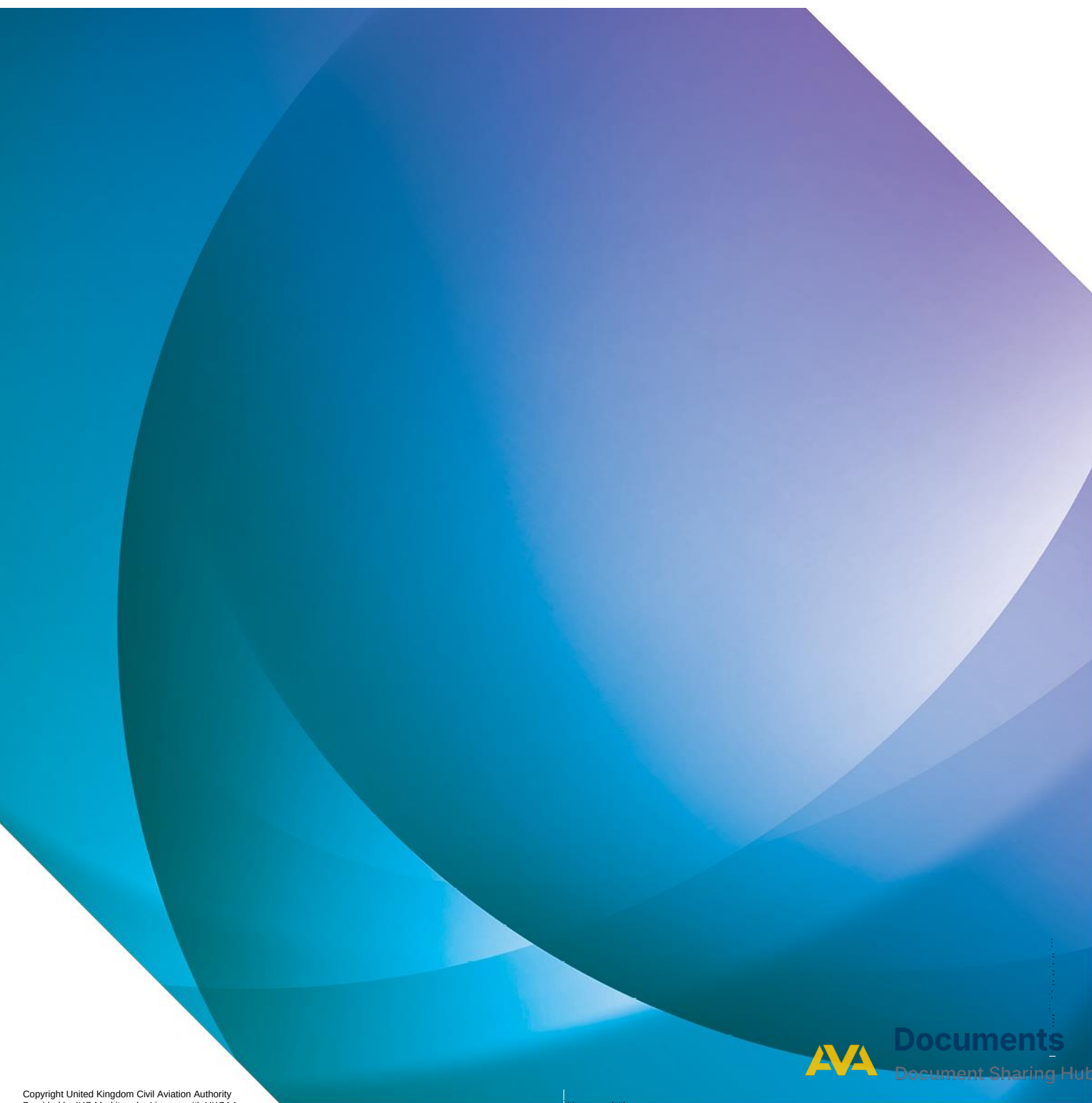


Operating Resilience of the UK's aviation infrastructure and the consumer interest

CAP 1515



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

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Contents

Contents.....	3
Executive summary	5
Introduction	5
Delay	5
CAA research.....	8
Capacity Planning and Scheduling.....	11
Operational Consistency	12
Conclusions.....	13
Chapter 1.....	15
Introduction and document structure	15
Introduction	15
Structure of this document	21
Chapter 2.....	22
Delay	22
Types of delay	22
Capacity and delay relationships.....	26
International comparators.....	28
Passenger Interest	30
Chapter 3.....	33
CAA research	33
Consumer Research	34
Overview of CAA's request for information.....	37
Responses	38
Conclusion	45

Independent Gatwick Delay Causation Study	46
Research conclusions	47
Chapter 4.....	49
Capacity Planning and Scheduling	49
How an airport declares capacity	49
History of increases in capacity and utilisation	54
Industry Incentives	56
Comparison to passenger interest	57
Incentive risk	59
Planning and scheduling risk.....	62
Airspace risk.....	66
Chapter 5.....	71
Operational consistency	71
Operational risk	71
Options to address risks to consumers	72
Information risk.....	76
Chapter 6.....	78
Conclusions.....	78
The current situation.....	78
Options for change	79
Appendix A	81
Request for Information responses	81
Appendix B	88
Glossary	88

Executive summary

Introduction

1. The UK's airport and airspace capacity is constrained, and there will be no new significant airport runway capacity until 2025. Our busiest airports are regularly among the worst performing in Europe in terms of on-time performance. Increases in capacity, such as those which arise from higher utilisation of airports, bring more choice and competition, but passengers may also suffer if that leads to more delays and worse reliability.
2. Existing airport and airspace infrastructure will be under increasing demands in the future. In 2016, NATS were predicting¹ a further 9% increase in aircraft movements at the five major London airports by 2022.
3. This report examines the current balance of delay and punctuality² against the number of flights at the airports in the South East of the UK where congestion in airspace and at airports is greatest, particularly in the planning and operational processes that the industry undertakes, and comments on how it reflects the consumer interest.

Delay

4. Passengers can be affected by different types of delay even if their flight is considered to be on-time. For example, passenger waiting and queue times may exceed expectations (irrespective of ultimate time of arrival) at security, the gate, on the aircraft waiting to take-off, holding in the air, baggage reclaim or at immigration. However, in this study we generally take delay to refer to

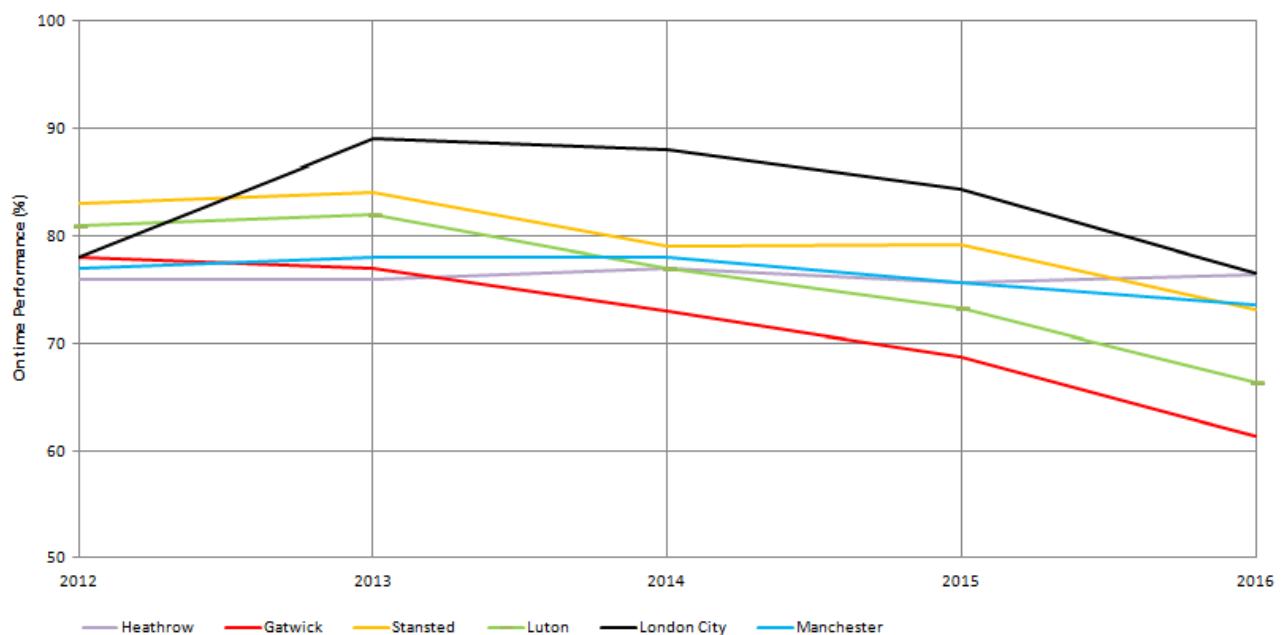
¹ <http://nats.aero/blog/2016/02/record-demand-will-put-pressure-on-airspace-capacity10605/>

² 'Delay' generally refers to the average number of minutes after its scheduled time that a flight arrives or departs, whereas 'punctuality' generally refers to the proportion of flights that are within a certain delay threshold, usually early to 15 minutes late. Such flights are generally referred to as 'on time' and so 'on-time performance' has the same meaning as punctuality.

on/off stand delay (i.e. the delay compared to the purchased ticket times) of which other delays may be a contributing factor.

5. A lack of capacity (both infrastructure and resources), variability and prolonged high utilisation can lead to increasing delays, reduced on-time performance (which is the proportion of flights considered to be no more than 15 minutes later than their scheduled on/off stand time) and difficulties in recovery.
6. At the UK's busiest airports, on-time performance has generally been decreasing and delays have been increasing in recent years, as shown in Figure 1. Although UK airports are not the worst performing in the world³, there is room for improvement.

Figure 1: On-time Performance, 2012 – 2016

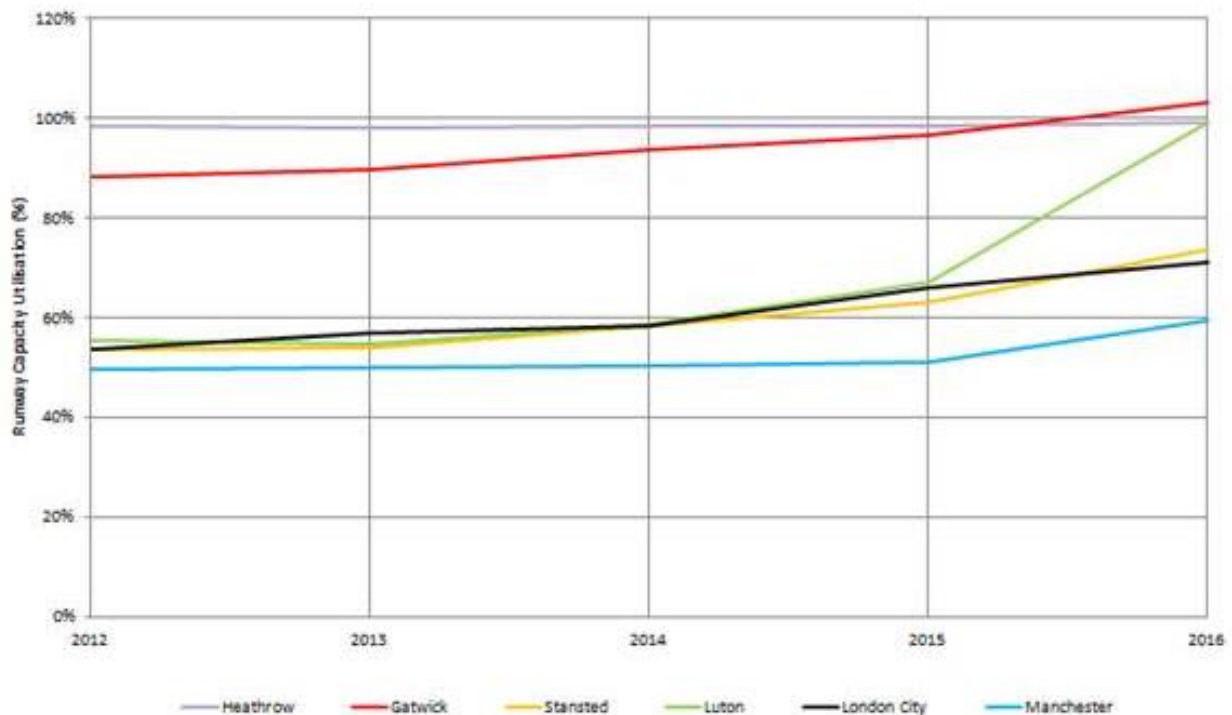


Source: CAA Statistics

³ The effects of airport and airspace capacity constraints are evident in other countries such as US and China.

7. As Figure 2 shows, the decline in on-time performance has happened alongside an increase in runway utilisation for UK airports, some of which are constrained by the capacity of their runways⁴.

Figure 2: Annual Runway Capacity Utilisation – 2012-2016⁵



Source: ATM capacity: Airports Commission. Actual ATMs: CAA statistics.

8. In the peak summer months, many airports experience even higher utilisation; for example, Gatwick and Manchester handled over 20% more flights in August 2016 compared to an 'average' month. During peak periods, on-time performance is often significantly lower; for example, in 2015 Gatwick achieved 57.2% during August compared to 68.7% for year overall, whilst Manchester achieved 70.7% compared to 75.6%.
9. Airlines, airports and air traffic control are continually improving their processes to reduce delay and improve resilience. However, the overall effect of these efforts, particularly in the South East, has often been to

⁴ Heathrow has a limit set by the Terminal 5 planning inquiry of 480,000 aircraft movements per annum, but other airports are typically only limited by the number of flights they believe their runways and other infrastructure can cope with. The annual movement capacities used in Figure 2 are those assumed by the Airports Commission for its traffic forecasting.

⁵ Airports Commission 2011 base line airport capacity assumptions.

increase the number of services offered alongside an overall decline in on-time performance.

10. As airports approach capacity, it appears that the industry is faced with a trade-off on behalf of passengers between more choice, frequency or competition against less uncertainty, fewer delays and cancellations or higher costs. There are many factors which affect delay, some of which are outside the control of airports and airlines (for example, weather effects and issues in air traffic control from around Europe). Whilst some issues are outside the control of industry, there is a need anticipate issues and create resilience in operations to deal with these events.

CAA research

11. The CAA has undertaken three pieces of research which have informed our conclusions including investigating consumer attitudes to disruption, a consultation request for information and a study into delay causes at Gatwick Airport.
12. The CAA commissioned a piece of qualitative consumer research⁶ to update and expand its existing evidence in order to provide a particular focus on consumers' views on *day-to-day* journey disruption, as well as the effectiveness of operational planning and specific intelligence on consumers using four London airports: Heathrow, Gatwick, Stansted and Luton. The research indicated that:
 - Consumers generally considered the current situation acceptable in terms of the delays they experience, although they would be concerned if those delays were likely to increase.
 - On the whole, they prioritised cost and convenience over delays, and would be unwilling to trade-off extra flights for better performance. This may be driven through a lack of certainty that delays would actually be avoided even if a cost/convenience price were paid.
 - Increasing scheduled block times would just hide delay and they would still be experienced e.g. queuing on a taxiway.

⁶ CAP1472 Consumer attitudes to journey disruption: A qualitative research report

- They would be willing to consider (slightly) increased fares if that increased the resources (e.g. ground handlers) used to combat delays.
- Consumers value greater information provision when they are experiencing delays.

13. In June 2016 the CAA published CAP1420, 'Operating resilience of the UK's aviation infrastructure: A request for information'⁷. We explored two key areas from a UK perspective, recognising that the issues are likely to be more severe in the South East of England.

- How can the performance of the aviation network be improved or optimised?
- How effective is the current regime, and how are consumer interests represented?

14. The main relevant issues raised by stakeholders were:

- The lack of airspace capacity and need for modernisation, both in Europe and the UK.
- The need for better collaboration / co-operation, particularly where resources – runway capacity, ground handling capability, airspace, etc – were in short supply.
- Mixed views about the airport capacity declaration process, with some stakeholders feeling that the UK process 'led the world' whilst others had reservations about whether it prioritised greater utilisation at the expense of worse resilience.
- That there were weak links in the aviation system which impacted resilience, for example, competition between ground handlers.

15. In December 2016, in collaboration with Gatwick airport and the Airport Operators Committee, we commissioned an independent Gatwick Delay Causation study⁸, which found that:

- Gatwick is growing but punctuality is reducing

⁷ www.caa.co.uk/CAP1420

⁸ CAP 1516 Gatwick Airport Delay Root Cause Analysis, April 2017 – PA Consulting

- With its current infrastructure, Gatwick's runway utilisation is near, and at times exceeds, capacity – in recent summer seasons, the holding assumptions used for capacity planning are being regularly reached for arrivals and breached for departures.
- Short turns⁹ are very challenging – airline schedules are predicated on short turns, but more often than not, these are not achieved.
- First wave¹⁰ performance underpins performance for the remainder of the day – there is a strong statistical relationship between the punctuality of the first wave and that of the remainder of the day, maybe unsurprising in an airport where most of the flights are short haul.
- Holding on stand is severely affecting punctuality, especially first wave – the principal causes appear to be Air Traffic Flow Management (ATFM) holding (due to constraints in European airspace or at the destination airport), and Start Delay, the elapsed time between the pilot asking permission to start and air traffic control granting it.
- High levels of utilisation need optimised planning and operations – the report recommends improving the planning process, building 'headroom' into the schedule, investigating further the causes of ATFM and Start Delays, and enhancing the data collection system.

16. From the evidence that we have collected – that increased utilisation often leads to increased delay; that consumers currently are aware of acceptable levels of delay but are nervous of any increases; of the incentives and practices of the UK's busiest single runway airport and its airlines not being sufficiently aligned to control delays – it appears that there is a tension between capacity provision and delay. However, as demand increases, there is a growing risk that consumers will suffer and the incentives in the industry may not be currently aligned in such a way as to promote outcomes that are in the consumer interest.

⁹ The time between an aircraft arriving on the stand and departing on its next flight.

¹⁰ Flights scheduled to depart from Gatwick before 09:00 local time, using an aircraft not previously having departed from or arrived at Gatwick on the same day.

Capacity Planning and Scheduling

17. The maximum number of flights operated at an airport, although it may be influenced by planning limits or local authority agreements, is mainly dictated by the airport capacity declaration process. The rules for this are derived from the International Airline Trade Association (IATA) guidelines, but in the UK they are set by the EU slot regulation¹¹ as implemented by the Airport Slot Allocation Regulations 1993. This latter piece of legislation makes the airport operator solely responsible for declaring capacity, which is based on a number of assumptions and rules such as the levels of delay expected. The airport operator consults with its coordination committee which consists of airlines, air traffic control and the slot coordinator. There are different levels of process maturity across different airports in the UK.
18. Once capacity is declared at an airport, it is allocated to individual airlines by the slot coordinator, and, once an airline has used the capacity it is entitled to retain it in future seasons provided it keeps up a certain level of utilisation. Therefore, at airports where slots are in demand, capacity, once used, will be difficult to subsequently reduce even if it would benefit consumers and other users of the airport to do so.
19. Airlines are responsible for their own scheduling assumptions, including the time taken to fly between destinations and to prepare an aircraft for its next flight (called the turn time). Airlines are advised by the airport on the time they should allow for taxiing, etc. but there are currently no comprehensive checks on whether they follow this advice, nor how achievable their schedule is given the likely congestion at the airport.
20. Similarly, airspace usage is planned with little formal connection between the assumptions and outcomes used by airports and airlines. This situation is improving and NATS enroute operation has begun to request individual airport schedules when it plans its operation. However, currently this only works one way – the enroute airspace controller takes account of the schedules of the airports and airlines, but there is no way for capacity limits on particular routes or pieces of airspace to be recognised in the various plans of those that use it.

¹¹ European Regulation 95/93/EEC ('the EU Slot Allocation Regulation'), as amended by Regulation 894/2002/EC and 793/2004/EC.

21. In conclusion, resilience is only likely to be maintained if it is allowed for somewhere in the scheduling process. In normal competitive circumstances, we might expect that the potential success of a more reliable competitor would give all players the incentive to provide reasonable level of service. However, where capacity is scarce, new entrants struggle to get a foothold, and so this pressure is weakened. Further, delays may arise from factors outside any one player's control whilst resilience is likely to be shared by all, meaning that there is no guarantee that resources 'spent' on resilience will be reflected in better performance than competitors, nor that this will be recognised by consumers.
22. Airline, airport and airspace scheduling processes also happen independently with no mechanism (either regulatory or market) to coordinate them.

Operational Consistency

23. Once the operational plan comes to be implemented, it can be affected by a variety of controllable and uncontrollable factors. Controllable factors can include operational behaviours, targets, resourcing levels or physical infrastructure. Uncontrollable factors can include weather, disruption outside the UK (to European airports or air traffic control) or security alerts.
24. Even if the plan itself is achievable, then it can be derailed by these operational factors, and the greater the capacity utilisation, the less chance there is for it to recover for the remainder of the operational day. For controllable factors, there needs to be more focus on controlling them, whereas uncontrollable issues need to be anticipated and planned for.
25. In addition, consumers have indicated that they cope better with disruption when they feel better informed about its cause and likely duration.
26. In the first instance, industry has an opportunity to address how to manage and improve resilience as it is aware of the causes and potential solutions. If this is not successful, broader consideration will be required of more radical options by other parties.

Conclusions

27. There are currently no collective rights and responsibilities concerning resilience in the aviation system, potentially leading to inefficient outcomes for the industry and consumers. Indeed, there are many complexities, such that it may be difficult for a single entity to guarantee improvements to its own operation, even where it chooses to spend more money on resilience.
28. The CAA believes that, in the period up to and following the provision of new runway capacity in the South East, action needs to be taken to mitigate the risks to consumers arising from resilience which we have highlighted in this report.
29. Given resilience problems are likely to require collective cross industry action to resolve, in early 2017, the CAA decided to test industry appetite for forming a voluntary group to consider how best to tackle these issues. In April 2017 a group of airports and airlines based in the congested South East of the UK, along with NATS, ACL and the CAA formed the Voluntary Industry Resilience Group (VIRG) to pool their expertise and recommend actions (for industry itself or the Government's expected review of Aviation Strategy) to address current and future resilience issues.
30. Notwithstanding the recommendations of the VIRG, there are still opportunities for the CAA to consider or formalise resilience issues through the appropriate airport economic licence process. However, CAA regulation may not be the most appropriate mechanism, as for airports it only applies currently at Heathrow and Gatwick and in general we can only introduce licence conditions at airports where we have deemed that they have sufficient market power to require a licence.
31. The CAA could also consider NERL licence conditions to cover traffic prioritisation, airspace change, airport schedule oversight and staffing level resilience. Any such changes must be implemented through the appropriate licence process involving consultation with NERL and its stakeholders, and considered in the context of relevant European wide airspace targets.
32. Government intervention would take time, and there is an opportunity as a likely new aviation strategy and legal arrangements for a new runway are developed. The CAA believes that the Government should consider options

for structural reform as it develops its aviation strategy. In particular what beneficial changes (if any) could be made to the airport capacity declaration responsibilities (or oversight) or to the UK slot legislation, and the potential benefits of a network system manager who could plan, co-ordinate and make decisions to improve resilience.

33. The CAA also intends to review its information duties and punctuality statistics reporting during 2017 and could take the opportunity to introduce new or modified measures that better capture resilience or the factors which affect it.

Chapter 1

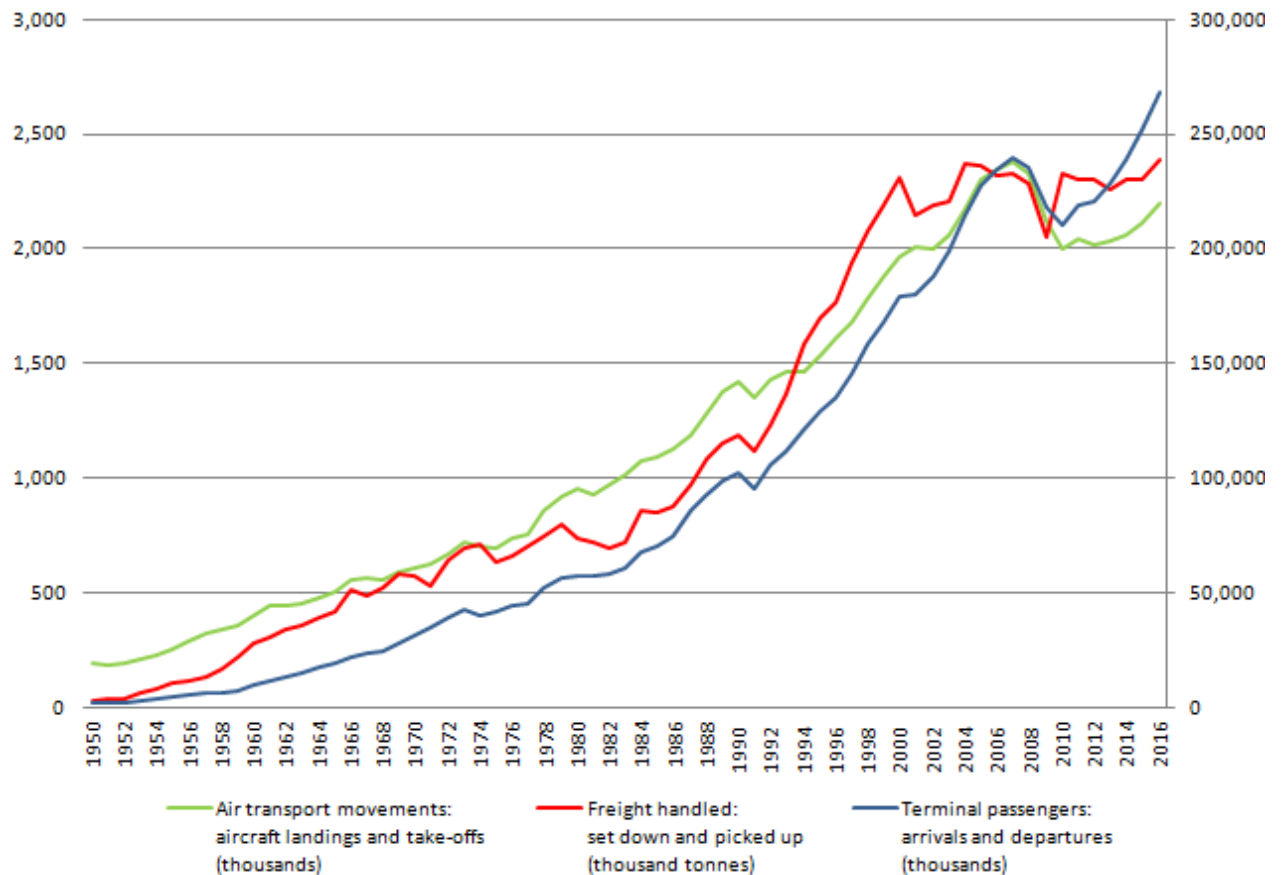
Introduction and document structure

- **Our airport and airspace capacity is constrained, and there will be no new significant airport capacity for at least 10 years.**
- **Our busiest airports are regularly among the worst performing in Europe in terms of on-time performance.**
- **Passengers benefit from increases in capacity utilisation but also suffer if that leads to more delays.**
- **We need to consider if current rules and practices reflect the consumer interest.**

Introduction

- 1.1 The number of passengers using the UK's airports has grown significantly since the beginnings of commercial aviation in the 1940s. There has been steady growth with relatively few declines, the most significant being the global recession at the end of 2008 as illustrated in Figure 3. In terms of passenger numbers we have now recovered from this, although in terms of movements we are still well below the peak before the recession.
- 1.2 Aviation relies on the limited resource that is airspace and airport infrastructure to ensure that passengers, businesses, the military and leisure flyers enjoy the many benefits aviation brings.

Figure 3: Aviation growth 1950-2016



Source: CAA Statistics

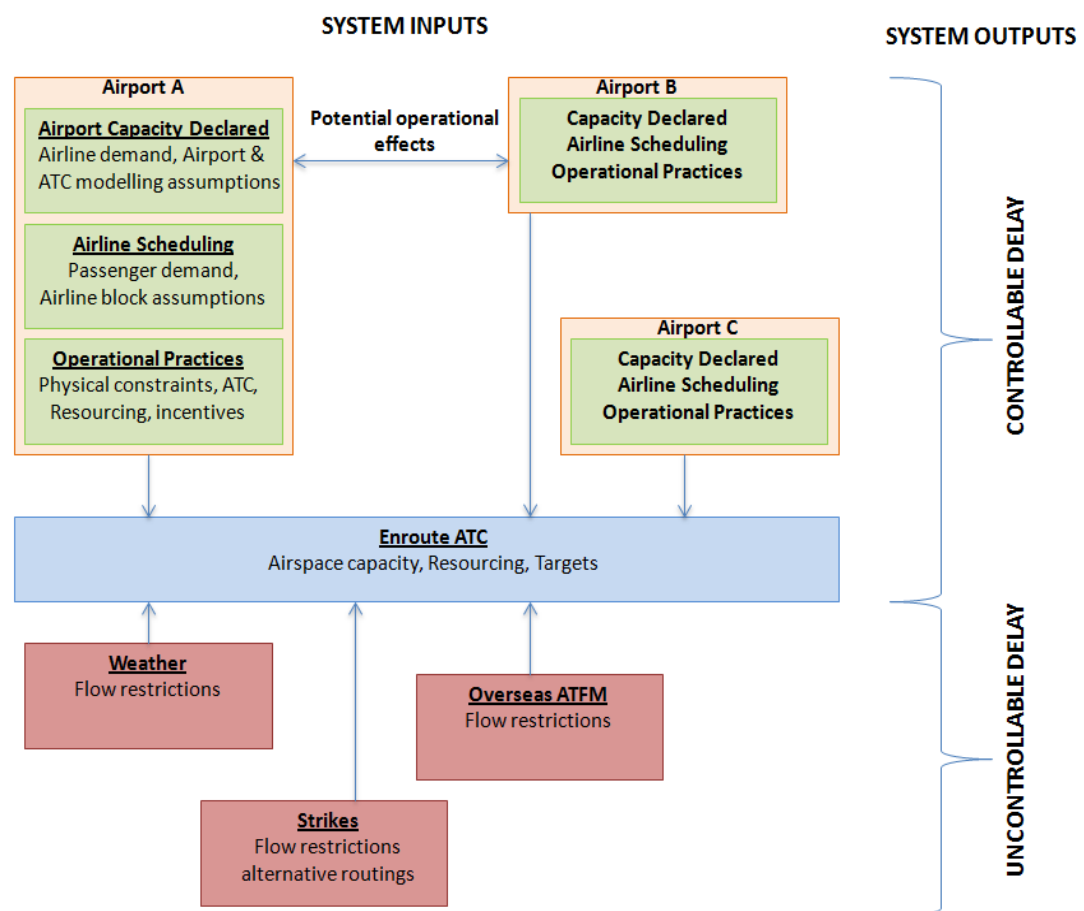
1.3 The basic structure of the UK's airspace was developed over forty years ago. Throughout Europe there is a move to simplify and harmonise the way airspace and air traffic control is used through the Single European Sky project. In the UK and Ireland we're meeting those and other issues through the Future Airspace Strategy (FAS) which sets out a plan to modernise airspace. FAS is a collaborative initiative between a range of stakeholders which sets the direction for modernisation, but does not include details or recommendations about specific structures or flightpaths. For more information see www.caa.co.uk/fas/.

1.4 In recent years some of the UK's airports, particularly those in the South East of England have seen numbers of flights in excess of any comparable

city in the world¹² and London has one of the world's busiest airspace systems¹³. Although the UK Government has recently announced support for a third runway to be built at Heathrow, this new capacity is unlikely to become operational in London until 2025 at the earliest.

- 1.5 With passenger demand increasing, airports and airlines will attempt to accommodate as much as possible whilst maintaining an acceptable level of service. However, since individual airports operate within a system, levels of 'controllable' delay (from factors not external to the UK system – see figure below) can increase as a result of individual or local issues, or as a consequence of others' decisions operating within the system.

Figure 4: Controllable and uncontrollable delay



¹² In terms of aircraft take-offs and landings, Heathrow is the busiest 2-runway airport and Gatwick the busiest 1-runway airport in the world.

¹³ Although in 2015 total ATMs in the rest of the UK were still 20% below the peak 2007 level, the London airports served only 2% fewer ATMs than at their peak.

- 1.6 Some UK airports are regularly listed amongst the worst performers in terms of delay and on-time performance in Europe by Eurocontrol as illustrated in Tables 1 and 2 for 2016.

Table 1: All Causes Delay, Top 10 affected departure airports, 2016

Rank	Departure Airport	Delayed Departures (%)	Average Delay per flight (mins)	Average Delay per flight change (%)	Average Delay per delayed flight (mins)
1	LONDON GATWICK	59.2%	19.2	22%	32.5
2	LONDON LUTON	59.2%	18.6	32%	31.5
3	MALAGA	52.1%	16.3	31%	31.2
4	BARCELONA	49.5%	15.6	41%	31.6
5	PALMA DE MALLORCA	49.0%	15.3	26%	31.3
6	ALICANTE	49.7%	15.2	-	30.6
7	ROME FIUMICINO	58.5%	14.6	-24%	25.0
8	TEL AVIV BEN GURION	48.3%	14.5	-	30.1
9	MANCHESTER	48.9%	13.7	2%	28.0
10	PARIS CHARLES DE GAULLE	52.0%	13.6	20%	26.1

Source: CODA: All-Causes Delay and Cancellations to Air Transport in Europe – Annual 2016

Table 2: All Causes Delay, Top 10 affected arrival airports, 2016

Rank	Departure Airport	Delayed Departures (%)	Average Delay per flight (mins)	Average Delay per flight change (%)	Average Delay per delayed flight (mins)
1	ISTANBUL ATATURK	62.2%	21.1	1%	33.9
2	LONDON GATWICK	49.8%	20.2	22%	40.5
3	TEL AVIV BEN GURION	60.3%	19.4	49%	32.2
4	BARCELONA	46.6%	16.9	42%	36.2
5	ALICANTE	40.3%	16.4	76%	40.8
6	LONDON LUTON	46.4%	16.3	29%	35.2
7	MALAGA	43.8%	13.5	34%	30.9
8	PORTO	43.8%	13.3	21%	30.5
9	MANCHESTER	40.1%	12.9	8%	32.2
10	LONDON HEATHROW	39.6%	12.7	-3%	32.2

Source: CODA: All-Causes Delay and Cancellations to Air Transport in Europe – Annual 2016

- 1.7 UK airports, their airlines and air traffic control have implemented a number of measures to improve on-time performance: those to encourage better planning, such as Airport Collaborative Decision Making (A-CDM); those to allow for more activity, such as Time Based Separation (TBS); and those which provide more of a buffer to soak up delays, such as lengthening turnaround and flight times.
- 1.8 The runway capacity of the major London airports has increased over the years as new techniques have been developed to safely take off and land aircraft more intensively. For example, Table 3 shows the actual and assumed runway capacities for Heathrow and Gatwick since the RUCATSE study in 1993.

Table 3: Heathrow and Gatwick Capacity Forecasts vs Actual Movements

Annual Air Transport Movements	RUCATSE 1993	Air Transport White Paper 2003	Airports Commission 2015
Heathrow			
2000	410	460	460
2005	410	480	472
2010	410	480	449
2015	410	480	472
2020	410	480	480
Gatwick			
2000	220	251	251
2005	220	260	252
2010	220	260	234
2015	220	260	263
2020	220	260	280

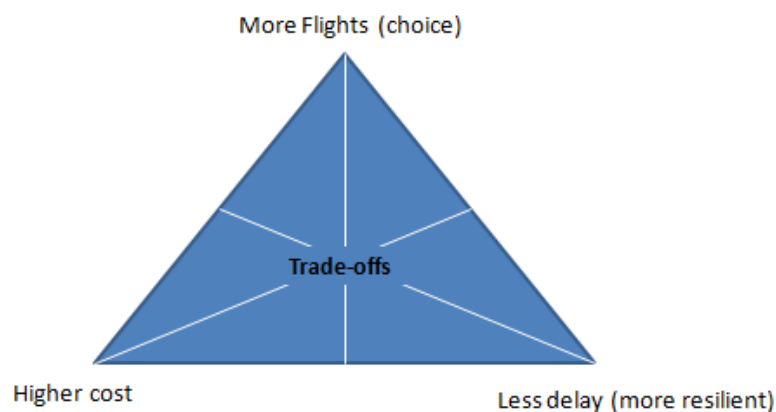
Notes: figures in black are forecasts, those in blue are actuals – 2010 throughput was affected by airport closures due to snow and volcanic ash.

- 1.9 Future developments in the aviation industry are likely to put more challenges on airports' resilience. Increasing passenger demand with constrained runway capacity tends to lead to larger aircraft sizes, which may require greater separation times and decrease the efficiency of the runway. Also as demand grows at all airports in the London area, the airspace around London will become more difficult to manage and

therefore may add delay to flights; this effect could be exacerbated by increasing use of business jets from smaller airports in the south east of England.

- 1.10 Passengers benefit from the provision of more flights, even as they suffer from any increase in delays that occur as a consequence. Therefore there will be circumstances where an increase in delay is 'a price worth paying' to obtain extra flights. In considering whether the level of capacity produces results in line with the passenger interest, it is necessary to have some understanding of how passengers value delays and capacity.
- 1.11 Where demand is high, the rules of slot allocation can mean that decisions to increase capacity cannot easily be reversed, even in cases where it may be beneficial for the consumer and the industry that they are reversed.
- 1.12 In the CAA's Strategic Plan for 2016-2021, we committed to thinking creatively about how existing capacity can be planned and operated to meet stakeholders' expectations, and what the CAA can do to ensure that resilience issues are addressed.
- 1.13 In that context, this paper examines the current balance of delay and punctuality against the number of flights, particularly in the planning and operational processes that the industry undertakes, and comments on how it reflects the consumer interest.

Figure 5: Trade-offs



Structure of this document

1.14 The remainder of this document is structured as follows:

- Chapter 2 considers the different types and measures of delay, delay and capacity relationships and an overview of consumer interest.
- Chapter 3 summarises CAA's recent research in these areas.
- Chapter 4 examines the rules and practices of how an airport decides upon the runway capacity that it can operate within any planning limits, how airlines secure and schedule take-off and landing times, and how that process differs at different airports. We also look at the potential risks and options for change in the process.
- Chapter 5 considers how operational practices may not be consistent with the planning and scheduling process, and consider potential risks and options for change.
- Chapter 6 draws conclusions and sets out a way forward for industry, Government and the CAA to protect consumer interests in the coming decade.

Chapter 2

Delay

- **Passengers can be affected by different types of delay even if their flight is considered to be on time.**
- **Consumers have access to a wide range of data sources but these can be difficult to understand.**
- **A lack of capacity (both infrastructure and resources), variability and prolonged high utilisation can lead to increasing delays, reduced on-time performance and difficulties in recovery.**
- **On-time performance has been decreasing and delays have been increasing in recent years, and although the UK is not the worst performing in the world, there is room for improvement. The effects of airport and airspace capacity constraints are evident in other countries such as US and China.**
- **As airports approach capacity, the industry is faced with a trade-off on behalf of passengers between more choice / frequency / competition vs uncertainty / delays / cancellations / costs.**

Types of delay

2.1 According to the dictionary, delay is “a period of time by which something is late or postponed”¹⁴. However, in the context of a flight, there are many different ways in which delay could be, and is, experienced.

- **Passenger ticket times – departure and arrival at terminal gate. The departure and arrivals times shown on a flight ticket or itinerary are the times that the aircraft should leave or arrive at the terminal gate. In the UK, and many other countries, airlines generally report being ‘on-time’ as early or within 15mins of the scheduled aircraft arrival or departure time.**

¹⁴ Oxford English Dictionary

- Passenger waiting and queue times exceeding expectations (irrespective of ultimate time of arrival) at security, the gate, on the aircraft waiting to take-off, baggage reclaim or at immigration.
- Holding on the ground or in the air, as air traffic control (ATC) implement procedures to alleviate over-congestion in certain blocks of airspace.

2.2 These definitions of delay are measured and reported publicly by the aviation industry in a variety of different places, although the definitions can sometimes be complicated:

- UK CAA reports average delay per flight and 'on-time performance'¹⁵ (proportion of flights no more than 15 mins late) at 25 UK airports. The data which the CAA receives from UK airports to calculate its punctuality statistics relate to when aircraft reach the runway for landing or take-off. This is not the same as the time of passenger arrival or departure at the terminal as referred to in the EU's Denied Boarding Legislation. The CAA uses average taxiing time to convert from runway times to terminal times.
- Eurocontrol Central Office for Delay Analysis (CODA) reports aggregated delay, including delay reason code, and on-time performance for all flights of largest EU airlines and largest EU airports. Delay is calculated by comparing latest scheduled arrival/departure time at the terminal with the actual performance. However CODA often quote 5 mins rather than 15 mins as a threshold to report on-time performance.
- OAG publishes On-time departure performance (proportion of flights no more than 15 mins late) for global airlines and airports. 'On time' is defined as departures that take place strictly less than 15 minutes after schedule for airports. For airlines, 'on-time' is defined as arrivals that take place strictly less than 15 minutes after schedule. 'Schedule' is defined as what has been provided by airlines to the OAG

¹⁵ It should be noted that different airline business models may result in a difference in OTP. Airlines may choose to increase the scheduled time between the flight departure and arrival (the block time) to take into account congestion or to improve flight connection performance. However, passengers may still perceive queuing or waiting as a delay.

database. To qualify for inclusion in the OAG Punctuality League, the OAG database must have received data for at least 80% of scheduled flights operating to and from an airport. OAG provide an analysis of small, medium and large airports as well as different airline categories and by region.

- Third parties like flightstats.com provide search facilities where consumers can search live flight status and historical delay and cancellation statistics by region, airport, airline or route. The statistics are based on a wide range of data feeds (including airports, airlines, Global Distribution Systems and positional data sources), which are used to power many developer and customer mobile apps.
- NATS¹⁶ report 'ATC caused [enroute] delay', which is delay attributable to the performance of NATS and is broken down into capacity or staffing reasons. NATS also compare this with data from Eurocontrol to show how NATS and the UK perform relatively.
- Eurocontrol also now publish congestion related indicators of delay in support of COMMISSION REGULATION (EU) No 691/2010 which lays down a performance scheme for air navigation services and network functions. These indicators include Arrivals Sequencing and Metering Area (ASMA), Airport related Air Traffic Flow Management (ATFM) delay, ATC pre-departure delay and Additional Taxi out time. These indicators are useful in comparing airport performance as they can illustrate congestion effects at an airport.
- Airports produce a variety of statistics – for example, Gatwick publishes monthly reports of on-time performance (proportion of flights no more than 15 mins late compared to scheduled terminal arrival/departure) as well as targets for security queuing, baggage handling and availability of pier served stands.

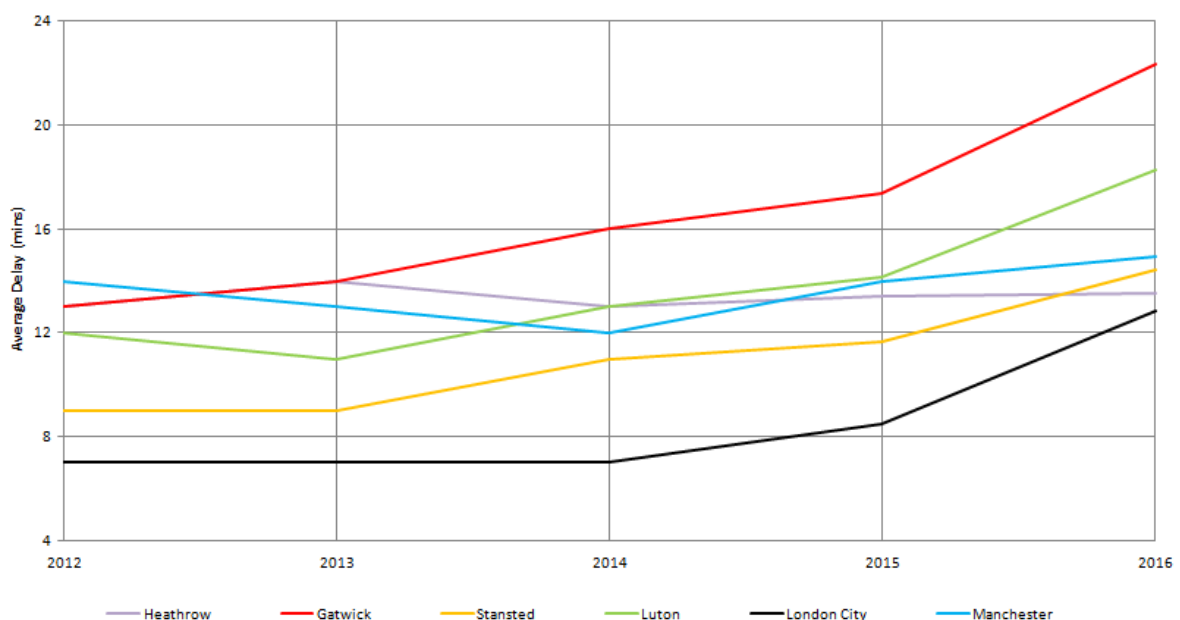
2.3 In the following sections we will generally refer to on/off stand delay (i.e. the delay compared to the purchased ticket times) of which other delays may be a contributing factor. For example, a passenger delayed at security

¹⁶ NATS (formerly National Air Traffic Services), the biggest air navigation service provider in the UK, parent company of NERL (NATS En Route plc) and NSL (NATS Services Limited). www.nats.co.uk

may cause the aircraft to be delayed moving off stand. Or air traffic flow restrictions due to lack of staff resources in another country may delay a flight arriving on stand in the UK. Although these delays may cause passengers stress, it is generally the arrival time at the destination which is seen as most important to passengers (as indicated in our consumer research, described in Chapter 3).

- 2.4 Figure 6 shows average delay at the UK's six coordinated airports between 2012 and 2016. All with the exception of Heathrow and Manchester have suffered significant increases in delay over that period.

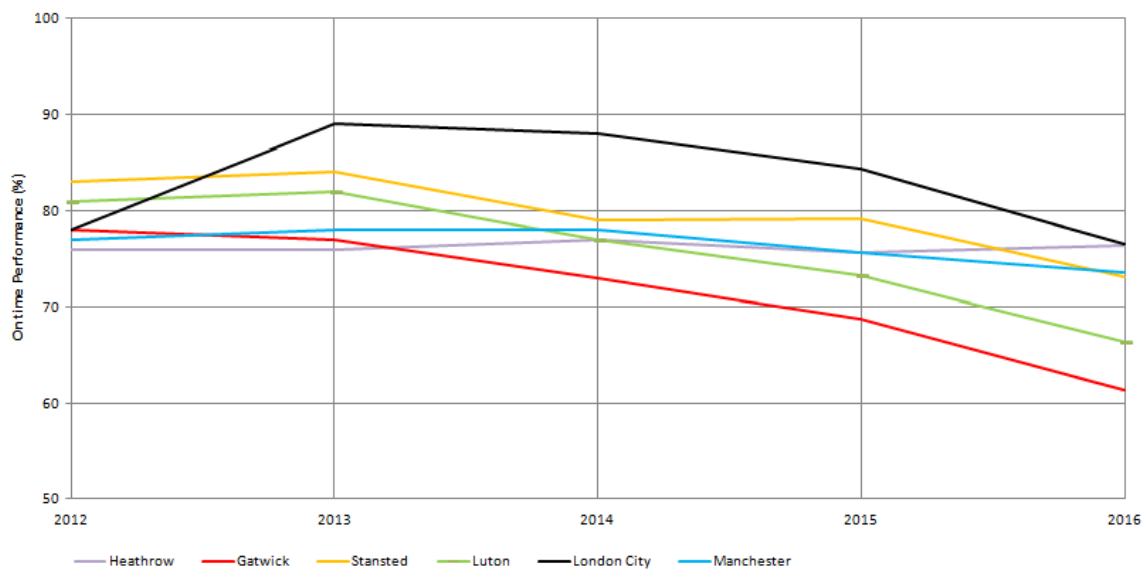
Figure 6: Average Delay (mins), 2012-2016



Source: CAA Statistics

- 2.5 Figure 7 shows the corresponding on-time performance between 2012 and 2016 as calculated by the CAA. Heathrow and Manchester have remained relatively static, and London City has seen improvements in 2013 which have since been eroded. Other airports, in particular Gatwick and Luton have seen on-time performance deteriorate.

Figure 7: On-time Performance, 2012 - 2016



Source: CAA Statistics

- 2.6 Whilst the majority of UK flights are considered to be 'on time'¹⁷ the average delay for a delayed flight is more likely to be up to 60 minutes¹⁸. Passenger who suffer long delays over 3 hours or cancellations are entitled to compensation under EU regulation 261.
- 2.7 Delay reasons are reported by airlines using standard IATA delay codes covering categories such as weather, airline related, airport related, air traffic flow restrictions.
- 2.8 However these do not necessarily provide the root cause of the delay in all cases, which may be related to fundamental capacity, planning/scheduling or operational practices which was the subject of our Request for Information, discussed further in Chapter 3.

Capacity and delay relationships

- 2.9 Basic queuing theory suggests that higher utilisation and variability lead to waiting. This is the same for any service with a finite capacity, for example queuing on busy roads, shops or hospitals.

¹⁷ For reporting punctuality 'on-time' is considered to be early or up to 15mins late

¹⁸ CAA punctuality statistics