world, and benefits consumers who increasingly have access to a range of globally sourced goods which can be delivered within days of ordering. Air freight facilitates trade that otherwise may not be viable, for example for goods with a short shelf life.

4.46 Air freight and those businesses that support it deliver over 46,000 jobs and contributes over £1.4 billion to the UK economy. The UK ships a greater proportion of its extra-EU exports by air than most other European economies.[99]

4.47 The three main airports for handling air freight in the UK are Heathrow, East Midlands and Stansted. Collectively they account for around 85% of the total amount of freight handled at UK airports.[100] The benefits of air freight to the UK, however, are not restricted solely to the areas around those airports. It has a catalytic effect on the UK economy – for example, it has been estimated that 8.6% of the gross value added (GVA) of the Welsh economy is dependent on air freight, despite Wales having no major air freight traffic at its airports.[101]

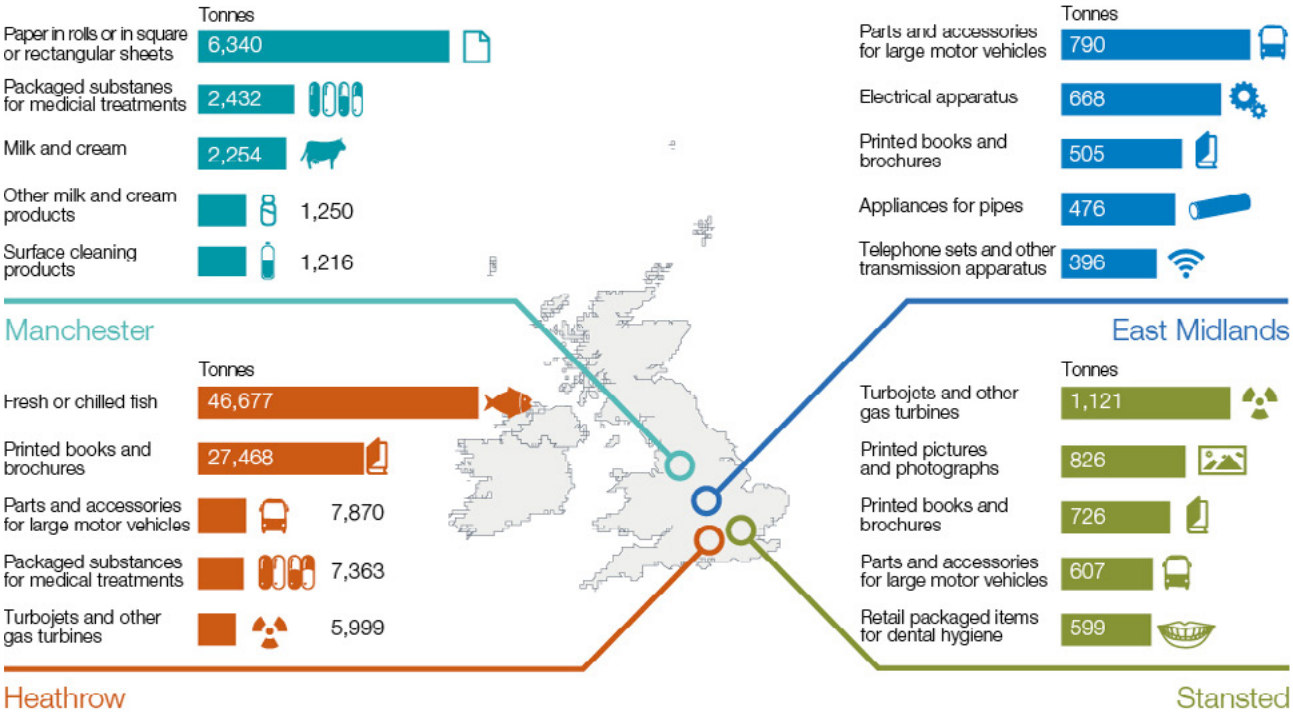


Figure 13 Tonnage of non-EU exports at Heathrow, East Midlands, Stansted and Manchester, 2017
Source: HMRC: Overseas Trade Data (2017)

99 Airlines UK (2018): Assessment of the value of air freight services to the UK economy

100 Department for Transport analysis of Civil Aviation Authority: Airport Data 2017

101 Airlines UK (2018): Assessment of the value of air freight services to the UK economy

4.48 The government recognises the importance of night flights to the air freight industry particularly for the express freight market which allows UK consumers to receive products from around the world in ever shorter timescales. For example, around 50% of freight at East Midlands Airport arrives before 7.00am.[102] Industry can support growth within existing night noise limits by using quieter and more environmentally friendly cargo aircraft and the government encourages their early adoption wherever possible.

4.49 The government supports continued growth of the air freight sector particularly making best use of existing capacity at airports, to continue to facilitate global trade for UK businesses and consumers. It has already taken action by supporting the Northwest Runway scheme at Heathrow, which has been estimated to nearly double the capacity for freight at the airport to 3 million tonnes per year.[103]

4.50 Since the call for evidence, the government has worked with the industry to examine the potential barriers to the air freight industry and how it can help reduce them. This work will continue; the government is committed to removing or reducing any unnecessary barriers to air freight and the global trade that it supports, including in non-aviation areas of policy.

One area where the government is already working to remove barriers to trade is in supporting increased digitisation of the air freight sector. Working alongside industry, it has set up the Digital Cargo UK board to facilitate work to improve the digitisation of the sector, for example with increased uptake of electronic Air Way Bills (eAWB); the documents that cover the carriage of cargo from origin airport to destination airport.

The government aims to promote digitisation as a more efficient and effective way to do business and to remove barriers that are preventing more widespread use of eAWBs in the UK.

102 Department for Transport analysis of Civil Aviation Authority: Airport Data 2017

103 Heathrow Airport Limited (2016): Heathrow's Cargo Strategy

Regional employment, training and skills

4.51 The UK is able to maintain its global presence and competitiveness by having a strong workforce and demonstrating an ongoing commitment to investing in home-grown talent and skills. The UK aviation industry is estimated to directly provide over 230,000 jobs with many more supported indirectly, in every region across the country.[104]

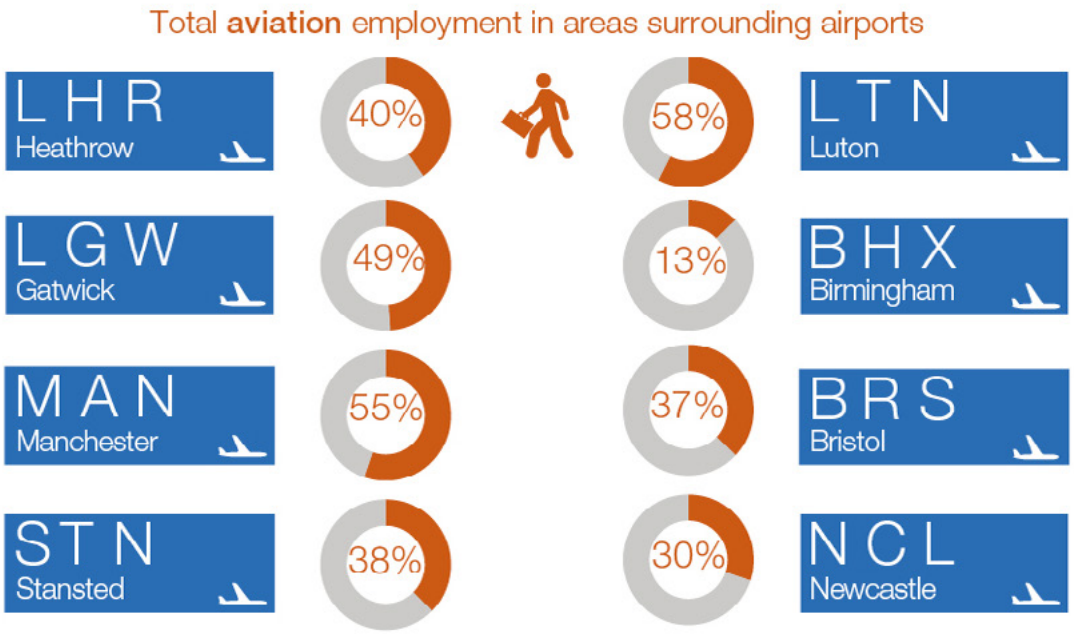


Figure 14 Aviation sector employment in the regions[105]
Source: Independent Transport Commission (2017): The strategic challenges facing UK aviation

4.52 The government wants to ensure that the industry continues to deliver a world class, safe, secure and sustainable aviation industry that meets the needs of consumers. In part this means working with the industry to ensure that it has at its disposal a ready supply of talent to meet both current demand and future need.

Workforce challenges

4.53 The 2018 Boeing Pilot and Technician Outlook forecast that globally an additional 790,000 civil aviation pilots, 754,000 maintenance technicians and 890,000 cabin crew will be needed over the next 20 years.[106] The forecast includes the commercial aviation, business aviation and civil helicopter industries. Airbus has separately estimated a global need for 540,000 new pilots in the next 20 years.[107]

104 Department for Transport analysis of Office for National Statistics: Annual Business Survey (2017)

105 Analysis based on the Middle Super Output Area (MSOA) in which the airport is based

106 Boeing (2018): Pilot, Technician and Cabin Crew Outlook

107 Airbus: Global Services Forecast

4.54 The aviation industry in the UK will need to address a number of challenges in the years ahead to ensure that it has the skills it needs to succeed. These include:

- continuing to address the current science, technology, engineering and mathematics (STEM) skills shortage
- keeping pace with technological developments and the changing nature of aviation jobs
- an ageing workforce and inspiring the next generation of young people to consider careers in aviation
- realising aviation's potential to deliver social mobility, including through maximising the benefits of apprenticeships
- improving diversity and inclusion in the industry

4.55 A stronger, and sustained, focus on attracting currently underrepresented groups to seek employment in aviation is likely to be a key component of addressing these challenges.

STEM shortages

4.56 Addressing STEM shortages is a key part of the government's policy agenda. The government has two initiatives to tackle this:

- the Industrial Strategy, which is aimed at boosting productivity by backing businesses to create good jobs and increase the earning power of people throughout the UK with investment in skills, industries and infrastructure. There are five key strands to this strategy, one of which is centred on people, ensuring good jobs and greater earning power for all. The government is investing an additional £406 million in education and skills, including boosting spending on maths, digital and technical education to ensure the continued growth of the STEM skills pipeline[108]
- the Aerospace Sector Deal, which provides a unique opportunity for the government and industry to work together to deliver a skills agenda that equips the aerospace sector to meet the challenges and opportunities of the future

4.57 The Aerospace Growth Partnership Skills Working Group, comprising the government and the industry representatives, is currently undertaking work to review skills in the aerospace sector. This is looking at current and future STEM skill gaps, which impact the aviation and aerospace sectors. The government proposes to:

- **work with the Aviation Industry Skills Board to create a careers map for the aviation industry.** It will explore how the current skills gaps will evolve over time, and where the industry sees future demand

108 Department for Business, Energy and Industrial Strategy (2018): Industrial Strategy

New technology and the changing nature of aviation jobs

4.58 New and emerging technologies are likely to have a significant impact on the jobs available in aviation. New employment opportunities are likely to be created but current jobs may be replaced or become obsolete with the adoption of new technologies. It is essential that the industry understands how these are likely to affect it as an employer and, in turn, how it delivers for its customers.

4.59 To support the workforce in adapting to advances in technology, the government, led by the Department for Education, has committed to a new adult digital skills entitlement to full funding for basic digital courses from 2020. This will provide adults the opportunity to undertake improved digital courses, based on new national standards, free of charge.

4.60 The government has also committed to a new National Retraining Scheme which will help people re-skill and up-skill as the economy changes, including as a result of automation. While this scheme is developed, the government is also funding additional projects including £30 million to test the use of Artificial Intelligence (AI) and innovative educational technology (Edtech), as well as providing £34 million for construction skills funding.

Increasing the diversity of the workforce

4.61 The aviation industry has a significant opportunity to address its future skills needs by increasing the diversity of its workforce to deliver a greater potential pool of employees now and in the future. In particular, the industry needs to increase the diversity of the workforce in terms of age, socio-economic background, gender, people from minority groups and disabled employees.

Inspiring the next generation

4.62 A further workforce challenge for the future is the ageing workforce. Of those pilots who hold an EASA Air Transport Pilot Licence (ATPL), 20% are found to be over the age of 55 and 55% are over the age of 45. Similarly for aerospace, 24% of the workforce is over 55, with 53% over 45.[109] These figures highlight the importance of engaging the next generation of aviation workers.

109 Department for Transport analysis of Office for National Statistics: Annual Population Survey 2017. Based on the following Standard Industrial Classification (SIC) codes: Manufacture of aircraft and spacecraft and related machinery (SIC 30.3), Repair and maintenance of aircraft and spacecraft (SIC 33.16)

4.63 The aviation industry is already leading the way in using innovative methods to train, recruit and retain a resilient labour force.[110] It has many good examples of providing training and employment opportunities for local communities, for instance:

- Manchester Airport Group's academies help people into work at the airport, by providing support and work experience for those who have been out of work for a long time or want to switch sectors, as well as offering specific programmes for people with learning difficulties
- London Stansted and East Midlands have developed aerozones where they demonstrate options for a viable, long term career in aviation to local school children and young adults
- the creation of Stansted Airport College and the International Aviation Academy in Norwich has increased opportunities for young people to pursue a career in aviation, with apprenticeships and training opportunities on offer
- Craven College's Aviation School, based at Leeds Bradford Airport, offers aviation-specific apprenticeships and degree courses to support the growth of aviation skills in the region. Those newly skilled people are then available to fill a range of jobs in aviation, including airline customer service managers, ground operations managers and pilots. In 2016 the college was recognised as a Swissport (the global airline service company) Academy, which further enhanced the standard of teaching provided and opportunities available to help young people take their first step towards a career in aviation.

110 Department for Transport analysis of Civil Aviation Authority: Flight Crew Licence Age Profiles 2016

RAF Managed Path scheme

The Royal Air Force (RAF) has recently opened a scheme with British Airways (BA) called Managed Path, which streamlines the process for RAF Multi engine pilots transferring into commercial piloting. It seeks to agree a point in RAF careers where BA will facilitate a transfer for those wishing to leave. This provides a source of well-qualified pilots for BA and promotes retention to a certain critical point in the RAF, which means the RAF achieves a good return on its training costs. The programme seeks to provide further career opportunities to those approaching the end of their RAF careers.

Socio economic background

4.64 The government is committed to tackling the social mobility barriers which may be preventing people from entering aviation as employees. A 2018 Organisation for Economic Co-operation and Development (OECD) report revealed that students from lower socio economic backgrounds in the UK are almost three years behind their peers academically.[111] The industry, supported by the government, needs to take action to ensure that opportunities in aviation are open to everyone, irrespective of socio economic status or background.

Apprenticeships

4.65 One way of achieving this, and encouraging young people into STEM subjects, is through the development of new English apprenticeships, work-based training programmes that lead to nationally recognised qualifications. The government introduced the Apprenticeship Levy in April 2017 - employers with an annual wage bill over £3 million a year must contribute 0.5 per cent of their payroll towards the levy and receive an allowance of £15,000 to offset against their levy payment. The levy provided the impetus for the aviation industry to work together to develop apprenticeship standards which qualify for levy funding.

4.66 The Institute for Apprenticeships (IfA) and industry have worked in collaboration to develop a pilot apprenticeship standard. The standard has been approved and is awaiting the final funding band recommendation.

4.67 It can cost up to £120,000 to train a pilot, but the maximum an employer can contribute to the cost of training an apprentice via levy funding is £27,000. The disparity between the cost and the government contribution means that airlines can be discouraged from recruiting apprentices.

4.68 The government has announced a package of reforms to ensure the Apprenticeship Levy continues to provide people with the skills they need to succeed. These reforms mean that from April 2019 businesses paying the levy will be able to transfer up to 25% (up from 10%) of their levy payments each year to other employers (including smaller employers in their supply chain) to support specific apprenticeships. Reforms also include an extra £90 million of government funding to reduce the contributions that non-levy paying employers make, from 10% to 5% of the cost, and a further £5 million for the IfA to introduce new standards and updating existing ones. The government will

111 OECD (2018): Equity in Education

be seeking views from employers on the operation of the levy after 2020 to ensure it supports the development and growth of the skilled workforce.

4.69 The government wants to encourage the aviation industry to increase the number of apprenticeships and ensure training opportunities within the industry are widely available. This is particularly important in relation to commercial piloting as the industry has highlighted the high cost of training as a barrier to entry.

4.70 The IfA and the aviation industry trailblazer group have worked together to create an array of apprenticeships standards for a range of low, medium and high skill jobs, including ground operatives, operation managers and cabin crew.

4.71 The reforms of the levy discussed above may provide further support for First Officer-Pilot and Air Traffic Controller apprenticeship standards. The standards for these apprenticeships have been approved, but the end-point assessments are still being developed. The IfA will make a final funding band recommendation when the end-point assessment plans are agreed.

4.72 The government is:

- encouraging the industry to continue to contribute to the creation of current and future aviation standards, as part of the trailblazer group process

The government welcomes Heathrow Airport Limited's commitment to providing an additional 5,000 apprenticeships when the airport is expanded, doubling the current number of apprenticeships to 10,000 and increasing opportunities for the UK. The Heathrow Employment and Skills Academy designs and delivers tailored programmes to provide opportunities for development, enabling individuals to perform to their full potential.

Pilot training

4.73 The industry has raised concerns about the high cost of pilot training as a potential barrier for new entrants wishing to become commercial pilots. It can cost up to £120,000 to gain a commercial pilot license. Unless an individual is successful in securing a full scholarship, this cost needs to be self-funded. A 2015 survey found that for over half of trainees, the cost of training would exceed £100,000 but only 12% had any kind of sponsorship, 45% had taken out a loan and 42% were aided by their parents.[112]

4.74 The industry is of the view that more needs to be done to drive down the cost of pilot training and increase mobility within the industry and it identified three possible funding options for reducing the cost of pilot training:

- Higher Education student support, which is not available for the practical elements of pilot training
- a tri-payment arrangement whereby the levy, the employer (separate from the levy) and the individual contribute to the cost of training
- a relief on the VAT charge

112 BALPA in house survey of cadets, conducted in 2015

4.75 The provision of Higher Education student support is governed by legislation. In accordance with the Education (Student Support) Regulations, eligible students can apply for student loans for the academic elements of designated degree programmes for pilot training. This does not extend to the practical elements of gaining a pilot licence. However, students may be eligible to apply for a maintenance loan to contribute towards their living costs while at University. There are some higher education providers in the UK, such as Brunel University and Buckinghamshire New University, which offer a range of degrees linked to the aviation industry, including commercial piloting. The creation of aviation colleges and university degree programmes are a positive step forward in supporting the next generation of commercial pilots.

4.76 Current government policy prohibits tri-payment arrangements whereby apprentices contribute to the cost of their training. This policy of not allowing the costs of pilot training and assessment to be passed on to apprentices is intended to protect them and ensure that employers meet their responsibilities. Employers who pay the levy can already use the funds in their account to fund training on any apprenticeship standard. More generally employers who do not pay the levy can access government funding to support their training.

4.77 If the government were to consider VAT relief, the industry would need to provide viable industry-led solutions that would work in conjunction with that relief, to further reduce the cost of training to an attainable level. In addition, any VAT exemption for pilot training would need to be implemented alongside a suitable regulatory framework for providers in order to comply with existing VAT rules for education and training. It is important to highlight that a VAT exemption for flight training could result in increased input VAT costs for training providers, potentially increasing the overall cost of provision. Careful modelling would be required in order to understand the impact on trainees, providers and airlines.

4.78 **The government would like suggestions for possible industry-led initiatives which would help drive down the cost of pilot training to an attainable level. This could be in conjunction with a VAT exemption for flight training if a suitable regulatory framework were in place for providers.**

Gender

4.79 In 2017, only 6% of pilots and co-pilots employed by UK airlines worldwide were female.[113]

113 Department for Transport analysis of Civil Aviation Authority: Airline personnel UK and overseas 2017

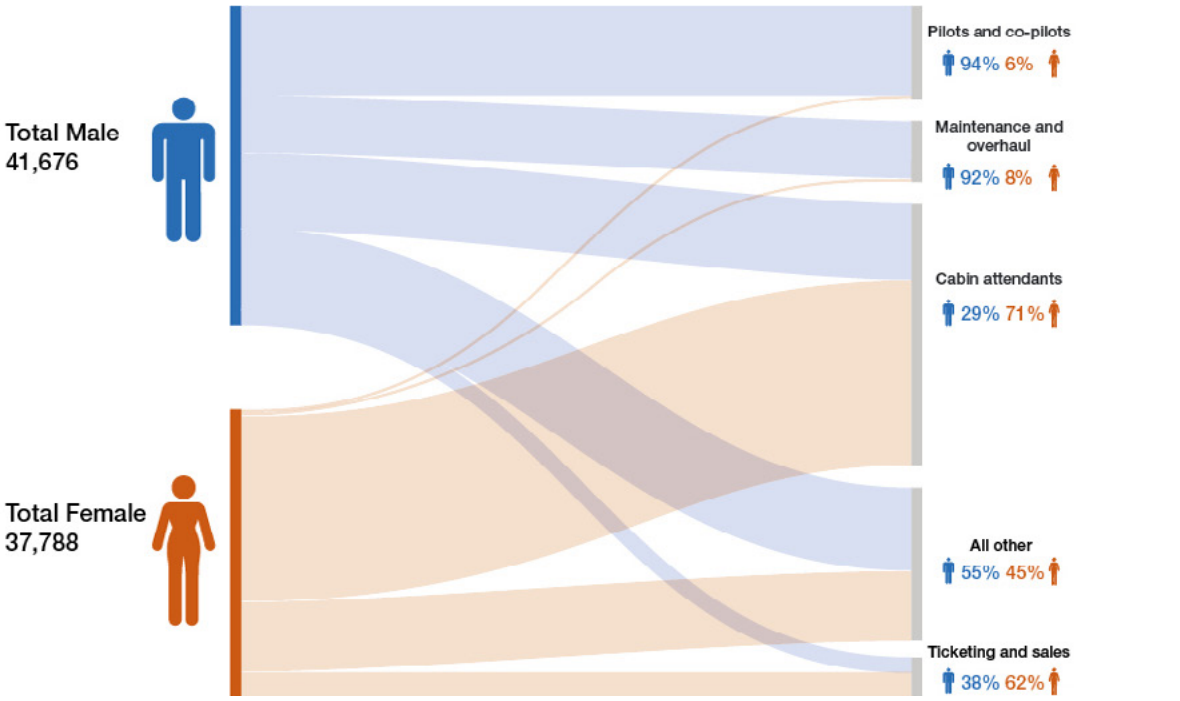


Figure 15 Worldwide employment by UK airlines, 2017
Source: Civil Aviation Authority: Airline Data (2017)

4.80 Gender based stereotypes can act as a deterrent to young women and girls. More needs to be done to tackle the gender associations that have arisen around jobs such as engineering and commercial piloting.

Brownies Aviation Badge

Earlier this year it was announced that easyJet and Girlguiding have created a partnership to engage more girls in aviation by introducing a new 'aviation badge' for Brownies. The partnership has the potential to introduce 200,000 girls aged seven to ten to aviation and it is estimated that tens of thousands of girls will earn this badge in its first year.

4.81 The government welcomes the establishment of the Women in Aviation and Aerospace Charter earlier this year as a positive collaboration with the industry to improve the gender balance of people working in aviation.[114] The Charter includes a number of commitments, including supporting the progression of women into senior roles, and requires organisations to publicly report on progress. The government proposes to:

- **encourage more of the industry to sign up to the Women in Aviation and Aerospace Charter**

114 UK Government (2018): Women in Aviation and Aerospace charter

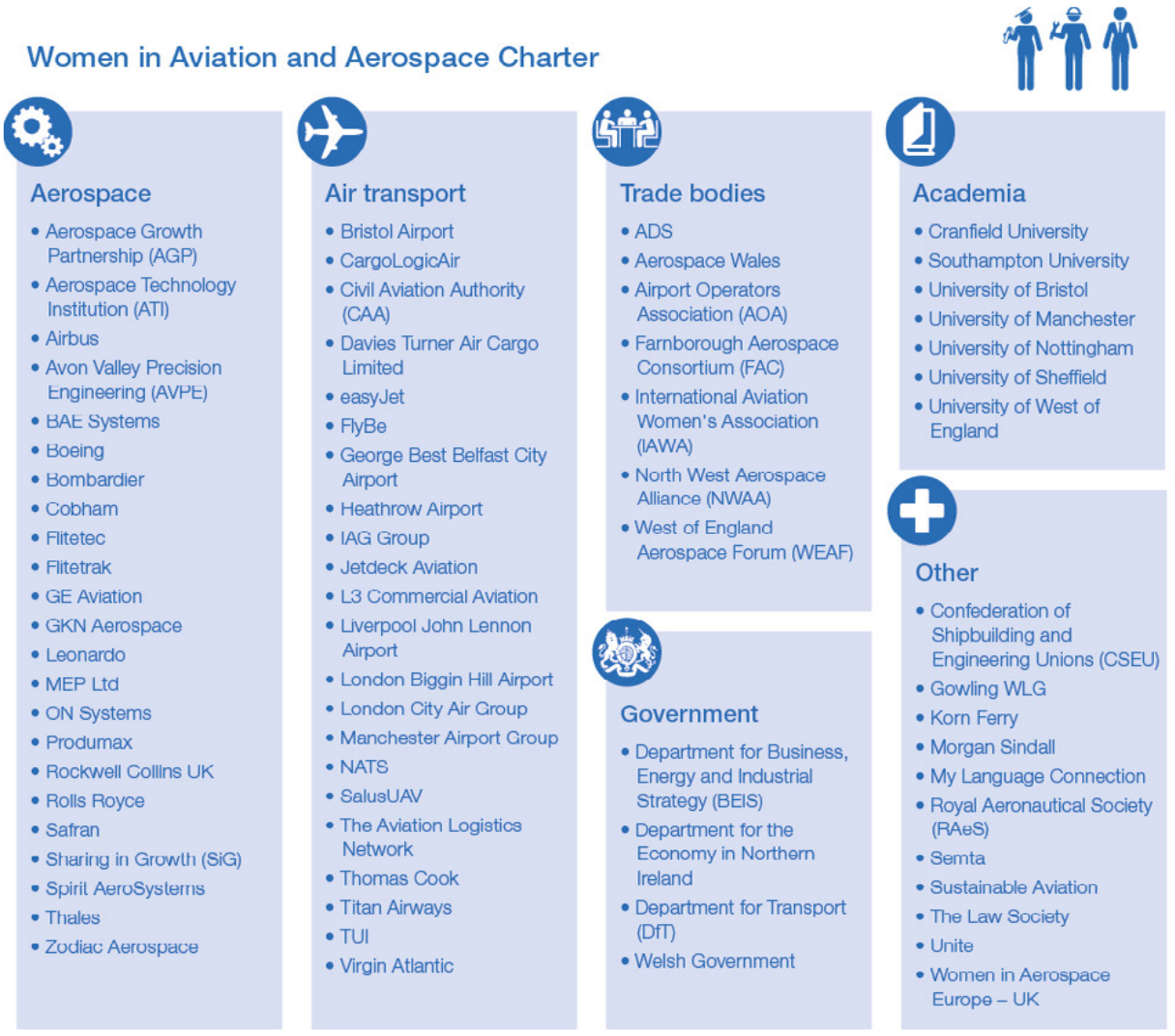


Figure 16 Women in Aviation and Aerospace Charter, as at end November 2018

4.82 The government is also encouraged by industry led initiatives which take positive action to increase the number of women in aviation. For example, easyJet's 'Amy Johnson' initiative, focusing on female pilots, has set an ambitious target that 20% of new entrant cadet pilots recruited by easyJet in 2020 will be female, after the airline successfully achieved its 2015 target of 12% by 2017. In addition, FlyBe's 'FlyShe' campaign is aimed at drawing attention to the current gender biases that exist and inspiring the next generation of young women to consider careers in aviation.

Black, asian and minority ethnic (BAME)

4.83 There is currently a lack of data on whether there is fair and proportionate BAME representation in the aviation workforce. It is currently not mandatory to report on this and the industry does not voluntarily report. The government has announced that

employers could be obliged to release their race pay gap statistics, following on from the move to release gender pay gap statistics. The government:

- **encourages industry to consider the value in utilising this data to ensure fair representation across the industry**

Disabilities and hidden disabilities

4.84 13.9 million people in the UK have a disability, which is approximately 1 in 5 people.[115] It is estimated that a 10 percentage point rise in the employment rate for disabled people would, by 2030, contribute an extra £45 billion to the UK economy.[116] The government wants to:

- **encourage more organisations to sign up to the Disability Confident scheme to become Disabled Friendly Employers. It also wants the industry to utilise and work closely with the Department for Work and Pensions' disability sector champion.**

Consultation questions

Consider the policy proposals in each chapter and answer the following either for the chapter as a whole; groups of policies within the chapter and/or individual policies:

1. How could the policy proposals be improved to maximise their impact and effectiveness in addressing the issues that have been identified?
2. How should the proposals described be prioritised, based on their importance and urgency?
3. Are you aware of any relevant additional evidence that should be taken into account?
4. What implementation issues need to be considered and how should these be approached?
5. What burdens, both financial and regulatory, are likely to need to be managed and how might those be addressed?
6. Are there any options or policy approaches that have not been included in this chapter that should be considered for inclusion in the Aviation Strategy?
7. Looking ahead to 2050, are there any other long term challenges which need to be addressed?
8. To what extent do these proposals provide the right approach to support the complex and varied role that airports play in their regions?
9. To what extent are the proposals on skills the right approach to ensuring the aviation sector is able to train and retain the next generation of aviation professionals?

115 Department for Work and Pensions: Family Resources Survey 2016/17

116 Scope (2015): Enabling work: disabled people, employment and the UK economy

Enhance the passenger experience

5. Enhance the passenger experience

All passengers should have the confidence to fly. Airlines and airports are generally responsive to the needs of their customers but improvements should be made for passengers with additional needs and when things go wrong. The government is committed to making flying a more positive experience for everyone. The proposed Passenger Charter aims to promote best practice and create a shared understanding of the required service levels for passengers.

Introduction

5.1 The government wants to ensure that the aviation industry works for everyone and that consumers have equal access to services and to the opportunities that air travel brings. It also wants to ensure that the airline industry is equipped for the demographic challenges of the future.

5.2 The competitiveness of the aviation industry means that it already delivers good choice, service and value to consumers in the majority of circumstances. Survey data shows that 83% of recent flyers were satisfied with the overall travel experience during their last flight.[117] It is also clear that the aviation industry has a strong customer focus and is increasingly making use of new technologies to offer an enhanced travel experience.

117 Civil Aviation Authority (2018): UK Aviation Consumer Survey, Wave 5, respondents that have flown within the last 12 months

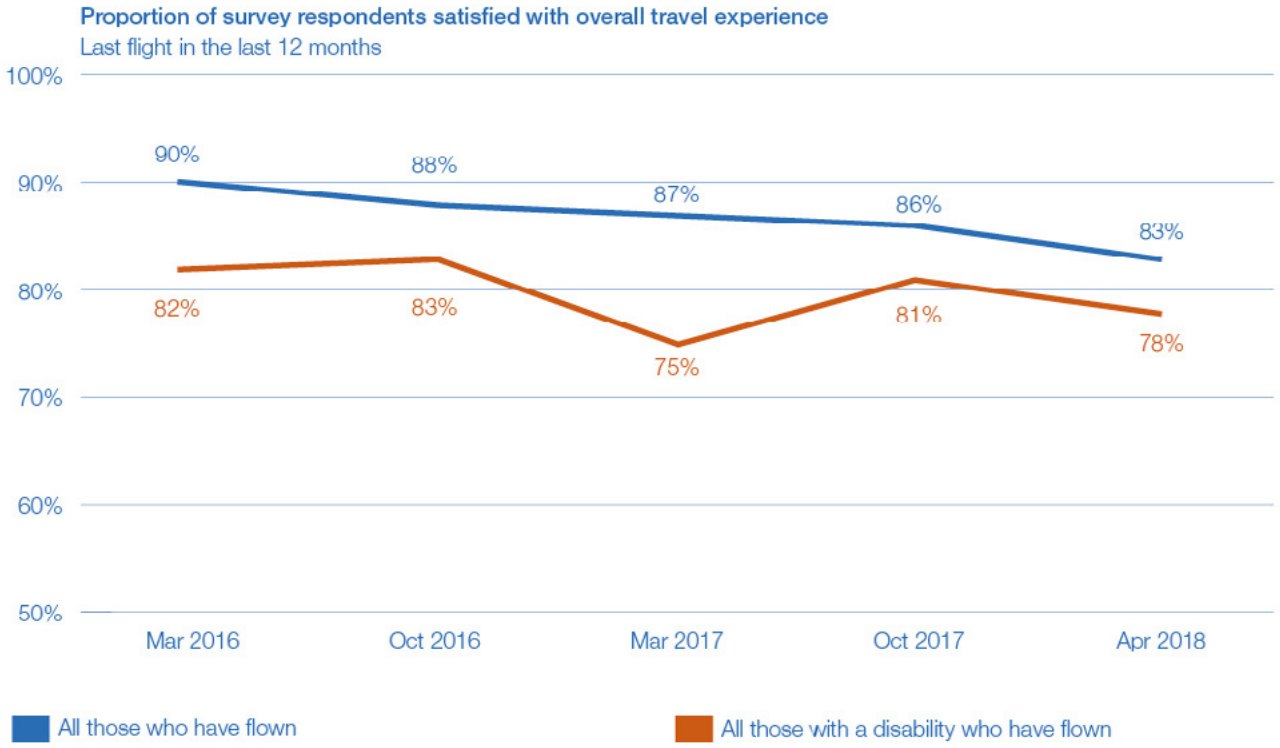


Figure 17a Overall satisfaction with travel experience
Source: Civil Aviation Authority (2018): UK Aviation Consumer Survey, Wave 5

5.3 However, engagement with the industry, passengers and others has shown that more could be done to improve the experience for some passengers, particularly when things go wrong. There is evidence to show that their experience when unplanned situations occur, such as flight delays or airline insolvency, could be improved. While passenger numbers continue to grow, there remain barriers for people with additional needs, such as disabilities, reduced mobility and those suffering from allergies. These can mean that they are less likely to choose to fly or find the experience more difficult when they do.

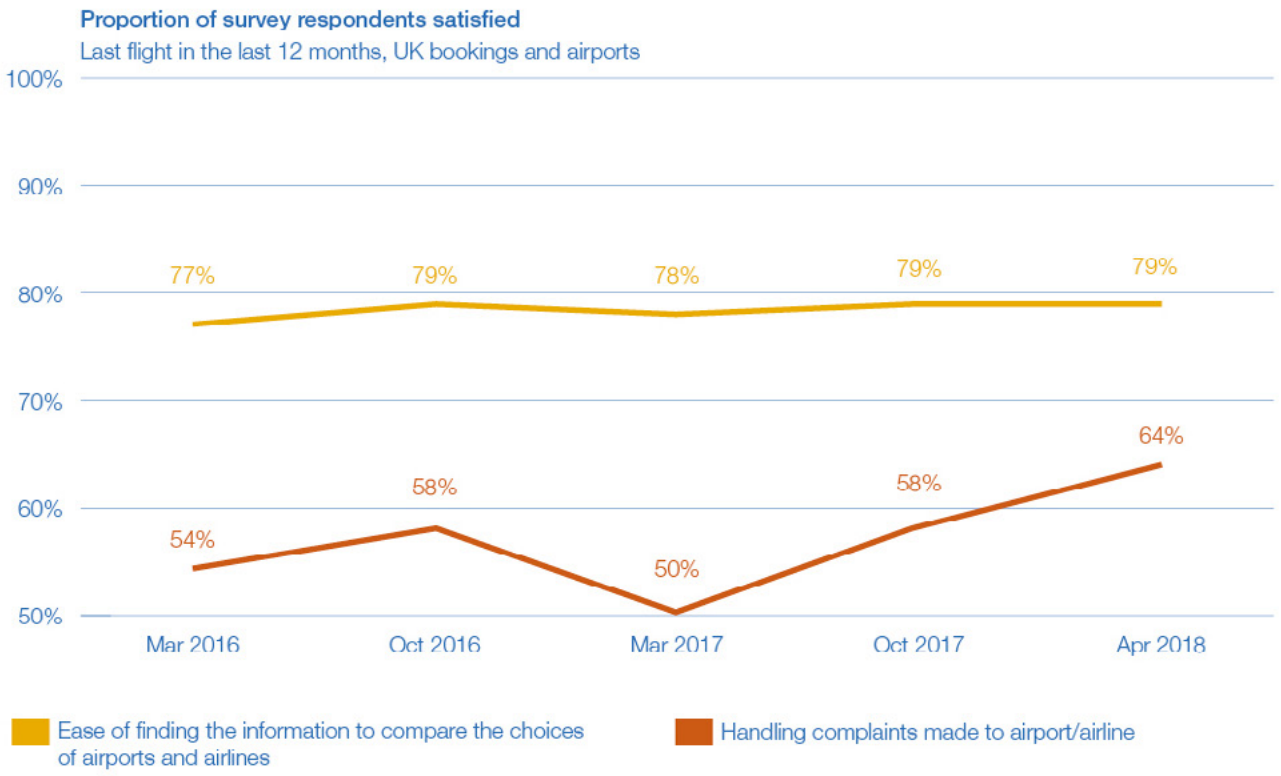


Figure 17b Satisfaction with elements of the journey
Source: Civil Aviation Authority (2018): UK Aviation Consumer Survey, Wave 5

5.4 This chapter:

- sets out the scope of a new Passenger Charter for aviation
- sets out a range of new measures for passengers with reduced mobility and additional needs
- outlines measures to tackle the problem of disruptive passengers associated with alcohol
- describes the government's approach to improving the operating model at the border to enhance the passenger experience
- details proposals for simplifying and improving complaints and compensation procedures
- sets out government proposals for ensuring that consumers have timely access to the information they need to make informed choices

Responding to future challenges

5.5 It is difficult to predict the characteristics and preferences of passengers in 2050 and beyond. As new generations begin to travel and the passenger base further diversifies, we do not know with certainty how attitudes and expectations will change, nor how the market might respond or innovate.

5.6 However, while the future is unpredictable, we can assume that passengers will want more flexibility, convenience and connectivity in their travel choices supported by personalised real-time information, surface transport options and faster passage through airports. We can also anticipate different service models entering the market, as new technologies, such as passenger drones, become commercialised and digitalisation and automation further penetrate the market. These changes create opportunities for businesses that can respond and innovate, including new entrants to the market.

5.7 We can also foresee challenges for additional support service delivery, as demographic changes continue. In 2017 over 3 million requests were made for special assistance at UK airports and requests for assistance are increasing at a rate of around double that of general growth in passenger numbers.[118]

Roles and responsibilities

Government and the regulator

5.8 The aviation industry has an excellent track record at responding to changing consumer demands. The government's role is to continue to provide a regulatory and policy framework that facilitates innovation, while ensuring that consumers' needs are met, even in more difficult circumstances. The CAA protects consumers by enforcing civil aviation rules and the government keeps its powers under review. The government and the CAA also need to be clear on expected outcomes and to develop performance frameworks so that performance standards can be measured and reported upon, to challenge industry as appropriate.

Airlines and airports

5.9 Airlines and airports already respond well to changing customer needs but as new technology develops the government will look to the industry to continue to be innovative, collaborative and responsive in order to accommodate the needs and expectations of a more diverse customer base. The industry also needs to provide greater confidence to all passengers about the standards of service that will be delivered.

118 Civil Aviation Authority (2018): Airport accessibility report 2017/18

Ensuring all passengers share the benefits of growth – a new Passenger Charter

5.10 The government's objective for aviation is for overall satisfaction rates to be at least 90% – in line with targets across other transport modes.

5.11 Meeting this objective will require close collaboration with the industry and better co-ordination to further improve the quality of experience for passengers. There are a number of common challenges in delivering quality customer service that appear across a range of different consumer groups and services. These include:

- growing volumes of passengers, with increasingly complex needs such as reduced mobility, hidden disabilities and allergies
- lack of clarity about roles and responsibilities across airlines, airports and airside services, including accountability for the quality delivery of passenger assistance services
- variation of clarity, quality and timeliness of information and service that is provided to consumers such as hidden charges, notification of delays and complaints and compensation processes

5.12 In order to drive up overall satisfaction for consumers, it is proposed that the government, CAA, industry and consumer groups will:

- **work collaboratively to develop and adopt a new Passenger Charter that clearly sets out what passengers can expect through their journey to deliver improvements in service for all passengers**

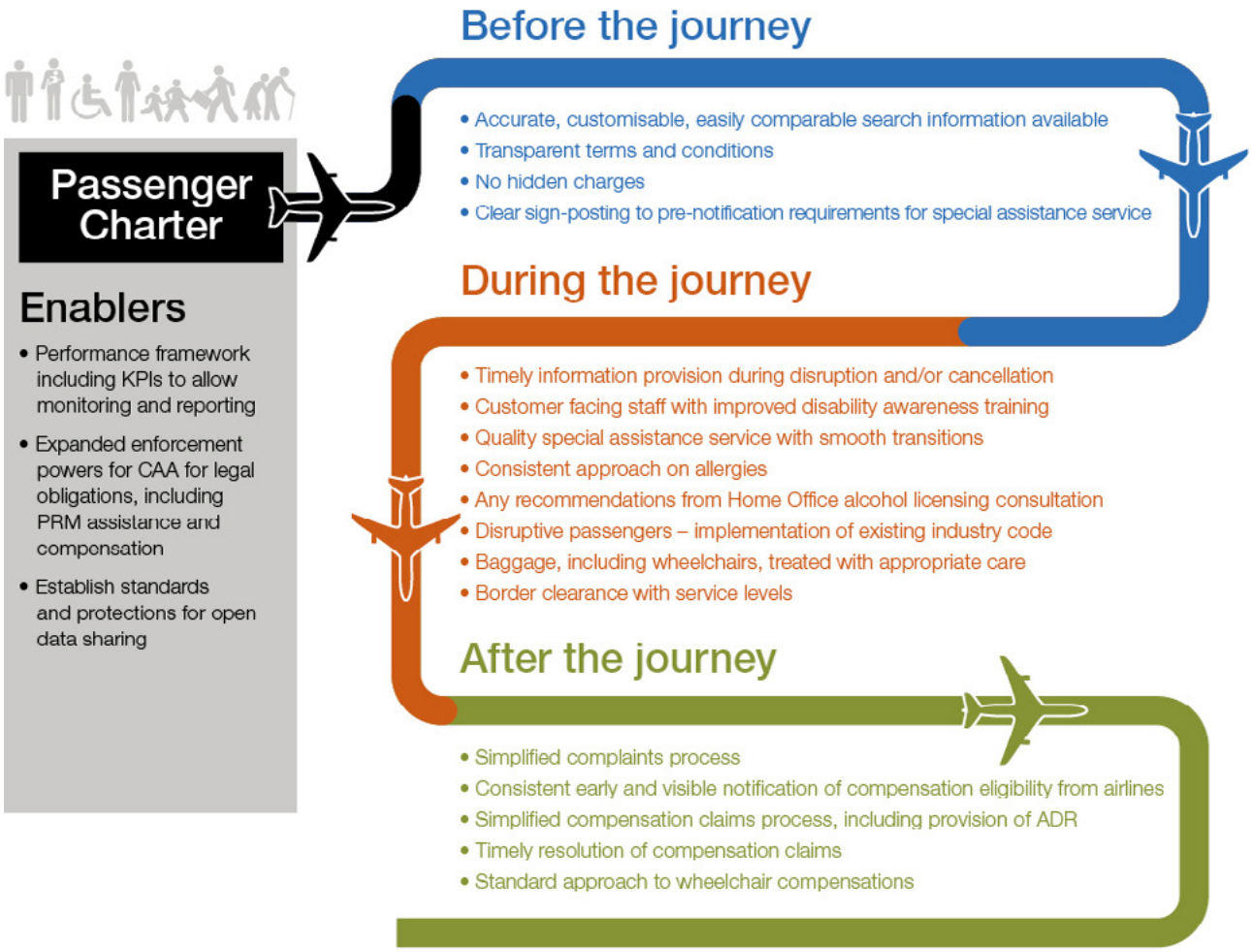


Figure 18 Passenger Charter

5.13 The government is committed to improving the standards of service and passenger experience for all passengers. The government wishes to see the aviation sector voluntarily improve its standards through the Charter, while also delivering on its legal obligations. If standards do not improve, the government may need to consider regulating for improved outcomes.

5.14 A Charter would help to promote good practice, create a shared understanding of levels of service, and communicate roles and accountabilities clearly to drive service improvement. It would draw on existing guidance and codes of practice and develop new standards where these do not currently exist.

5.15 Such a Charter would also provide an opportunity for airlines and airports to communicate the good work that they are already doing and share best practice in a clear and accessible way for passengers. It would also address the significant challenges in air travel that disabled passengers continue to experience. The Charter would be an easy to find, one-stop shop for information for disabled passengers.

5.16 The Charter would be supported by an improved performance framework and expanded enforcement powers for the CAA for legal obligations under the Charter.

5.17 It is proposed that the Charter would set out clear standards for a range of passenger issues including, but not limited, to:

- **accessibility standards for disabled passengers and passengers with reduced mobility (PRMs)**
- **service standards for consumers with hidden disabilities and/or allergies**
- **expectations around the management of disruptive passengers**
- **service levels for processing people at the border**
- **standards for notification of delays, complaint handling and compensation claims**
- **expectations and obligations on compensation and repatriation for when an airline becomes insolvent**
- **standards for booking information and clear terms and conditions**

5.18 The Charter would be supported by:

- **a performance framework with clear Key Performance Indicators (KPIs) to allow monitoring, reporting and ongoing improvement**
- **expanded enforcement powers for the CAA with respect to legal obligations for passengers with reduced mobility and compensation claims**
- **new standards for open data, data sharing and data protection**
- **improved border performance standards through changes to business and delivery models and funding arrangements**
- **enhanced passenger representation**

5.19 Some of these measures would require legislative change to be implemented. In the longer term, the government proposes to consider how to provide a clear indication of which companies have delivered an expected level of service under the Charter, to give consumers greater confidence in the standards they can expect to receive.

Passengers with additional needs

Passengers with reduced mobility or disabilities

5.20 Everyone should be able to fly. Airlines and airports have worked to support passengers with additional needs but the government is aware of the need for improvements to be made. The government wants to improve accessibility not only at airports, but at every stage of the journey, including working with industry to deliver changes in aircraft design in the longer term. Regulation is in place to protect the rights of disabled people and passengers with reduced mobility while travelling by air.[119] This ensures that passengers receive special assistance services free of charge, from their designated point of arrival until the point of disembarkation. Use of such services has increased by over two thirds in less than a decade and demand for these services is likely to continue to rise. Requests for assistance at UK airports are increasing at a rate of around double that of general passenger growth.

119 Regulation (EC) No 1107/2006

5.21 The Regulation ensures that disabled passengers and those with reduced mobility receive assistance particular to their needs at the airport, as well as on board aircraft, by ensuring airports and airlines employ the necessary staff and provide appropriate equipment. More than 70% of passengers that have flown within the last 12 months and requested assistance are happy with the service provided. The government wants to ensure that service standards continue to improve and that there is greater awareness of the assistance available by working with health professionals and disability organisations.[120] To achieve improved standards, the government will consider how to address the challenges in delivering a service that needs to respond respectfully to a range of individual needs throughout the journey, including the transitions from airport to airline.

5.22 One in five UK adults has a limiting disability or health condition and over half of those with such conditions say they find accessing or using airports difficult and/or find flying difficult in general.[121] In addition to being the right thing to do, there is a clear commercial case for the industry to do more to make it easier for disabled people to fly.

5.23 Wheelchairs can cost thousands of pounds and are often customised to the specific needs of the person using them. When carried on flights, wheelchairs are currently covered by the same legislation (the 1999 Montreal Convention) as baggage, limiting compensation to around £1000. A number of airlines, including EasyJet and Thomas Cook voluntarily waive this financial limit for wheelchairs. Wheelchairs can be damaged in transit, whether through incorrect stowage, poor handling or a lack of standardised tether points for safe stowage in the hold. Damaged wheelchairs directly impact on the quality of life of their users, as well as creating a significant, unplanned, financial cost.

5.24 The government intends to continue working with specialists in aviation accessibility, designers, manufacturers, disability groups and airlines to consider how further improvements can be made. The long-term goal is to enable wheelchair users to travel in their own air-worthy wheelchair on a plane.

5.25 The proposed Passenger Charter will aim to promote best practice for assistance services and the government will consider what further measures are needed for passengers with reduced mobility or disabilities. Details of specific measures under the Charter are set out later in this chapter.

120 Civil Aviation Authority (2018): UK Aviation Consumer Survey, Wave 5

121 As above

5.26 The CAA introduced guidance and airport accessibility reporting in 2015 – the first of its kind in Europe. Good and poor performers are identified in the annual report, incentivising targeted investment from airports to improve their rankings. Airports classified as good, amongst other things ensure that waiting times meet monthly performance targets and that users are satisfied with the service provided. They also engage with local disability organisations to better design their assistance to meet the needs of disabled passengers. Poor performers have failed to meet the required standards or have not taken the necessary steps to address those failings. The CAA is planning to consult shortly on the existing reporting measures.

The Inclusive Transport Strategy

The Strategy sets out the government's plans to make the transport system across all modes work better for disabled people, through:

- awareness and enforcement of passenger rights – raising awareness of the obligations on transport operators, the processes for raising concerns or complaints and working with regulators to hold operators to account
- staff training – ensuring that transport staff (frontline and managerial) understand the needs of disabled people with physical, mental, cognitive or sensory impairments, and can provide better assistance
- improving information – ensuring that transport operators provide travel information in formats that all passengers can easily access and understand, before and during a journey
- improving physical infrastructure – ensuring that vehicles, stations and streetscapes are designed, built and operated so that they are easy to use for all
- the future of inclusive transport – ensuring that technological advances and new business models provide opportunities for all, and that disabled people are involved from the outset in their design

Hidden disabilities

5.27 The existing regulation not only covers physical disabilities, but also neurodiversity. As a result, in 2016, the CAA was the first regulator in the world to set out guidance and reporting in airports to cover passengers with hidden disabilities, such as dementia, autism, learning disabilities, anxiety issues, mental health impairments and hearing loss.

5.28 A year after the guidance was introduced, the CAA reviewed airport performance and a first report was published in June 2018 highlighting progress airports have made in improving their environments for passengers with hidden disabilities.[122] This has been followed by the extension of guidance to airlines which was published in October 2018.[123]

122 Civil Aviation Authority (2018): Supporting people with hidden disabilities at UK airports

123 Civil Aviation Authority (2018): Guidance for airlines assisting people with hidden disabilities

5.29 The revised guidance sets out that airlines should:

- have a clear and accessible pre-notification system in place allowing passengers to request special assistance at the point of booking
- share information about a passenger's assistance needs within their own organisation and with the airport and ground handling agents.
- ensure a passenger with a hidden disability is seated with a travelling companion at no extra cost
- invest in quality training for staff so hidden disabilities can be identified and passengers assisted accordingly
- ensure passengers with hidden disabilities are looked after in the event of flight delays and cancellations

5.30 When providing assistance to passengers, it is important that the specific needs of the passenger are considered and their preferences taken into account, where appropriate.

Case study: Aviation sector's initiatives to support passengers

Virgin Atlantic has designed a special symbol that will alert any Virgin Atlantic staff that a passenger needs some extra assistance. Any passenger with a hidden disability can simply download a hidden disability alert symbol; including a bookmark that can be slipped into a passport, or pick up a badge to wear at the airport.

Staff have been specially trained to recognise the symbol and assist customers with hidden disabilities at airports where Virgin Atlantic fly to across the globe.

There are already innovative approaches and good practice to build on.

Gatwick Airport was the first UK airport to introduce a 'lanyard scheme' so that airport staff can easily identify vulnerable passengers who may not wish to publicly share details of their disability. This has been adopted by airports across the UK and overseas, and was recently taken up by a major supermarket chain

Gatwick has also introduced the first ever sensory room at a UK airport for passengers with autism, dementia, cognitive impairment or other special needs who could benefit from a designated place to help them feel at ease before their flight

Allergies

5.31 Passengers with nut allergies can face potentially life-threatening challenges when travelling through a lack of clarity and consistency in airline polices in relation to the serving of nuts as snacks or as an ingredient in food served on the plane. Airlines take the health and welfare of their passengers extremely seriously and want to ensure all passengers have an enjoyable and safe flight. Most airlines already have processes in place to enable passengers to notify them in advance of their flight of any allergies to reduce risk and mitigate against potential exposure. Some airlines have stopped serving nuts on flights, which provides some reassurance but the possibility of exposure cannot be fully ruled out. Allergy UK research has highlighted a lack of clarity around airlines' policies, with over 70% of respondents feeling that policies are not clear.[124] Travelling with nut allergies, especially for families with children, can cause significant stress and anxiety. The government wants to see improved clarity and consistency in how the sector deals with nut allergies and will consider providing clear guidelines for airlines.

5.32 The CAA has undertaken an evidence review of passenger exposure to peanuts and tree nut allergens on airlines to establish the scientific evidence for the perceived risk and to identify what mitigation measures, if any, would be appropriate on the basis of the evidence. The report is due to be published before the end of the year.

Proposed measures for the Passenger Charter

5.33 The Passenger Charter should improve passenger service and promote best practice in the air transport sector. As part of the commitment to help the aviation industry work for all of its customers, all of the time, the new Charter would help to increase awareness of consumer rights across a range of areas. The Charter will be an easy to find, one-stop shop for information for passengers with additional needs. The government proposes including the following measures in the Charter for passengers with reduced mobility or additional needs:

- **review and strengthen accessibility performance standards for airports and introduce standards for airlines**
- **raise awareness of special assistance services** – including how to access them and ensure that passengers have the information they need to give them the confidence to travel by air; considering formats, language, appropriate illustrations or videos and sources of information provision such as health centres

124 Allergy UK (2018): Flying with allergy survey

- **improve the pre-notification process** – to capture and transmit all relevant information, particularly around wheelchairs and batteries, in an accurate and timely manner so that the special assistance service provided can be tailored to the customer needs, and ground handlers can prepare for wheelchair loading
- **strengthen standards around waiting times, handover instances and requirements for critical infrastructure** – to provide a quality assistance service
- **improve the storage standards for wheelchairs in the hold** – through improving knowledge of wheelchairs and batteries for ground handlers, creating safe stowage areas in the hold, and considering wheelchair standards, such as universal tether points, for robust securement
- **adopt the recommendations and provisions in European Civil Aviation Conference (ECAC) Document Number 30 in Section 5 on Facilitation of the Transport of Persons with Disabilities and Persons with Reduced Mobility**
- **remove limits to payments for damage caused to wheelchairs during flight** – so that realistic replacement or repair costs are remunerated by airlines
- **increase uptake of training programmes to improve disability awareness for customer-facing staff** – including security and border staff, and for ground handlers to minimise damage to wheelchairs when loading
- **expand the range of enforcement powers available to the CAA to provide for fines for breaches of Regulation [EC] 1107/2006 (accessibility requirements)**
- **provide consistent, standards for allergy sufferers to make certain that consumers know what to expect when they fly**

5.34 In addition to the measures included in the Passenger Charter, the government intends to support a working group of industry, wheelchair manufacturers, disability representatives and the CAA to:

- **develop a certified air-worthy wheelchair standard and docking station system** – to achieve the longer term goal of enabling disabled passengers to travel safely in their own wheelchairs in the aircraft cabin

European Civil Aviation Conference (ECAC) Document Number 30

Standards in ECAC Doc. No 30 include, but are not limited to:

- in the plans for building or renovating airports, the accessibility standards for disabled persons and PRMs should be considered at the outset
- parking spaces should be reserved for disabled persons and PRMs, as close as possible to the terminal
- set down and pick up points to include forecourts, public car parks, taxi ranks, coach and rail stations or other interchanges (where these exist within airport boundaries)
- a seamless assistance service with 'handover' procedures being avoided where possible
- regular refresher training sessions for staff assisting disabled persons and PRMs
- airlines should make all reasonable efforts to arrange seating to meet the needs of disabled passengers (subject to safety requirements and availability)
- air carriers should be encouraged to offer discounts for the carriage of an accompanying person for disabled persons when they are required for safety reasons
- new and refurbished aircraft (certain to specific criteria) should have:
  - moveable armrests
  - at least one lavatory for PRMs catering for all kinds of disabilities
  - at least one on-board wheelchair
  - a priority space in the cabin, designated for storage of at least one vertically folding personal wheelchair

Disruptive passengers and alcohol

5.35 All passengers should have the right to feel safe while travelling and all passengers should take personal responsibility for managing their behaviour while travelling. Passengers who behave in a disruptive manner can affect the journeys of other travellers both airside and on aircraft and, at its most extreme, disruptive behaviour can threaten the safety of an aircraft. Industry information suggests that disruptive incidents are on the increase but concentrated on particular routes.

5.36 The sale of alcohol airside at all but one international airport in England and Wales is currently exempt from the Licensing Act 2003, which governs the sale and control of alcohol. The House of Lords Select Committee on the Licensing Act 2003 recommended that the exemption be revoked due to an increased number of alcohol-related incidents in recent years. The Home Office published a call for evidence on 1 November 2018 to gather more information about the scale of the problem and the impact that airside alcohol licensing could have on reducing it.[125] Any potential extension of the Act would allow for targeted action to be taken against problem premises or for relevant conditions to be attached to how they operate.

The Home Office call for evidence is examining:

- the present scale of the problem of drunk and disorderly airline passengers and its recent trends
- the use, effectiveness and limitations of the current statutory powers; as well as industry-led measures to tackle the problem
- the strengths and limitations of using licensing laws airside to tackle the issue of drunk and disorderly passengers
- the prospective economic implications of applying the Licensing Act airside, as well as maintaining the current exemption
- the suitability and practicalities of applying the current licensing regime to airside: to establish practical implications of extending the Licensing Act in its current form to airside premises

5.37 Every person must obey all lawful commands given by the pilot in command of an aircraft. In practice, this means the captain has the ultimate right to prohibit the consumption of alcohol on board a flight. In addition, there are clear criminal penalties in place for drunken behaviour on board an aircraft. The Air Navigation Order (ANO) 2016 makes it an offence to be drunk on board an aircraft, or to board an aircraft while drunk, with maximum penalties being an unlimited fine and 2 years in prison. However, prosecution rates are low.

125 Home Office (2018): Airside alcohol licensing at international airports in England and Wales: call for evidence

5.38 The government currently believes that the existing penalty regime for disorderly behaviour on airlines and airlines' powers to manage disruptive passengers are sufficiently robust and that increased penalties would do little to change passengers' behaviour. Drunken passengers risk being denied boarding, having their plane diverted (and the associated costs), potential fines, up to two years imprisonment, an airline ban and a diversion fee up to £80,000 for the most serious in-flight incidents.

5.39 The government therefore supports providing greater awareness of the consequences of disruptive behaviour and increased use of existing powers by industry.

5.40 Industry initiatives to raise awareness of the consequences of disruptive behaviour already exist. In 2015, a selection of industry representatives developed the UK Aviation Industry Code of Practice on Disruptive Passengers. The code creates a common, consistent approach that co-ordinates and enhances existing efforts to prevent and minimise disruptive passenger behaviour where alcohol is a contributing factor. In addition to the code, airports and airlines have introduced a number of new initiatives to tackle this issue including information campaigns such as the One Too Many campaign run over peak summer periods.

Case study: One Too Many campaign

The UK Travel Retail Forum (UKTRF), AOA, IATA and Airlines UK representing travel retailers, airports and airlines joined forces over summer 2018 to launch a passenger awareness campaign to encourage people to fly responsibly.

Building on the UK Aviation Industry Code of Practice on Disruptive Passengers, the campaign was the first-of-its-kind to bring all facets of the industry together under one banner.

The campaign reminded passengers of the costs of drinking to excess and it was rolled out via a national Facebook and Instagram social media campaign and in ten pilot airports across the UK.

Since its launch the campaign has reached over 1 million people on Instagram and Facebook. Signage and displays are prominent in airports around the UK on digital boards, point of sale, retailer notices and through a dedicated police leaflet.

5.41 The government believes that with its continued support, a combined approach from airports and airlines is the most effective way to tackle the issue and proposes to include the following measures in the Charter:

- **demonstrate zero tolerance for disruptive behaviour from passengers caused by excessive consumption of alcohol by encouraging best practice across airports and airlines** through initiatives such as the introduction of tamper-proof bags for duty free, and awareness raising campaigns
- **raise passengers' awareness of penalties, encourage greater use of existing sanctions and support staff in enforcement actions**
- **adopt any relevant measures adopted in response to the findings of the call for evidence on airside alcohol licensing**

Improving the experience at the border

5.42 The border plays an essential part in securing the UK against a wide range of current and evolving threats. The government is committed to delivering a world-leading border service, which protects the public and ensures the UK remains a welcome destination for legitimate business and passengers.

5.43 Border control at the airport is most people's first experience of the UK, yet some passengers can still experience long queues and inconvenience at border control points at certain ports at peak times. Border Force currently meets many of its key targets. But increasing demand at the border is creating wait times significantly above Service Level Agreements (SLAs) at peak times at some airports causing the service not to be of the standard desired by either airports or passengers.[126] This is particularly the case for non-EEA passengers, where we have seen an increase in the number of passengers of over 20% between 2016 and 2017 to 20 million.

5.44 In 2017, around 137 million passengers crossed the UK border, primarily through airports. Currently, all arriving passengers are processed at the border by Border Force.[127] The volume of passengers is likely to grow, as the demand for aviation in the UK is forecasted to rise.[128]

5.45 In continuing to deliver a world-leading yet secure border there needs to be a drive for service improvements which meet the expectations of passengers and has the flexibility to respond to the growth expected in passenger numbers. This should include making better use of data, biometrics, analytics and automation to improve both security and fluidity across the border.

126 The British public expect UK and EEA passport holders to wait no more than 12 minutes at passport control in airports and 25 minutes for non-EU citizens (ComRes; The Airport Operators Association (2018): Public Border Attitudes)

127 Home Office (2018): Immigration statistics, passenger arrivals

128 Department for Transport (2017): UK aviation forecasts

5.46 Fundamental to achieving this is ensuring strong alignment between different agencies of the government and with airlines and airports. The Future Borders Programme is already looking at the design of border services for 2025 – central to which are a set of design principles based on a more targeted and risk-based approach to managing the flow of passengers across the border, while ensuring that security remains paramount.

5.47 Airline and airports are key partners for the government in determining what the future operating model should look like and how decisions about investment in supporting architecture, such as airport layout, can best facilitate this. Exploring the potential for new technologies will be a critical component of this, and we know international competitors, such as Dubai, are embracing innovative technology for border crossings.

Case study: International technological innovation

The Australian Department of Immigration and Border Protection (DIBP) has started to deliver a new and integrated border clearance traveller platform. The DIBP announced that by 2020, international travellers entering the country will be processed via a completely unmanned biometric system based on fingerprints, iris scanning, and facial recognition.

The Dubai Immigration and Visa department are testing a 'gateless borders technology' which combines biometric verification and Blockchain technology. Once launched, passengers travelling to Dubai will walk straight from the plane to baggage reclaim via a short tunnel in which a facial recognition system will conduct a three dimensional scan of the passenger's face to instantly verify their identity against a digital passport. The tunnel will be linked into the central traveller platform, integrating the various identity components of a passenger coming into Dubai. The digital passport, which will be linked to a passenger's identity on the platform, also protects the privacy of the individual through the creation of a 'self-sovereign identity', which ensures that the holder alone has full control of the data. Using Blockchain technology, the solution ensures that the information stored on the digital passport can only be viewed by the passenger alone and anyone specifically permitted by the passenger.

5.48 Many of these technological improvements will rely on open and secure sharing of data and passenger information.

5.49 This has the potential to enhance the process by which individual travellers' identity and permissions are gained, shared and validated; enabling a more seamless journey for those not requiring targeted intervention, while improving border security and safety for all. Border Force has already began to embrace automation. There are now 259 ePassport Gates (eGates) operational and they are processing more passengers on arrival than any other country, with a sizable increase in the number of gates and locations over the past five years.

5.50 To continue to harness the opportunities delivered through automation, the government intends to:

- **increase the number of travellers who are eligible to use eGates by summer 2019.** Eligible travellers from Australia, Canada, Japan, New Zealand, Singapore, South Korea and the United States will be able to use eGates at all ports which have them. The government has recently laid the Statutory Instrument to allow this to happen

5.51 This will maintain the security of our border while improving the experience for individuals from those countries, and will also help relieve pressure on non-EEA queues as the number of travellers coming to the UK continues to grow.

5.52 Delivering the border of the future requires input and expertise from all those involved.

5.53 In looking to improve the service at the border, while maintaining the security of the UK, the government proposes to:

- **work with industry to consider a new operating model between the government and the industry, enhancing collaboration and considering options to encourage innovation and new technology**
- **ensure the sustainability of funding through a new funding model**
- **review the current SLA level and process to ensure it is robust, and appropriately balances security and service at the border**
- **support innovation and technology through collaborative working across government and with industry**

Complaints and compensation

5.54 When a journey is disrupted, passenger levels of satisfaction for their overall journey decrease.[129] A number of factors contribute to lower satisfaction rates:

- lack of communication from the airport or airline giving a reason for a flight delay, or insufficient updates regarding the status of the flight
- lack of information about the progress or resolution of complaints
- delays in responding to complaints and the nature of redress offered create a perception of being unfairly treated
- lack of awareness of consumer rights when a flight is delayed or cancelled, or when passengers are denied boarding
- where compensation may be payable, passengers feel the system is complex and their entitlements are unclear

5.55 Complaints are an important way for airlines and airports to understand and meet their passengers' expectations, especially when things go wrong. The existing complaints process is complex and fragmented. There are multiple steps to make a complaint, starting with the airline or airport, and different resolution or appeal routes if the consumer is not satisfied with the redress offered. The introduction of Alternative Dispute Resolution (ADR) on a voluntary basis to airlines has provided the majority of consumers with an alternative mechanism to court action and has a binding outcome in most cases. An initial review demonstrates high levels of passenger satisfaction and those that have used an approved ADR provider have found the process easy to navigate.[130] However, ADR is not currently available to all passengers.

5.56 There are common rules on compensation and assistance to passengers in the event of long delay, cancellation or denied boarding.[131] This includes the provision of refreshments or accommodation, levels of compensation, and expectations around notifying consumers of their rights.

5.57 The government believes that the Passenger Charter can contribute to increasing overall passenger satisfaction with their journey by ensuring customers are aware of their rights, and through improving the responsiveness of the industry when things have gone wrong during a journey.

129 Civil Aviation Authority (2017): Consumer Tracker Survey, Wave 4

130 Civil Aviation Authority (2017): ADR in the aviation sector – a first review

131 Regulation (EC) No 261/2004

5.58 The government proposes to include the following measures in the Charter:

- **set standards for timely notification to passengers of flight delays or cancellation**
- **set standards for quality response to complaints**
- **simplify the compensation process and speed up the payment of claims**
- **improve standards for timely and consistent notification to passengers of their eligibility for compensation**
- **review ADR to ensure it is working in the best interests of consumers**
- **encourage the industry to offer ADR to all passengers. If insufficient progress is made on a voluntary basis the government will consider mandating it in the future**
- **develop a performance framework including KPIs to monitor performance of the standards**
- **expand the range of enforcement powers available to the CAA by providing for fines for breaches of Regulation [EC] 261/2004 (compensation and other enforcement measures)**

Airline failure

5.59 Growth in demand for air travel has been driven by the competitive responses of both new entrant and incumbent carriers to the liberalisation of global aviation markets in more recent years. These developments have brought large and widespread consumer benefits. But they have also led to growing financial pressures in the travel industry which have resulted in clear risks to the consumer, including airline insolvency.

5.60 The Air Travel Organisers' Licence (ATOL) scheme provides important protection for holiday makers booking flight-inclusive holidays, ensuring they are refunded or repatriated if their travel provider collapses. But this consumer protection does not reflect the growing proportion of purchases that are not covered by the ATOL scheme, such as most flight only bookings.

5.61 In October 2017, Monarch Airlines ceased trading, resulting in 750,000 customers losing their advanced bookings. The government launched the biggest ever peacetime repatriation to bring 110,000 passengers stranded overseas home.[132]

5.62 Following this, the Secretary of State for Transport commissioned an independent Airline Insolvency Review. The review is considering how airlines that become insolvent can wind down with minimum impact on passengers and taxpayers. An interim report was published in July 2018, outlining the initial conclusions.[133] The Review is expected to report by spring 2019 and the government will consider its recommendations at that point.

132 Airline Insolvency Review (2018): Interim Report

133 As above

5.63 The government is considering the following measures for the Passenger Charter:

- **expanding the range of enforcement powers available to the CAA under the ATOL regulations.**[134] The existing sanctions available to the CAA can be disproportionately severe for the majority of the non-compliance issues. This can lead to a lack of a credible threat of intervention by the CAA and can make it difficult for it to tackle breaches when they are identified. They also fail to provide an adequate deterrent to stop poor practice arising in the first place. A broader range of civil sanctions could prove fairer to compliant ATOL holders, and may provide a more stable travel market, which in turn could feed into the government's wider aim of taking a more market based approach to consumer protection
- **considering the recommendations of the Airline Insolvency Review**

Booking information and terms and conditions

5.64 The government wants consumers to be able to access accurate, reliable journey information that is easy to understand and available when consumers need it. If passengers have the right information, in the right format and at the right time, this can help them make the best possible choices and can respond to unforeseen circumstances such as delay.

5.65 The CAA's report on airline seating policies found that price partitioning, where elements such as allocated seating or priority boarding can be charged as separate add-ons to the basic ticket, may have benefits for some consumers who prefer to pay less for their ticket. However, this issue will also be looked at by the new Centre for Data Ethics and Innovation.[135]

5.66 Many companies are already responding innovatively to passenger preferences by providing additional information at different stages of the booking process and journey. These are well received by users and help to improve the consumer experience. The government wants to challenge industry to continue to enhance consumer information and ensure that innovation in this area continues to grow, while also ensuring that resilience is built into the latest technologies as consumers' and industry's dependency on them grows.

5.67 The government proposes the following measures for the Passenger Charter:

- **establishing open data standards to support innovation for consumers** – set aspirations and minimum standards on open data use, storage and protection so that information for consumers is freely available for the industry and the government to use to meet consumer needs. This is a key enabler of many of the elements of the Charter

134 Civil Aviation (Air Travel Organisers' Licensing) Regulations 2012 (ATOL Regulations)

135 Civil Aviation Authority (2018): Paid-for allocated seating in aviation: an update

- **ensuring transparency in relation to airline terms and conditions.** The CAA is engaging with industry to ensure that their terms and conditions are transparent, prominent and, ultimately, fair. It intends to report on its work shortly and any recommendations may be adopted as part of the Charter
- **ensuring that consumers can make informed decisions in relation to allocated seating.** The CAA has recently reported on the first phase of its work on allocated seating. It intends to follow up on the findings with individual airlines to ensure that consumers are given the information they need to make an informed decision over whether to purchase an allocated seat. Any recommendations may be adopted as part of the Charter
- **extending the role of Transport Focus to act as a representative body for air passengers.** Transport Focus would work closely with the CAA to boost the voice of air passengers and inform understanding of passengers' wants and needs which will help identify priorities for more targeted improvement. This would be important in developing many of the elements of the Charter

Consultation questions

Consider the policy proposals in this chapter and answer the following either for the chapter as a whole; groups of policies within the chapter and/or individual policies:

1. How could the policy proposals be improved to maximise their impact and effectiveness in addressing the issues that have been identified?
2. How should the proposals described be prioritised, based on their importance and urgency?
3. Are you aware of any relevant additional evidence that should be taken into account?
4. What implementation issues need to be considered and how should these be approached?
5. What burdens, both financial and regulatory, are likely to need to be managed and how might those be addressed?
6. Are there any options or policy approaches that have not been included in this chapter that should be considered for inclusion in the Aviation Strategy?
7. Looking ahead to 2050, are there any other long term challenges which need to be addressed?
8. To what extent does the proposed Passenger Charter adequately address the issues that are most important to passengers?
9. How should the operating model for border service be designed to improve the passenger experience?

Ensure a safe and secure way to travel

6. Ensure a safe and secure way to travel

The UK is a global leader in aviation security and safety, with one of the safest and most secure aviation systems in the world. The government and the CAA share knowledge and expertise with other nations, encouraging them to adhere to international standards and implement improvements with industry to make the skies safer for everyone.

Safety

Introduction

6.1 The UK is recognised as a world leader in aviation safety. There has not been a fatality on a commercial airline in the UK since 1989. This exemplary record ensures consumer confidence and international trust in the UK's regulatory regime allowing the UK's aviation industry to flourish. In order to maintain the UK's safety record the government must focus on:

- addressing concentrations of safety risks
- targeting emerging safety risks
- improving data and reporting
- addressing global variations in safety standards

6.2 As a signatory state of the Convention on International Civil Aviation (the 1944 Chicago Convention), the UK implements the international standards established by the International Civil Aviation Organisation (ICAO). The UK's policy and legislative framework on safety is currently determined by the EU through EASA, and the UK government through DfT. The UK plays a key role in determining EASA's rules and regulations, through the European Regulatory Process, and our membership of the EASA Committee. The CAA is responsible for safety regulation within this legislative framework.

6.3 To maintain and improve upon its exemplary record, the UK must pro-actively anticipate and mitigate emerging risk, continue to adapt its regulatory regime, and continue to respond to global variations in safety standards. This will support the UK's objective that there are no accidents involving commercial air transport that result in serious injuries or fatalities, as well as no serious injuries or fatalities to third parties as a result of any aviation activities.

Concentration of safety risks

6.4 The UK's rate of 0 fatalities per million commercial flights compares well against Europe's 0.2, and the World average of 0.4.[136]

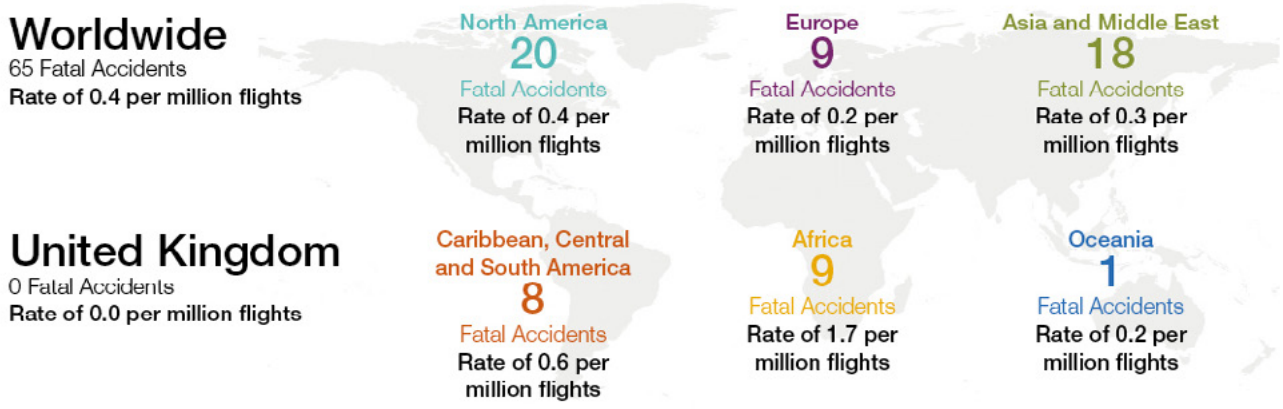


Figure 19 Fatal accidents shown in the ICAO region the operator is registered, January 2013 to December 2017
Source: Civil Aviation Authority analysis of Accident Analysis Group (AAG) database and Official Airlines Group (OAG) database

6.5 However, while the UK's safety record is excellent, risk is unduly concentrated in specific geographical areas, particular causes and particular sub-sectors of the aviation industry.

Human and cultural factors

6.6 The UK can be proud of its existing safety record across all areas of the aviation system but cannot be complacent. Risks to aviation safety are complex and influenced by many factors but key amongst these factors is human error which is a contributory factor in as many as 70% of air accidents.[137] To maintain and further improve safety outcomes, human and cultural factors must be included as explicit variables in the risk management process. The use of new technologies to anticipate and influence pilot behaviour, and using behavioural insights to understand and to influence people's choices can all contribute to maintaining the UK's exemplary safety record.

6.7 Pilot performance/error is the leading cause of accidents in both commercial and General Aviation and the industry has voluntarily invested in human factors expertise to improve safety. The CAA and Air Accident Investigation Branch (AAIB) have each recruited experts in human factors to understand how people actually behave in an operational environment. In recognition of this, the CAA's new Human Factors strategy establishes human factors as a focus during routine oversight activities, and encourages a more proactive approach towards supporting and developing human performance in aviation. It seeks to understand people's limitations and how their capabilities can enhance safety, and to develop the internal capabilities and competencies of CAA inspection staff.

136 Civil Aviation Authority analysis of Accident Analysis Group (AAG) database and Official Airlines Group (OAG) database: January 2013 to December 2017, scheduled passenger and cargo services

137 Boeing: Aero Magazine, Human Factors

6.8 The government and the CAA will continue to invest in human factors expertise and to use new technology to anticipate and mitigate human error, increase situational awareness, and enhance safety.

6.9 EASA regulation obliges airlines to put peer support arrangements in place for pilots and industry is responding accordingly. These programmes aim to give pilots a facility to contact a trained peer on a confidential basis to discuss a developing social, personal or health related issue in a trusted environment, thereby addressing issues around stress and self-management. This aims to provide increased resilience to staff and reduce human errors.

6.10 New technologies such as augmented reality head-sets and pilot assistance programs also have a critical part to play. For example automatic information retrieval and processing reduces the number of tasks a pilot needs to perform and thereby improves situational awareness. The government will continue to work in partnership with industry to understand the potential and limitations of new technologies such as these to influence human factors.

6.11 Aircraft are already partially automated, and industry continues to move in this direction with systems such as autopilot routinely used to assist pilots during flight. Increasingly automated, and potentially fully automated, systems could enable safer operations through diminishing or eliminating human error.

6.12 The government proposes to:

- **mandate peer support programmes across all safety critical elements of aviation, building on the EASA-regulated pilot schemes by extending schemes to all safety critical roles including engineers and air traffic controllers.** Some in industry have already established such schemes, and the CAA and the government will monitor its results closely to understand the value it could add and share best practice
- **incentivise take up of existing technology and new innovation by working with industry to set out common specifications to facilitate greater interoperability, reduce cost, and to mitigate safety risks.** A number of emerging aviation apps provide details about individual flights and operating restrictions which could enable pilots to be better informed and less distracted

General Aviation (GA)

6.13 The UK is proud of its current safety record across all areas of the aviation system, but risk remains concentrated outside of scheduled commercial passenger flights in both fixed wing aircraft and helicopters. 78% of accidents, serious incidents (including near misses with scheduled aircraft) or high severity occurrences involved GA aircraft, in some cases having an impact on third parties.[138]

138 Civil Aviation Authority (2017): UK Aviation Safety Review for 2016

- safety in the air: There were 21 fatalities and 244 accidents or serious injuries in General Aviation (non-scheduled civil aviation) in 2016 alone, with 19 people, on average, killed each year between 2012 and 2016[139]
- safety on the ground: On 22 August 2015, a Hawker Hunter G-BXFI crashed on to the A27, Shoreham Bypass, while performing at the Shoreham Airshow, fatally injuring eleven road users and bystanders. A further 13 people, including the pilot, sustained injuries

Figure 20 UK aviation safety in context
Source: Civil Aviation Authority (2016): UK Aviation Safety Review for 2016

6.14 Given the accident rate in GA compared to the rest of the aviation system, the government is committed to continually seeking new and innovative ways to improve the UK's safety record across the entire aviation system. The development of emerging technologies such as electronic conspicuity devices, and our greater understanding of behavioural insights can be exploited to ensure that an acceptable level of safety is maintained.

6.15 The government proposes to:

- **review the UK approach to General Aviation safety to re-evaluate the risk picture and risk appetite**

6.16 The review would:

- assess the current level of risk to all parties (pilots, passengers and third parties)
- map out the current regulatory system
- assess the theoretical coherence of the current regulatory system and how it operates in practice

139 Civil Aviation Authority (2017): UK Aviation Safety Review for 2016

- compare this with other international regulatory systems for General Aviation and regulatory systems in other sectors with similar safety risks and other sport and recreational activity
- make recommendations that ensure the regulatory system is fit for purpose and proportionate

Emerging risks

6.17 The development of new technologies and business models, increased aviation activity and an increase in available data sources has changed both the aviation environment and our ability to anticipate and mitigate safety risks.

6.18 Since the publication of the next steps document, the government has been working with the CAA to ensure that it has an accurate UK risk picture and that our regulatory regime keeps pace with a changing aviation environment. The government wants consumers to remain confident in the level of safety in the aviation system. Confidence in the regulatory system will facilitate the introduction of new technologies and business models to the market.

New business models

6.19 The last decade has seen increasingly diversified business models, with new business models moving away from the 'all activity in-house' approach that has traditionally characterised legacy carriers. These developments have brought greater choice (more routes, capacity, and frequency), and value (lower fares and unbundled products), increased efficiency to industry and airport infrastructure. However, diversified business models, where the regulated elements may be geographically split between and provided by third parties, raise the challenge of whether current regulation sufficiently covers such structures. For example:

- Norwegian Air Shuttle owns five separate subsidiary airlines in Argentina, Norway, Ireland, and the UK, contracts operational services from third party providers, and hires its crew through a Norwegian/Swedish/Thai employment company, its aircraft from an Irish leasing company, and has computer services based in the Ukraine and Poland
- IAG has developed a concept where all the airlines in the Group (Aer Lingus, BA, Cityflyer, Iberia, Iberia Express, and Vueling) operate as individual entities across different geographies, but the majority of support services are centralised across the business. For example, procurement of spares and fuel is done at group level. This structure creates potential oversight difficulties as a number of different regulators are involved (in this case the UK, Irish, and Spanish authorities). The risk is of regulatory imbalance, with regulatory authorities taking different interpretations or approaches with regard to the application of licensing legislation and guidance, such as in relation to Flight Time Limitation, financial adequacy or ownership and control

6.20 The government proposes to:

- **develop a partnership model with European and international regulators to facilitate flexible and effective oversight of new global business models.** This approach would allow regulators to give a common consistent view/decision to a licence holder(s) and to more effectively leverage resources across different jurisdictions

New technologies

6.21 The government is facilitating the introduction of new technologies to the market through pro-actively working in partnership with industry to understand the safety impacts of technological innovation and the required regulatory framework. The CAA's 2018 Enabling Innovation in Aviation conference brought together leaders from across aviation and other allied sectors to consider and discuss opportunities to develop and adapt its regulatory engagement strategy to keep pace with future trends.

6.22 The CAA has worked in partnership with companies including Amazon Prime Air, uAvionix (electronic surveillance devices), Rolls-Royce (on additive layer manufacturing) and Reaction Engines to understand potential safety issues. This ongoing engagement has supported the development of UK regulatory frameworks which have been ahead of many other states.

6.23 The government and CAA will continue to engage with industry and use horizon scanning techniques to identify and prepare for risks in future technologies such as autonomous vehicles and supersonic technology. This will provide a visible and evolving presentation of future aviation risk based on industry intelligence, and will facilitate innovation.

6.24 New technologies can bring significant economic benefits, including new aviation services. However, they can also present new safety risks to other aircraft and people on the ground. For example, there has been a year on year increase in drone incidents with 71 in 2016 rising to 93 in 2017, and an increase in the number of laser attacks on aircraft in recent years.[140]

6.25 The government and regulator have introduced measures to deal with specific risks to the safety of aircraft, arising from new technologies:

- there has been a significant increase in the number of commercial permissions[141] issued by the CAA in the last year. The number of active commercial licenses increased from 2,500 to 3,800 in 2017, an increase of 52%[142]
- the government introduced legislation in 2018 setting out tougher penalties and providing the police with greater powers to investigate laser attacks on aircraft

140 UK Airprox Board: Airprox reports involving drones and other objects

141 Applications for new commercial activities, such as using drones for building inspections etc.

142 Civil Aviation Authority (2017)

Drones

Drones have the potential to bring great benefits to the UK, including improved productivity and jobs. However, following fast growth in the numbers of drones being used and a year on year increase in drone incidents where they have come into unsafe proximity with airliners or helicopters (71 in 2016, rising to 93 in 2017), the government has introduced new laws to protect the travelling public.

As of 30 July 2018, new laws have restricted small drones from flying above 400 feet and within 1 kilometre of airport boundaries. In addition, new laws will also require owners of drones weighing 250 grams or more to register with the CAA and drone pilots will have to take an online safety test to ensure the UK's skies are safe from irresponsible flyers. These requirements will come into force on 30 November 2019.

In July 2018 the government launched a new consultation on drones. The consultation covered a variety of measures, including whether the airports restriction measure needs to be extended and what powers the police might require to enforce the law. The consultation responses are currently being analysed and the government will set out its plan for action shortly.

Lasers

Lasers have become a growing concern, particularly near airports where they can dazzle and distract both pilots and air traffic controllers with serious and potentially fatal consequences.

In 2003 there had been no reported cases of lasers being shone at an aircraft. In 2017, UK airports reported 989 laser incidents to the CAA.

To tackle this issue the government brought forward the Laser Misuse (Vehicles) Act 2018, which created a specific offence for a person shining a laser at a vehicle including aircraft. The legislation introduced tough penalties for people who target aircraft and strengthened police powers to catch and prosecute offenders.

6.26 New technologies have brought significantly increased numbers of operators into aviation. All aircraft must be safely accommodated, including scheduled flights, General Aviation and new technologies such as drones, in some of the world's most congested airspace.

Electronic conspicuity

6.27 Aircraft equipped with e-conspicuity equipment can actively signal their presence to other airspace users. Such devices also receive signals which alert the pilot to other aircraft in the vicinity thus enabling the pilot see that aircraft and take action to avoid it.

6.28 UK Airprox data indicates that late sighting or no sighting is a significant factor in risk bearing airproxes. Using e-conspicuity could help to reduce the number of mid-air collisions through increasing both the quantity and quality of information for pilots, increasing their situational awareness.

6.29 The CAA has taken forward the Electronic Conspicuity Working Group's work and recently published a technical guide setting out key outcomes to develop a new industry standard for a low cost conspicuity device for light aircraft that is non-technology specific and interoperable.[143]

6.30 The benefits of electronic conspicuity are apparent: reduction in the likelihood of mid-air collision, reduction in the number of airspace infringements (leading to reduced safety separation), increased ability to re-grade airspace to enable greater sharing, and integration of new users, such as unmanned vehicles. The government will work with the CAA and other stakeholders to balance costs and simplicity with the safety benefits electronic conspicuity can bring.

6.31 The government proposes that:

- **there should be mandatory identification of all aircraft in UK airspace**

143 Civil Aviation Authority (2018): Electronic conspicuity devices

6.32 It will work with the CAA and other stakeholders (including international partners) on the best way to achieve this. This form of electronic conspicuity is likely to be a key foundation in developing an effective traffic management system for all airspace users, including manned and unmanned aircraft, within and outside what is currently understood to be 'Controlled Airspace' and enable safely shared airspace.

Improving data and reporting

6.33 The aviation industry has a very strong collaborative and open approach to safety, demonstrated through voluntarily sharing data with the CAA and AAIB. To maintain and encourage more collaboration it is crucial to retain the current confidential and no-blame nature of collecting and investigating incident reports. The government and the CAA need to continue to have an accurate understanding of the risks facing the UK to ensure the regulatory regime keeps pace with a changing aviation environment. This relies on robust data, the technical support to analyse data and a culture that supports reporting and operates with a high level of trust.

6.34 Changes in European regulation made in November 2015 (EU 376/2014) have encouraged more reporting, with a 50% increase in the number of occurrence reports (the reporting of any safety-related event which endangers or which, if not corrected or addressed, could endanger an aircraft, its occupants or any other person) received by the CAA in 2016 compared to 2015. Of these, 99% were not considered high severity, yet still provide valuable information. This is a strong indicator of the positive reporting culture in the UK.[144]

6.35 The UK recently released its redeveloped State Safety Programme which provides the basis through which aviation safety is managed in the UK, including in its Overseas Territories and Crown Dependencies.[145] This new web-based edition is designed to be a living, flexible tool (in accordance with International Civil Aviation Organisation Annex 19 requirements) which demonstrates how the UK is managing aviation safety and aims to provide trust and confidence in the system.

6.36 The programme is based on identifying and prioritising the highest safety risks in a changing aviation environment through a series of Safety Performance Indicators (SPIs). To support the development of the SPIs, the CAA is investing in a 'big data' programme to deliver a technical platform that facilitates information sharing and enables the automation of reporting and application of advanced analytics across a wide range of sources. SPIs will be used as a pro-active means to help identify and prioritise both the highest safety risks and emerging safety risks. This will allow smarter, more targeted and timely interventions to be taken by industry and the regulator to prevent future accidents.

6.37 The aviation industry already has a good record of promoting and maintaining a no blame safety culture (where staff feel confident to report incidents without fear of being castigated), as seen in its high levels of reporting of safety-related incidents. The government wants to build on this, to ensure it is replicated throughout aviation.

144 Civil Aviation Authority (2017): UK Aviation Safety Review for 2016

145 Civil Aviation Authority: State Safety Programme

6.38 Specific measures including collaborating with British Air Line Pilots' Association and the London School of Economics to look at the reporting culture of pilots to the Mandatory Occurrence Reporting scheme to inform future work on safety reporting, to review pilot training, and commission research to better understand how to measure fatigue and to develop robust, yet simple, fatigue self-assessment tools. These measures aim to understand human error as a variable which can be reduced, and so decrease the incidence of aviation accidents.

6.39 A just reporting culture is equally important on the ground. The CAA-led Ground Handling Operations Safety Team (GHOST) works as a partnership between more than 200 industry members and safety regulators to promote a no blame culture and enhance safety on the ground. Initiatives have included an aircraft loading safety film (Safety in the Balance), a guide to ground safety incident reporting and promotional materials. The CAA is also investigating developing a user friendly app which would enhance reporting, particularly in the ground handling and General Aviation sectors.

6.40 The government proposes to:

- **continue to implement the State Safety Programme, through development of the Safety Performance Indicators, supported by appropriate technical tools**
- **encourage more transparent reporting of international data collected by ICAO. A vast amount of safety data is available including through ICAO which undertakes Universal Safety Oversight Audit Programme (USOAP) audits which inform the public about the safety performance of 192 States. To be effective, this information must be transparent and easy to understand**
- **continue to support a no-blame reporting culture across industry, including on the ground, as well as the air**

Responding to global variations in safety standards

6.41 The UK consumer relies on a global aviation system largely outside of the UK's regulatory jurisdiction and with varying safety standards. The UK's objective is to improve safety for UK passengers overseas.

6.42 Information from ICAO safety audits and the EU Air Safety Committee highlight that certain states and operators have poorer safety records. The government also receives occurrence reports from UK operators overseas which highlight areas of concern. Using that data, engagement with UK operators and EU Safety Assessment of Foreign Aircraft (SAFA) scores[146] the government can identify risk areas across the globe.

6.43 The UK has shared its experience through increasing its international capacity building activities in a strategic and sustainable way. Through building relationships and enhancing the UK's global safety reputation, the government will be able to influence decision making at an individual state level and through international organisations.

146 EU inspection programme of aircraft used by operators from outside the EU.

6.44 The UK's State Safety Partnership programme provides targeted safety interventions and support to states of interest to UK passengers, often in collaboration with UK industry. It is essential to build strong and trusted relationships to encourage and facilitate better data sharing to overcome limits in access to formal data on risk in other states. This also helps to strengthen the UK's reputation as a trusted partner across the globe.

6.45 CAAi and the State Safety Partnership programme have a proven track record of success.

State Safety Partnership – Case study 1

In 2009 the CAA noted several serious Mandatory Occurrence Reports (MORs) filed by NATS for carriers from the same State, which is a popular holiday destination for British passengers.

Over several months, a relationship was developed between the UK CAA State Safety Partnership team and the state's regulator and main airline. Workshops and meetings were held to address the issues identified.

In 2009, carriers from this state featured in the top 5 of foreign MORs. In 2018 they no longer feature in the top 20 of foreign MORs. A very positive working partnership still exists and a paper was presented at the 39th ICAO General Assembly in 2019 to highlight the success of a state-to-state partnership approach based on this case.

State Safety Partnership – Case study 2

In 2016, a UK airline approached the State Safety Partnership team with serious concerns about the lack of wildlife hazard management at a foreign airport. A serious birdstrike had recently occurred and the airline's internal safety management system had raised concerns about further operation into this airport if the situation could not be mitigated.

Although the exposure to UK passengers was low (UK passenger numbers to this state for 2017 were fewer than fifty thousand), there would not have been any direct flights between this state and the UK if the airline pulled out of the route. A State Safety Partnership was established through the Department and the local Consulate. This enabled the UK government to hold workshops on safety management, aerodrome infrastructure, and wildlife hazard management with local airport staff. On-the-job training and shadowing were organised for six of the airport staff at a UK airport with a mature wildlife hazard management programme.

The airport has since established a medium-long term wildlife hazard management plan and flights from the UK have continued.

6.46 The government proposes to:

- **significantly scale up the state safety partnership programme by establishing more safety partnerships to improve safety overseas and also facilitate greater sharing of data**
- **diversify funding of safety partnerships to enable long term planning and sustainable growth**

- **establish a strategy and set of criteria for prioritising particular State Safety Partnership projects.** These criteria will be based on the safety risk and UK passenger exposure using the CAA's existing risk matrix so this can be compared with other CAA priorities. This will be assessed alongside value for money, sustainability international priorities as well as long term and wider benefits for the UK
- **facilitate greater cooperation with industry and other states, either in the form of direct funding, data sharing or through shared resource and secondments**
- **take a more targeted approach to ICAO and EASA initiatives including working groups and panels in establishing future standards.** The UK has a large presence on ICAO panels but could be better coordinated and prioritised so that we target particular issues that are of interest to the UK and where our presence and contribution can have the greatest impact
- **increase UK consumers' awareness by publicising the safety record of foreign airlines.** This could be achieved through signposting consumers to publically available information such as the list of airlines banned from flying in the EU
- **encourage ICAO to make their data and assessments of countries more accessible and transparent, highlighting countries with Significant Safety Concerns.** This would allow consumers to make informed decisions as to the risk levels of air travel outside of the UK's regulatory system and outside of EASA's regulatory jurisdiction

Security

Introduction

6.47 The UK is a global leader in aviation security, with one of the best and safest aviation security systems in the world. Highly trained staff oversee a whole range of security procedures, including many that are not visible to the public, creating a formidable, integrated system that is hard to overcome. We also share knowledge and expertise with other countries, encouraging them to adhere to international standards and implement improvements to make the skies safer for everyone.

6.48 However, the UK is not complacent. The government is working hard to ensure that aviation security remains extremely effective, while also prioritising a smooth experience for passengers and operational efficiency. It will keep the UK at the forefront of aviation security globally, and set the benchmark to which others aspire.

Customer experience

6.49 The government has worked hard with UK airports to deliver a high-quality experience at security for passengers, while maintaining robust and proportionate security standards to deter and detect those who would look to do harm. The industry's investment in modern equipment and focus on staff recruitment and training staff have had a significant positive impact on the customer experience.

6.50 This is borne out by feedback from passengers. In 2017 the majority (85%) of air passengers surveyed said they were very satisfied or satisfied with their experiences of security screening. Only 3% said they were very dissatisfied or dissatisfied.[147]

6.51 The average queuing time in 2017, based on passengers' estimates of how long they queued, was 7.1 minutes. The majority (63%) of passengers surveyed said they queued for 5 minutes or less. The majority of passengers (93%) strongly agreed or agreed that any inconvenience caused by the security screening was acceptable.[148]

6.52 As it maintains and enhances its strong aviation security system, the government will work with airports to further improve its already high-quality experience for passengers, including making the most of new technology to make it quicker and easier to move through security at airports.

Threat to aviation

6.53 The threat to commercial civil aviation has developed over recent years, and some terrorists have the intent and capability to carry out complex attacks. Attacks and attempts by terrorists over recent decades, including Daesh's attempt to target a passenger aircraft flying from Australia in July 2017, show that the global aviation system remains a symbolic target for terrorists worldwide. The threat to aviation will continue to evolve and diversify, and the UK's approach to aviation security needs to develop and adapt accordingly.

Figure 21 Threats to aviation timeline

147 Department for Transport: Air passenger experience of security screening 2017 (revised). Passenger survey conducted at Heathrow, Gatwick, Manchester, Stansted and Luton

148 As above

Driving global action

6.54 The threat to aviation is truly global, so improving the standard of aviation security around the world is essential to make the skies safer for everyone. The UK has made one of the largest contributions to driving up global aviation security standards. We led the work on UN Security Council Resolution (UNSCR) 23091 to raise the profile of aviation security in the multilateral system. The UK pushed for the first ever Global Aviation Security Plan (GASeP), produced by ICAO and now being implemented around the world.

6.55 But raising standards in global aviation security is not something the UK can achieve alone. The government will continue to work closely with industry and international partners to deliver a step change in aviation security to get ahead of the threat and keep UK citizens safe and secure, both at home and overseas. The UK has made a significant contribution across Europe, including the establishment of the Air Cargo or Mail Carrier operating into the Union from a Third Country Airport (ACC3) cargo regime to enhance standards of cargo screening from third countries.

6.56 Since November 2015, the government has invested over £20m to develop its Aviation Security Liaison Officer (ASLO) network, significantly expanding its overseas capability to work with host states to improve aviation security standards. The government has undertaken over 300 technical aviation security assessments across over 60 airports in over 30 countries. Working with host states, it has delivered over 200 training courses, enhancing the skills of over 3000 security staff at overseas airports including screening staff, specialist operators and security managers. In addition, the government has provided security screening and detection equipment to increase the capability of other countries to detect threats at airports with flights to the UK. The UK's new aviation security capability is among the best in the world, securing unprecedented access to overseas airports through a network of aviation security experts and a cooperative approach to working with host states.

World leader

6.57 The UK is a global leader in aviation security within the UK. This is underpinned by a world class intelligence capability, a multi-agency approach within government, a strong and well-established regulator, cutting edge policy capability and a dynamic industry willing to innovate and invest private capital in security.

6.58 The government has acted to ensure that the UK has one of the strongest aviation security frameworks in the world. It has adopted More Stringent Measures (MSMs) over and above the EU standard, to provide even greater assurance against attacks on flights leaving the UK. The UK continues to be at the forefront of technology development and deployment, trialling the very latest 3-Dimensional Computed Tomography (CT) screening equipment for cabin baggage and rolling out the new Standard 3 (HBS3) screening for hold baggage.

6.59 But there remains more to do. The UK Aviation Security Strategy sets out a proactive approach to getting ahead of threats to aviation. While the detail of the strategy is necessarily highly sensitive, the work focuses around six core themes:

- confident: collective confidence in aviation security, ensuring a shared understanding of risk and proactively testing the system
- comprehensive: an aviation system that is a hard target, where we take an end-to-end view of our options to deter, detect and disrupt terrorist activities that target aviation
- concentrated: a data-driven approach to identify and target higher risk people and goods
- collaborative: a collaborative approach to information sharing, policy making and regulation
- co-operative: increased quality and full implementation of international aviation security standards, driven by co-operation with international partners, multilateral bodies and industry, and underpinned by a greater understanding of host state capabilities
- capable: building capability and culture, a new focus on the human element to drive capability, skills, morale and resilience

6.60 Science and technology is critical to the delivery of the government's strategy and underpins all of aviation security. The strategy aims to focus across all aspects of science and technology, such as innovative solutions and new and improved ways of working that can be applied across the whole aviation system. The government is supporting future technology development through £25 million of funding in the Future Aviation Security Solutions (FASS) Programme, to drive innovation in aviation security science and technology and proposes to:

- **provide access to new and improved ways of achieving security outcomes, including development of solutions for future security challenges.** Science and technology will have an impact across the whole end-to-end aviation security system

Cyber threat to aviation

6.61 As the aviation system embraces new technology, there will be new operational ideas, more products developed using open standards, and increased sharing of data and networking of systems. These newly evolved systems are not without risks, including from cyber threats.

6.62 The government will ensure that the UK's transport sector remains safe, secure and resilient in the face of cyber threats, and is able to thrive in an increasingly interconnected, digital world.

6.63 The government published an Aviation Cyber Security Strategy in 2018 to help industry protect civil aviation from malicious and unintended interference. It focuses on:

- understanding the risks posed by cyber threats to, and vulnerabilities within, the transport sector, and their potential consequences
- managing cyber risks and taking appropriate and proportionate action to protect key assets

- responding to, and recovering from, cyber incidents effectively and ensuring that lessons are learnt
- promoting cultural change, raising awareness and building cyber capability

6.64 The government is working with the National Cyber Security Centre (NCSC), industry and key stakeholders to gain a fuller understanding of the sector, the systems used and how best to support industry, in line with implementation of the Network and Information Systems Directive. It has already worked with the NCSC to produce key guidance to help the aviation industry to mitigate cyber risk. It is working with industry to ensure cyber security is built into new technology from the design phase. This includes impeding hardware interference, agreeing international standards for security, and providing guidance, to reduce the avenues through which cyber-attacks can be conducted.

Regulatory burden

6.65 All airports in the UK, regardless of their size, are required to conform to the same safety and security regulations required by the regulator and the government. The safety and security of the travelling public is always of the utmost importance, and the UK is a world leader in aviation security and safety.

6.66 Domestically, the government and the aviation industry invest to ensure that the very latest technology is in place to keep passenger and cargo safe and secure, and the government is committed to further improving the passenger and cargo experience, using better, faster equipment to provide an increasingly seamless passenger journey.

6.67 However, the government recognises that for smaller airports the costs per passenger of achieving these objectives are often significantly higher than their larger counterparts and it is sometimes harder for them to pass costs on to airlines due to the comparative power of the airline.

6.68 Many security and safety regulations are integrated into the airport license set out by the CAA, and maintaining these standards is paramount when considering any policy changes. The Regional and Business Airports Group (RABA) recently published a briefing paper investigating the regulatory and policy challenges for smaller airports and the government encourages industry to submit evidence of any disproportionate regulatory burden as part of the Aviation Strategy consultation process.

Commitments

6.69 Through the Aviation Security Strategy, the government has committed to a major programme of work in partnership with industry to get ahead of the threat to aviation. While much of this is highly sensitive, major commitments include:

- proactively challenging the aviation security system, conducting exercises and tests to identify potential vulnerabilities and close them before they are targeted by terrorists
- understanding and identifying sources and data that could be used to support aviation security, and to target increased security screening on passengers and cargo based on risk

- supporting wider activities at the UK border to deliver advances in passports, visas and using biometric data for identification
- working with international partners to help support skills and capacity development, alongside the implementation of international standards, building ever safer and more secure international aviation, particularly with countries where the threat is highest
- restricting access to information and resources that may aid those planning to attack aviation, as well as developing integrated solutions to tackle emerging challenges, such as cyber
- working with industry to support the development and implementation of new and innovative technological solutions, such as the next generation of cabin baggage screening equipment, to build upon the already high-quality technology and deliver a better experience for passengers
- finally, recognising the vital role of those who work in aviation security roles by supporting industry to develop career pathways and accreditation, recognising, respecting and rewarding the skills and professionalism within the industry

Consultation questions

Consider the policy proposals in this chapter and answer the following either for the chapter as a whole; groups of policies within the chapter and/or individual policies:

1. **How could the policy proposals be improved to maximise their impact and effectiveness in addressing the issues that have been identified?**
2. **How should the proposals described be prioritised, based on their importance and urgency?**
3. **Are you aware of any relevant additional evidence that should be taken into account?**
4. **What implementation issues need to be considered and how should these be approached?**
5. **What burdens, both financial and regulatory, are likely to need to be managed and how might those be addressed?**
6. **Are there any options or policy approaches that have not been included in this chapter that should be considered for inclusion in the Aviation Strategy?**
7. **Looking ahead to 2050, are there any other long term challenges which need to be addressed?**
8. **To what extent do these proposals sufficiently address existing and emerging safety and security risks in order to maintain business and passenger confidence in the UK aviation industry and in the UK as a destination?**

Support General Aviation

7. Support General Aviation

The government aims to ensure that there are appropriate and proportionate policies in place to protect and support General Aviation (GA) and its contribution to GDP and jobs. The government recognises that the needs of GA have to be seen in the wider context of civil and military aviation. In areas such as the use of airspace and the allocation of slots it is important to balance the needs of private flying, commercial GA and scheduled aviation, so that all classes of aviation are properly and proportionately considered and the benefits GA can be supported.

Introduction

7.1 The GA sector covers all kinds of non-scheduled civil aviation. It includes, amongst other things, business jets, aerial photography, pilot training, emergency service flights and air displays as well as private flying. The aircraft involved include single and multi-engine fixed wing aeroplanes, helicopters, gliders, balloons, microlights, paragliders and model aircraft. GA activity falls into two main types – commercial aviation, predominantly represented by business aviation and non-commercial activity, predominantly covering sport, recreational and personal transport aviation. The GA community is a diverse group and different sections within it may have differing, sometimes conflicting, priorities.

7.2 In 2014 the CAA set up its General Aviation Unit to support and encourage a dynamic GA sector in the UK, and encourage the European Aviation Safety Agency (EASA) to take the same approach. In 2015 the government published the first GA Strategy, outlining its vision for UK GA and recognising its potential as a wealth generating, and job producing sector of the economy. The core of the 2015 GA Strategy remains government policy.[149]

7.3 The development of the Aviation Strategy gives the government an opportunity to reflect on the needs and priorities in the sector, listen to feedback from the GA community and refresh the 2015 Strategy as appropriate.

7.4 The research that underpinned the 2015 GA Strategy identified that GA directly supports almost 10,000 jobs and indirectly nearly 30,000 more. Many are skilled careers, including aerospace engineers, those involved in advanced avionics and those training the next generation of pilots. Other jobs include a wide range of activities from airfield and operations management to catering and building/office support.

149 Department for Transport (2015): General Aviation Strategy

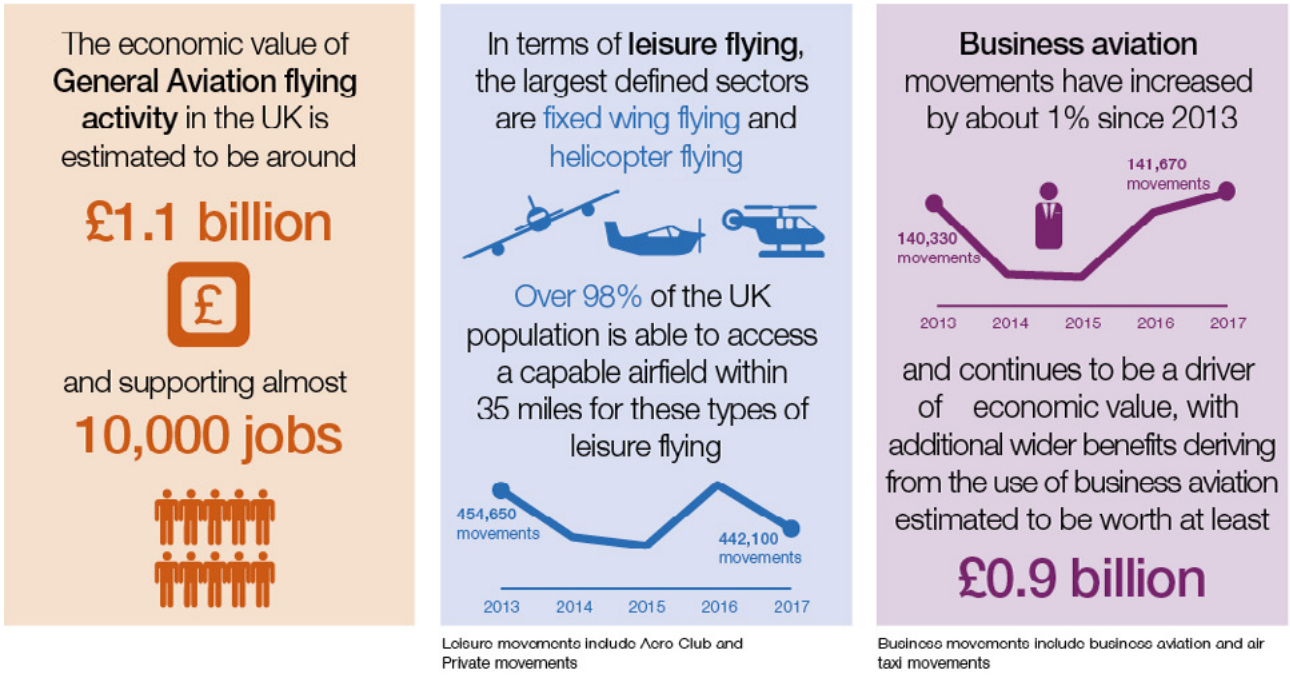


Figure 22 General Aviation in context
Source: : York Aviation (2018): Research into a strategic network of General Aviation aerodromes; Department for Transport analysis of Civil Aviation Authority: Airport data

7.6 New research commissioned by the government has confirmed that the economic benefits of GA come from a range of activities such as business aviation operations, flying schools, air displays, and support services and some additional value from the purchase of aircraft and services by private flyers.[150]

7.7 The government recognises the contribution of GA to the wider aviation sector. GA still represents the entry point into aviation for many that go on to have full careers in commercial aviation. Despite the deregulatory approach outlined in the 2015 Strategy, and the creation of a dedicated GA Unit at the CAA, overall GA activity in the UK has not increased and private GA has reduced in recent years.

7.8 This chapter sets out how the government proposes to enable, facilitate and encourage growth in GA, and indicate where it thinks that the GA sector itself should seize the initiative and capitalise on opportunities. The chapter covers:

- reducing regulation
- General Aviation Strategic Network
- supporting commercial activities
- airspace
- safety
- training
- skills
- environmental impacts of GA

150 York Aviation (2018): Research into a strategic network of General Aviation aerodromes

Reduce regulatory burden on GA

7.9 The government's objective is to continue to reduce regulatory burdens for businesses and to continue to help support high standards of GA safety across Europe.

7.10 The regulation of GA, mostly governed by European Aviation Safety Regulations (EASA), is as varied as the sector itself. This includes requirements relating to noise, to licensing and to safety. Much business GA regulation depends on distinctions based on aircraft weight, engine type, passengers and pilot numbers.

7.11 For private flying there is a range of licence types, together with ratings for the types of aircraft flown.

7.12 Pilots need a valid and appropriate class or type rating in order to do any flying other than receive flight instruction or carry out a skill test or proficiency check for the renewal of type or class rating.

7.13 The sector plays a critical partnership role for the government in suggesting where there is potential for deregulation and more proportionate rules and by actively supporting and reviewing the development of the rules and associated impact assessments. For example:

- new and proportionate regulations for balloons have now been introduced, with lighter regulations for sailplanes (gliders) to follow
- the industry has proposed further liberalisation to allow all types of training to be conducted in appropriate Permit to Fly aircraft, following on from changes to the legislation to allow some types of training to be conducted in such aircraft. The CAA is now working with industry to introduce this change

7.14 The government proposes to:

- **continue working with EASA to develop a proportionate regulatory framework for GA and reduce burdens including the development of the EASA GA Road Map and an aim of simpler, lighter, better regulation for GA; this was a commitment under the 2015 GA Strategy**
- **continue to identify opportunities to reduce regulatory burdens by rigorously assessing and minimising the impact of new and existing regulation**

GA Strategic Network and planning

7.15 GA activity takes place at almost all aerodromes. Commercial GA is located at many larger aerodromes and much private flying at smaller aerodromes. Some types of GA, such as paragliding and model flying, do not always use aerodromes.

7.16 GA aerodromes vary in how successful they are at meeting the challenges of changes in aviation. Some are growing, others are losing business and a few have closed, the land being used for other purposes. Continuing population growth and demand for housing development means there are strong economic incentives for aerodrome owners to sell part or all of their land and more aerodromes may be lost to development, with particular pressures in the South East.

7.17 The government's new National Planning Policy Framework was published in July 2018. It requires planners to "recognise the importance of maintaining a national network of GA airfields, and their need to adapt and change over time – taking into account their economic value in serving business, leisure, training and emergency service needs, and the government's General Aviation Strategy."[151]

7.18 To provide recommendations for how to give effect to this, the government appointed a GA Champion, Byron Davies, to recommend a methodology to identify the contribution of GA aerodromes to inform the development of a General Aviation Strategic Network (GASN) of aerodromes. The intention of the GASN is to ensure an appropriate balance between transport and housing development priorities, protecting the GA sector's contribution to the UK economy.

7.19 The government is grateful to the GA Champion for his extensive engagement with the GA community on the issue of defining a GASN and welcomes his report, published alongside this document.[152] The government is considering its recommendations and welcomes feedback on the report's recommendations through this Aviation Strategy consultation process, particularly those related to the GA Strategic Network.

7.20 The GA Champion sought the views of numerous individuals, groups and organisations to inform his report, and visited numerous airfields. A full list is included in the Champion's report. Groups included:

- Aircraft Owners and Pilots Association
- British Business and General Aviation Association
- British Helicopter Association
- General Aviation Alliance
- Light Aircraft Association

7.21 The GA Champion's report concluded that the GA sector is losing airfields to property developers and that there is a risk to the long-term viability of UK airfields. He made several recommendations, including that:

- the Department for Transport and the Ministry of Housing, Communities and Local Government (MHCLG) develop planning practice guidance to provide further detail on how planning authorities can recognise the importance of maintaining airfields that qualify as part of a strategic network
- the Department for Transport to consider whether safeguarding (discussed further below) should be made obligatory by Statutory Direction
- in the longer term, serious consideration should be given to developing mixed use airfields, where GA, industry and housing can co-exist

151 Ministry of Housing, Communities and Local Government (2018): National Planning Policy Framework

152 Byron Davies, GA Champion (2018): General Aviation Strategic Network Recommendations

7.22 To support the GA Champion's important work, the government commissioned York Aviation to carry out supporting research to identify airfields of strategic significance. This research is also published alongside this consultation document. As part of its research, York Aviation considered a number of broad issues including identifying specialist sites, in relation to :

- business GA
- helicopters
- gliding
- microlights
- parachuting
- hang gliding and parascending

7.23 Aerodromes in the GASN could be identified in two ways:

- publication of a set of criteria that, if met, would enable an airfield to identify itself as being part of the strategic network. Under this approach, individual aerodromes or their users could bid for the aerodrome to be identified as part of the GASN and local authorities would have to take this into consideration when planning applications are made
- production by the government of a list of airfields that comprise the network, based on the criteria identified by the GA Champion and York Aviation. The list could be periodically updated

Strategic network – proposed criteria (source: GA Champion; York Aviation)

Quantitative considerations

- the economic value of GA and GA airfields
- different GA user groups
- future needs of the network
- role of commercial airports
- role of military airfields
- competitive environment in which airfields operate

Qualitative considerations

- financial viability
- scale of facilities and investment in hanger facilities and, specialised engineering facilities
- emergency services use
- heritage value
- community engagement and education

7.24 The government believes that there are potential advantages and disadvantages to identifying and protecting a GASN which identifies a subset of airfields and the government would welcome views. Advantages include:

- a subset of aerodromes that make a particularly significant contribution to the value of GA is identified, of which planners will need to recognise the importance
- increased certainty is provided to aerodromes and communities of the status of aerodromes in the local area and region
- the methodology used to identify airfields could act as an incentive to aerodromes to increase the facilities that they offer their customers and their educational and community work
- the presence of an aerodrome on the GASN could provide a level of prominence and would give greater weighting to an aerodrome

7.25 There are corresponding disadvantages:

- an aerodrome owner might consider that designation as part of the GASN could reduce the value of the site for some other purpose such as housing. They could also appeal for the aerodrome to be removed from the network
- aerodromes that are not in the network might be more exposed to development and the consequent negative impacts on the GA sector could outweigh the benefits that those that are part of the network benefit from
- parts of the GA community feel that the network is a crude tool and that there should be separate networks for all of the different kinds of business and leisure users. Others feel that all aerodromes should be protected rather than a selected few

Supporting new and existing commercial activities

7.26 The government proposes to support new and promote existing business in the GA sector, such as through:

- **continuing to allow paid for flights in historic aircraft that cannot meet the safety criteria for commercial air transport operations where participants have the risks explained to them and accept them** under the CAA's Safety Standards and Acknowledgement and Consent process (such as flights in two seat Spitfire aircraft)
- **enabling new activities of skytyping and skywriting by consulting on changes to the secondary legislation that regulates aerial advertising.**[153] Skytyping is an aerial activity that delivers a line of text in the sky visible from the ground. Skywriting is the formation of letters and symbols visible from the ground from a smoke trail made by an aircraft manoeuvring in the sky. This separate, statutory, consultation will take place once parliamentary time permits.

153 The Civil Aviation (Aerial Advertising) Regulations 1995

- **consulting next year on the principles for the next night flight regime for the period beyond the current regime, which ends in 2022.** The government is aware that night flight restrictions at some London airports are having an impact on the business GA sector, resulting in difficulties in operators obtaining slots for ad-hoc movements at short notice during the night quota period.

Airspace

7.27 Just as aerodromes are essential to allow GA to operate, so to is access to airspace. Historically, the majority of airspace change requests have seen unrestricted airspace change to airspace where there are restrictions to certain classes of aircraft. This can limit the access to that airspace for certain sections of the GA community.

7.28 As set out in Chapter 3, the overall objective for airspace modernisation is to deliver quicker, quieter and cleaner journeys and more capacity for the benefit of those who use and are affected by UK airspace. This is defined within a set of parameters, and importantly for GA, this includes the use of the minimum volume of controlled airspace consistent with safe and efficient air traffic operations. The government and CAA have committed to co-sponsor airspace modernisation and will work collaboratively with all key stakeholders, including GA, to support delivery in a way that balances the objectives of each stakeholder group.

7.29 As part of this work, the government and CAA have asked NATS to work with key stakeholders to develop a coordinated implementation plan and timeline for airspace changes (or airspace change masterplan) that will be required in the future in the south of the UK. The masterplan will identify where airspace changes are needed to deliver safety, capacity, noise reduction, air quality, fuel efficiency, access to airspace for users (including where controlled airspace is no longer justified or should be a different classification), military access, or to introduce new technology.

7.30 Airspace modernisation is expected to improve access to airspace for GA, by enabling greater integration, rather than segregation of different airspace user groups. To assure the safety of commercial air transport flights, GA is constrained to an extent by the segregation between controlled and uncontrolled airspace. However, the forecast growth in traffic and technological advancements will require access to the finite volume of UK airspace. To facilitate access by all airspace users to the greatest extent possible, there must be a transition towards greater integration of air traffic, where it is safe to do so. Achieving this will require a consideration of new airspace designs, operating procedures, technologies and equipment. A key facilitator to achieving greater airspace sharing will be greater electronic conspicuity.

Safety

7.31 In its response to the Aviation Strategy call for evidence, the government committed to review the proportionality of the safety regime, bearing in mind the safety record of GA, in relation to both other types of aviation and other activities. The government proposes to:

- **review the UK's approach to GA safety to re-evaluate the risk picture and risk appetite, with the review to be led by an independent chair.** Chapter 6 sets out further details of the review.

7.32 The UK is proud of its current safety record across all areas of the aviation system, but risk remains concentrated outside of scheduled commercial passenger flights in both fixed wing aircraft and helicopters. 80% of accidents, serious incidents (including near misses with scheduled aircraft) or high severity occurrences involved GA aircraft, in some cases having an impact on third parties.[154]

7.33 The delegation of certain safety and oversight activities in aviation has been successful, for example in the case of gliding and certain tasks undertaken by the Light Aircraft Association and British Microlight Aircraft Association under CAA Approvals. As part of the safety review, the government proposes that the reviewer should:

154 Civil Aviation Authority (2017): UK Aviation Safety Review for 2016

- **work with the CAA to consider the delegation of responsibility to the GA sector where it is appropriate, and where there are no adverse safety implications and where an accountable and proficient body is able to assume responsibility**

7.34 The UK must safely accommodate an increasing number of users in some of the world's most congested airspace. As set out in Chapter 6, **the government proposes that there should be mandatory identification of all aircraft in UK airspace.**

7.35 Electronic conspicuity devices allow an aircraft to determine its own position and then broadcast that information to other aircraft in its vicinity, and receiving stations on the ground, providing greater situational awareness. Mandating such technology would mitigate the significant risks of mid-air collisions, and increase the ability to regrade airspace to enable greater sharing of airspace.

7.36 In addition, the government proposes to:

- **introduce civil sanctions for Air Navigation Order offences**

7.37 Expanded options would widen the CAA's powers to include directions to rectify the situation; require binding undertakings or to fine offenders. At present the CAA has no enforcement options between a warning letter on the one hand and court action or the removal of licenses and permissions on the other. This proposal would provide a more proportionate focus on corrective responses rather than punitive measures for more minor offences. The government will look for an appropriate legislative opportunity to take this proposal forward.

7.38 The AAIB's report of the 22 August 2015 Shoreham Airshow accident recommended that Department for Transport (DfT) commission an independent review of the governance of flying display activity in the UK. The independent review, completed by Helios, was published in July 2017. The government proposes to:

- **work with the CAA and air display community to take the report's recommendations forward**[155]

155 Helios (2018): Review of UK civil flying display and special event governance

Review of UK Civil Flying Display and Special Event Governance

The review concluded that no alternative form of governance that would lead to further improvements within UK flying display activity has been identified, and that a transition towards greater self-governance by the display industry would not be an appropriate course of action.

It found that the CAA is strongly independent, including from industry, and it has improved in openness and transparency.

It recommended that the CAA:

- could provide greater guidance and advice
- could have a greater clarity of purpose
- should work to increase understanding of safety risks with industry and the flying display community

The CAA has accepted these recommendations and is implementing them.

Safeguarding for safe development

7.39 Safeguarding is intended to monitor and arbitrate developments in the vicinity of aerodromes that could interfere with their safe operation. Unofficial safeguarding will be appropriate to the majority of aerodromes.

7.40 Safeguarding in the context of aerodromes refers to a requirement for local authorities to consult with aerodromes when planning permission for buildings that may interfere with the operation of the airport is being considered. Two different safeguarding options are available:

- official safeguarding gives a role to the CAA with regards to planning applications in the vicinity of the aerodrome in question; currently 42 aerodromes are officially safeguarded

- unofficial safeguarding does not require the CAA to be involved but allows for a consultative process between the aerodrome and the local authority

7.41 The government proposes that:

- **every aerodrome should adopt either official or unofficial safeguarding and does not propose mandatory official safeguarding**

Training and skills

7.42 Chapter 4 explores a range of issues within aviation that are affecting the UK's pool of talent and skills, issues such as including barriers to training, diversity, retention, and resourcing of skilled staff. The government understands that some of these issues have particular implications for GA.

7.43 As outlined in Chapter 4, if the government were to consider VAT relief, the industry would need to provide viable industry-led solutions that would work in conjunction with that relief, to further reduce the cost of training to an attainable level. In addition, any VAT exemption for pilot training would need to be implemented alongside a suitable regulatory framework for providers in order to comply with existing VAT rules for education and training. It is important to highlight that a VAT exemption for flight training could result in increased input VAT costs for training providers, potentially increasing the overall cost of provision. Careful modelling would be required in order to understand the impact on trainees, providers and airlines.

7.44 The government is aware of concerns that have been raised around the process for approving apprenticeship standards with the Institute for Apprenticeships (IfA), such as standards for engineering skills relevant to GA. At the beginning of 2018, the IfA published details of reforms to streamline the way it works with employers in developing new standards. The Institute's Faster and Better programme aims to simplify aspects of the standards development process. Furthermore in October of this year, further funding was pledged to the IfA. The government proposes to discontinue the old frameworks so that all new apprenticeships will be on the same higher-quality standards by the start of the 2020/21 academic year.

7.45 The changes to the IFA processes are aimed at providing flexibility for businesses so they can take full advantage of the benefits of employing apprentices, and to help as many people as possible find the right training to equip them for the new economy. The government encourages the GA community to:

- continue to contribute to the creation of standards as part of the trailblazer group process. The government remains committed to promoting GA training and understands the challenges the community faces.

7.46 In addition, as set out in Chapter 4, the government proposes to:

- **work with the CAA and industry to investigate the potential for reducing the costs of pilot training through greater use of technological alternatives, such as simulators and virtual reality, to the extent this would not compromise safety**

Environmental impact of GA

7.47 The environmental impacts of aviation come primarily from the commercial sector in terms of noise, mileage and fuel consumption, and the government's policy proposals on noise and air quality in chapter 3 therefore apply only to larger commercial airports and airlines. However, the GA sector also has a responsibility to follow and promote good practice in terms of their environmental impacts.

7.48 Many who fly in light aircraft note that it increases their appreciation of the UK's natural and heritage environment. Some modes of GA such as balloons and gliders are noted for their quietness compared to other transport modes. However, GA can also have adverse noise and other environmental impacts.

7.49 This is particularly the case where arrivals, departures and circular flights can lead to periods of intense or consistent activity at aerodromes, including at weekends, that can be disturbing for some local residents. Helicopter activity can also be particularly intrusive due to the fact that helicopters tend to fly at low altitudes and can hover for some time at a single location.

7.50 For many aerodromes the only constraints in terms of noise are those imposed by the planning process, which have effect when major infrastructure is created. Some General Aviation activity takes place under the 28-day planning threshold which permits land to be used for purposes other than those for which planning permission has been given for a period no longer than 28 days.

7.51 A number of codes of practice have been established:

- Code of Practice on Noise from Model Aircraft[156]
- British Helicopter Association Pilots Code of Conduct in 2008[157]
- CAA's Noise Considerations at GA Aerodromes[158]

7.52 The government proposes that the GA sector should:

- **develop and review its codes of practice and would be interested to know how useful and effective these codes of practice have been**

156 Department for Transport (1982): Code of practice on noise from model aircraft

157 Civil Helicopter Association (2008): The Civil Helicopter In The Community

158 CAA (2012): Noise Considerations at General Aviation (GA) Aerodromes

Refreshing the 2015 GA Strategy

7.53 The 2015 GA Strategy contained 20 actions for the government to take forward. Ministers have reviewed progress against these annually with the General and Business Aviation Strategic Forum. The government has concluded that nine of these have been achieved, three have been overtaken by changes in government policy and eight are still active.

7.54 The eight active actions form a core part of the government's ongoing work programme and will continue to be progressed and can be summarised in the following nine points:

- effective engagement with the GA communities and ministerial support for GA initiatives
- support the CAA in delivering the principles for the regulation of GA developed from its response to the GA Red Tape Challenge process to:
  - only regulate directly when necessary and do so proportionately
  - deregulate where possible
  - delegate where it is safe to do so
  - do not gold plate regulation
- bring forward legislative reform to introduce civil sanctions for ANO offences
- provide an appropriate GA perspective to government policy on apprenticeships and aviation skills
- influence the EASA GA Road Map

7.55 The government will continue to monitor these with the General and Business Aviation Strategic Forum.

Towards the future

7.56 In the longer term, the GA sector will face further pressures from the growth of commercial aviation and on environmental issues; and challenges, as well as opportunities, from innovative and emerging technologies. The distinction between model aircraft and drones is already becoming blurred but it is recognised the intent and operation of each is very different. The nature of personal air transport will change as air taxis and further technological innovation develops. If GA is to continue to encompass all types of non-scheduled civil flying, it will need to expand and embrace some fundamentally different types of flying and operations than those that it has traditionally encompassed.

Consultation questions

Consider the policy proposals in each chapter and answer the following either for the chapter as a whole; groups of policies within the chapter and/or individual policies:

1. How could the policy proposals be improved to maximise their impact and effectiveness in addressing the issues that have been identified?
2. How should the proposals described be prioritised, based on their importance and urgency?
3. Are you aware of any relevant additional evidence that should be taken into account?
4. What implementation issues need to be considered and how should these be approached?
5. What burdens, both financial and regulatory, are likely to need to be managed and how might those be addressed?
6. Are there any options or policy approaches that have not been included in this chapter that should be considered for inclusion in the Aviation Strategy?
7. Looking ahead to 2050, are there any other long term challenges which need to be addressed?
8. To what extent do these proposals strike the right balance between the needs of General Aviation and the rest of the aviation sector?

Encourage innovation and new technology

8. Encourage innovation and new technology

Promoting the development of innovation and technology will be a core part of the Aviation Strategy. The government wants the sector to make the best use of new technology for the benefit of consumers and to build on the aviation sector's track record of success in encouraging innovation.

Introduction

8.1 Innovation is key to delivering the outcomes of the Aviation Strategy. The government recognises the important role that technological advances and new business models play in economic growth, especially in industries such as aviation and aerospace. The aviation and aerospace sectors have a record of historic success, from the pioneering development of the jet engine in the 20th century to the cutting edge development of new technologies. It has demonstrated its capability to lead these changes independently of government, but the government recognises that it has a crucial role in removing barriers and creating the right environment for innovation to flourish.

8.2 The so-called 'Fourth Industrial Revolution' is building on the digital revolution of recent years with rapid technological changes which have the potential to fundamentally alter the way we live, work and move around. A mobility revolution is also underway, driven by innovation in automation, electrification and digitalisation. The government wants to capture the benefits this will bring for:

- consumers – by unlocking mobility and offering new options on how people and goods can move around
- the aerospace and aviation sectors – to maintain the UK's global leadership, help support jobs, increase productivity, and boost our trade and export capabilities

8.3 Aviation and aerospace are already a source of significant research and development (R&D) investment in the UK. The Industrial Strategy set out the commitment to reach 2.4% of GDP investment in R&D by 2027 and 3% of GDP in the longer term, recognising the critical importance of R&D investment for driving productivity and establishing the UK's leadership in global markets.[159] Increasing levels of R&D investment will create opportunities to build on aviation's track record of success in encouraging innovation, and the government is committed to using its full range of policy levers to support this.

8.4 This chapter:

- sets out some of the main areas of opportunity for innovation in aviation – automation, electrification and digitalisation and data sharing

159 Department for Business, Energy and Industrial Strategy (2018): Industrial Strategy

- identifies some of the barriers to innovation and how these can be addressed by the government in its enabling role, working in partnership with the sector
- proposes measures to better align policy and investment

Opportunities for Innovation

Automation

8.5 Aircraft are already automated to some degree, with systems like autopilot used to assist pilots during flight. Human factors were one of the main causes for accidents in the aviation sector in the 1950s and 1960s. This drove the development of technological solutions to support pilots in managing factors that could result in the loss of an aircraft, such as the impact of fatigue. This led to the introduction of automated systems such as autopilot and the auto-throttle, following which the number of aviation accidents fell sharply after the mid-1950s. Human error is reported to be a primary contributor to more than 70% of commercial airplane hull-loss accidents.[160]

160 Boeing: Aero Magazine, Human Factors

8.6 The aviation industry is continuing to shift towards greater automation of flight and associated ground infrastructure. Increasingly automated, and potentially fully autonomous, processes will likely play an important role in shaping the dynamic between the aircrew and on-board systems, enabling safer operations. New opportunities and challenges could arise from increasing automation in aviation which the government will need to be fully prepared for.

8.7 Automated systems offer a range of opportunities for the aviation industry, aiding in improvements to safety, potential environmental benefits and consumer benefits. The Aerospace Technology Institute (ATI) has published a technology strategy for the UK, which includes developing more advanced systems, such as sensing and avoiding other aircraft. Working with the government and Innovate UK, ATI seeks to support world leading aerospace technologies in the UK. This includes elements of automation, such as approaches to factory automation and robotics for manufacturing and assembly, as well as R&D that explores key factors to move towards single crew operations in future aircraft.

8.8 The rapid expansion of the drones market in the UK, alongside an increasing volume of other air traffic, means that traditional air traffic management methods and systems need to evolve. If we are to fully realise the social and economic benefits presented by unmanned aircraft, while maintaining public safety and confidence, we need a highly automated system capable of tracking and coordinating the unmanned portion of air traffic. Without the capability to integrate unmanned systems with manned aviation in congested areas, it is unlikely the full potential of drones will be realised in the UK.

8.9 The government has funded a development programme, led by the Transport Systems Catapult, on the requirements of an Unmanned Traffic Management (UTM). The results of this work will feed into future policy development. The government proposes to:

- **work with the CAA and industry to determine the next steps for UTM technology and regulation in the UK, and more widely consider the impact that UTM will have on the aviation sector as a whole**

8.10 The government wants to maximise the benefits that greater automation and autonomy can bring, while minimising the risks that can arise (see Chapter 6 for further details). The government proposes that:

- **there should be mandatory identification of all aircraft in our airspace**

8.11 This form of electronic conspicuity is a key foundation in developing the next generation of traffic management system for all airspace users, both for manned and unmanned aircraft. The government will work with the CAA on the best way to achieve the right level of conspicuity for all airspace users.

Electrification

8.12 Hybrid and fully-electric aircraft have the potential to transform aviation through:

- new air mobility solutions which open up new electric regional routes and urban/city air services, providing greater options on how people and goods can move around and bringing higher national productivity and mobility
- offering new markets for the UK aerospace industry globally
- tackling a number of the environmental impacts of aviation, including reducing carbon dioxide and NOx emissions. As part of this, there is a need to better understand the changing noise impacts of electric aircraft. The electrification of existing technologies is primarily being driven by the combination of fuel costs and environmental requirements

8.13 In a global race to exploit the potential of new ways of travelling, there is intense competition from industry to develop these technologies, as demonstrated by the increasing number of electric, hybrid-electric, autonomous and VTOL (vertical take-off and lift) concepts being developed. These aircraft could transform how people travel between places, with some business models offering regional connectivity which will improve mobility, while other models focus on urban air mobility solutions. The government is working with industry and academia to understand whether there is a potential commercial market for these platforms before it can examine the role of government and how best to support this emerging sector.

8.14 Electrification could present significant opportunities for the UK. The market for conventional aircraft will continue to represent significant value to the UK economy, generating estimated global revenues of around £5.6 trillion in the period up to 2050. As conventional aircraft decline in sales volume throughout this period, hybrid-electric aircraft and all-electric aircraft will enter the market. Hybrid-electric aircraft could generate up to £4 trillion in revenue over the same period and overtake the value of conventional aircraft.[161]

8.15 Other countries are already beginning to move towards electric and hybrid flights. For example, Norway has already announced its ambitions for all-electric short-haul flights by 2040. There is significant potential for the UK to export to countries that are not large aerospace manufacturing nations. If we can move quickly, there is an opportunity for the UK to lead the world in these areas, capturing a segment of the growing global aerospace market. This could see the delivery of greater mobility within the UK through new air mobility solutions and business models improving connectivity, greater productivity, as well as high export potential contributing to the overall economy.

161 Aerospace Technology Institute (2018): Insight 07 – Electrical Power Systems

Investment

8.16 The government is investing £1.95 billion in aerospace R&D from 2013 to 2026. The industry has committed match funding which will bring the overall 'pot' to £3.9 billion. In July at the Farnborough International Airshow, the Prime Minister announced that, together with the industry, it has:

- committed £343 million of investment for research and development projects and to boost productivity – from developing the most technologically advanced aircraft and creating newer more efficient engines, to the manufacture of cleaner, quieter aircraft that will help cut emissions

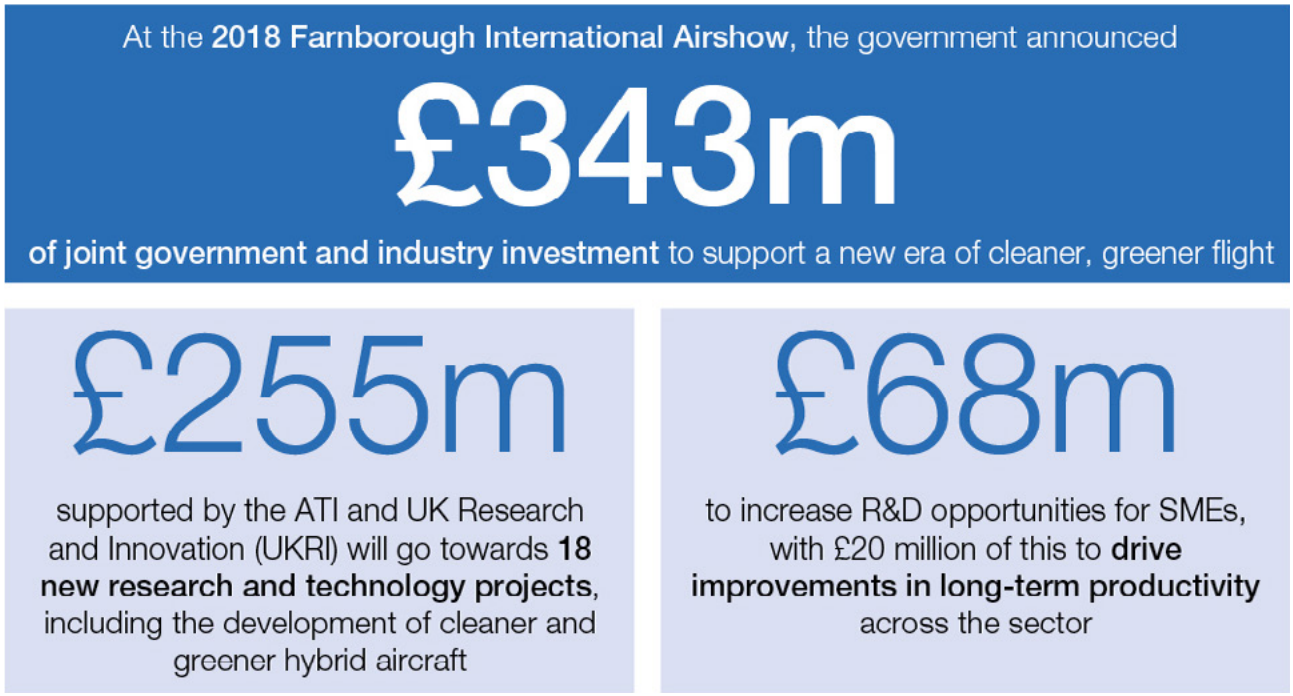


Figure 23 Investment to support development of cleaner and greener flight

Digitalisation and data sharing

8.17 The development of digital systems and the better use of data is transforming transport systems and bringing benefits for consumers. The sharing of data, with the appropriate security and privacy arrangements, can catalyse innovation and improve user experience. The use of data is already transforming passenger choice and journeys. The use of platforms such as Skyscanner and TripAdvisor allows passengers to access a wealth of flight information in an instant, providing the ability to compare options on a range of criteria such as price and flight times, and combine it with other information such as hotel options and ongoing travel connections.

Digitalisation

8.18 There are many other examples of where the government and the industry are making progress towards greater digitalisation in the aviation industry. The UK is already leading the way in some areas of digital innovation with the development of pioneering digital towers at major airports like London City Airport, which are expected to become operational in the next couple of years. The use of technology to provide a 360-degree view of the airfield at a greater level of detail than the human eye and new viewing tools will modernise and improve air traffic management. The creation of centres like DARTeC at Cranfield University also position the UK as a leader in digital aviation technology.

Data

8.19 In some respects, the sector is behind other transport industries when it comes to making data more open, and the government wants to work with the UK aviation sector to improve its offer. For example, the rail industry has opened substantial amounts of its core datasets which has led to the development of many applications that deliver benefits to passengers. Some examples include operational and performance data, real-time running information, platform numbers, delay estimates, and timetable data.

8.20 Challenges still remain, which is why the government published the Joint Rail Data Action Plan earlier this year which sets out how the government and rail industry will work together to improve the quality and openness of rail data and to increase collaboration between the rail and tech sectors, for the benefit of passengers, the railway, and the UK economy.[162] The plan details key actions including: improving standardisation of how data is collected, stored and published; improving clarity over which data is commercially sensitive; and what data can be used for what purposes. This will ensure that the information currently available is used to its maximum potential, for example by encouraging industry bodies to improve their digital capability, find innovative solutions to problems and go a step further in providing more tailored information to passengers. The rail industry has established a taskforce to drive the action plan forward.

8.21 The government is seeking views on what else can be done to resolve barriers to data sharing and use in the aviation sector while protecting privacy and security. The government proposes to:

- **work with industry to improve the quality and the openness of data and create an Aviation Data Action Plan, similar in concept to the data action plan for rail.** This will include working with industry to develop a common definition of 'commercial data' and standards for publishing data in a standardised, readable format

162 Department for Transport (2016): Joint Rail Data Action Plan

Overcoming barriers to innovation

8.22 There are a number of barriers to innovation, particularly regulation, communication and investment, which need to be addressed by the Aviation Strategy. Addressing these barriers will require some action by the government to support industry to develop and commercialise innovation. This requires close collaboration across a number of industries and authorities and the government is well placed to facilitate this in its role as an enabler.

The importance of agile regulation

8.23 The government wants to provide an agile regulatory landscape which not only keeps pace with technological development, but enables and supports new opportunities, helping to bring innovations to market where benefits can be realised sooner. This has to be done in line with maintaining a safe aviation sector and protecting the environment. This is true both for increasing automation and electrification in the sector, but also for emerging areas such as artificial intelligence.

8.24 Manufacturers are already developing technologies for increasingly automated flight. For example:

- Boeing is developing a portfolio of technologies that enable safe and reliable autonomous flight alongside working on technology that would remove the need for two pilots in the cockpits of passenger planes
- Airbus has developed a roadmap for the safe integration of autonomous aircraft within our skies

8.25 Industry is also progressing with the design of electric aircraft, though regulations to enable electric aircraft to fly in our skies safely and securely do not yet exist. There are also questions surrounding the infrastructure that will be needed to support such vehicles, as airports have been designed for conventional aircraft (such as fixed wing) where designs have remained largely the same over the past decades.

8.26 The UK's regulatory frameworks are some of the most progressive when it comes to supporting innovation. For example, Amazon chose to carry out innovative drone trials in the UK rather than elsewhere because of our agile approach to regulating innovation in a safe and controlled way. But there are opportunities for improvement. The UK's regulatory environment needs to evolve with the times to support innovation whether in the form of disruptive, new technologies or new business models.

8.27 As part of the Regulatory Review under the Future of Mobility Grand Challenge, the government is looking at how regulation can enable and support technological solutions. This includes setting a strategic direction for the CAA to continue shifting towards a more agile approach to regulating new technologies and business models.

8.28 The CAA's current approach is to engage with innovators once they have reached a relatively mature stage in the development phase. However, by this stage, industry will have heavily invested in their proposition and this can be particularly challenging for SMEs.

8.29 The government is taking important steps to address this. The CAA has successfully secured funding from the government's Regulators' Pioneer Fund to transform how the CAA engages with innovation in the aviation sector through three work streams:

- an innovation gateway, allowing anyone to submit ideas for the aviation sector and receive an initial response from the CAA on whether they need regulatory input or approval
- a regulatory lab, developing test cases for issues such as automation and urban air mobility. This will bring together everyone with an interest in the area including other regulators, academia and the public, to develop potential regulatory models and avoid duplication between agencies
- a regulatory 'sandbox' where the CAA can give initial guidance to innovators on the development and potential approval of their ideas

8.30 These initiatives will allow the CAA to convene innovators, other regulators and stakeholders, to work together to identify specific legislative and regulatory barriers to innovation, map routes for change, and develop best practice. This will also provide opportunities to create blueprints for entirely new regulatory frameworks in an interdisciplinary and cross-sectoral way.

Meeting the public acceptance challenge

8.31 Technology is affecting people's attitudes to travel. Public trust in new transport technologies and services will be important in determining the extent and rate of their deployment. A frequent comment from industry is that they are developing new technologies, such as systems which are more automated, including systems that could have the potential to eventually support single-pilot flight. However, industry often cites that public acceptance to new technologies can be a barrier and that there is a role for the government in informing the public's understanding. A possible example of this is the noise impact of new forms of VTOL aircraft, which could operate in lower altitude airspace over urban areas.

8.32 The government is seeking views on the role it should play in understanding, shaping and responding to public attitudes to emerging technologies and services in the aviation sector. It is proposing to:

- **support industry with the early safe demonstration and piloting of new technologies and support to enable business models**

- **where appropriate, use public awareness campaigns and information jointly with industry to articulate the benefits of new technologies, as it has done on the Go Ultra Low electric vehicles campaign**

Anticipating future developments

8.33 There will be other technologies, some of which are already in development and some of which are yet to come, which could bring benefits to the UK and consumers. The government will need to work with industry and regulators to manage uncertainty around these technologies, some of which may not ultimately commercialise or realise the promised benefits.

8.34 A return to commercial supersonic flight is being pursued by a number of potential manufacturers and could become a reality in the near future. While the government recognises that there are potential benefits to supersonic civil flight, there are potentially significant environmental consequences. The government is therefore negotiating in the International Civil Aviation Organisation (ICAO) for supersonic noise and emission standards that balance environmental benefit with technical feasibility.

8.35 In the longer term, hypersonic flight, which operates at speeds in excess of supersonic flight (more than five times the speed of sound) offers potentially lower emission transport solution, both to international destinations and destinations in space. This is because Hypersonic Engines will use cleaner fuels, like hydrogen, which do not produce harmful pollutants like carbon monoxide (CO), carbon dioxide (CO_2), or particulate matter during the combustion process. Development is gathering pace, and the use of such technology could be available in the next 20 to 30 years. This could reduce flight time from the UK to Australia to less than five hours – opening up significant business, trade and economic opportunities.

Case study: Reaction Engines

In the UK, Reaction Engines have already proven an innovative pre-cooling system which does not require the development of new materials to handle the heat of hypersonic flight speeds.

Significant government investment has helped the company develop a new revolutionary engine, Synergetic Air-Breathing Rocket Engine (SABRE), that the government anticipates will revolutionise the fields of propulsion and launcher technology, and significantly reduce the costs of accessing space to transform future air and space travel.

SABRE engines will enable aircraft to fly much faster than traditional jet engines (more than five times the speed of sound). Unlike jet engines, they can also operate in a rocket mode, allowing the next generation of truly reusable space launch vehicles.

8.36 The UK is at the forefront of developing a new sustainable operating model for commercial spaceflight in the UK. This is being driven by an increasing global need for new satellites, which in turn provides downstream applications for the aviation sector and supports new digital innovations, such as cloud-based black box capabilities. In particular, the government's Space Industry Act offers the UK's world-leading small satellite companies new options for competitive, reliable access to space on their door-step, closing the gap in the UK space value chain.

8.37 The UK's early work in the development of new commercial space regulations, coupled with our first experiences of commercial spaceflight activities launched from the UK mean we will be better placed to work with new innovative aerospace and space companies to ensure that the UK can capitalise on the potential of future horizontal launched spacecraft and hypersonic transport systems. The government will continue to work with the industry to ensure that the UK has the right infrastructure, including supporting the development of horizontal spaceports, to maximise new growth opportunities in the horizontal launch and hypersonic markets in the UK.

8.38 These new technologies have the potential to give rise to different business models and infrastructure requirements but the challenge for the government and the industry is understanding what the demand for these services could be and the potential benefits, as well as their impacts. The government recognises that more work needs to be carried out in these areas.

Aligning policy and investment

Aerospace Sector Deal

8.39 The government has delivered on the Prime Minister's announcement at Farnborough Airshow 2018 to:

- **agree an Aerospace Sector Deal with industry building on the existing successful relationship developed through the Aerospace Growth Partnership**

8.40 The Sector Deal positions the industry to secure the once in a lifetime opportunity presented by a foundational shift in technologies from jet powered aircraft to more electric/ hybrid/ autonomous aircraft, including drones and Urban Air Mobility. It will enable the UK aerospace sector to respond to intensifying global competition, environmental challenges and technological disruptions and maintain its place in the global market. Achieving this will require a boost in UK competitiveness and in the productivity of the UK supply chain, including investing in engineering excellence and leveraging the country's world-class technology base, to ensure it positions itself as a world leader in the move to electric and autonomous aircraft. The Sector Deal will support several Grand Challenges: Future of Mobility, Clean Growth, Artificial Intelligence and Data Economy.

The Aerospace Sector Deal

The Aerospace Sector Deal will put in place activities that:

- enable delivery of more electric and autonomous air vehicles through the Future Flight Challenge supported by Industrial Strategy Challenge Fund funding
- enable productivity improvement activities (subject to business case) for supply chain companies
- increase the diversity of the aviation and aerospace sector through the implementation of the Women in Aviation and Aerospace Charter and work with education providers to ensure appropriate educational standards and apprenticeships are in place to deliver the skilled workforce needed for today's demands and tomorrow's future technologies

8.41 The Sector Deal includes funding from the Industrial Strategy Challenge Fund for the industry-led Future Flight Challenge. The funding will unlock new aviation markets through demonstration of aviation systems incorporating low environmental impact, autonomous air vehicles and airspace management, by 2025. It will transform connectivity, boost UK exports and productivity and benefit passengers through higher mobility. Ultimately it will lead to transformational electrically powered passenger aircraft and the supporting infrastructure and systems.

8.42 Through the Future Flight Challenge funding, the Sector Deal will provide the integration, direction and critical research funding for UK industry, agencies and academia to position the UK at the forefront of the pending electrified air transport revolution by 2025. It will explore the potential societal, environmental and sustainability impacts of this new transport system and engage the public to build broader understanding of the benefits and to address concerns.

8.43 The shift towards electric and autonomous aircraft is potentially very disruptive and will enable new entrants to enter the market. The Sector Deal supports all parts of the UK's aerospace sector that will lead the charge towards electrification and autonomy.

Enhancing cross-government working

8.44 The aviation sector provides at least £22 billion to the economy each year with around £14 billion contributed from the air transport sector and £8 billion from the aerospace sector.[163] These are both successful in their own rights, generating lots of benefits for the economy and decisions in one sector will drive incentives for the other, giving rise to opportunities.

8.45 The government recognises that, sometimes, the objectives of these sectors need to be better aligned. It wants to create the right environment, aligning incentives to support the development and adoption of new aviation technologies. The government will continue to improve cross-government partnership working and coordination between sector players, including the Aerospace Growth Partnership and other cross-government and sector bodies, to drive the UK's ambitions for more electric and automated aircraft, and to encourage greater digitalisation and data sharing to bring forward benefits for consumers.

8.46 The government proposes to:

- **consider the current arrangement of working across government in response to specific challenges** and whether this is sufficient to deliver on specific areas of innovation, such as driving forward the electrification agenda for the aviation sector

8.47 It will consider how it can work in partnership with both the aviation and the aerospace industries, looking to other sectors for examples of how to do this effectively for significant or disruptive technological step changes. The government wants to ensure that such technological developments are supported by the right policies and investments to deliver its industrial strategy and Future of Mobility objectives.

163 Department for Transport analysis of Office for National Statistics: GDP low level aggregates

Consultation questions

Consider the policy proposals in this chapter and answer the following either for the chapter as a whole; groups of policies within the chapter and/or individual policies:

1. How could the policy proposals be improved to maximise their impact and effectiveness in addressing the issues that have been identified?
2. How should the proposals described be prioritised, based on their importance and urgency?
3. Are you aware of any relevant additional evidence that should be taken into account?
4. What implementation issues need to be considered and how should these be approached?
5. What burdens, both financial and regulatory, are likely to need to be managed and how might those be addressed?
6. Are there any options or policy approaches that have not been included in this chapter that should be considered for inclusion in the Aviation Strategy?
7. Looking ahead to 2050, are there any other long term challenges which need to be addressed?
8. To what extent are the government's proposals for supporting innovation in the aviation sector the right approach for capturing the potential benefits for the industry and consumers?
9. Do the proposals in this chapter sufficiently address the barriers to innovation?

9. Next steps in developing an Aviation Strategy

9.1 This consultation document marks the beginning of a 16-week consultation on the proposals that the government has put forward under each of the seven strategic themes:

- **build a global and connected Britain**
- **ensure aviation can grow sustainably**
- **support regional growth and connectivity**
- **enhance the passenger experience**
- **ensure a safe and secure way to travel**
- **support General Aviation**
- **encourage innovation and new technology**

9.2 Throughout the development of this document, engagement with industry and other stakeholders has been an integral part of the process, and the government is keen to see that collaboration continue. As the strategy moves into the next phase of development, the focus of this engagement will change from shaping potential policy options to examining the impact and feasibility of those options in greater detail.

9.3 Over the coming months the government will be working with the aviation industry, the General Aviation community, businesses in the wider economy, business groups, community groups, environmental groups, and passenger representatives to finalise the government's policy positions and develop a series of clear plans and roadmaps for how it intends to make the vision for Aviation 2050 a reality.

9.4 You can make your views heard on the proposals contained in this document, and get involved in the work going forward through a number of channels. The government plans to undertake a programme of engagement across the UK, including meetings, events, focus groups and workshops. However to ensure that your views are fully recorded, you should respond to the consultation questions contained in this document, either online at aviationstrategy.campaign.gov.uk, or by emailing AviationStrategy@dft.gov.uk.

9.5 In the next steps document published in April 2018 the government set out its intention that the final strategy – in the form of a white paper – would be published by the middle of 2019.[164] This remains its intention. The consultation period will close on 11 April 2019.

164 Department for Transport (2018): Beyond the horizon – the future of UK aviation. Next steps towards an Aviation Strategy

9.6 You can keep up to date with work to develop the Aviation Strategy by visiting the website at: aviationstrategy.campaign.gov.uk. The government will also be keeping stakeholders up to date through regular communication channels.

9.7 It will also be sharing Aviation 2050 content through the Department for Transport twitter channel @DfTgovuk. To find out more about engagement plans and how to get involved with the consultation, email the aviation strategy team at: AviationStrategy@dft.gov.uk.

Annex A: Legislation to enforce the development of airspace change proposals

The government recognises that there is a major challenge in coordinating multiple airspace changes across different airports and by NATS (En Route) plc (NERL) in the coming years to modernise the UK's airspace. The feasibility work conducted by NATS into airspace modernisation in the south of the UK shows that there is a high level of interdependence between different airports demands over airspace, especially in the South East.

Given this, airspace change sponsors – usually airports or Air Navigation Service Providers (ANSP) – will need to develop their airspace change proposals (ACPs) in close collaboration with each other and ensure that they develop and consult on these in a coordinated way. If they do not, a scenario could be created whereby airports consult separately on, and then submit to the CAA for decision, conflicting design options. This would be inefficient and could cause major issues and delays to the modernisation programme.

Neither the government nor the CAA currently have effective levers or powers to guarantee that airspace change as part of a wider modernisation programme is taken forward by airports or ANSPs. This means that, where airspace change proposals are interdependent, one airport could hold up several others. The government has therefore worked with key stakeholders to develop policies to address this risk.

The government's lead policy option (set out below) would allow the Secretary of State (SoS) for Transport to direct an airport or ANSP to bring forward an airspace change. This is subject to new primary legislation, which the Department for Transport is currently bidding for in a cross-government prioritisation exercise.

The information and questions in this section are detailed as the government is seeking stakeholder views on how the proposed legislation would work in practice.

Existing powers that will be used to require NERL to develop a masterplan

DfT and CAA have asked NATS to work with key stakeholders to develop a coordinated implementation plan and timeline for airspace changes (or airspace change masterplan) that will be required in the future in the South of the UK. The masterplan will identify where airspace changes are needed to deliver: safety, capacity, noise reduction, improvements to air quality, fuel efficiency, improved access to airspace for users including where controlled airspace is no longer justified or should be a different classification, military access, or to introduce new technology. These are all the factors that the CAA consider when undertaking their airspace functions, under section 70 of the Transport Act 2000.

The CAA intends to place an obligation on NERL to develop a masterplan of all airspace changes that will deliver modernisation, as part of the licence modifications implementing the UK Performance Plan for Reference Period 3 (RP3), which runs from January 2020 to December 2024.

Once the masterplan is produced, the CAA will provide assurance. The masterplan will also need to be refreshed periodically.

The new powers requiring ACPs to be developed to deliver the masterplan will also be applicable to ACPs which benefit a wide range of airspace users, including General Aviation (GA), and those affected by aircraft noise.

The powers are intended to be used only where airports or ANSPs do not voluntarily take forward key ACPs, and to provide assurance to all parties that the masterplan can be delivered.

Q1. Should the government legislate for powers to direct individual ACPs identified as necessary in a masterplan to be taken forward?

Proposed legislative powers

The proposal is for new legislative powers in the following two areas:

a. Secretary of State to direct airports/ANSPs to develop ACPs identified within a masterplan of changes

Airports and ANSPs would be directed to develop airspace change proposals in accordance with the CAA's CAP1616 airspace change process. The ACPs would be identified through a new masterplan of ACPs. Further detail on the masterplan and what NERL will be expected to deliver will be set out in the CAA's Airspace Modernisation Strategy and will be included in the CAA's consultation on a draft performance plan for RP3. Once the masterplan is assured and a delivery plan is in place, the CAA will monitor delivery; if delivery falters, the power may be used (see 'triggers for use of the powers', below).

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

Airports/ANSPs would be directed to hand over their ACP and any work to date to NERL who would take forward the changes on the airport/ANSPs behalf in accordance with the CAA's CAP1616 airspace change process. This option would require significant changes to the way that NERL operates and significant interaction with local communities, which is currently the responsibility of airports. This option would be implemented by:

- The Secretary of State directing the CAA (under S.66 of the Transport Act 2000) in relation to the development of ACPs
- CAA amending NERL's licence to make it mandatory that NERL carry out this work (see text below on updates to NERL's licensing framework)

Additionally, the government is considering whether other third parties could be asked to take forward ACPs on behalf of airports/ANSPs.

The government's proposal is that both of the above powers are taken, but option a. is the lead option as it would be preferable for the ACP to remain with the initial sponsor of the ACP.

The Secretary of State will also consider whether it is appropriate to delegate these powers to an appropriate authority such as the CAA.

Q2. What are your views on the above two proposals?

Q3. Do you agree that option a) should be the lead option?

Scope of powers

The government proposes that the powers should be used to ensure that the changes identified within the masterplan are delivered. The masterplan which the CAA will require NERL to develop will be designed around several policy considerations (changes to deliver safety, capacity, noise reductions, improvements to air quality, fuel efficiency, access to airspace for users including GA, military access, or to introduce new technology). It would therefore appear appropriate that the powers to direct an ACP would apply to all these factors.

Q4. What are your views on the scope for the use of the powers?

Triggers for use of the powers

The government proposes that before any formal action is taken to direct a change under the proposed legislation, the new Airspace Modernisation Strategy Delivery Monitoring and Oversight (DMO) team, (currently being set up within the CAA) would provide support and engage with the airport/ANSP to consider the circumstances and what other measures could be used to assist in bringing forward an airspace change. Where technical issues arose, or something exceptional, unforeseeable and outside the sponsor's control occurred, the government's preference would be to use alternative approaches rather than the powers.

The government considers that there could be at least two triggers for the activation of the powers:

1. Initiation: failure to initiate an ACP identified as necessary

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

2. Progress: failure to adhere to the proposed timeline for a necessary ACP

Sponsors agree a timeline for the airspace change with the CAA at an early stage of the CAP 1616 airspace change process. This timeline takes into account the dates of any gateways (stages of the airspace change process) the sponsor intends to meet, and when the CAA will make a decision, and will be aligned with the overall masterplan. This trigger could be used where a sponsor falls behind schedule because they have not passed their gateways on time (either because they have failed to submit materials to the gateway assessment, or the quality of those materials is rejected by the CAA at the gateway assessment, for example for failing to adhere to the objectives of a necessary ACP) to the extent that the overall masterplan delivery is called into question.

Q5. What are your views on the use of the triggers for using the legislative powers?

Sanctions and penalty regime

In order to ensure that the powers can be effectively enforced, the government proposes that these are accompanied by appropriate sanctions for non-compliance.

One option is that similar enforcement tools available to the CAA under the Civil Aviation Act 2012 for enforcing the economic licences of airports are used. Under that option the government would also propose that these additional tools are accompanied by appeal rights for airports/ANSPs, as is the case for airports regulated under the Civil Aviation Act 2012.

The proposed tools would include powers to:

- **Issue a contravention notice for failing to comply with the direction to take forward an ACP.** This would confer on the Secretary of State the power to issue a notice if the government considered that there was a contravention of the direction to take forward an ACP. The serving of a contravention notice would have no immediate consequences, but would be the first step before an enforcement order and penalty were imposed. This would also give the airport/ANSP further opportunity to take forward an ACP before a formal enforcement order was issued.
- **Make an enforcement order.** This would confer on the Secretary of State the power to impose fines of up to 10% turnover and/or a daily amount up to 0.1% of turnover until the direction to take forward an ACP was carried out by the company.

This proposal aims to give flexibility to enforce a direction to take forward an ACP, and the government considers that the threat of a financial penalty should act as an appropriate deterrent for non-compliance. A maximum fine of 10% turnover is already in place for the regulation of airports under the Civil Aviation Act 2012, and is also consistent with enforcement penalties issued in other regulated sectors such as water and energy. As is the case for those sectors and in line with HM Treasury policy, all proceeds from financial penalties would go into the Consolidated Fund.

Q6. What are your views on the proposed sanctions and penalties regime?

Appeal rights

In line with regulatory best practice, the government proposes that the tools to enforce a direction to take forward an ACP be accompanied by the introduction of additional safeguards for the airport/ANSP. The government believes the grounds for appeal should be set out in legislation to provide clarity on the scope that an appeal may have. It therefore proposes that the grounds for appeal are the same as those in the Civil Aviation Act 2012.

The government proposes that the appropriate destination for the handling of appeals under the proposed new legislation would be for a suitable tribunal chamber in the Unified Tribunal system, or the Competition and Appeals Tribunal (CAT), as is the case for enforcement appeals considered under the Civil Aviation Act 2012. The latter option would ensure consistency of appeals within the aviation sector and provide certainty to airports/ANSPs, in line with government recommendations following its review into Streamlining Regulatory and Competition Appeals.[165]

165 Department for Business, Energy and Industrial Strategy (2017): Streamlining Regulatory and Competition Appeals

The government proposes that the airport/ANSP would be able to appeal in relation to the following matters:

- the validity or terms of an enforcement order
- the imposition of a financial penalty
- the timing of the payment of a penalty
- the amount of the penalty

Q7. What are your views on the grounds for appeals?

Funding

It is a well-established principle that air passengers should fund the cost of their travel, rather than for this to be subsidised by the general taxpayer. The government continues to believe that this should be the case and that the existing funding mechanisms in place are the most effective way of delivering airspace changes.

The government's expectation is that where an airport or ASNP is directed to take forward an ACP (under option a) above), the airport or ANSP will fund this.

The government also expects that, under option b) where NERL or another third party takes forward an ACP on behalf of an airport, they will be eligible to recover its efficient costs from airspace users. It will also consider new funding mechanisms for this purpose if necessary.

However, the government recognises that for small airports where airspace change is required but where the airport may be in need of financial support to carry out some aspects of the airspace change process, there may be a justification to consider whether the ACP should be funded from other sources in order to avoid delays to the modernisation programme. If this is required, the government considers that the UK unit rate could be a suitable means of funding. It will also consider new industry funding mechanisms for this purpose if necessary. This could be applied before an airport, NERL or other ANSP was directed to develop the change proposal, or after.

Q8. What are your views on the best approach to funding an airspace change where a small airport may need financial support to do so?

Updates to the NERL Air Traffic Services Licensing Framework

Subject to new primary legislation, the government also intends to progress proposals to modernise the licensing framework for air traffic services. These measures have already been consulted on and were previously taken forward in the Vehicle, Technology and Aviation Bill in the last Parliament, but were subsequently put on hold following the calling of the June 2017 election.

The measures include:

- amendments to the air traffic services licence modification process to enable the CAA to modify licence conditions without the licence-holder's prior consent, such as conditions relating to the delivery of airspace modernisation. The process includes implementation of appeals mechanisms for licence holders, airspace users and some airport operators

- introduction of new enforcement tools to enable the CAA to enforce the licence proportionately
- amendments to modify terms of the licence, such as the licence notice period, to enable the licence holder to access competitive finance and therefore continue to invest in improving the service it provides

The government considers these measures important for the airspace modernisation programme as they will enable the CAA to regulate NERL more effectively in order to deliver change.

Annex B: Slot allocation – the case for change

The government believes that the current process for slot allocation can create issues at highly constrained airports. The existing process can limit competition in the market and is unlikely to produce the best outcomes for consumers. Where there is significant new capacity being made available at a highly constrained airport, such as Heathrow, some of these issues can be heightened and prevent the efficient allocation of scarce capacity. The government has identified the following specific issues that may impact on efficient allocation:

- **allocation timing** – Slots are allocated six months before the start of a season. Where there is potential new capacity available, this may not allow airlines, particularly smaller carriers which have more limited access to capital, sufficient time to plan and invest. The availability of aircraft is a particular bottleneck
- **transparency of the allocation system** – Certain aspects of the system used by the UK's designated slot coordinator Airport Coordination Limited (ACL), including how it deals with competing bids and the independence of airline members that sit on its board, are opaque to the public. Transparency of the allocation process, particularly in the context of highly sought after capacity, is central to the government's aims in reforming slot allocation
- **slot hoarding and gaming** – At airports where the demand for slots exceeds the available supply, there may be incentives for airlines to bid for, and hold, slots regardless of whether they are able to operate them efficiently or profitably, for example, to stop competitors entering the market or for speculative future route development. Airlines can also sell slots which are initially allocated for free, on the secondary market, potentially obtaining slots under the new entrant rule (see below) with the sole purpose of later transferring these to an incumbent or affiliate airline
- **new entrant rule** – The regulations require 50% of available slots to be made available to new entrants and the remaining 50% to be allocated to incumbents. While the intention of the rule is to encourage competition, it has the unintended consequence of acting as a barrier to smaller incumbent airlines expanding because they are unable to build sufficient scale to operate competitively against airlines with larger slot holdings
- **historic grandfather rights (the 80-20 rule)** – The current regulations provide that as long as 80% of slots are used ('use-it-or-lose-it rule'), within a scheduling season, airlines have a right to retain them in perpetuity ('grandfather rights'). However, in practice rights can be retained even where the 80% usage requirement has not been met. This is because airlines are also permitted to hand back up to 20% of slots without losing ongoing rights to that 20%

- **secondary trading market** – While slot trading has benefitted consumers in increasing competition and choice at airports, those exchanges often favour incumbent carriers with the deepest pockets. The high value of slots, especially at very congested airports, may serve as a barrier to entry for smaller airlines, limiting their ability to participate in the secondary market. At a highly constrained airport such as Heathrow, where demand is expected to exceed supply even after expansion it is likely slot value will remain high
- **re-timing of existing slots** – Existing slot holders hold priority rights in retiming their existing slot holdings, before the remaining pool is allocated. This gives existing slot holders a competitive advantage by giving them first access to the most lucrative slots upon their release, preventing those slots being available to new entrants

Annex C: Potential carbon abatement measures

Research

Research was commissioned by the government to understand the emissions abatement potential from technological, operational and air traffic management measures.

This research estimated the reduction in CO_2 emissions that is possible as a result of technology, operational and air traffic management improvements for a number of different aircraft types in both the 2030 to 2035 and 2045 to 2050 periods.[166,167,168]

As an example of this, the graph below shows the low, central and high percentage reductions in CO_2 when the improvements are applied hypothetically to a Boeing 777-200ER flying 3,000 nautical miles. This represents a mid-size aircraft holding around 300 passengers, flying roughly the distance from London to Dubai.

For full details on the measures assessed and the analytical approach taken to produce these estimates, please see the research report 'Understanding the potential and costs for reducing UK aviation emissions' published alongside this consultation document.[169]

166 The technology category includes: ultra-high by-pass ratio turbofan, boundary layer ingestion, hybrid laminar flow, 15 aspect ratio wing, hybrid electric propulsion, composite materials and riblets.

167 The operational category sums improvement as a result of: long range to maximum range cruise speed, aircraft design for 0.06 lower cruise, mach number, engine inoperative taxi, E-tug and E-taxi.

168 Air traffic management totals savings from: reduced taxi time, cruise climb, optimum track, continuous descent, and reduced diversion hold.

169 Department for Transport (2018): Understanding the potential and costs for reducing UK aviation emissions

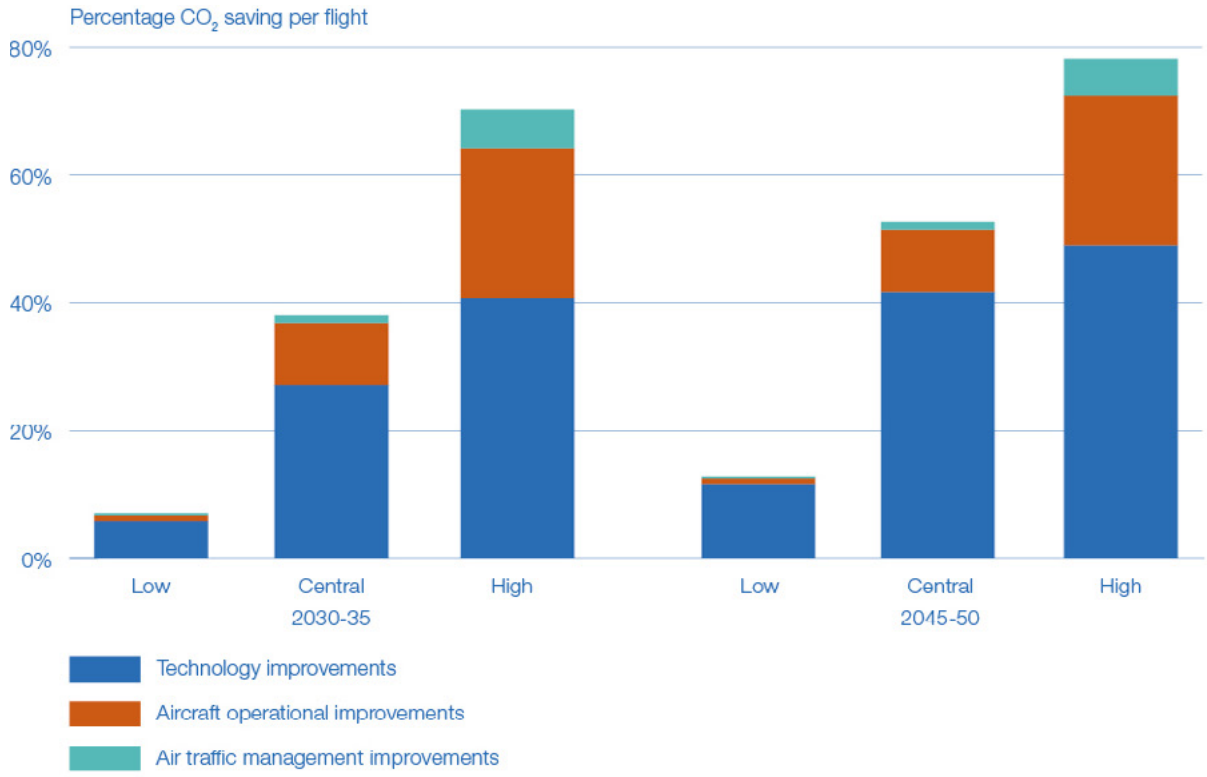


Figure 24 Illustration of the hypothetical application of improvement measures to a Boeing 777-200ER flying 3,000 nautical miles
Source: Air Transport Analytics Ltd and Ellondee Ltd (2018): Understanding the potential and costs for reducing UK aviation emissions

Policy measures

There are a wide range of policy measures available, not all of which are viable or feasible at this point in time. The following measures are currently under consideration by the government as those that are expected to be viable within approximately the next 10 to 15 years. It would be for the industry to determine which measures to adopt, within the overall policy framework established by the government, as set out in Chapter 3.

Operational and Air Traffic Management:

- draft or revise, airline and airport Codes of Practice and Standard Operating Procedures to increase uptake of measures such as e-taxiing, reduced taxi times, Fixed Electrical Ground Power, Pre-Conditioned Air, electric airside vehicles, continuous ascent and descent, reduced stacking and holding
- airports and airlines to report on compliance with the emissions reduction measures in airport and airline Codes of Practice and Standard Operating Procedures
- airports to install infrastructure to support the uptake of improved operations such as e-taxiing, Fixed Electrical Ground Power, Pre-Conditioned Air, electric airside vehicles
- airports to publish league tables on environmental efficiency of airport and airline operations
- all major UK airports encouraged to gain ACI (Airports Council International) carbon neutral airport accreditation[170]

170 Airport carbon neutral accreditation

- introduce emissions criteria within landing based charging schemes at the UK's major airports
- work in ICAO to produce guidance for improving and measuring the efficiency of operations including considering publishing worldwide fuel efficiency performance or setting targets

New technology – engine and airframe:

- investigate how the government's Industrial Strategy aerospace funding can provide greater support for progression of the UK's environmental objectives through new aerospace technologies
- negotiate in ICAO for a strengthened CO_2 standard

Sustainable aviation fuels:

- continue to work closely with industry to maximise the opportunities for the development of sustainable aviation fuels
- assess options to further promote sustainable aviation fuels. This includes continuing to monitor progress towards the development fuel sub-target in the RTFO as part of the wider carbon budget process[171]
- analyse the potential of low carbon fossil fuels from wastes to help decarbonise transport, including aviation
- work in ICAO towards a global target and market for sustainable aviation fuels, accompanied by robust sustainability criteria covering environmental, social and economic issues

Market based measures:

- work with international partners to ensure that CORSIA is implemented as widely as possible and enforced effectively
- negotiate for strengthening of CORSIA through regular reviews from 2022, in line with the long term goal agreed at ICAO
- negotiate for CORSIA to be continued beyond 2035 in line with an agreed international goal, to maintain carbon pricing in the international aviation sector
- work to ensure that any post-EU exit approach to carbon pricing meets the commitments made in the Clean Growth Strategy and works for the aviation industry

Non-CO_2:

- pursue ICAO standards for all engine emissions with climate effects
- negotiate for ICAO guidance on mitigation measures for non-CO_2 effects as scientific understanding improves
- negotiate in ICAO for a long term goal that considers aviation's non-CO_2 climate effects and for reviews of the goal as scientific understanding improves

171 RTFO Guidance, Year 11

Annex D: Proposed Public Service Obligation (PSO) assessment criteria

The government is proposing a new two-stage process for assessing PSO applications

Stage 1 – Prerequisite criteria

The government proposes that the following should be included in the PSO prerequisites:

- evidence showing that the route would not run to certain standards on continuity, frequency, pricing or minimum capacity, either now or in the future, if carriers were solely to consider their commercial interests
- support will only be offered to protect existing routes to national and London airports
- evidence that the PSO will only secure an adequate minimum level of service
- existing journey time between the urban centres served by the origin and destination airports must be over three hours
- evidence shows that a route is vital to the economic and social development of the region
- that no air route exists between two airports that serves the same urban areas as both of those proposed
- that no air route exists to the proposed destination airport from an origin airport that is less than one hour, by road or rail, from the origin airport's urban centre

The government recognises the importance of onward connectivity in helping regions access more long-haul destinations. Therefore, subject to provision of robust evidence it also proposes to allow the following alternative interpretations of the prerequisites, where connectivity into the national airport is not possible through reserved slots:

- new and existing routes to national airports where justified through onward connectivity benefits
- routes can be tendered for a specific airport in an airport system, even if a current route into a different airport in that system exists
- there is demand for significant onward connectivity
- can be a higher minimum service level, compared with a standard PSO (which has two rotations a day as a minimum to enable a day's business)
- journey times to be judged from airport to airport, as connectivity into the hub supersedes connection to the city or urban area

Stage 2 – Proposed full criteria

Upon passing the prerequisites, applicants would be invited to submit their evidence in full, showing the extent to which the proposed route meets the full criteria – these would likely be assessed using a RAG system.

The proposed criteria broadly fall within three categories:

a. Regulatory considerations: are these PSOs benefiting those from the most peripheral regions, without placing an undue burden on the taxpayer?

b. Strategic benefits: how well would the imposition of the PSO further the strategic objectives of DfT and the wider government?

c. Market distortion: are there negative second-order impacts of the PSO, and if so, how will these be avoided?

Regulatory Considerations	Strategic Benefits	Distortionary (undesirable) effects that the PSO might induce
Assessment of subsidy required per passenger (either direct or indirect)	Strategic fit (how does the PSO help to rebalance the UK economy)	Degree of impact on existing air route(s) from the origin airport (either to foreign hubs or other domestic airports)
Degree of peripherality (<3, <4, <5 hours)	Does it improve domestic connectivity to the region, relative to connectivity today by any other mode of transport	Degree of impact on existing air route(s) from a nearby airport to the same destination airport (for example Liverpool and Manchester)
Peripherality to alternative airport in the same region	Does it improve long haul connections for the region, either directly from regional airport or through a hub airport	Degree of impact on other route(s) from the destination airport (long haul)
	How much of the surrounding area is designated as a 'development region'	Distortion of existing market for rail and other surface public transport connectivity
		Distortion of existing market for road connectivity

Figure 25 PSO proposed criteria

Q1: Are these the right criteria to judge PSO proposals against?

Annex E: Glossary

Aerospace	the branch of technology and industry concerned with both aviation and space flight
Air services agreement	an agreement which two nations sign to allow international commercial air transport services between their territories
Air transport sector	industries that provide air transportation of passengers and/or cargo using aircraft, such as airplanes and helicopters
Airside	the areas of an airport terminal beyond passport and customs control
Airspace	the air available for aircraft to fly in, especially the part subject to the jurisdiction of a particular country
Automation	use of control systems and information technologies reducing the need for human intervention
Blockchain technology	a growing list of records, called blocks, which are linked together and that can record transactions between two parties efficiently and in a verifiable and permanent way
Carbon abatement	reduction of carbon emissions
Carbon leakage	the increase in CO_2 emissions outside the countries taking domestic mitigation action
Electronic conspicuity	an umbrella term for a range of technologies that can help airspace users to be more aware of other aircraft in the same airspace. It includes transponders and radios
European Union emissions trading system	the European Union's policy to combat climate change and its key tool for reducing greenhouse gas emissions cost-effectively
Grandfather rights	the control that airlines exert over slots
Greenhouse gas	any gaseous compound in the atmosphere that is capable of absorbing infrared radiation, thereby trapping and holding heat in the atmosphere

Hidden disabilities	disabilities that are not immediately apparent to other individuals
Holding stacks	manoeuvres of aircraft waiting to land
Microlights	a very small, light, one- or two-seater aircraft
New entrant rule	regulation that requires 50% of available slots to be made available to new entrants
NOx	oxides of nitrogen, especially as atmospheric pollutants
Performance Based Navigation	improving the accuracy of where aircraft fly
Public service obligations	an obligation imposed on an organisation by legislation or contract to provide a service
Route development fund	programme to encourage the development of additional regional aviation routes
Safeguarding	process used to ensure the safety of aircraft while taking off and landing, or flying in the vicinity of aerodromes
Slot	right granted by an airport owner which allows the slot holder to schedule a landing or departure during a specific time period
SMEs	small and medium-sized enterprises
State aid	any advantage granted by public authorities through state resources on a selective basis to any organisations that could potentially distort competition and trade in the European Union (EU)
Surface access	surface access refers to all the ways in which passengers, visitors, employees and commercial traffic travel to and from an airport when they are not in an aircraft
Traffic rights	allow commercial international services between, through and in some cases within the countries that are parties to air services agreements or other treaties
Ultrafine particles	particulate matter of nanoscale size
Unmanned traffic management	air traffic management ecosystem under development for autonomously controlled operations of unmanned aerial systems

Annex F: Photo credits

Page	Picture description	Photo credit
Cover	Child at airport	Heathrow Airport
12	Aircraft waiting for take-off in sunset	Civil Aviation Authority
24	British Airways Boeing 787 at Edinburgh Airport	British Airways
32	International and domestic flightpaths in the UK	NATS
36	Aircraft flies over skyscrapers	Unsplash
62	Aircraft parked at Gatwick Airport	Gatwick Airport
70	TUI Boeing 787 Dreamliner	TUI
77	Noise monitor at Heathrow Airport	Heathrow Airport
81	Recycling bin at Heathrow Airport	Heathrow Airport
92	Airport departure board	Unsplash
96	Two DHL aircraft at East Midlands Airport	DHL
101	School girl at STEM event using a mixed reality device	London City Airport
112	Passengers boarding plane at sunset	Shutterstock
115	Disabled passenger in a waiting area at London City Airport	Ralph Spegel
126	Row of e-gates at border	Bristol Airport
138	Drone above runway	Unsplash
157	Row of helicopters	Civil Aviation Authority
159	Microlight	Civil Aviation Authority
167	Aircraft cockpit	Civil Aviation Authority
174	Wright Electric design for an all-electric easyJet commercial passenger aircraft	easyJet

CCS1218200688
978-1-5286-0932-6