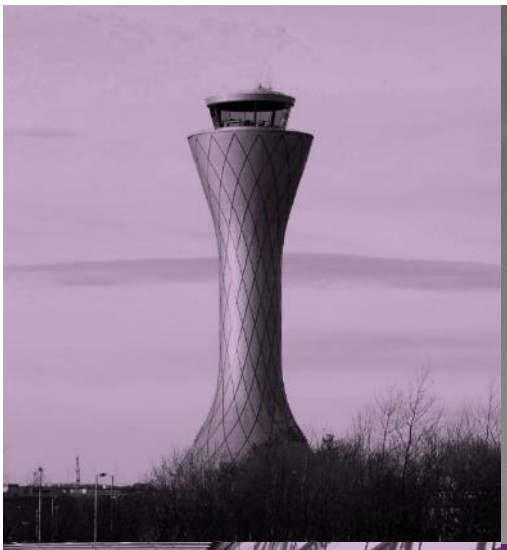

The Economic Impact of Night Flying in the UK

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York Aviation

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Executive Summary

Introduction

1. In early 2021, Airlines UK, working with a number of industry partners, commissioned York Aviation to undertake an assessment of the economic impact of night flying in the UK. The primary purpose of this report is to update, refresh and extend previous research undertaken in this area to provide a strong evidence base as to the economic benefits associated with night flying that will assist policy makers and other stakeholders in making informed judgements around future night flying policy. The study focusses on providing a profile of and assessing the economic impact of night flying in the UK in 2019, before the onset of the COVID-19 pandemic. This was a deliberate choice, as it provides the best basis for considering the role of night flying in the medium to long term.

Relationship to the Balanced Approach

2. The international approach to aircraft noise management is based on the ICAO Balanced Approach. The Balanced Approach consists of identifying noise problems that exist at an airport and then assessing the cost-effectiveness of the various measures available to reduce noise through the exploration of four principal elements, which are:

- reduction of noise at source (quieter aircraft);
- land-use planning and management;
- noise abatement operational procedures (optimising how aircraft are flown and the routes they follow to limit the noise impacts);
- operating restrictions (including night flight restrictions brought about via this process).

3. At its core, the Balanced Approach is based on the principle of sustainable development, allowing development of air travel while balancing the impact on the acoustic environment. The Balanced Approach has been incorporated into UK law and government has a duty to undertake an assessment of any proposals it brings forward in the context of the Balanced Approach.

4. This research is not intended to be a full assessment of the costs and benefits of night flying in the context of the Balanced Approach. This report is intended to provide additional evidence on the economic benefits of night flying, and particularly the benefits in the wider economy away from airports and from the immediate operators and users of services. In part, this focus on the economic benefits of night flying is designed to address an evidential gap within the Department for Transport's existing framework for considering the economic impacts of night flights. The existing approach used by the Department, and developed by Systra, currently does not consider a range of key economic benefits from night flying, namely those accruing to cargo users, economic effects in the wider economy or the knock-on effects from night flying across operations over the day. Hence, the Department for Transport's approach, while broadly robust in what it covers, cannot be considered as a complete view of the economic costs and benefits of night flying. By extension, any attempt at a 'Balanced Approach' assessment using it is at present not actually balanced, as significant potential benefits to society are not being considered.

Profile of Night Flying in the UK

5. Although the majority of passenger-related activity at UK airports occurs during the daytime, the volume of passengers handled during the night is significant, with approximately 31 million passengers arriving at or departing from UK airports during the night in 2019. This is around 11% of total passenger traffic at UK airports.

6. The second busiest hour for passengers departing UK airports in 2019 was 06:00 to 06:59, which falls into the night period. The busiest hour is the subsequent hour between 07:00 and 07:59, which falls into the day period. These early morning departures are essential to the business models of many airlines with aircraft based at UK airports. If the ability to fly early in the day is curtailed, the rationale for basing aircraft at an airport is severely undermined, with knock-on effects across the day. Although few passengers depart from UK airports between 23:00 and 05:59, a steady stream of passengers arrive throughout this period, with approximately 6.6 million and 8.8 million arriving

seats at designated and non-designated airports respectively. The majority of arriving seats from long-haul destinations at designated airports are early morning arrivals into Heathrow.

7. The profile of activity for freighter aircraft is more weighted towards night operations. This is particularly true for freighter aircraft flying for express freight operators, for which night operations are critical for the delivery of next-day logistics services. The peak for inbound freight carried by express freight operators arriving at UK airports is between 03:00 and 03:59. In total, around 47% of cargo tonnage on freighter aircraft is moved during the night period at UK airports.

8. The profile of bellyhold cargo arriving at and departing from UK airports throughout the day is intrinsically linked to passenger airline schedules, particularly long-haul services, meaning that the great majority of bellyhold cargo at UK airports is handled during the daytime. However, the early morning long-haul arrivals into Heathrow are seen as critically important. Heathrow is important for express services, both in terms of cargo flights and, most particularly, bellyhold. Bellyhold offers a valuable addition to freight only flights, providing flexibility and efficiency. The small number of flights that arrive into Heathrow in the early morning are long haul commercial passenger aircraft coming from strategically important international markets in the Far East, Asia and Africa. Express services have freight on all these movements, which gets cleared and delivered into the UK on the same day of arrival.

Why is Night Flying Important?

9. Night flying is driven by demand and consumer preferences. Business passengers want to maximise 'on the ground' time and minimise overnight stays and access key connections at hub airports across Europe. Leisure passengers typically also want to maximise time at their destinations. Airlines need to maximise the length of the day available for flying to utilise their aircraft assets effectively. For cargo airlines, particularly those offering express freight services, the night is essential in enabling time definite, next-day delivery services.

10. The effect of reducing the 'length' of the day by reducing night flying will have a multifaceted impact on airlines. In particular, reducing airlines' ability to start early and return late in the day will mean they are faced with potentially unattractive options. Consultations with key airlines illustrates that most airlines flying in the night period do so to maximise their aircraft utilisation, a critical factor in spreading their asset and operational costs over the maximum number of services and passengers. If airlines need to reschedule, they may lose some frequencies which, at best will lead to fare increases for UK passengers and some reduced connectivity or, at worst will potentially undermine their case for basing aircraft at UK airports and lead to assets being redeployed to European bases, leading to more significant reductions in connectivity as well as direct job losses in the UK.

11. Night flying forms a critical feature of hub connectivity, both at the UK's main hub at London Heathrow, but also in terms of regional airports having access to hub connectivity at major European airports. Early morning arrivals into the UK are important in meeting the first wave of short haul departures, helping to sustain services which are particularly attractive to business passengers. These connections also allow airlines to maximise their long haul network, providing further passengers that support increased destinations and frequencies which enhance the UK's connectivity, but which may not be sustainable without arriving or departing in the Night Period so as to maximise onward connections. Access to European hubs from regional airports in many cases requires early morning departures to meet the first wave of onward connections from those hubs. These early morning connections provide significant connectivity for many regional airports and passengers, a necessity given the constrained capacity at London Heathrow.

12. Night flying also adds significantly to airport capacity in the UK, contributing to UK government policy to 'make best use of existing runways'. Whilst airports such as London Heathrow and London Gatwick are at the extreme end of this capacity shortfall spectrum, it remains an issue across many larger UK airports where demand for slots at each end of the day would exceed the available capacity if runways could not be used in the night periods.

13. Night flying allows airlines to overcome the UK's time zone disadvantage when compared with other European countries. Flights often need to depart in the night period from the UK in order to reach their destination in good time, maximising business efficiency and making UK cities competitive as places to locate business within Europe.

14. There is a clear desire for passengers on long-haul flights to travel overnight where possible. For flights from a number of world regions, this results in services operating into the UK with early morning arrivals both from the east and the west, ranging from 04:00 hours from Asia through to 07:00 (and beyond) from the USA and other world regions. Long haul flights in the night periods also play a vital role in supporting the short-haul network from UK hub airports and in carrying bellyhold cargo.

15. Cargo operations, particularly express freight operations, such as the hubs at East Midlands and Stansted, are heavily dependent on night flying in order to meet the needs of customers and to support the UK's position as a place to do business. Guaranteed delivery times and next business day delivery are key features of the offer for night freight operators. If airlines and shippers cannot make their operations work into the UK, they are more likely to fly to hubs on the continent and complete the rest of the journey by truck. This will lead to a significant loss of productivity in the wider economy and will reduce direct employment associated with these activities in the UK.

16. Over the past 20 years express air freight services have grown substantially faster than general air freight services, reflecting the increasing integration of global markets and global supply chains, continued growth of 'just in time' processes, and the rise of time-sensitive shipping from business to consumer (B2C).

The Current Economic Impact of Night Flying

17. The economic impact generated by night flying at UK airports has been assessed using a commonly used and widely accepted economic impact framework which assesses employment and Gross Value Added (GVA) in terms of direct, indirect and induced effects, and also considers the wider impacts supported in the economy by the quality of air connectivity supporting productivity across a wide range of sectors. The direct, indirect and induced impacts reflect the GVA and employment generated by operating flights at night. Wider impacts are different as they accrue to the economy through the benefits that users of passenger and cargo services gain from night flying. These impacts cannot be directly observed in the same way as direct, indirect and induced impacts, and estimates are based on economic modelling. These effects are embedded in the broader UK economy.

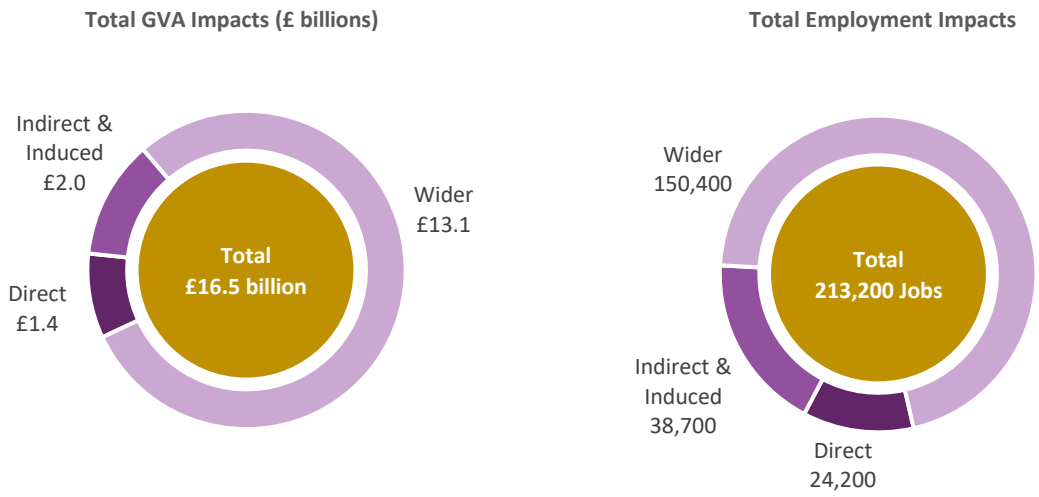
18. Figure 1 overleaf presents the total economic impact in terms of GVA and employment generated at UK airports by passenger and cargo-related activity during the entire night period, i.e. across the Night Quota Period (NQP) and Other Night period[1] combined.

19. The direct impact of night flying in 2019 was estimated to be around £1.4 billion in GVA and 24,200 jobs. These direct impacts, in turn, generate around £2.0 billion in GVA through indirect and induced effects and 38,700 jobs.

20. If wider impacts are included, night flying in the UK in 2019 was estimated to generate a total of £16.5 billion of GVA and approximately 213,200 jobs across the UK. This demonstrates the vital role that night flying plays in the wider UK economy. Our assessment suggests that, while direct, indirect and induced impacts are important, particularly to the communities around airports, it is the wider economic benefits associated with night flying that really drive the overall impact in the UK economy.

[1] The 'Night Quota Period' (NQP) is a term used by Government and is defined as 23:30 to 05:59. 'Other Night' includes the parts of the standard 'night period' that are not within the NQP – i.e. 23:00 to 06:59. 'Day' is the daytime period, defined as 07:00 to 22:59.

Figure 1: Total Economic Impact of Aviation Activity at UK Airports During the Night



Source: York Aviation.

21. The total impact associated with night flying in the UK is spread across many airports. The operations at the designated UK airports (Heathrow, Gatwick and Stansted – the three largest London airports) support around £7.6 billion of total GVA and 98,000 jobs, while operations during the night periods at the non-designated UK airports support around £8.8 billion of GVA and 115,000 jobs.

22. Of the total impact in the UK, cargo and passenger operations during the night contribute a similar total of just over £8 billion in GVA each. In terms of total employment, cargo and passenger operations support approximately 101,000 and 112,100 jobs respectively across the entire economy.

The Impact of Restricting Night Flying

23. We evaluated the economic impacts that would occur under four hypothetical scenarios that would further constrain the levels of night flying that occurs at UK airports:

- Night Ban – a total ban on all aircraft movements between 23:00 to 06:59;
- NQP Ban – a total ban on all aircraft movements during the NQP (23:30 to 05:59);
- NQP Ban, 50% Night Reduction – a total ban on all aircraft movements during the NQP (23:30 to 05:59), and a 50% reduction in aircraft movements between 23:00 to 23:29 and 06:00 to 06:59;
- 50% Night Reduction – a 50% reduction of aircraft movements between 23:00 and 06:59.

24. These scenarios are, of course, simplified and illustrative. In particular, they assume that increased restrictions are applied across the UK and, hence, there is no shifting of demand between UK airports. It should also be recognised that while the approach does consider 'knock-on' effects to day time operations, it does not necessarily identify the full range of less quantifiable 'shadow effects' that might come with night curfews or similar tight restrictions.

25. Table 1 overleaf outlines the passengers and cargo tonnes that would be foregone across designated and non-designated airports under each of the four scenarios.

Table 1: Annual Passengers and Annual Cargo Volumes Foregone by Constraint Scenario

Scenario	Airport Category	Total Passengers (millions) Foregone	Total Cargo (Tonnes) Foregone
Scenario 1: Night Ban	Designated Airports	13.1	200,000
	Other Airports	7.6	280,000
	Total	20.7	480,000
Scenario 2: NQP Ban, 50% Other Night Reduction	Designated Airports	6.8	130,000
	Other Airports	3.5	260,000
	Total	10.3	400,000
Scenario 3: NQP Ban	Designated Airports	2.7	80,000
	Other Airports	1.0	250,000
	Total	3.6	320,000
Scenario 4: 50% Night Reduction	Designated Airports	3.4	100,000
	Other Airports	0.6	160,000
	Total	4.0	260,000

Source: York Aviation.

26. Figure 2 illustrates the sum of direct, indirect, induced, and wider impacts of each of the four constrained scenarios in terms of foregone GVA and employment. The economic impact that would result under each of the four scenarios is significant.

27. A ban of aircraft movements during the hours of 23:00 and 06:59 would have the most significant impact on the aviation industry and the wider UK economy, with 20.7 million passengers and 480,000 tonnes of cargo per annum lost, which would result in around £1.0 billion in direct GVA foregone and 16,000 jobs put at risk, with indirect and induced impacts increasing this impact by around £1.3 billion in GVA and 26,000 jobs. If wider impacts are then included as well, a total of approximately £12.4 billion of GVA is forgone and up to 158,000 jobs put at risk. Furthermore, consumers would face increased generalised costs as they are forced to travel at less optimal times and as airlines increase air fares for short-haul services by an estimated 0.8%. The total impact on passengers is estimated to be around £571 million at 2019 demand levels.

28. A ban on flying during the NQP and a 50% reduction in the number of movements during the Other Night period would result in an economic impact of £0.5 billion in direct GVA foregone and 9,000 jobs put at risk, with indirect and induced impacts increasing this effect by £0.8 billion in GVA and 15,000 jobs. If wider impacts are included, the total impact on foregone GVA increases to approximately £8.7 billion with around 109,000 jobs being put at risk. Air fares would rise by an estimated 0.6% for short-haul passengers, and re-timing costs are estimated to range between £14 and £18 per passenger. The total impact on passengers is estimated to be around £380 million at 2019 demand levels.

29. An outright ban on aircraft movements during the NQP alone would result in an economic impact of £0.3 billion in direct GVA foregone and 4,000 jobs put at risk, with indirect and induced impacts increasing this effect by £0.4 billion in GVA and 7,000 jobs. If wider impacts are included, the total impact on foregone GVA increases to approximately £5.7 billion of GVA with approximately 69,000 jobs at risk. Air fares would rise by an estimated 0.2% for short-haul passengers, and re-timing costs are estimated to range between £14 and £18 per passenger. The total impact on passengers is estimated to be around £111 million at 2019 demand levels.

30. Even a 50% reduction of aircraft movements throughout the entire night period would result in an economic impact of £0.3 billion in direct GVA foregone and 4,000 jobs put at risk, with indirect and induced impacts increasing this effect by £0.4 billion in GVA and 7,000 jobs. If wider impacts are included, the total impact on foregone GVA increases to approximately £5.1 billion with around 62,000 jobs being put at risk. Air fares would rise by an estimated 0.2% for short-haul passengers, and re-timing costs are estimated to range between £14 and £18 per passenger. The total impact on passengers is estimated to be around £255 million at 2019 demand levels.

Figure 2: Economic Impact of Constrained Night Flying Scenarios by Economic Impact Category

Source: York Aviation.

1. Introduction

Background

1.1. In early 2021, Airlines UK, working with a number of industry partners[2], commissioned York Aviation to undertake an assessment of the economic impact of night flying in the UK. This is an area where previous work has been undertaken by the Department for Transport and a range of other parties, including the Freight Transport Association, Heathrow Airport and British Airways. However, the economic value of night flights remains a 'live' issue and the extent to which the full economic value of night flights is recognised and taken account of in policy decisions is unclear. The primary purpose of this report is, therefore, to update, refresh and extend the previous research undertaken in this area to provide a strong evidence base as to the economic benefits associated with night flying that will assist policy makers and other stakeholders in making informed judgements around future night flying policy.

Context for the Research

1.2. The key context for this new research is the Department for Transport's consultation into the night flying regime in the UK. The consultation is being undertaken in two stages:

- in the first stage, to formally consult on the proposal to maintain the existing night flight restrictions for the designated airports (Heathrow, Gatwick and Stansted) from 2022 to 2024, and the proposal to ban QC4 rated aircraft movements during the NQP (23:30 to 06:00). This stage has now closed and the UK Government has announced that the existing restrictions will in fact continue until 2025 and that the ban QC4 aircraft will go ahead;
- in the second stage, to seek early views and evidence on policy options for the government's future night flight policy at the designated airports beyond 2024, and nationally. This includes whether there should be amendments to the national noise policy to include specific policy for night noise, revisions to the night flight dispensation guidance, whether there should be set criteria for airport designation, and what any future night flight regime at the designated airports should look like.

1.3. A main aim for this analysis is to provide evidence in relation to the second stage of the consultation.

Research Scope

1.4. The formal objective for the project was set out as follows:

"The study will produce a fact-based report illustrating the role and contribution of night flights to the UK aviation industry and the wider UK economy to support the industry in responding to the DfT consultation on future night flight policy. This will look at both the role of night flights in supporting UK commercial route connectivity and viability, and also the role of night flights in facilitating UK air cargo services, and the value that such air cargo brings to the wider UK economy. The study should highlight the critical role that night flying plays in supporting a commercially viable aviation sector for both passengers and freight, and therefore its importance in supporting Global Britain."

1.5. There are a number of important themes within this objective that are perhaps worth highlighting:

- the study focusses on the economic value of both passenger and cargo night flying. Night flying is important to both market segments and a rounded picture of the economic value of night flying cannot be reached without considering both;

[2] AICES International Express, Airport Operators Association, Logistics UK, Association of International Courier & Express Services, DHL, FedEx, UPS, Gatwick Airport, Heathrow Airport, Manchester Airports Group, IATA.

- the study has focused strongly on articulating the importance of night flying to the wider UK economy that uses these passenger and cargo services. This is a significant and recognised gap in the evidence base around the economic benefits of night flying currently. Existing approaches do not adequately reflect the important productivity benefits to the UK economy from being able to fly at night;

- it articulates the need to set the importance of night flying in the context of the operating models of airlines in the UK. This research sets out to explain why night flying is important to airline operating models, both passenger and cargo, and, importantly, to highlight why night time operations cannot be viewed in isolation from the rest of the day;

- it highlights the importance of placing the importance of night flying in the context of 'Global Britain' and the increasing reliance of the UK economy on global trade and its integration with the global economy. This returns to the theme above of properly articulating the importance of night flying to the wider economy.

1.6. The report focusses on the economic impact of night flying in 2019, prior to the significant disruption caused to the aviation market by COVID-19. This is for two main reasons. Firstly, seeking to assess the economic impact of night flying in 2020 or at current flying levels would be largely meaningless, as the travel restrictions that have been in place for much of the last 16 months mean that is not actually possible to assess current levels of demand. Secondly, one of the primary drivers for this research is to provide evidence in relation to stage 2 of the Department for Transport consultation, which focuses on policy post 2024. Most commentators expect air transport markets to have largely recovered by 2024 and, hence, impacts in 2019 are likely to provide a better view of the economic impacts of night flying moving into the future.

1.7. This research focusses on assessing the economic impact of night flying primarily in terms of impacts on Gross Value Added (GVA) and employment. These are felt to provide the clearest and most understandable measure of economic impact. It does, however, also provide some quantification of passenger economic welfare effects and demand effects. It should be noted that the Department for Transport's approach to considering the economic impacts of night flying, as developed by Systra, focuses primarily on economic welfare effects. As a result, any direct comparisons between the two should be undertaken with caution. However, it is important to note that the wider economic impacts identified in this research are compatible with the Department for Transport's approach and would not include any 'double counting'. These are benefits that are not currently included within the Department for Transport's existing framework for valuing the economic impact of night flights and this omission is a significant gap given the potential scale of these effects.

Relationship with the Balanced Approach

1.8. The international approach to aircraft noise management is based on the ICAO Balanced Approach. The Balanced Approach consists of identifying noise problems that exist at an airport and then assessing the cost-effectiveness of the various measures available to reduce noise through the exploration of four principal elements, which are:

- reduction of noise at source (quieter aircraft);
- land-use planning and management;
- noise abatement operational procedures (optimising how aircraft are flown and the routes they follow to limit the noise impacts);
- operating restrictions (including night flight restrictions brought about via this process).

1.9. At its core, the Balanced Approach is based on the principle of sustainable development, allowing development of air travel while balancing the impact on the acoustic environment. The Balanced Approach has been incorporated into UK law and government has a duty to undertake an assessment of any proposals it brings forward in the context of the Balanced Approach.

1.10. Prior to considering the results of this analysis, it is important to consider how it sits within the overall 'Balanced Approach' to noise management. The 'Balanced Approach' seeks to examine the costs and benefits to society of night flying to identify cost effective approaches to mitigating / managing aircraft noise. It should be made clear

at the outset that this work does not represent a cost effectiveness analysis or a cost benefit analysis. It does not seek to consider the scale of costs associated with night flying or to address the balance between costs and benefits. York Aviation and the project sponsors recognise that there are potentially significant societal costs from night flying, particularly from noise, and that these are vital considerations in the Balanced Approach. The scale and nature of these costs is not the subject of this report. It should be emphasised that this research is not intended to be a full assessment of the costs and benefits of night flying in the context of the Balanced Approach. This report is intended to provide additional evidence on the economic benefits of night flying, and particularly the benefits in the wider economy away from airports and from the immediate operators and users of services. In part, this focus on the economic benefits of night flying is designed to address an evidential gap within the Department for Transport's existing framework for considering the economic impacts of night flights.

1.11. The Systra approach for assessing the economic benefits of night flying was commissioned by DfT and is its default approach to considering the economic effects of night flying[3]. The approach considers economic welfare effects, examining the costs and benefits of night flying to different actors in the economy. Essentially, it considers airports, airlines, passengers, and the public accounts. This approach is taken in order to maximise compatibility with WebTAG, the Department's broader approach to appraising transport interventions. It should be noted that this is not an issue. It is a perfectly reasonable and sensible starting point. However, by its own admission, the Systra approach does not cover a number of effects that are potentially significant in the context of a taking a balanced approach to considering the costs and benefits of night flying. Specifically, it does not consider:

- Cargo users – the impacts on passengers as the users of passenger services are considered but there is no similar consideration of the impact on cargo users in terms of the costs of retiming or lost connectivity. Given the importance of night flying in the cargo market, particularly for express freight, this is a significant omission;
- Wider Economic Benefits – it does not consider the broader impacts on the UK economy in terms of trade, foreign direct investment (FDI), productivity or tourism from changes to the night flying regime. This applies to both passenger and cargo services. Again, this is potentially a significant omission;
- Knock-on Effects through the day – the Systra approach does not consider how changes to operations in the night would affect day time operations. It does not consider the potential impact on aircraft utilisation for short haul airlines, which is an essential tenet of the low cost airline model in particular. This could significantly impact fares and connectivity, which will ultimately have severe implications for overall demand and in turn significantly reduce economic benefits. It does not consider how transfer traffic might be affected through the remainder of the day by squeezing connection options. The same applies to transferring cargo traffic. In terms of express services, squeezing the night will potentially reduce day time operations , with the overnight business model significantly impaired, the general business case for flying overall is reduced, with some daytime flights likely to move to trucking as well.

1.12. At present the Systra approach, while broadly robust in what it covers, cannot be considered as a complete view of the economic costs and benefits of night flying. By extension, any attempt at a 'Balanced Approach' assessment using it is at present not actually balanced. Significant potential benefits to society are not being considered. This research seeks to address a number of these concerns and to enable a better understanding of the benefits side of the equation.

[3] Systra (2017). Economic Impacts of Night Flights: Research Study.

Approach

1.13. The development of this report has involved a number of key activities:

- data on passenger and cargo activity has been collected from airports, airlines and a range of public sources. Establishing a baseline position as to what happens during the night period and precisely when has been a fundamental part of this research. Across the UK, the extent and nature of night flying activity is not something that is well understood but it is clearly core to undertaking any form of economic impact assessment. In particular, data on night flying in terms of air transport movements, passengers and cargo tonnage has been collected from 11 UK airports. These airports accounted for 86% of passenger traffic and 96% of cargo tonnage at UK airports in 2019;
- consultations have been undertaken with a number of airports, airlines and stakeholders to assist in understanding the importance of night flying to operating models and the broader and economy;
- a wide-ranging review of previous research into the economic impact of night flying and air services and airports more generally has been undertaken to provide the basis for the economic impact modelling undertaken. We have also undertaken a review of night time operational regimes in a number of other countries worldwide;
- the evidence base established through this research has been used to develop a model of airline and passenger behaviour, which enables the consideration of the effects on the market from changes in the night flying regime. This sits alongside and feeds into an economic impact model that has been developed using existing secondary research on the economic impact of airports and air services in the UK. This model enables consideration of the GVA and employment impacts of night flying and changes in night flights policy across the UK.

Structure of the Report

1.14. The structure of this report is as follows:

- in Section 2 we set out a broad profile of current night flying in the UK;
- in Section 3 we explain why night flying is important for airlines, passengers, and consumers;
- in Section 4 we set out the current economic impact of night flying in the UK;
- in Section 5 we consider the impact of restricting night flying more than is currently the case;
- in Section 6 we draw some conclusions.

2. Profile of Night Flying in the UK

Introduction

2.1. This section sets out a profile of aviation activity that occurred at UK airports throughout day and night periods in 2019. Our analysis illustrates the varying profiles of aviation activity between airports that are designated by central Government as requiring restrictions on night flying, which are Heathrow, Gatwick and Stansted, and all other airports in the UK that are non-designated, where night flying activity may be regulated through individual local arrangements.

2.2. The analysis primarily considers flying activity in three time bands:

- Night Quota Period (NQP), which is defined as 23:30 to 05:59;
- Other Night, which includes the parts of the standard night period, which is defined as 23:00 to 06:59, that are not within the NQP;
- Day, which is the day time period, defined as 07:00 to 22:59.

2.3. Additionally, we have provided some analysis on an hour-by-hour basis to aid understanding of flying patterns.

2.4. The analysis has focussed on aviation activity related to:

- commercial passenger operations, which includes scheduled and charter services; and
- air freight operations, where we have distinguished between the operations of integrators/express cargo firms[4] (e.g., DHL, FedEx and UPS) and general cargo firms (e.g., CargoLogicAir, Emirates, SkyCargo, and Cargolux);
- where appropriate, we have considered bellyhold cargo that is carried by passenger aircraft separately.

2.5. It should be noted that the analysis of air cargo operations has relied solely on data provided to us by 11 UK airports, which covered approximately 96% of cargo tonnage handled across all UK airports in 2019.

2.6. General aviation, business aviation, and other sub-sectors of the aviation industry have not formed part of this analysis. Information for these sectors is difficult to obtain, but there is a clear need for business aviation flights to be able to operate during the night periods and anecdotally we understand this is becoming increasingly difficult at the London airports.

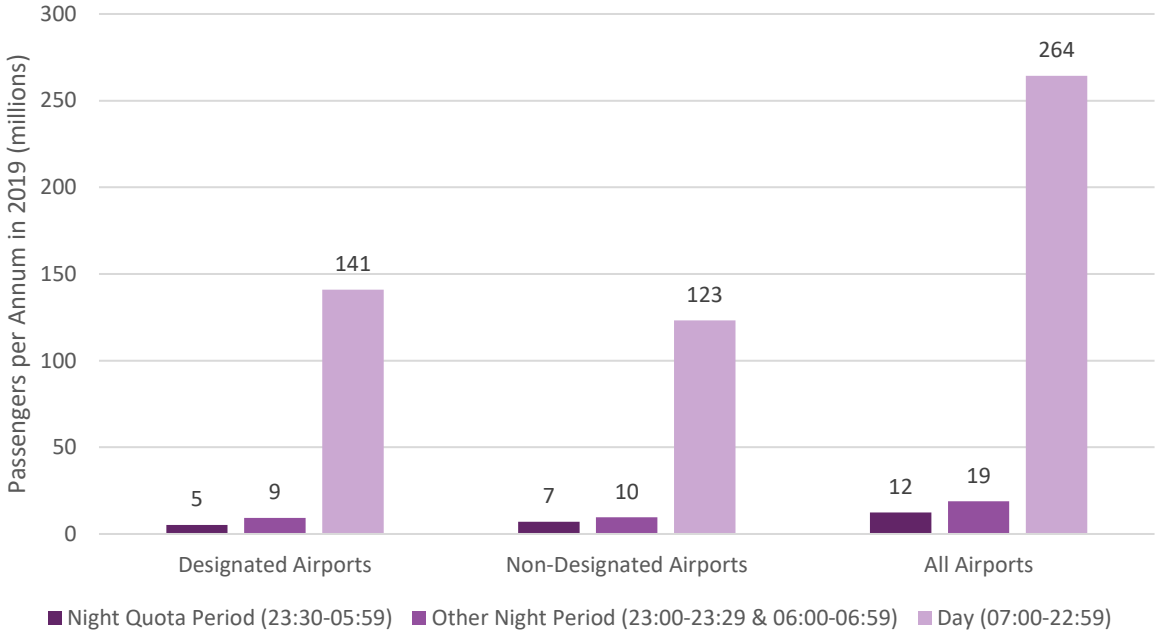
Overview of Aviation Activity in the Night Periods

Passenger Activity

2.7. Figure 2.1 demonstrates that most passenger traffic at UK airports arrives or departs during the daytime, with approximately 264 million passengers handled at UK airports during the day period in 2019. However, the volume of passenger traffic handled during the night is not insignificant. Approximately 31 million passengers were handled during the night in 2019, of which approximately 12.4 million were handled during the NQP.

[4] It should be noted that this is not a perfect definition of the express cargo sector as there are a range of smaller operators in the UK that offer express freight services but do not operate their own aircraft. Similarly, in terms of cargo tonnage, we are aware that the express freight sector makes significant use of bellyhold capacity but that, again, this is not separately identifiable within this profile. We have, however, reflected this use of bellyhold capacity within our economic impact modelling.

Figure 2.1: Profile of Passenger Traffic at UK Airports Throughout Day and Night Periods in 2019



Source: CAA Airport Survey Data, CAA Airport Data, Study Airports Data.

2.8. The volume of passengers handled during the Other Night period is broadly equally split between designated and non-designated airports, with designated airports handling approximately 9.3 million passengers per annum (mppa) and non-designated airports handling approximately 9.7 mppa during this period. However, non-designated airports handled approximately 1.8 mppa more passengers than designated airports during the NQP.

Cargo

2.9. Patterns of cargo activity have been considered in relation to three market segments: express freight, general air freight and bellyhold cargo. The data available for this research focusses on aircraft movements and volumes of freight moved. However, whenever considering issues in relation to air cargo, it is important to remember that air cargo is all about moving high value and / or time sensitive items with an economic value which may be significantly higher than is reflected in their weight. For instance, research by Steer[5] identified that in 2017, non-EU trade classified as being transported by air accounted for over 40% in terms of value but under 1% of total trade in volume terms (with sea accounting for over 98%). Air freight represented 49% by value of non-EU exports (£91.5 billion) and 35% by value of non-EU imports (£89.9 billion). Furthermore, York Aviation's previous research for the Freight Transport Association on the economic impact of cargo night flying in 2016 identified that air freight flown at night displayed even higher values than air freight flown during the day. The value per tonne of exports flown on night flights was estimated to around 2.5 times higher than the average across the day, while the value per tonne of imports on night flights was estimated to be around 1.4 times higher. This is a vital consideration if comparing volumes across different modes of transport.

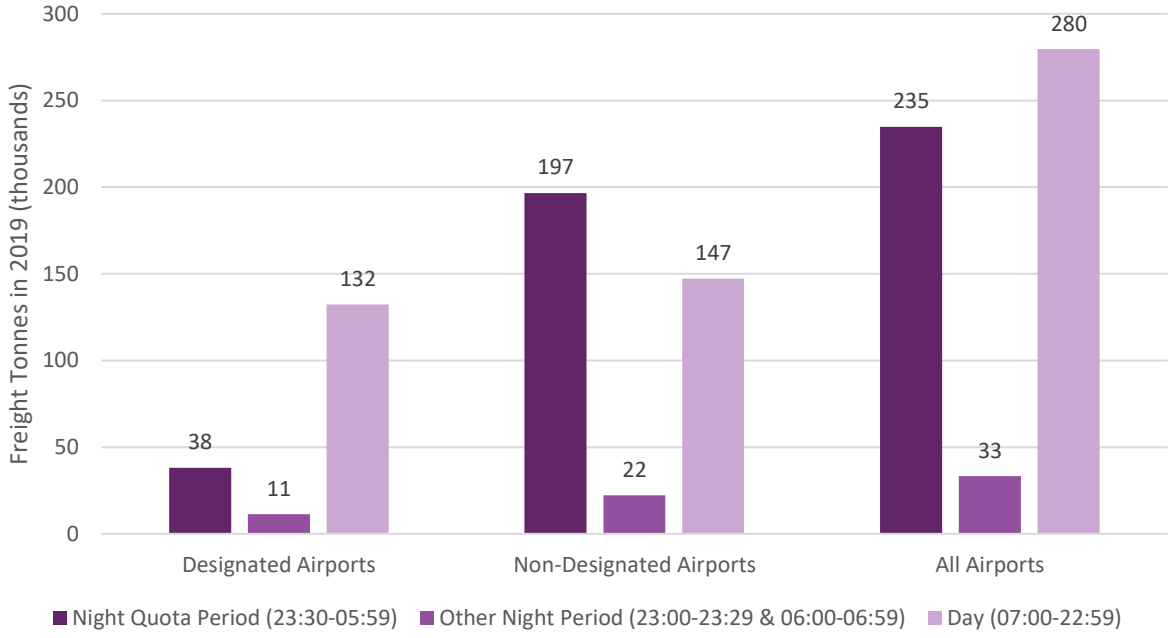
Express Freight

2.10. In percentage terms, the night period is significantly more important for the carriage of air freight by express freight operators, however. Figure 2.2 shows that around 268,000 tonnes were flown during the night period, with a strong emphasis on the NQP, compared to around 280,000 tonnes during the day. In other words, nearly half of all cargo flown on express freight aircraft was flown at night.

[5] Steer (2018). Assessment of the Value of Air Freight Services to the UK Economy.

2.11. The pattern is even more extreme if non-designated airports are considered alone. More air cargo is carried by express freight operators during the NQP alone than during the entire day period. This is largely driven by the significant scale of express freight operations at East Midlands Airport.

Figure 2.2: Profile of Air Freight Carried by Express Freight Operators at UK Airports Throughout Day and Night Periods in 2019



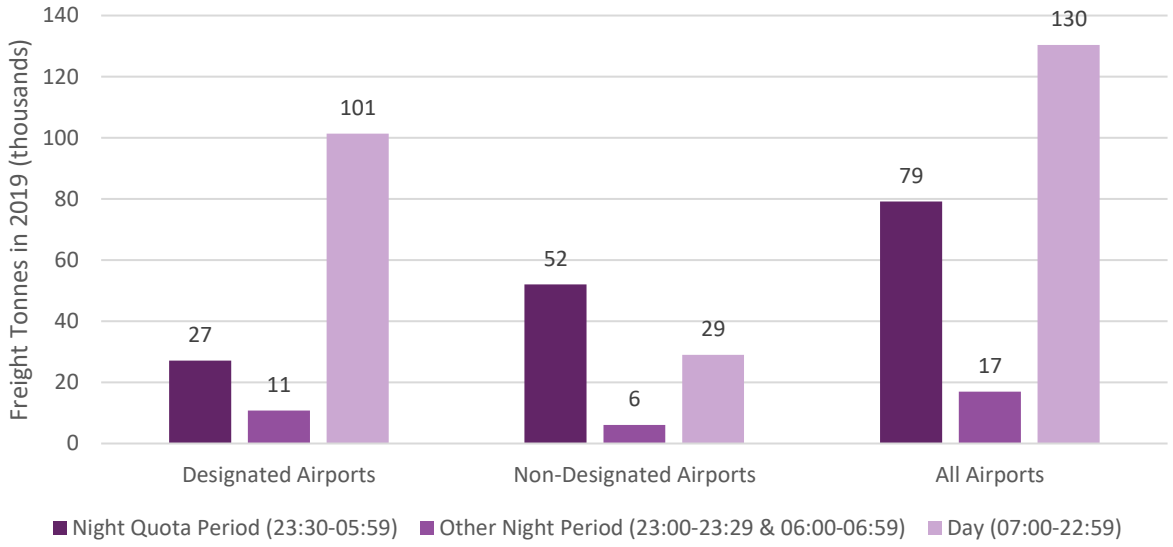
Source: Study Airports Data.

General Air Freight

2.12. The majority of air freight carried by general freighter operators to or from UK airports is also flown during the day (approximately 130,000 tonnes arriving and departing at UK airports) during this period (see Figure 2.3). However, the night period is also significant for general freighter operations, with approximately 96,000 tonnes carried during the NQP and Other Night period combined.

2.13. Again, the largest driver of night activity for general air freight is flying during the NQP at non-designated airports. This is again primarily driven by large volumes of general air freight arriving and departing at East Midlands Airport throughout the night.

Figure 2.3: Profile of Air Freight Carried by General Freighter Aircraft Operators at UK Airports Throughout Day and Night Periods in 2019

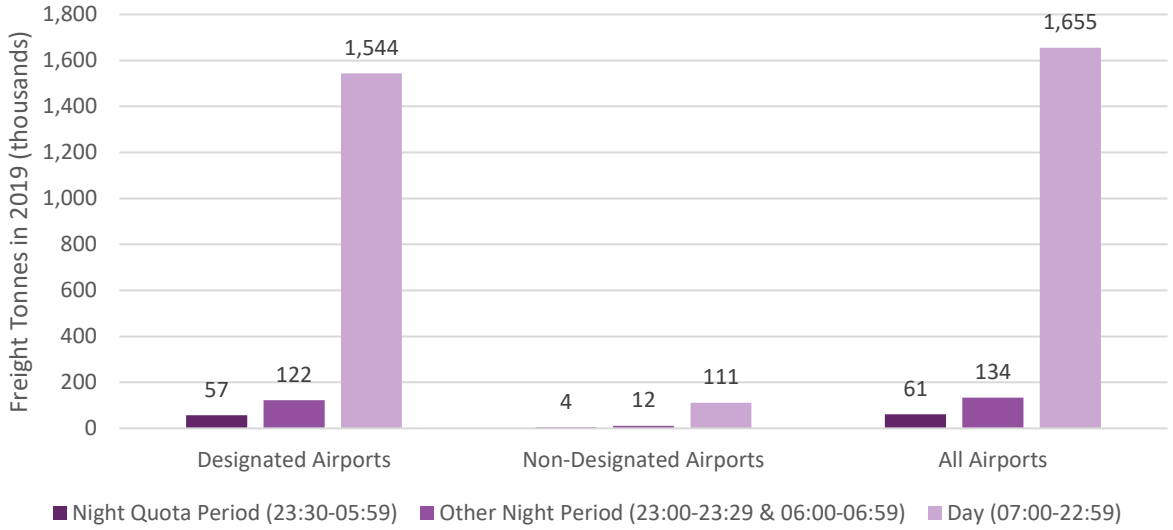


Source: Study Airports Data.

Bellyhold Cargo

2.14. Figure 2.4 shows the volume of bellyhold cargo departing and arriving at UK airports. Given the link between bellyhold cargo and passenger activity, it is not surprising that the profile of activity across the day is similar to that observed for passenger throughput, with the majority of activity occurring during the day. However, there is still around 195,000 tonnes of bellyhold freight moved at night. The market is, ultimately, heavily dominated by activity at Heathrow and this is reflected in the dominance of the designated airports.

Figure 2.4: Profile of Air Freight Carried by Passenger Aircraft (Bellyhold) at UK Airports Throughout Day and Night Periods in 2019



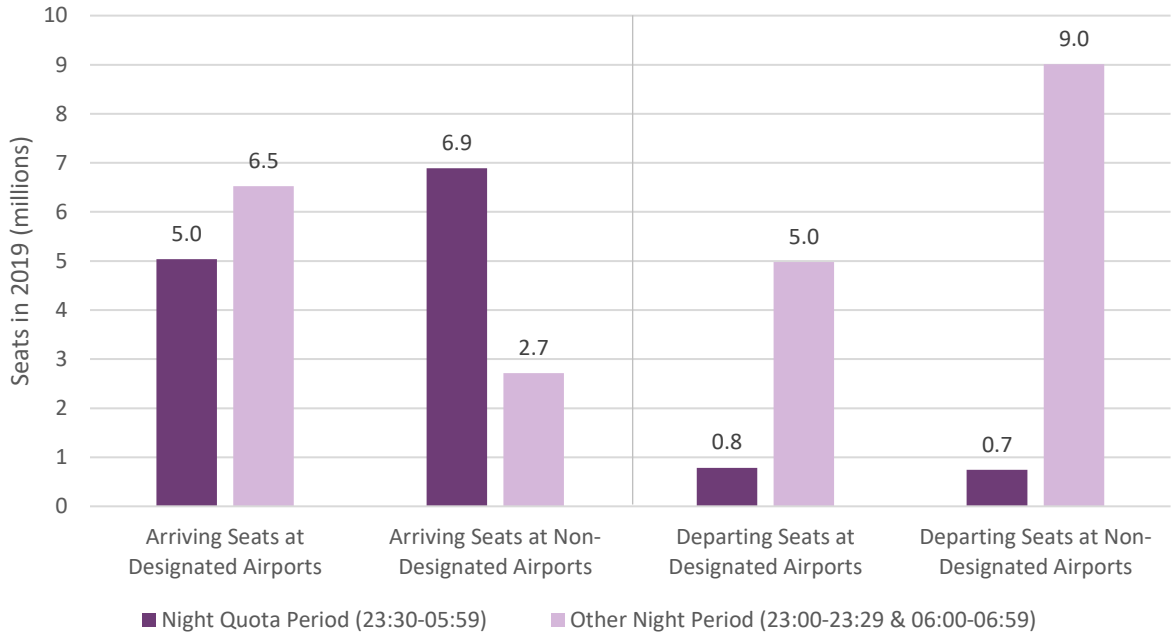
Source: Study Airports Data.

Arriving and Departing Volumes at Night

Passengers

2.15. Figure 2.5 shows the split of arriving and departing passenger seats at UK airports during the NQP and Other Night in 2019. It shows the generally greater focus on arrivals in the NQP period at both designated and non-designated airports. However, the picture in the rest of the night is more mixed, with a relatively more balanced position between departures and arrivals at designated airports, but a distinct bias towards departures at non-designated airports.

Figure 2.5: Arriving and Departing Seats at UK Airports by Broad Time Period in 2019

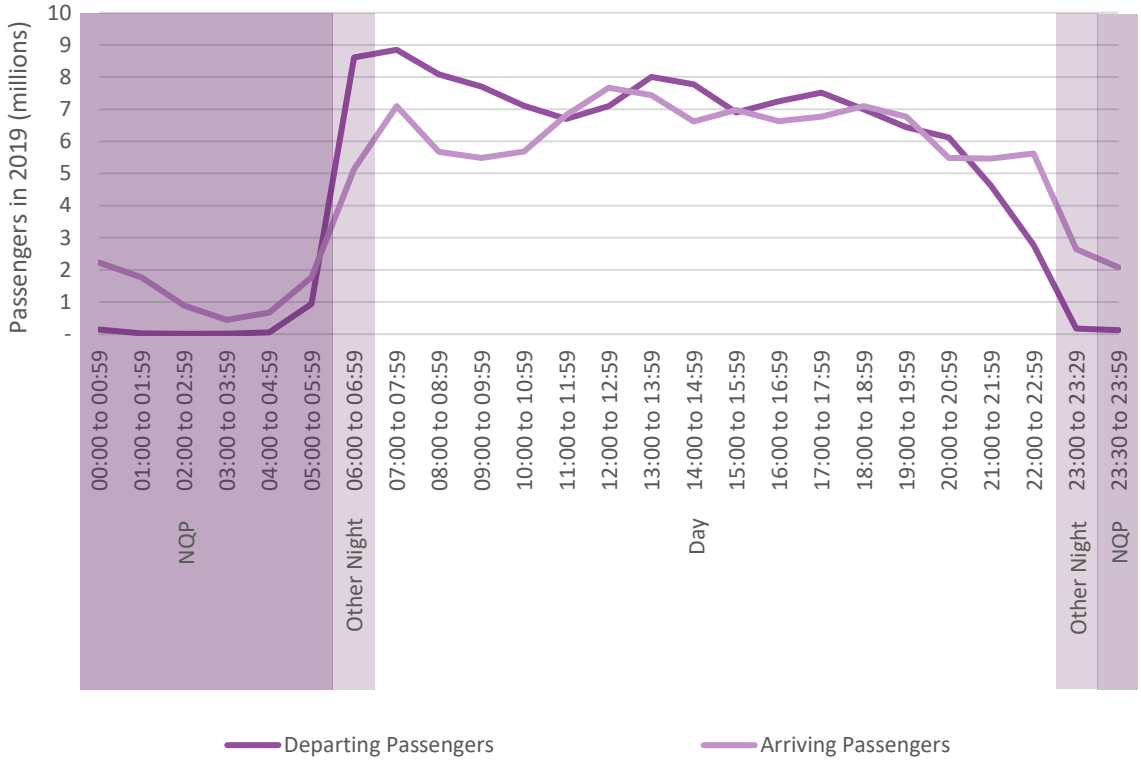


Source: OAG.

2.16. Figure 2.6 provides a detailed hour by hour analysis of passenger arrival and departure patterns at UK airports. Whilst it is clear that the majority of passengers arrive and depart during the day period, there is significant activity during the evening and morning shoulders and during the Other Night period. It is notable that the second busiest hour for passengers departing UK airports in 2019 was between 06:00 and 06:59, which falls in the night period.

2.17. Conversely, there are very few passengers departing UK airports between 23:00 and 04:59, although there is a clear steady stream of passengers that arrive at UK airports throughout the night. This is partly representative of the operating patterns of UK-based airlines, which we explore in greater detail in Section 3, and partly representative of consumer preferences, whereby there is generally little demand for flights departing from UK airports during this time period. In contrast, passengers are more accepting of late-night arrivals into UK airports, as flights arriving at UK airports during this time will allow for a later departure from their origin, which allows passengers a longer day of business or leisure before the return flight.

Figure 2.6: Passengers Handled at UK Airports per Hour by Arriving and Departing Passengers in 2019



Source: York Aviation.

Cargo

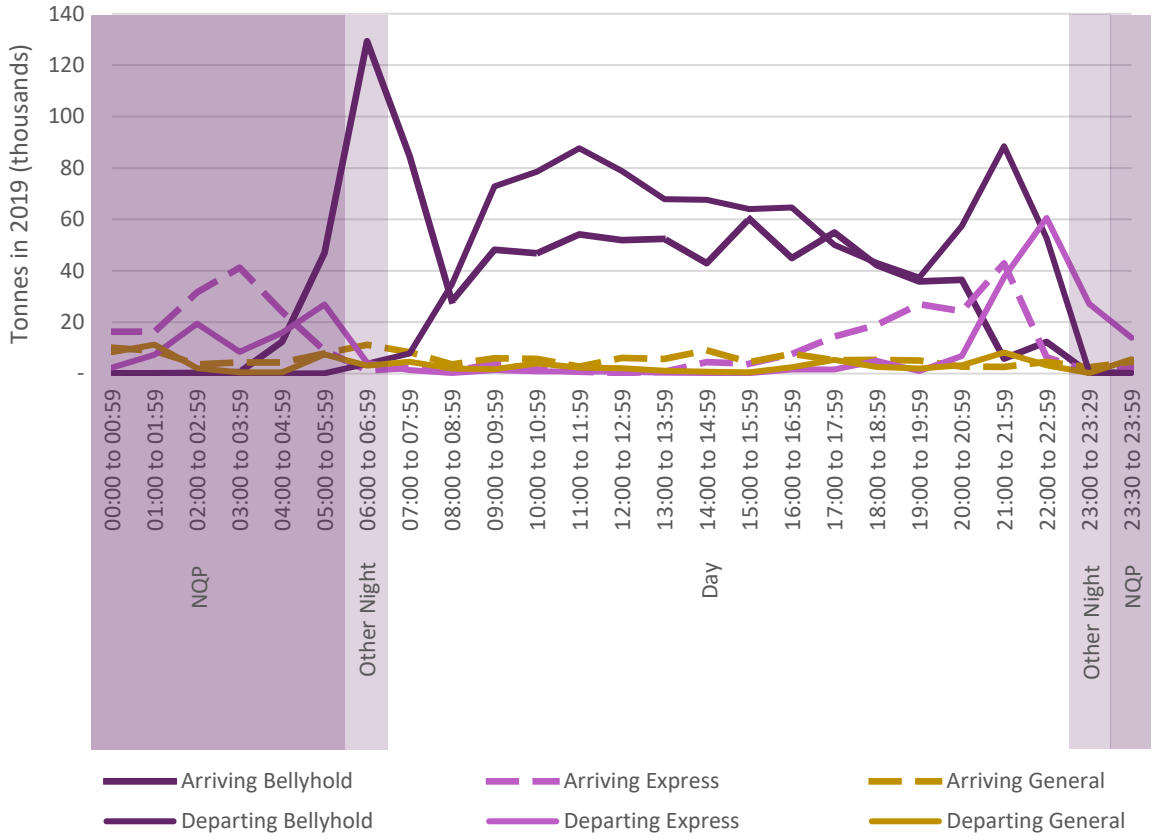
2.18. Figure 2.7 presents a similar profile for air freight tonnage by market segment arriving and departing at UK airports hour-by-hour in 2019.

2.19. The majority of air freight to and from UK airports is carried by passenger aircraft as bellyhold cargo. The peak for inbound bellyhold cargo is between 06:00 and 06:59, during the Night AM period, which is primarily driven by early morning arrivals into Heathrow from long-haul origins. Outbound bellyhold cargo follows a similar profile to outbound passengers throughout the day given that both metrics are dependent upon commercial passenger movements.

2.20. The peak for outbound express freight tonnage is between 22:00 and 22:59, just before the night period, as volume is shipped out of the UK to hubs across Europe for processing and delivery the next day. The peak for inbound express freight tonnage is between 03:00 and 03:59, in the NQP, as volume is brought into the UK ready for delivery to meet morning delivery thresholds. There is also a peak of express arrivals between 21:00 and 21:59, reflecting particularly the arrival of cargo volumes at the express freight hub at East Midlands ready for onward shipping.

2.21. Air freight tonnage shipped by general air cargo operators is also significant during the night, particularly between 23:29 and 01:59, although there are relatively steady volumes of activity throughout the daytime compared with express freighter operations.

Figure 2.7: Air Freight Tonnes Arriving and Departing at UK Airports per Hour in 2019



Source: Study Airports Data.

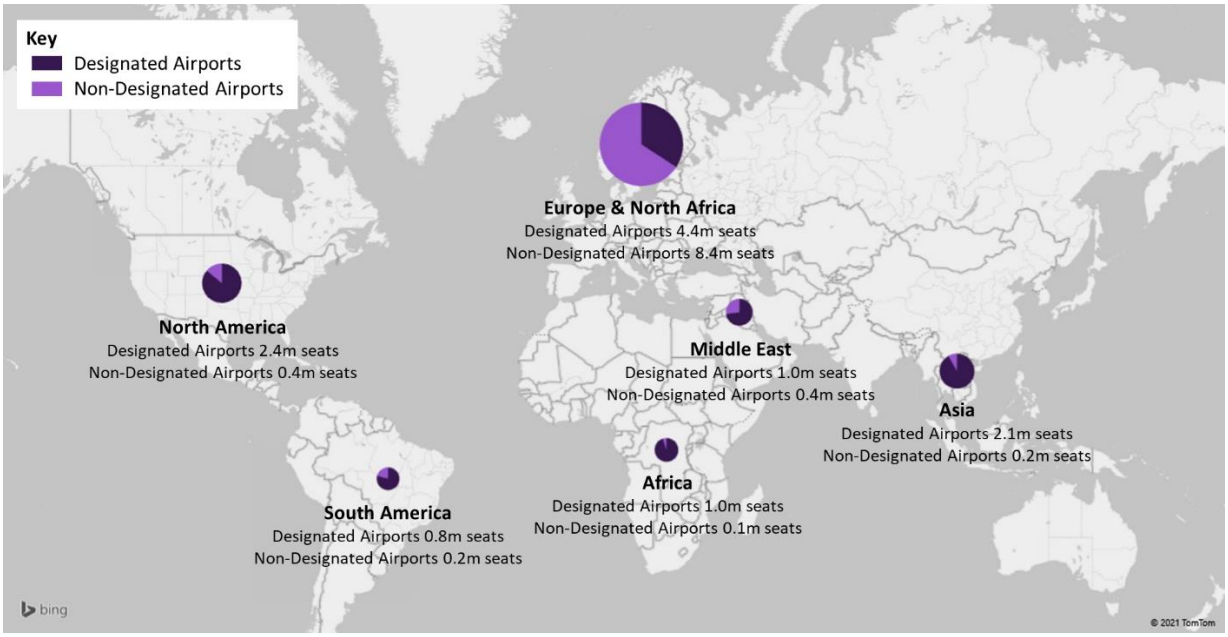
Origins and Destinations of Seats and Cargo Handled at UK Airports During Night Periods

Arriving Passengers and Cargo Tonnage

2.22. Figure 2.8 shows the volume of seats by origin arriving at UK airports during the NQP and Other Night period at designated and non-designated airports in 2019. The majority of arriving seats during these periods are from Europe and North Africa, with approximately 4.4 million and 8.4 million arrival seats at designated and non-designated airports respectively. There were significantly more arriving seats from long-haul destinations at designated airports compared with non-designated airports. The majority of arriving seats from long-haul destinations at designated airports come from early morning arrivals into Heathrow[6].

[6] This reflects the origin and destination of flights rather than passengers and as such takes no account of transfer traffic.

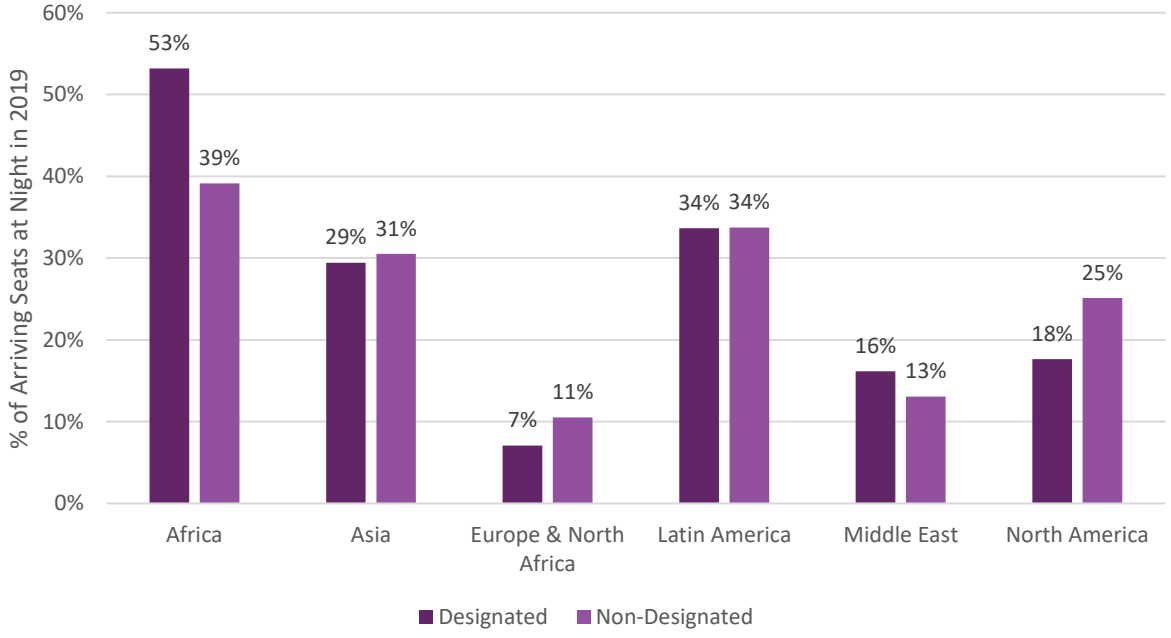
Figure 2.8: Arriving Seats at UK Airports During Night Quota Period and Other Night Periods in 2019



Source: OAG.

2.23. The volumes shown in Figure 2.8 do, however, mask an important point. While Europe & North Africa is by some margin the largest volume source of arrivals in the NQP and Other Night, this is heavily influenced by the overall size of different markets at UK airports. Some long-haul regions are, in reality, substantially more reliant on night time operations in terms the proportion of overall seat capacity that flies at night. This can be seen in Figure 2.9, which shows the proportion of seat capacity from different continents that arrives at night. It shows that arrivals from Africa, Asia and Latin America are particularly reliant on night flying. Of these markets, the economically important connections to Asia are by some margin the largest market, with around 2.3 million seats arriving during the night, with the great majority coming into Heathrow.

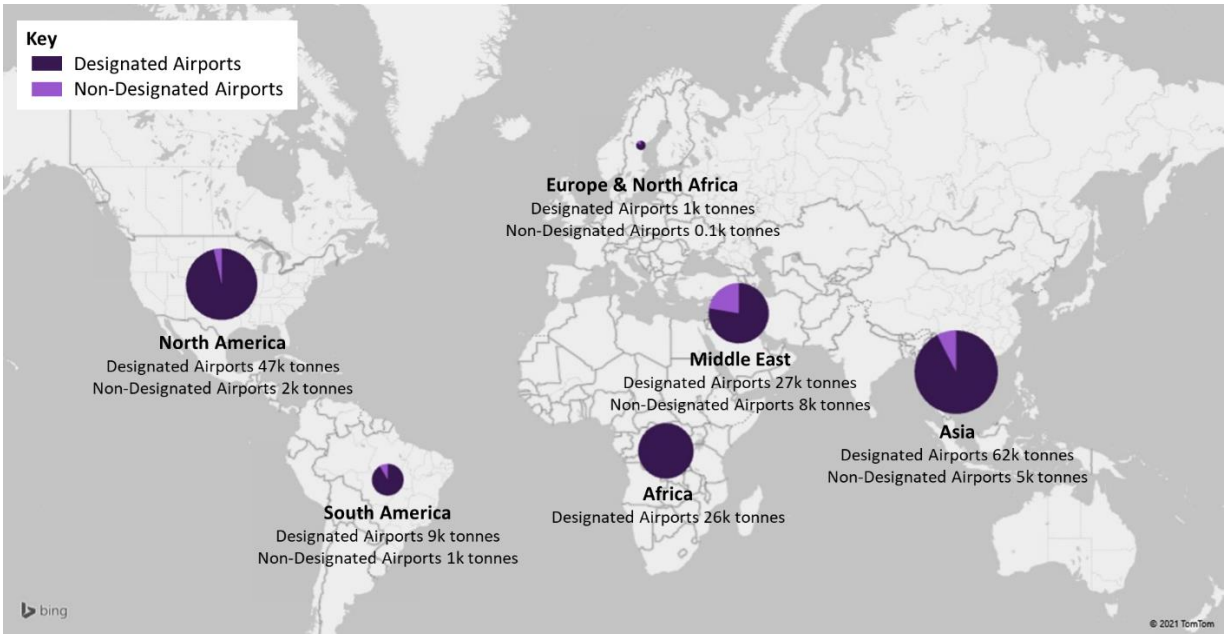
Figure 2.9: Percentage of Arriving Seat Capacity at UK Airports that Arrived During the Night Quota Period and Other Night Periods in 2019



Source: OAG.

2.24. Figure 2.10 shows that arriving bellyhold cargo tonnage at UK airports during the NQP and Other Night in 2019 predominantly originated from long-haul destinations, with only around 1,000 tonnes originating from Europe and North Africa. This contrasts with arriving passenger seats, where the majority during the same period originated from Europe & North Africa. Again, this reflects the pattern of long-haul arrivals into Heathrow in the early mornings.

Figure 2.10: Arriving Bellyhold Cargo Tonnes at UK Airports During Night Quota Period and Other Night Periods in 2019



Source: Study Airports Data.

2.25. The origin of air freight flown by freighter aircraft to UK airports during the NQP and Other Night in 2019 is shown in Figure 2.11. In contrast to the origin of bellyhold cargo, which was weighted towards long-haul origins, the majority of cargo arriving on freighter aircraft during the night originates from Europe and North Africa. This reflects the high volumes of freight that are carried from the key European express freight hubs, such as Leipzig, Cologne and Liege. However, it should be noted that this may disguise the original origin of some freight from further afield that is simply transferring through these hubs.

Figure 2.11: Arriving Cargo in Freighter Aircraft at UK Airports During Night Quota Period and Other Night Periods in 2019

Source: Study Airports Data.

Departing Passengers and Cargo Tonnage

2.26. In terms of outbound flows, Figure 2.12 shows the destination of seats departing UK airports during the NQP and Other Night in 2019. The great majority of departing seats are to destinations across Europe and North Africa. This is true for both designated and non-designated airports. The pattern ultimately reflects the operating models of short-haul airlines in the UK, particularly the low fares airlines, which rely on early departures from the UK of their based aircraft to maximise aircraft utilisation through the day. This issue is discussed further in Section 3.

Figure 2.12: Departing Seats at UK Airports During Night Quota Period and Other Night Periods in 2019

Source: OAG.

2.27. Figure 2.13 shows the destination of bellyhold cargo departing from UK airports during the NQP and Other Night in 2019. Approximately 5,000 tonnes depart from designated and non-designated airports during this period, which is relatively small, reflecting the fact that there are relatively few departing passenger movements during the night. The bellyhold freight that is being flown out in the night period is bound primarily for Europe & North Africa or North America, and, in line with the overall share of bellyhold activity, is flown almost exclusively from designated airports.

Figure 2.13: Departing Bellyhold Cargo Tonnes at UK Airports During Night Quota Period and Other Night Periods in 2019

Source: Study Airports Data.

2.28. Figure 2.14 shows the destinations of cargo that departed UK airports in freighter aircraft during the NQP and Other Night in 2019. The majority of this cargo was destined to Europe and North America. Approximately 70% of all outbound tonnage carried by freighter aircraft from UK airports during this time is from East Midlands Airport to Europe and North Africa, which again reflects volume being moved from the UK late in the day to express freight hubs in Europe for next day delivery.

Figure 2.14: Departing Cargo in Freighter Aircraft at UK Airports During Night Quota Period and Other Night Periods in 2019

Source: Study Airports Data.

Conclusions

2.29. The majority of passenger-related activity at UK airports occurs during the daytime. However, there is a significant minority of passengers that fly at night, with approximately 31 million passengers arriving at or departing UK airports during the night in 2019. The second busiest hour for passengers departing UK airports in 2019 was between 06:00 and 06:59. Few passengers depart from UK airports between 23:00 and 05:59, but a steady stream of passengers do arrive throughout this period.

2.30. The profile of bellyhold cargo arriving and departing from UK airports throughout the day is intrinsically linked to the schedules of passenger airlines, particularly to those airlines that operate long-haul services, and thus the great majority of bellyhold cargo at UK airports is handled during the daytime. However, the peak for bellyhold cargo arriving at UK airports is between 06:00 and 06:59, at the end of the night period. This is driven by long-haul arrivals into Heathrow.

2.31. Freighter aircraft operations, however, fly a considerably higher percentage of their volumes at night. This is particularly true for freighter aircraft flown by express freight operators, for which night operations are critical for the enabling of next-day delivery services. The peak for inbound freight tonnage carried by express freight operators arriving at UK airports is between 03:00 and 03:59, as shipments are brought into the UK for early morning delivery.

3. Why is Night Flying Important?

Introduction

3.1. In this section we consider why night flying is important to airlines and consumers and consider the extent to which changes in operating patterns towards more daytime and fewer night flights may be possible.

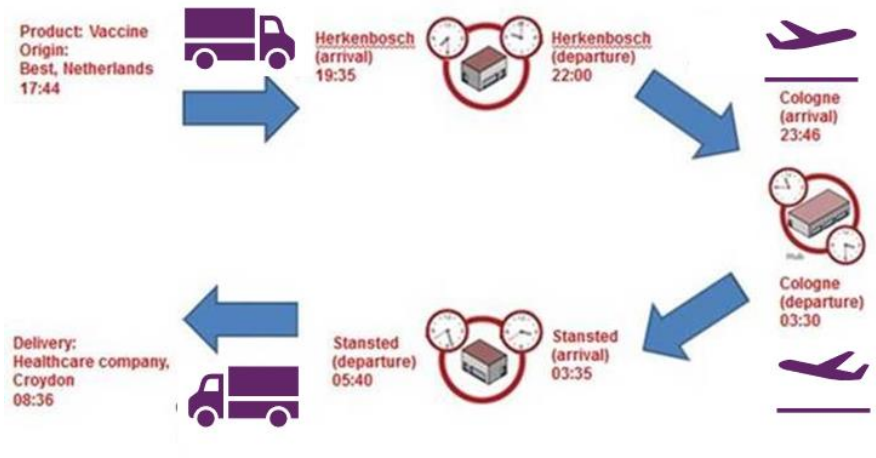
Overview

3.2. To a large extent night flying activity is driven by demand and consumer preferences. Ultimately, passengers want to travel at times which are convenient to their needs, such as:

- business passengers want to maximise 'on the ground' time and minimise overnight stays. This approach increases business efficiency and therefore economic output. This makes the UK a more attractive place to invest and from which to do business. From a short-haul perspective, this means leaving early in the morning and returning late in the day, while for long-haul passengers, there is a strong preference to travel overnight;
- passengers want to be able to access key connections both in the UK, notably at Heathrow, and at hub airports across Europe. Early morning arrivals into the UK are important in meeting the first wave of departures. While for access to European hubs, in many cases this requires early morning departures to meet the first wave of onward connections from those hubs. These early morning connections provide significant connectivity for many regional airports and passengers.
- leisure passengers typically also want to maximise their time at destinations and minimise 'dead time' travelling. This means they will prefer early and late flights or, in the case of long and medium haul services, overnight flights.
- passengers also want the best value from their flights, typically through lower fares. Maximising the length of the day available for flying is essential to utilising aircraft assets effectively and therefore minimising fares by allocating the asset costs across more passengers.

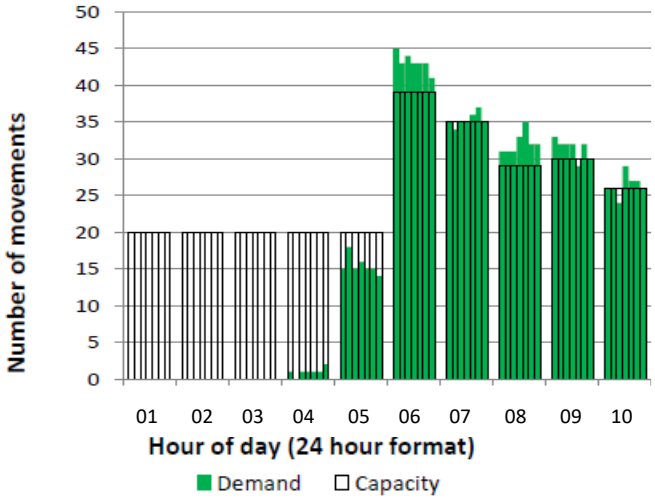
3.3. Air cargo is generally used to move mission critical, high value / time sensitive goods and packages. This is especially true of cargo flown at night. The night period is used to move items whose value is to a significant degree defined by their speed and / or certainty of delivery and for whom international delivery times need to be measured in hours rather than days and guaranteed delivery times and next business day delivery are key features of the offer. This could include essential time expiring medical or pharmaceutical products, financial, legal or business documents, critical manufacturing components or spares, perishable produce or high value consumer goods. The night provides vital time between business days when goods / packages can be moved with minimal loss of productivity or time to market or user.

How Night Flying Lets Express Freight Work – Time Sensitive Items



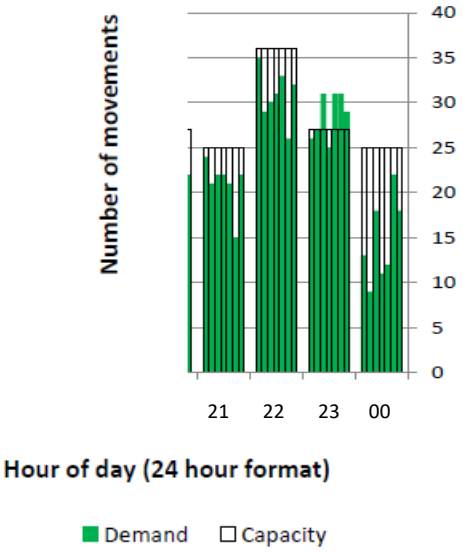
3.4. Night flying activity also adds significantly to airport capacity in the UK, contributing to UK government policy to 'make best use of existing runways'[7]. The early morning periods and those at the end of the day often remain the busiest for airports, as this is when based aircraft depart and arrive in quick succession at the beginning and ends of their working days. For departures, this leads to high levels of demand for slots in the period from 06:00-08:00 across UK airports. Figure 3.1 illustrates the early morning demand for departure slots at London Gatwick Airport in Summer 2019, showing the requested times for departure slots vs the available capacity. Clearly in this example, due to higher demand than capacity, not all the airlines will get their preferred slots, but the problem would be amplified if the departure slot capacity in the 05:00-06:59 periods was not available. Figure 3.2 illustrates the opposite end of the day, and in particular the high levels of arrival demand in the night periods which could not be accommodated within the spare capacity up to 23:00 hours.

Figure 3.1: Summer 2019 Departure Slot Demand vs Capacity for London Gatwick by Hour



Source: ACL Slot Coordination Report – Start of Season.

Figure 3.2: Summer 2019 Arrival Slot Demand vs Capacity for London Gatwick by Hour



Source: ACL Slot Coordination Report – Start of Season.

[7] See 'Beyond the Horizon - the future of UK aviation', UK Government, June 2018.

Why Night Flying Matters:
Its role in clinical trials testing

The UK is a world leader in clinical trials testing. Patient urine and blood samples from across the world are sent to the UK in order to develop world class drugs to treat illnesses such as cancer. The connectivity express air freight provides as a global hub is critical for this industry. As an example, biological samples are imported (often on dry ice) from countries such as South Africa and Kuwait on direct commercial flights into the UK.

From collection of these samples at patient sites across the world to delivery at UK laboratories, delivery needs to be within 48 hours so as not to compromise the sample integrity. Flying into the UK is the only way to meet this demand on such a tight timeline, enabling effective diagnosis and the development of life saving drugs.

3.5. Whilst airports such as London Heathrow and London Gatwick are at the extreme end of this capacity shortfall spectrum, it remains an issue across many UK airports where demand for slots at each end of the day would exceed the available capacity if runways could not be used in the night periods. Without night flying there could be an increasing need for additional runway infrastructure in the UK with associated environmental and cost implications, with the latter being passed on to consumers through higher fares.

3.6. Therefore, without the early morning and late evening periods being available to airlines there would be a significant reduction in the number of aircraft which could be handled at UK airports. Given that the night slots at many airports are often used by short-haul aircraft based at an airport, then the inability to handle these aircraft would lead not only to a loss of the movements at each end of the day, but also the subsequent flying to and from the airport that these aircraft perform throughout the day. We consider this in more detail later in this section.

3.7. Night flying also allows airlines to overcome the time zone disadvantage suffered by the UK when compared to other countries in Europe, which sees the UK at least an hour behind most European nations. Where passengers fly overnight from some long-haul points, such as Asia or southern Africa, the ability to arrive in the early morning means airlines can offer more attractive departure times from the origin, matching those offered by competitors flying into European airports. In particular, this is of relevance for passengers making connections through hubs whereby they may be inclined to choose a more attractively timed flight to a European hub rather than a later departure at an unsociable time to a UK hub. This enhances global connectivity by ensuring services are more sustainable financially through greater levels of passenger demand stemming from the hub connectivity offered.

3.8. Furthermore, in order to allow business travellers to reach their destinations in Europe in the early part of the working day, flights must often depart in the night period from the UK in order to reach their destination in good time due to the change of time zone into Europe, maximising business efficiency and making UK cities competitive as places to locate business within Europe. Ultimately the night period is therefore needed to minimise an inherent competitive disadvantage of operating in the UK.

3.9. The same argument can be made in relation to express cargo services. The time difference between the UK and much of Europe means that any express shipments to Europe are always operating behind other countries. This truncates the time that express freight operators have to deliver, making the night hours even more crucial.

3.10. Night flying activity also provides important resilience for all airlines and is necessary so that aircraft which are delayed can still complete their daily schedules and return to their bases in preparation for their flying programme the next day. In circumstances where night flying is not permitted, this could leave airlines vulnerable to aircraft being stuck away from their overnight destination which would incur considerable costs and allowance for which would need to be added to air fares and cargo costs more generally, thereby reducing consumer benefits. Costs which could be incurred and would need to be covered might include:

- a greater number of back-up aircraft at each base to build in resilience, with associated increases in fixed costs to be covered;
- hotel accommodation and compensation for passengers suffering disruption as required by law;
- hotel accommodation and costs for staff that cannot return to their base location;

- overnight parking costs for aircraft away from their base (particularly as many airports will not charge overnight based aircraft for parking); and
- increased use of third party handlers and maintenance providers at non-base locations.

3.11. We now go on to look at some of the issues affecting different types of flights and airlines in more detail.

Passenger Markets

Short-Haul

3.12. In the competitive short-haul market, night flying permits airlines to maximise the use of their aircraft assets to provide lower fares to consumers and to meet underlying demand for air travel through improved efficiency. This also allows improved connectivity through a greater array of destinations being available as well as providing higher frequencies on core routes, which is important to businesses operating within the UK.

3.13. The use of the night flying period by short-haul airlines is typically driven by early morning departures (from 05:00 hours onward, but most typically from 06:00) and late night or early morning arrivals (in the period 23:00-02:00 hours most typically). These represent the ends of the day for aircraft which also undertake flights back and forth from their base during the daytime period. For short-haul airlines, this may mean that the night period can represent anywhere from 12% to 50% of an aircraft's movements at a UK airport on a typical day depending on the overall number of flights undertaken and whether one or two night period slots are used.

3.14. This means that a large proportion of flying in the UK is undertaken by aircraft which require at least one night movement, but which still generate the majority of their movements, and therefore passengers, through the daytime period. As we consider in more detail below, losing access to even one movement in the night period can undermine the business case for basing an aircraft at a UK airport, and could lead to aircraft being relocated elsewhere in Europe with a subsequent loss of connectivity and employment.

3.15. Access to night flying can meet different needs for different airlines, but key components across the sector include:

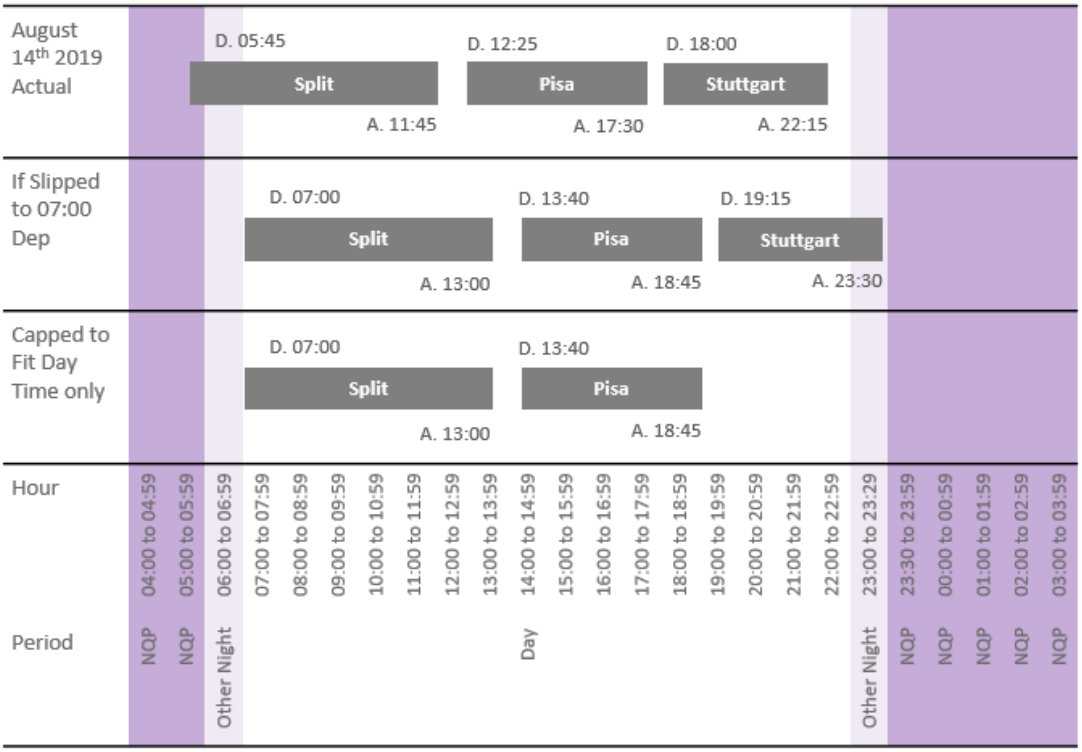
- night slot usage at one or both ends of the day can increase the available flying time throughout a typical day for low fares airlines and therefore allows them to maximise aircraft utilisation by undertaking the maximum possible number of rotations through the day. This lowers costs by dividing fixed costs, such as aircraft depreciation and management costs, by the maximum number of passengers and therefore helps keep fares lower for consumers. Many of these carriers have target minimum numbers of rotations across their fleets and anything that undermines this may threaten the viability of their operations within the UK. The same is also required for full service airlines as they increasingly compete against low fares airlines across large parts of their networks and therefore need to maximise aircraft utilisation to be competitive;
- through early departures and later arrivals, all airlines can better meet the needs of time sensitive travellers, particularly business users seeking to maximise the length of their day at the destination. This can translate to higher fares as passengers may be willing to pay more for an air fare if this reduces the need to spend money on hotels and subsistence at a destination. This is an important income source for all airlines;
- night flights at both ends of the day are required to meet the 'wave' structures employed by hub airlines across Europe. These waves are designed to maximise connections through co-ordinated arrivals times followed by co-ordinated departure times. However, these structures are not set up solely for UK passengers and therefore services originating in the UK must fit in with the wider wave system at a hub, often requiring an early morning departure in the night period to compensate for the time difference between the UK and most of mainland Europe. Even within the UK, connections to the hub at London Heathrow can be dependent on night departures from the regions in order to meet the first significant waves of departures out of London;

- for UK hub airlines, the use of night flying periods is important not only in providing outward connections from the hub after the first wave of long-haul arrivals, but also because this ensures the returning aircraft do so in sufficient time to feed the next wave of long-haul departures around lunchtime. Delaying the start of the day for some of these movements would undermine the ability of the hub airline to feed into key long-haul destinations from select destination across Europe, often those with a longer flying time, such as Italy or Spain.

3.16. We illustrate below some examples around the difficulties of re-timing flights to operate only in the daytime periods. Each of these represents an actual aircraft operating in Summer 2019.

3.17. Figure 3.3 shows an easyJet aircraft which departed London Gatwick in the night period but finished its rotations by arriving back before the night period started again. However, this aircraft could not be retimed to depart in the daytime (07:00 onwards) period without then encroaching into the night period for its evening arrival back in the UK. The result would be that, if the airline wished to retain the aircraft at the base, one of the rotations undertaken by the aircraft would need to be dropped, reducing the available seats (and likely passengers) by 33%.

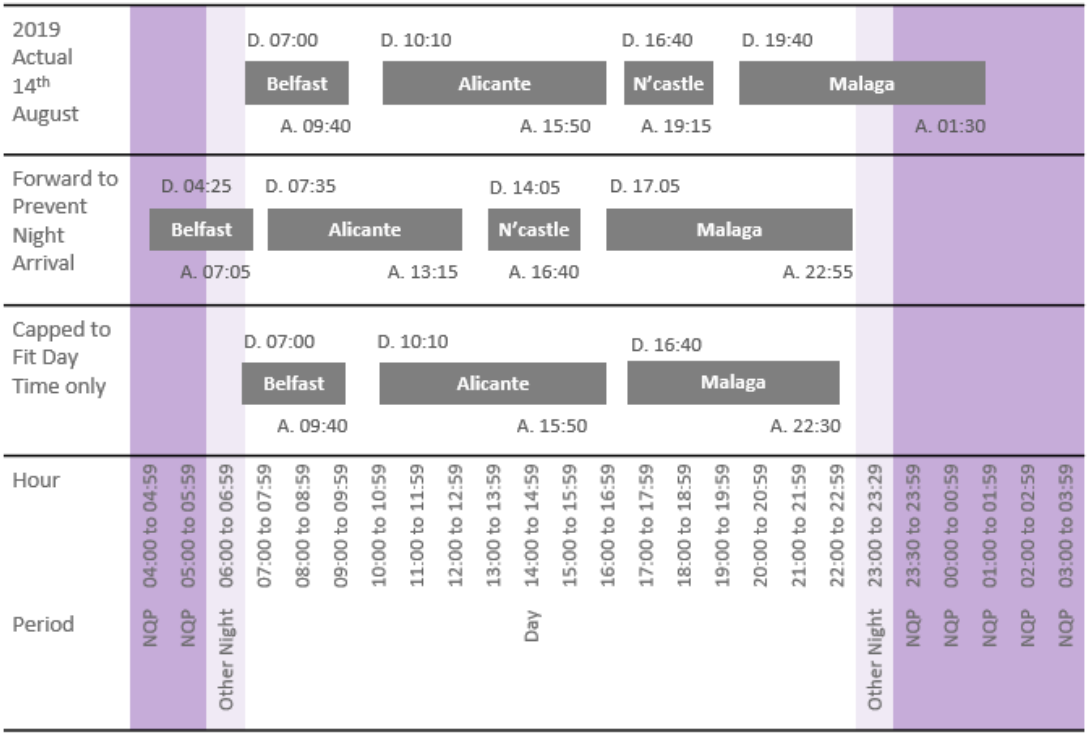
Figure 3.3: easyJet Example Schedule for London Gatwick Based Aircraft, Summer 2019



Source: OAG, York Aviation.

3.18. Figure 3.4 presents an easyJet aircraft operating from a regional airport (Bristol) beginning its schedule during the day period (at 0700) but finishing in the night period. If the arrival were pulled forward to occur before 23:00, then the whole schedule for this aircraft would then be pulled forward into the night period for departures. Again, if the airline wished to retain the aircraft in the UK base, the only solution would be the cancellation of one rotation if this aircraft were to fly only between 07:00 and 23:00, reducing capacity (and likely passengers) by 25%.

Figure 3.4: easyJet Example Schedule for Bristol Based Aircraft, Summer 2019



Source: Study Airport Data.

3.19. These patterns are typical for many airlines in the UK and any requirement to control movements within a more limited number of hours of operation in the day is likely to require airlines to reduce the overall number of rotations they perform with based aircraft because re-timing is, in some cases, only a hypothetical option, as at many airports there would not be sufficient runway capacity in the 07:00 period to shift departures later. Any attempt to move first departures later into the day would further exacerbate the problem with even less time available to complete rotations before any night restrictions. In reality, therefore, with morning capacity at airports restricted, all rotations would be lost, and based aircraft would be relocated by the airlines (considered below).

3.20. Where rotations could be reduced, this is likely to lead to the loss of some routes or reductions in frequency, both impacting on connectivity. It is difficult to say what rotations and destinations may be lost, but it is likely that airlines would focus on higher yielding core routes and therefore would drop rotations to destinations with less demand. This would likely lead to a concentration of capacity to a limited number of points. Domestic services, which act as useful infills for aircraft during the day, are often lower yielding than core leisure routes, so there is a risk that these would be the first to be dropped, thereby impacting on regional connectivity in the UK, the Channel Islands and Isle of Man.

3.21. In addition to lost connectivity benefits, passengers would be faced with increased fares to cover the continued fixed costs within each airlines' business. Whatever the drivers for increased fares, there would be a reduction in consumer welfare as a result.

3.22. Ultimately, such restrictions would seriously impair the 'based aircraft' model. Consultations with key airlines indicate that reducing rotations on based aircraft would not be a viable option in reality and airlines would move aircraft assets to their bases in Europe or remove them from the fleet. This would lead to reduced employment in the UK, with jobs supporting based aircraft (pilots, cabin crew, maintenance staff etc.) relocated with the aircraft out of the UK or lost altogether. Furthermore, it could not be relied upon that aircraft based elsewhere would adequately make up for lost connectivity because:

- many bases are at larger airports and therefore would not provide services to the UK from smaller airports and cities;
- aircraft based in Europe would be unable to operate domestic services in the UK due to Brexit;
- flight times would be less attractive because the aircraft would need to fly to the UK before allowing UK passengers to travel to the Continent, this would mean business travellers in the UK could be disadvantaged by shorter working days overseas compared to their European counterparts; and
- airports with their own capacity or night-movement restrictions across Europe could make it hard to generate viable schedules into the UK.

Why Night Flying Matters:
Supporting the Aerospace Industry

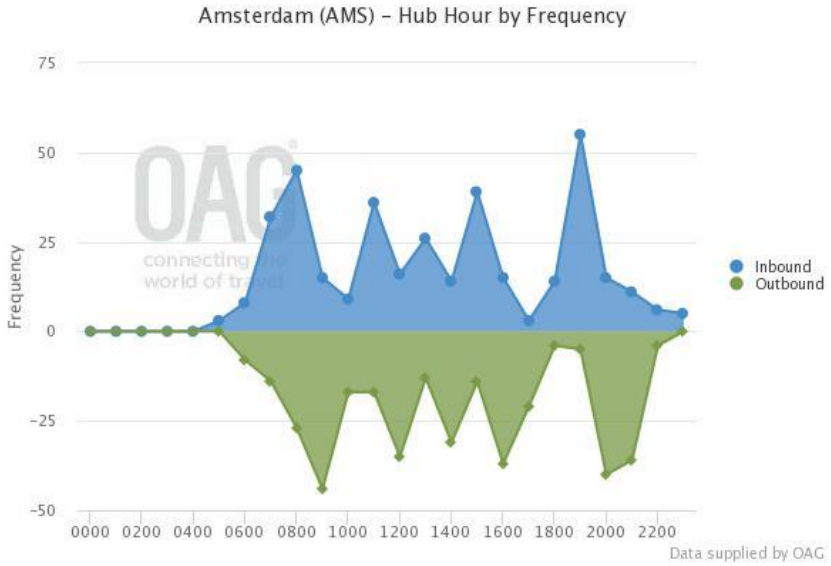
The UK has significant expertise in aerospace, with many manufacturers creating components essential to the global aerospace sector, including engines, wings and spare parts. For both private aircraft and commercial airlines, there are significant costs and repercussions to keeping an aircraft grounded. Night flying is a vital driving factor in enabling key components to be delivered across the globe while keeping down time to a minimum.

There is a growing use of 'Just in Time' stock holdings, where it is essential that spare parts and precision tools are delivered the next day, including to long-haul destinations. On occasion, there is a rapid turnaround on components which arrive into the UK for repair before being sent back out on the same day.

One example of success in this area is an independent aircraft maintenance and repair company which has grown to a truly global player thanks to the connectivity provided by outbound flights from the UK in the late evening. Shipments are collected close to the end of the working day and fly late in the evening, underpinning this "just in time" business model.

3.23. As previously highlighted, hub connectivity could be impacted by night flying restrictions, cutting off access to the first departures from the UK regions, which are needed to meet the first significant waves of departures out of hubs in the UK and in Europe. Figure 3.5 shows the pattern of arrivals and departures at Amsterdam airport by KLM in support of its hub waves. This clearly shows that the peak of early morning arrivals is around 8am local time to maximise connections for the first wave of onward departure which peaks around 9am. In order to meet this first wave of outward departures from its hub, KLM services tend to need to depart from the UK in the 0600-0645 period to allow for the difference in time zone between the UK and Amsterdam.

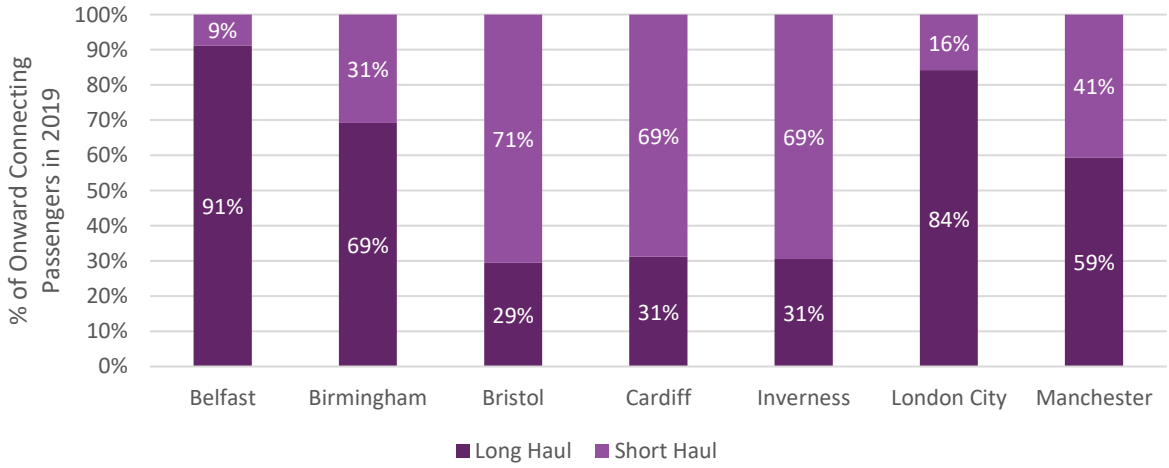
Figure 3.5: KLM Bank Structure Report at Amsterdam for August 2019



Source: OAG.

3.24. Capacity constraints at the UK's main hub at London Heathrow mean that it cannot currently act as a substitute for these links, and further night restrictions would impede the ability of the London hub still further. If these European services could not be operated, then a significant level of UK regional connectivity would be lost and it should be recognised that this is not just for long-haul passengers, with Europe's hubs also providing breadth of connectivity across the continent. This can be seen in Figure 3.6 which shows the ratio of long-haul and short-haul connections made at Amsterdam from selected UK regional airports.

Figure 3.6: Ratio of Long and Short-Haul Onward Connections Through KLM Hub from UK Regional Airports



Source: CAA Passenger Survey 2019.

3.25. Restrictions on night flying in the UK would ultimately lead to reduced connectivity, higher air fares, reduced business efficiency (through shorter working days, lower frequencies and higher costs) and reduced employment impacts from based aircraft. The result of this would be to stifle UK economic growth and recovery.

Long-Haul

3.26. Consultations with airlines and their consumer preference surveys demonstrate a clear desire for passengers on long-haul flights to travel overnight where possible. This allows travellers to maximise their day for being 'on the ground' for whatever purpose (business or leisure) at both ends of the route, whilst minimising hotel nights and therefore reducing overall travel costs. Early morning arrivals after overnight flights essentially allow business passengers to undertake a full day of work after landing and therefore increases business efficiency in the UK.

3.27. For flights from a number of world regions, this results in services operating into the UK with early morning arrivals both from the east and the west, as seen earlier in Section 2, ranging from 04:00 hours from Asia through to 07:00 (and beyond) from the USA and other world regions. In many cases, the chosen departure time from the origin is designed to be competitively attractive when compared to services to other European hubs, which can depart earlier and arrive after local night period restrictions given that European hubs are one hour ahead of the UK due to the time zone difference, for example pre-midnight departures from Singapore arrive into the European hubs just after 06:00, but to compete against these departure times, services to London arrive in the 05:00-06:00 period.

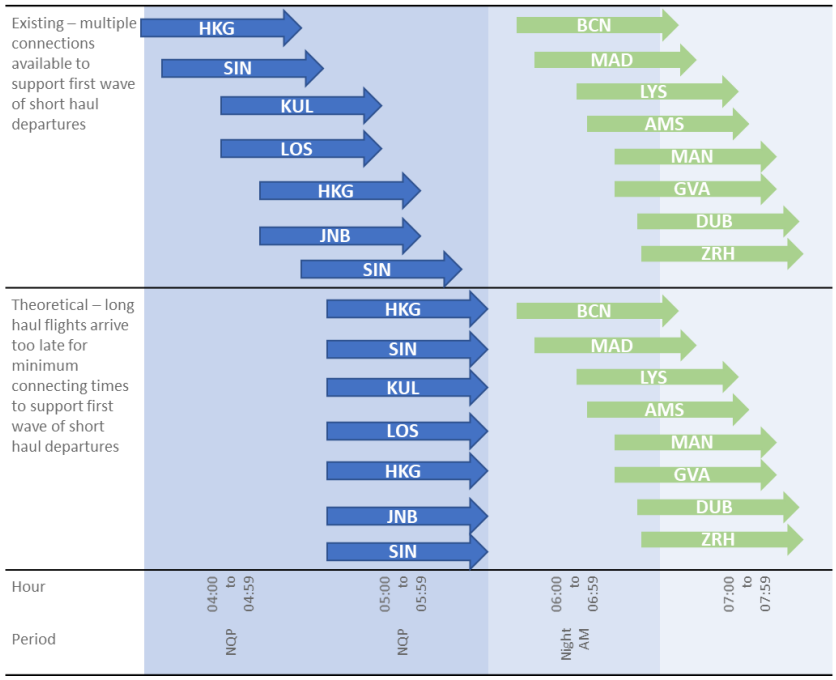
3.28. Whilst some overseas carriers (such as Singapore Airlines and Cathay Pacific) operate from their home regions across the day into the UK, these tend to be driven by their own hub waves and are not comparable to those services operated by UK airlines, which need to provide both short and long-haul connections in the morning period at the European end of the route.

3.29. Importantly, long-haul flights in the night periods play a vital role in supporting the short-haul network from UK hub airports. Early morning long-haul arrivals into the UK are the only viable option for supplementing point to point passengers with connecting traffic to increase overall passenger levels and make services more economically sustainable. At the other end of the day the counter is true to this, whereby final short-haul services into the hubs are supported by passengers arriving to connect to the final wave of long-haul departures, some of which can occur in the night period. Moving arriving flights later in the morning, or bringing late night departures forward would potentially undermine the viability of some of these short-haul services which themselves have two important functions;

- they are critical to business travellers, allowing a full day of business at the destination and therefore increasing UK business efficiency; and
- they support the hub activity through the remainder of the day by providing return frequencies into the hubs to meet outbound long-haul flights.

3.30. Figure 3.7 illustrates some of the impact of lost connections between early long-haul arrivals and the first wave of short-haul departures for British Airways at London Heathrow if all movements are required to take place outside of the NQP. Assuming a minimum connecting time of 60 minutes between flights, then any early departures from London (required to get people to their destinations in the early part of the working day) would lose all connecting passengers.

Figure 3.7: Example of Reduced Connections on British Airways Connections Without NQP Arrivals



Source: OAG Bank Report.

3.31. The lack of slot availability at key UK airports, particularly the main hub at London Heathrow, is potentially a significant issue for long-haul flying that is required to re-time from the NQP or Other Night period up to 0659. In these circumstances, airlines will need to determine how best to use the slots they hold outside of these periods and this will lead to a significant impact on UK connectivity. As with the short-haul market, the airlines are likely to seek to retain services to core destinations with strong point to point demand and higher yields, meaning they are more likely to free up slots for re-timing by suspending routes to emerging markets. As many of these will be dependent on short-haul feeder traffic from across Europe, they will be unlikely to be replaced within the UK overall as the only airport from which they can viably be served is the main hub airport at London Heathrow. This will run counter to Government aims for increasing global trade with emerging markets and reduce the UK's competitive position relative to other European nations.

3.32. Whilst we focus on the pure freighter market below, bellyhold cargo is also an important component of long-haul flying and is again dependent on night flying operations in the UK. Overnight flying in the long-haul market allows freight, parcels and documents to be collected as late in the day as possible from its origin and shipped to the UK for morning deliveries. The early morning arrivals into the UK therefore provide the best solution for just-in-time air freight to arrive into the UK for the start of the working day and to meet the needs of UK businesses and allow guaranteed next day delivery, which is a critical component of a number of business sectors in the UK economy.

3.33. The role of freight is important in adding revenue to long-haul flights and helping underpin the economic sustainability of such services, particularly on routes to emerging markets. There is also an element of connecting freight through the London Heathrow hub, which would be lost if early morning and late night long-haul flying was restricted. If freight connections cannot be made then the freight will be shipped through other hubs in Europe and lost from the airline revenue streams for UK bound carriers, potentially further undermining UK connectivity if services are made more marginal through the loss of bellyhold freight revenue.

Cargo Flights

3.34. As we have already highlighted earlier in this section, cargo operations are heavily dependent on night flying in order to meet the needs of customers and to support the UK's position as a place to do business. In addition to bellyhold cargo, touched on above, the sector covers the express freight market, dominated by the integrators such as DHL, Fedex and UPS, as well as the general air cargo market often consisting of multi-stop long-haul flights carrying mixed freight.

3.35. By reference to other freight modes, air freight costs are high and as a result freight and packages carried by air tend to be more time critical or higher value (or a combination of both) and this is especially true of cargo flown at night. The night period provides an opportunity to move items whose value is defined by their speed and/or certainty of delivery and for which international delivery times are measured in hours rather than days. Guaranteed delivery times and next business day delivery are key features of the offer for night freight operators and, due to the higher costs involved, users, shippers and operators will only choose overnight air freight when no other alternative will meet their business needs.

3.36. Such freight often covers essential time expiring medical or pharmaceutical products, financial, legal or business documents, critical manufacturing components or spares, perishable produce or high value consumer goods. The night provides vital time between business days when goods / packages can be moved with minimal loss of productivity or time to market or user, which is critical for UK competitiveness.

Why Night Flying Matters:
Supporting the Financial Services Industry and Trade Finance

The UK is the world's leading financial services capital, and both a major global origin and destination for financial documents. These include time critical trade documents, financial instruments (credit cards / cash letters) and confidential investment/private banking data. This allows shippers to benefit from pick up towards the end of the working day, and delivery close to the beginning of the next. Any change to the pick up or delivery times of these documents would impact their bottom line and harm London's status as the financial capital of the world.

One example is international trade finance. Every business that sells and buys goods needs the financial services industry to operate. This can range from the day-to-day management of working capital, investments to innovate and grow, and numerous financial transactions required along the fulfilment process from exporter to distributor. Trade Finance is the most vital part of global banking today. According to the World Trade Organisation (WTO), world merchandise trade was worth approximately $19.3 trillion in 2015. As globalisation continues, supply chains have lengthened and become more complex. For our banks this means greater risk and has resulted in a greater focus on financial supply chains. Express services make the movement of the vital trade documents more visible, quicker and reliable is very valuable to the customer.

Banks act as intermediaries to collect payment from the buyer of goods in exchange for the transfer of documents that enable the holder to take possession of the goods. Similar to an invoice, the exporter may send a bill of exchange with other shipping documents including the documents of title. These documents are sent to the importing country nominated agents and this agent only releases the title documents when the importer signs the bill to accept liability to pay on the terms stated. There are therefore two supply chain flows where the Express sector plays a role. The first is the physical flow of the actual goods and the second is the flow of financial documents as part of international trade financing solutions offered by the banks.

Express Freight

3.37. Services that use night flying are often referred to as express or priority services and are offered by a wide range of operators in the market. Express operators use a combination of their own aircraft for short-haul connections between major cities and their hubs as well as bellyhold capacity on long-haul scheduled services.

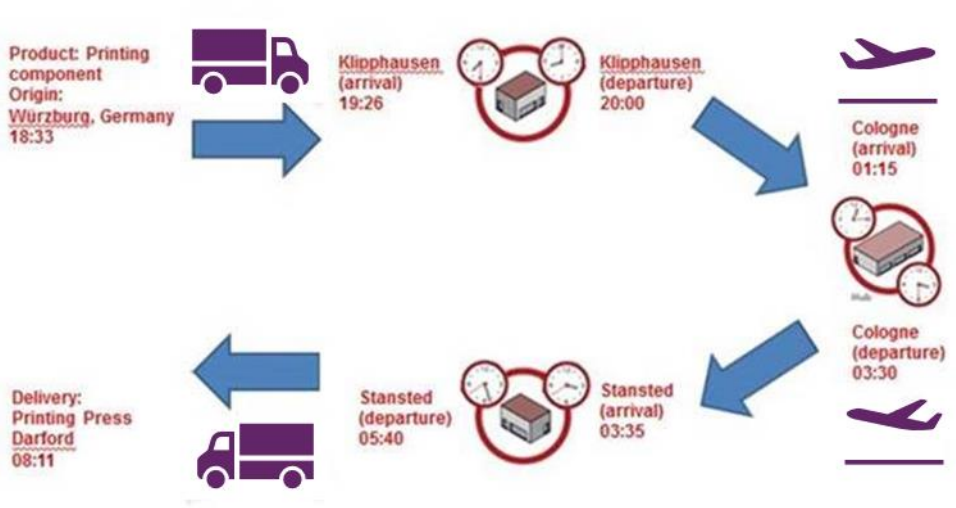
3.38. If the delivery timeframes offered by these services cannot be met then the impacts can be very high. For instance:

- some items may become degraded or unusable, such as clinical samples, time limited medical products or perishables, leading to knock on consequences ranging from financial losses to delayed or aborted treatments for life threatening illnesses;
- sales windows on perishable items may be shortened, meaning that the likelihood of sale is reduced and waste increased, ultimately leading to higher prices;
- production lines may be halted as components, spares or supplies are held up leading to delays and significant costs for manufacturers, operators and end users;
- deals may fail as essential legal and financial documents cannot reach their destinations in time.

3.39. It is a feature of the market that the economic cost of delay or failure to deliver can be disproportionate to the measurable value of the individual item.

3.40. Over the past 20 years, express freight services have grown substantially faster than general air freight, reflecting the increasing integration of global financial markets and global supply chains, continued growth of 'just in time' processes, and the rise of time sensitive business to consumer (B2C) shipping.

How Night Flying Lets Express Freight Work – Keeping Production Moving



3.41. There are a number of key reasons why night freight operators would be unable to retime some operations to the day time and continue to offer the same value to their customers and meet their service demands, including:

- items often need to be picked up at the end of the working day in the country of origin and then delivered as early as possible the following day to enable companies to maximise productivity. The night is the time available to transport items to meet these types of deadline. Flying is the only way to cover the distances necessary. Trucking is simply too slow in the great majority of cases. It is ultimately a case of being able to fly at night or not being able to offer the service, which in turn will impact on UK business productivity;
- night flights cannot simply be retimed. The ability of the express freight operators to offer next day and priority services is reliant on a global hub and spoke network similar to that used by the major network airlines for passenger air services. This is based on meeting a system of late pick ups and early deliveries and on waves of arrivals and departures that enable packages to make connections at key hub airports. It is therefore not possible to simply retime services to be just before or just after the night periods as this would severely damage the integrity of the broader network, of which the UK is only one part. The only course of action open to freight service providers is to accept that air is no longer an option for express services and that delivery will take at least 24 hours longer. In these circumstances it is more likely that freight would simply be trucked due to the lower cost, but end users must accept the loss of service and productivity and competitiveness in international markets;
- flying at night often means that airspace and airport infrastructure is less congested (as indeed is the road infrastructure around airports). This enables greater speed, efficiency and reliability of processing. All of which are essential elements of the service that is being delivered when margins for delay can be as short as only 15 minutes.

General Air Cargo

3.42. General dedicated air freight sits between express air freight and other, slower modes of transport, such as trucking or shipping. The items carried tend to have a higher value or are perishable in nature (such as flowers, food or pharmaceuticals) to justify the higher costs of air freight when compared to other forms of transport. The operating patterns of these services are often related to airline and airport capacity globally, which dictates when such operations will arrive in to the UK. If airlines and shippers cannot make their operations work into the UK because of night restrictions they are more likely to fly to hubs on the continent, such as Amsterdam, Brussels or

Luxembourg, and then complete the rest of the journey by truck. This will lead to a loss of productivity and will reduce direct employment associated with these activities in the UK over time.

Conclusions

3.43. This section has set out why night flying is such an intrinsic part of business models for both passenger and cargo airlines operating in the UK. Ultimately, flying at night is about demand and consumer preferences. Airlines fly at night to meet the requirements of their customers.

3.44. For passenger airlines, flying at night is about maximising 'on the ground' time for customers, about competing effectively with other European hubs, and about counteracting some of the innate difficulties in operating from the UK. For short-haul flying, it is also an essential element in enabling airlines to maximise aircraft utilisation through based aircraft and operate efficiently, which is at the heart of providing connectivity at a price that is acceptable to consumers. Having to retime services would have significant consequences for airlines, passengers and the wider economy.

Why Night Flying Matters:
Export of Life Saving Drugs

The UK is a world leader in pharmaceuticals, exporting life- saving drugs to patients across the world.

For example, a global exporter of pharmaceuticals ships drugs reliably and efficiently from their UK site to hospitals and medical facilities across the world. The drugs, which are used to treat cancer and other illnesses, are moved in temperature controlled boxes. They must be shipped using express services as they have a short life span before they start to degrade.

For each drug that is moved, a patient is depending on the connectivity and reliability of the air cargo services supported by night flights.

3.45. For express freight operators, flying at night is fundamental to their business model. It is simply not possible to offer the time definite, next day delivery services, that are in such high demand in modern economies without being able to fly at night. Without night flying the value of flying at all is lost. It becomes more efficient to simply truck freight and accept that next day services are not possible, with corresponding loss of time and productivity for users. The ability to retime for express freight operators is extremely limited. This also applies to express freight being carried in the bellyhold of passenger aircraft. General air freight is also reliant on night flying given its need to fit in with airline and airport capacity and operating patterns globally. It is, however, likely less reliant on night flying than express freight.

4. The Economic Impact of Night Flying in 2019

Introduction

4.1. In this section, we set out our assessment of the current economic impact generated by night flying at UK airports. Initially, we explain the analytical approach that we have adopted and the key assumptions and components that we have used in our economic modelling, followed by the results of our assessment.

Analytical Framework

4.2. The economic impact generated by night flying at UK airports has been assessed using a commonly used and widely accepted economic impact framework that is considered best practice in assessing the economic impact of aviation activity.

4.3. This approach splits the ways that airports interact with the economy into a series of economic effects. A range of techniques is then used to provide a quantitative assessment of the Gross Value Added (GVA) and employment benefits supported by each effect. Table 4.1 describes the various effects that we have sought to assess in this study.

Table 4.1: Types of Quantitative Economic Impacts

Type	Definition	Examples
Direct Impacts	Employment and GVA supported by activities wholly or largely related to the operation of air services and related activities. They are located at the airport or in the vicinity but off-site from the airport. There is no strict threshold for direct off-site activity, but typically such activities are usually located within 20 minutes drive of the airport.	Companies where effects might be felt include the airport company, airlines, handling agents, aircraft maintenance and engineering, freight forwarders and logistics companies.
Indirect Impacts	Employment and GVA supported in the supply chain to the direct activities. The companies that generate the direct impacts need to buy goods and services from others to produce their output, who in turn have their own supply chains. These purchases in turn support jobs and GVA in a wide range of sectors.	The types of economic activity that might be included is broad ranging. Examples might include utilities and energy, advertising, manufacturing, professional services or construction.
Induced Impacts	Employment and GVA supported in the economy by the expenditure of wages and salaries earned in relation to the direct and indirect activities. People working in the companies in the direct and indirect effects spend money in their local economies. This expenditure injection also supports GVA and jobs.	Impacts are likely to be felt across all sectors. Particular beneficiaries might include general retailing, food and beverage, leisure activities, utilities, banking and finance costs and insurance.
Wider Impacts	Employment and GVA supported in the wider economy by the role air connectivity plays in facilitating trade, foreign direct investment, competition, agglomeration, labour attraction and retention, and tourism.	Impacts are felt across all sectors, as the productivity benefits boost economic activity and increase overall output levels.

Source: York Aviation.

4.4. The direct, indirect and induced economic impacts described above are sometimes termed the operational economic impacts of air services, reflecting the GVA and employment supported through the operation of the

services as an economic activity. It is these types of impact that have traditionally been assessed in airport and air service economic impact studies and that have the most immediate and direct relationship to the labour market in areas around airports. Wider impacts are more complex and accrue to the users of passenger and cargo services in the economy. They reflect the role that air service connectivity plays in making other sectors more productive and efficient.

Approach to Assessing Baseline Economic Impact

4.5. The direct, indirect and induced economic impact of night flying at UK airports in 2019 has been estimated based on existing research into the economic impact of airports across the UK. This research has included a wide range of assessments of individual airports but also analysis of the economic impact of the air transport sector in the UK. This research has been undertaken by a range of organisations including York Aviation and a number of other well-known consultancies. These studies have been used to establish a baseline direct, indirect and induced impact for each airport in the study at 2019 traffic levels[8]. The economic impact associated with night flying is based on the proportion of workload units[9] operating in the relevant night period (either the NQP or Other Night). This is conceptually similar to one of the preferred approaches taken by CEPA in considering the economic impact of night flying previously at Heathrow. CEPA identified that viewing the impact of night flights in this way tied the estimate to actual night activity rather to simply considering the number of people on site at the airport in the night period, which was found to generate considerably higher estimate. Also, from a practical perspective, it is a methodology that is readily deliverable across UK airports without the requirement for significant primary research, which is simply not possible at the current time. These GVA and employment impacts are the immediate and most tangible impacts associated with night flying at UK airports. They are also the impacts that are likely to be felt most keenly by local communities around the UK's airports.

4.6. The wider economic impact of night flying has been assessed using a statistical relationship between the connectivity offered by UK airports and the level of productivity in the UK economy developed by Oxford Economics[10].. Within this relationship, connectivity is defined as the number of business passengers using UK airports plus air cargo tonnage multiplied by 10, relative to UK GDP. This analysis identified that a 10% increase in the UK's connectivity would result in a 0.5% increase in productivity. This particular relationship between connectivity and productivity in the economy has been selected for a number of reasons:

- it is an analysis that is focussed specifically on the UK. Other relationships of this nature have drawn data from a wide range of countries, which may have different characteristics;
- it is the only relationship identified that enables a consideration of air cargo alongside passenger connectivity;
- the modelling approach has been developed and refined over time through a number of studies, with similar results being identified each time. It involves analysis of the UK economy over a substantial period of time and across a range of sectors;
- the elasticity identified is in line with other similar work that has been undertaken in this area, albeit all the models are slightly different and consider different measures of connectivity. More recent work by InterVISTAS for ACI EUROPE identified a similar elasticity[11], while research by PwC for the Airports Commission identified an elasticity of around 0.1[12];
- the Oxford Economics' model's focus on business travel and cargo provides a close fit with the key drivers of the wider economic impacts of air travel, notably increased trade, foreign direct investment, competition

[8] A list of references can be found in Appendix B.
[9] A workload unit is standardized measure of activity in air transport. It refers to either one passenger or 100 Kg of cargo.
[10] Oxford Economics (2013). Impacts on the UK Economy through the Provision of International Connectivity.
[11] InterVISTAS. (2015). The Economic Impact of Airports in Europe.
[12] PwC. (2013). Econometric Analysis to Develop Evidence on the Link Between Aviation and the Economy.

and transparency of global markets. Other models that focus purely on passenger numbers or seat capacity do not, intuitively, have same direct linkage to the drivers of wider economic impacts.

4.7. In this analysis, we have used this relationship developed by Oxford Economics to estimate the GVA impact of night flights based on the proportion of total UK connectivity they make up[13]. These impacts have been allocated across UK airports based on the contribution of each airport to this definition of night flying connectivity (i.e. the number of passengers moved at night and cargo tonnage moved at night). The corresponding impact on employment has been estimated based on an average GVA per job for the UK's largest trading sectors. This is designed to ensure that the estimates reflect the likely user sectors of night flying services. As described above, this approach has the advantage of being able to deal with passenger and cargo related wider economic impacts within the same analytical approach.

4.8. It should, ultimately, be recognised that assessing the scale of the wider impacts of night flights is highly complex, as these wider impacts cannot be physically counted in quite the same way as, for instance, the number of jobs involved in actually operating air services (direct impacts). These wider impacts are intrinsic to the way that the UK economy functions as a trading nation in the globalised economy. Night flights make lots of economic activities in a wide range of sectors across the UK economy work better and more efficiently. The sum total of these incremental differences across the economy is what is being estimated through this process. The wider impacts estimates presented here should, therefore, be considered as broad order of magnitude assessments of these effects.

Economic Impacts in the Night Quota Period

4.9. Figure 4.1 shows the total economic impact in terms of Gross Value Added (GVA) and employment generated by passenger and cargo related aviation activity at UK airports during the NQP.

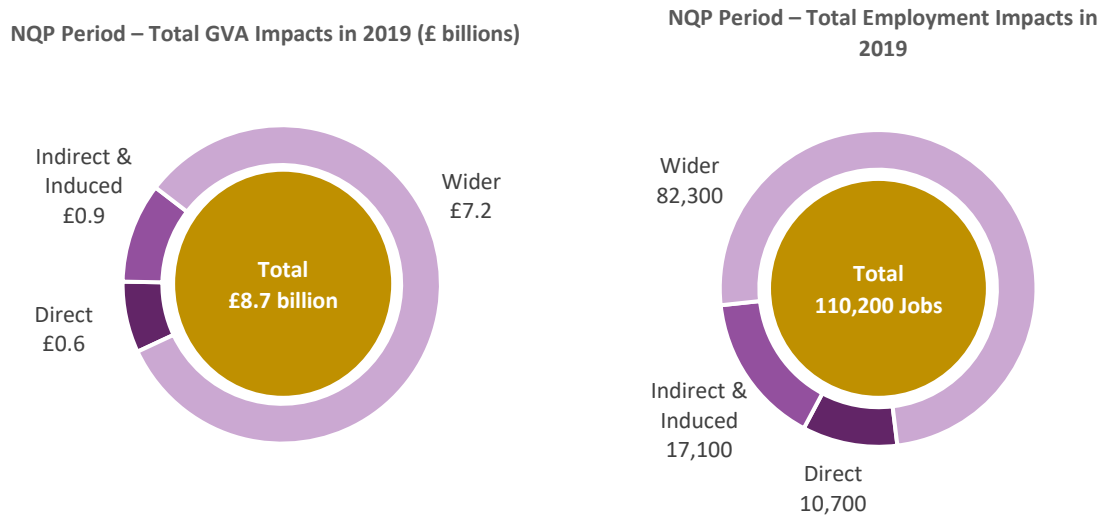
4.10. Direct impacts account for around £0.6 billion in GVA and 10,700 jobs. These direct impacts are supplemented by around £0.9 billion and 17,100 jobs in indirect and induced impacts.

4.11. The majority of the benefits in the NQP come from wider economic impacts. These account for £7.2 billion in GVA impacts and around 82,300 jobs across the UK.

4.12. When direct, indirect, induced and wider impacts are combined, night flying in the NQP has a total impact of £8.7 billion and 110,200 jobs across the UK.

[13] The number of business passengers on night flights has been estimated using CAA Passenger Survey and OAG data. OAG has been used to identify flight numbers operating in the night period, which have then been used to identify relevant records within the CAA Passenger Survey.

Figure 4.1: Economic Impact of Aviation Activity at UK Airports During the Night Quota Period in 2019



Source: York Aviation.

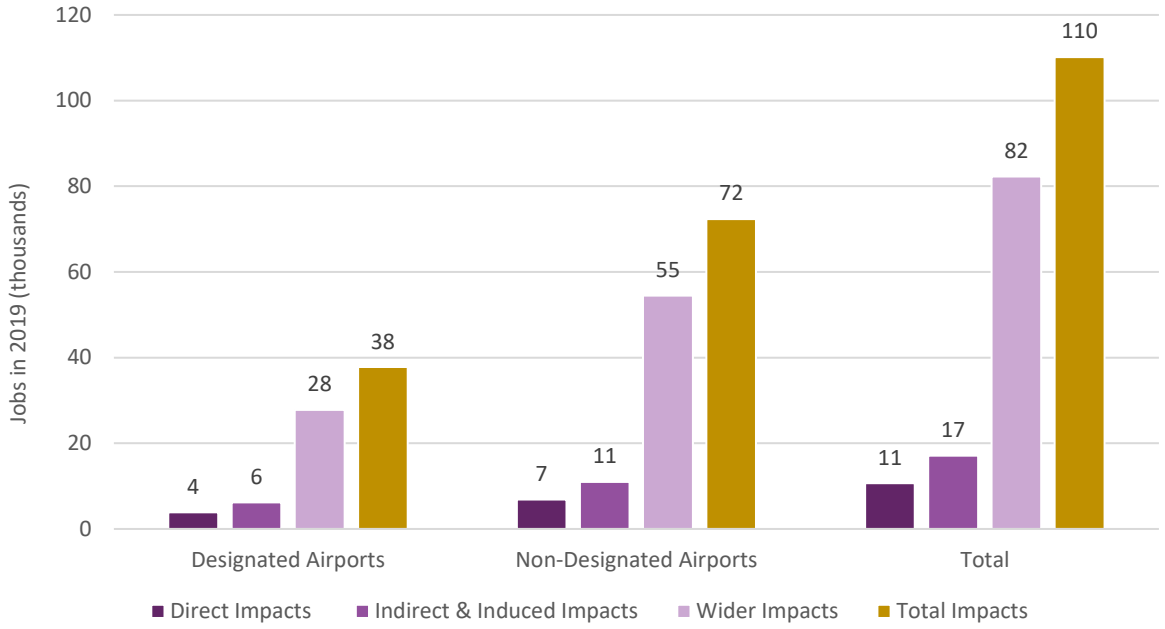
4.13. Figure 4.2 illustrates the GVA impacts that are generated by passenger and cargo related activity at UK airports during the NQP, split between designated and non-designated airports. The total GVA impact generated from designated and non-designated airports is approximately £3.0 billion and £5.7 billion, respectively. Non-designated airports account for the majority of GVA impacts generated by aviation activity during the NQP, which is heavily driven by the significant level of cargo activity during the period at East Midlands Airport.

Figure 4.2: GVA Impacts Generated by Aviation Activity at UK Airports During the Night Quota Period in 2019

Source: York Aviation.

4.14. Figure 4.3 illustrates that a total of approximately 38,000 jobs are supported by passenger and cargo operations in the NQP at designated airports and a further 72,000 jobs are supported at non-designated airports. Again, these jobs are primarily supported in the wider economy.

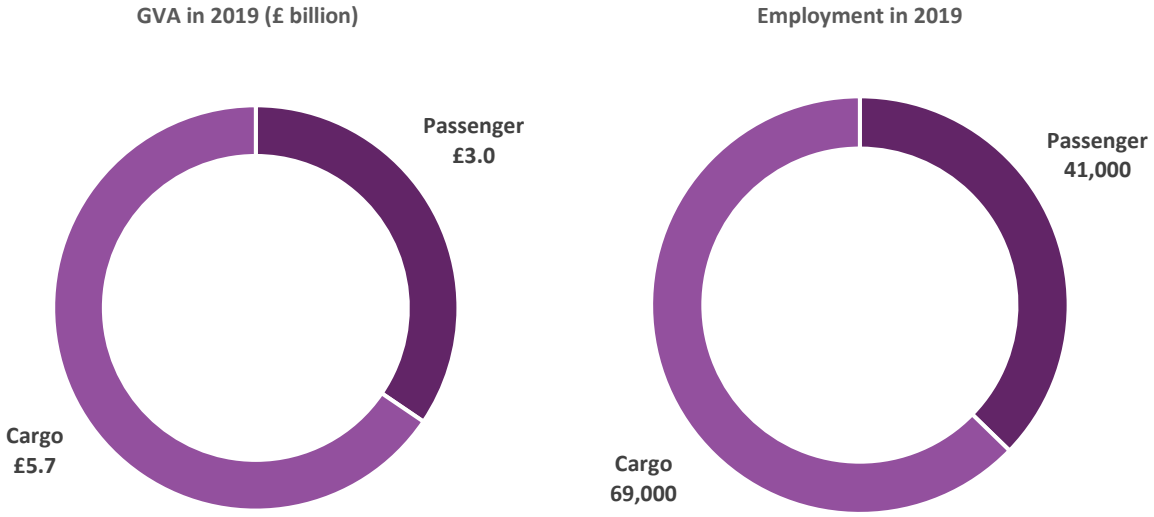
Figure 4.3: Employment Supported by Aviation Activity at UK Airports During the Night Quota Period in 2019



Source: York Aviation.

4.15. Figure 4.4 separates the GVA and employment impacts generated in the NQP at UK airports by cargo and passenger operations. The contribution to overall GVA impact from cargo operations during the NQP outweighs the contribution from passenger operations during the same period, with each generating approximately £5.7 billion and £3.0 billion, respectively. Cargo operations during the NQP period supported a total 69,000 jobs across the economy. Passenger operations during the same period supports a total of 41,000 jobs. Given the strong focus of express freight operations in the NQP and the more related role that the period plays in passenger markets, this pattern is not surprising.

Figure 4.4: GVA and Employment Impacts Generated by Cargo and Passenger Aviation Activity at UK Airports During the Night Quota Period in 2019



Source: York Aviation.

Economic Impacts During the Other Night Period

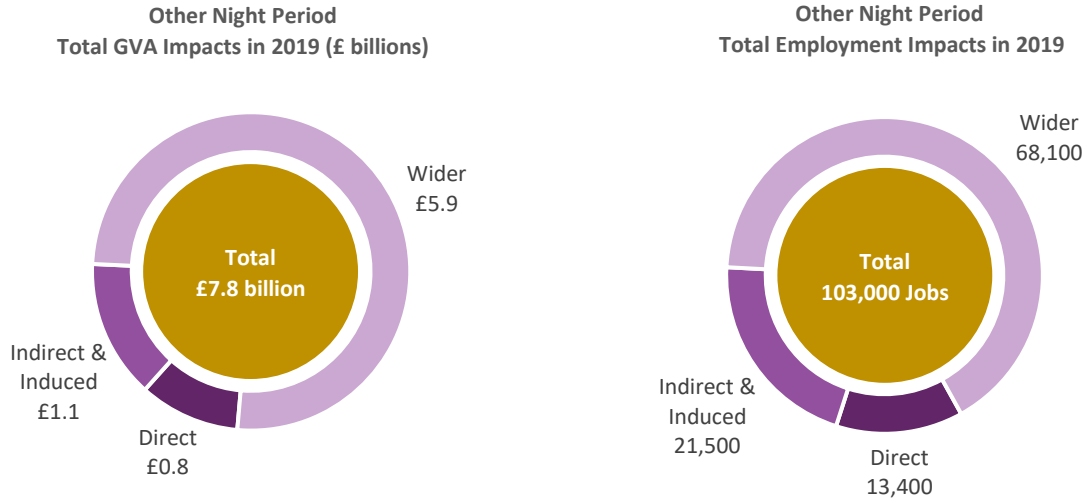
4.16. Figure 4.5 shows the total economic impact in terms of Gross Value Added (GVA) and employment generated by passenger and cargo related aviation activity at UK airports during the Other Night Period.

4.17. Direct impacts account for around £0.8 billion in GVA and 13,400 jobs. These direct impacts are supplemented by around £1.1 billion and 21,500 jobs in indirect and induced impacts.

4.18. The majority of the benefits in the Other Night period come from wider economic impacts. These account for £5.9 billion in GVA impacts and around 68,100 jobs across the UK.

4.19. When direct, indirect, induced and wider impacts are combined, night flying in the NQP has a total impact of £7.8 billion and 103,000 jobs across the UK.

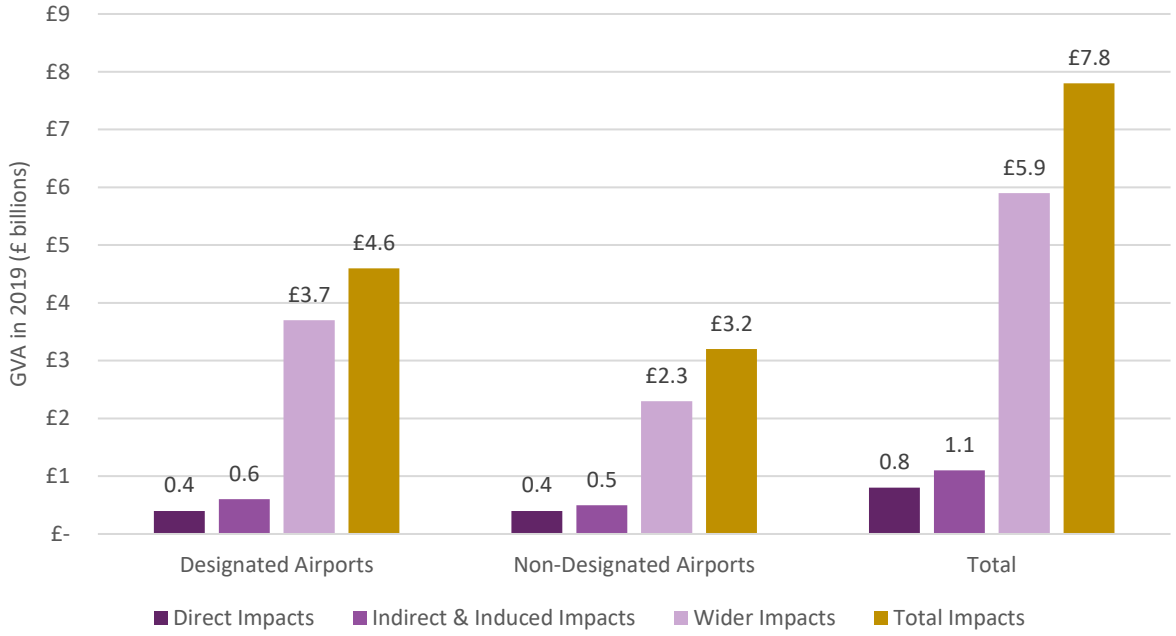
Figure 4.5: Economic Impact of Aviation Activity at UK Airports During Other Night Period in 2019



Source: York Aviation.

4.20. Figure 4.6 illustrates the GVA impacts that are generated by passenger and cargo related activity at UK airports during the Other Night period split between designated and non-designated airports. The total GVA impact generated from designated and non-designated airports is approximately £4.6 billion and £3.2 billion, respectively.

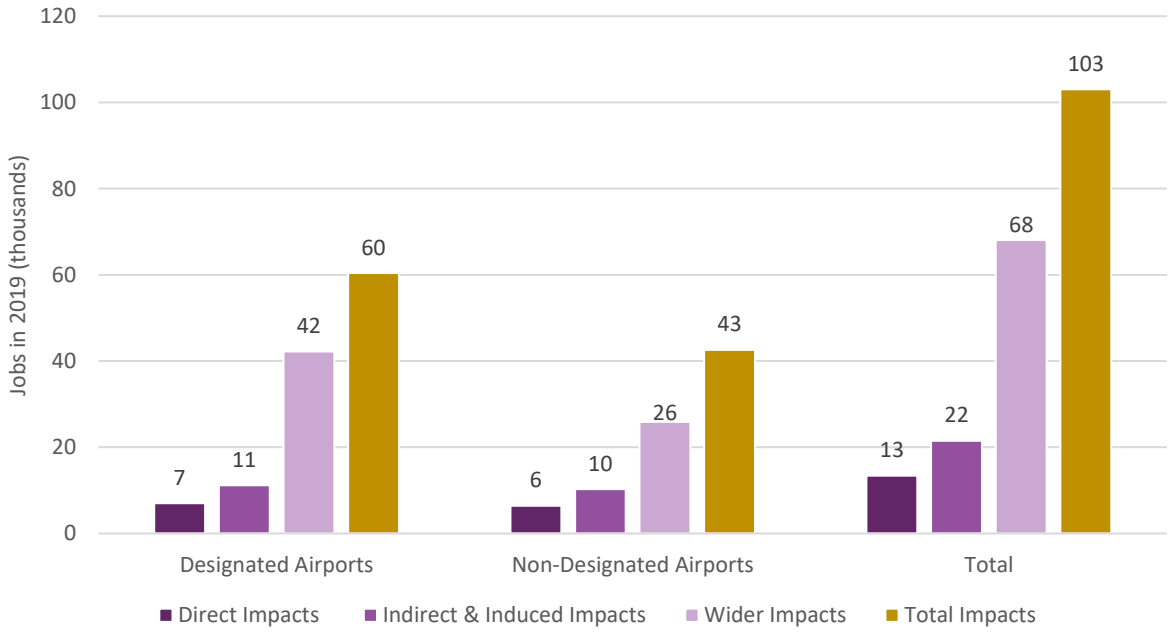
Figure 4.6: GVA Impacts Generated by Aviation Activity at UK Airports During Other Night Period in 2019



Source: York Aviation.

4.21. Figure 4.7 shows that approximately 60,000 jobs are supported by passenger and cargo operations in the Other Night period at designated airports, and a further 43,000 jobs are supported by activity at non-designated airports. The primary driver of these impacts is, again, jobs supported in the wider economy amongst sectors that are users of passenger and air freight services.

Figure 4.7: Employment Supported by Aviation Activity at UK Airports During Other Night Period in 2019

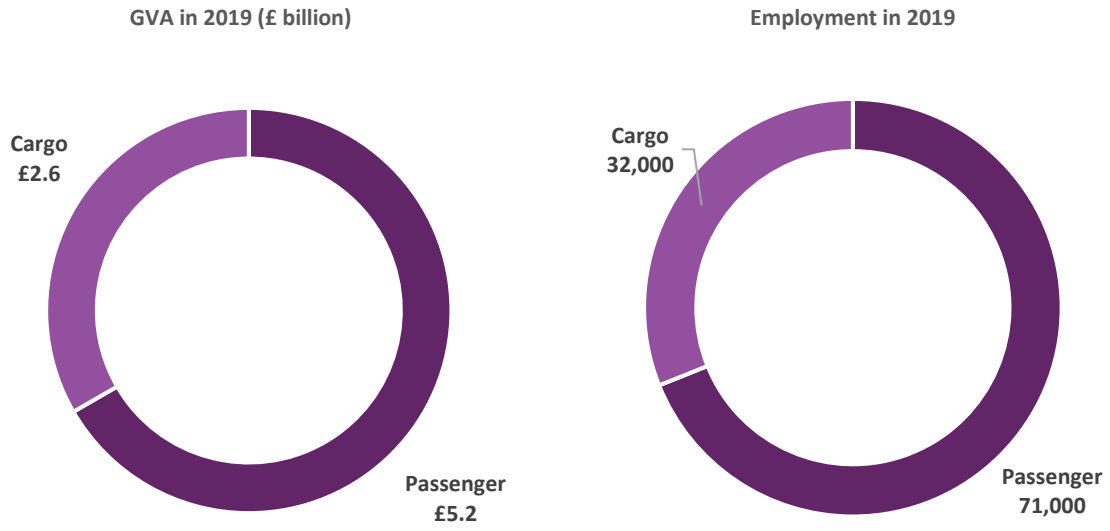


Source: York Aviation.

4.22. Figure 4.8 demonstrates that cargo and passenger operations during the Other Night period separately generate approximately £2.6 billion and £5.2 billion respectively in terms of GVA. Compared to the NQP, passenger operations contribute more to overall GVA versus cargo operations during the Other Night period. This reverses the position in the NQP and reflects the vital importance of the 06:00 to 06:59 period to passenger operations.

Passenger operations were estimated to have supported around 71,000 jobs across the UK economy, compared to 32,000 for cargo operations.

Figure 4.8: GVA Impacts Generated by Cargo and Passenger Aviation Activity at UK Airports During Other Night Period in 2019



Source: York Aviation.

Total Economic Impacts During the Night

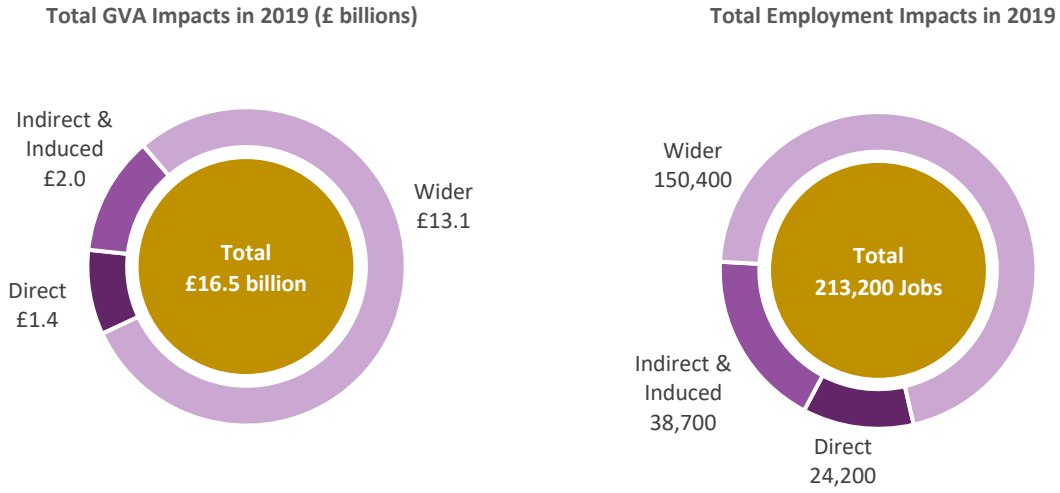
4.23. Figure 4.9 shows the total economic impact in terms of Gross Value Added (GVA) and employment generated by passenger and cargo related aviation activity at UK airports during the entire night period (23:00 to 06:59).

4.24. Direct impacts account for around £1.4 billion in GVA and 24,200 jobs. These direct impacts are supplemented by around £2.0 billion and 38,700 jobs in indirect and induced impacts.

4.25. The majority of the benefits across the night period come from wider economic impacts. These account for £13.1 billion in GVA impacts and around 150,400 jobs across the UK.

4.26. When direct, indirect, induced and wider impacts are combined, night flying across the whole night has a total impact of £16.5 billion and 213,200 jobs across the UK.

Figure 4.9: Total Economic Impact of Aviation Activity at UK Airports During the Night in 2019



Source: York Aviation.

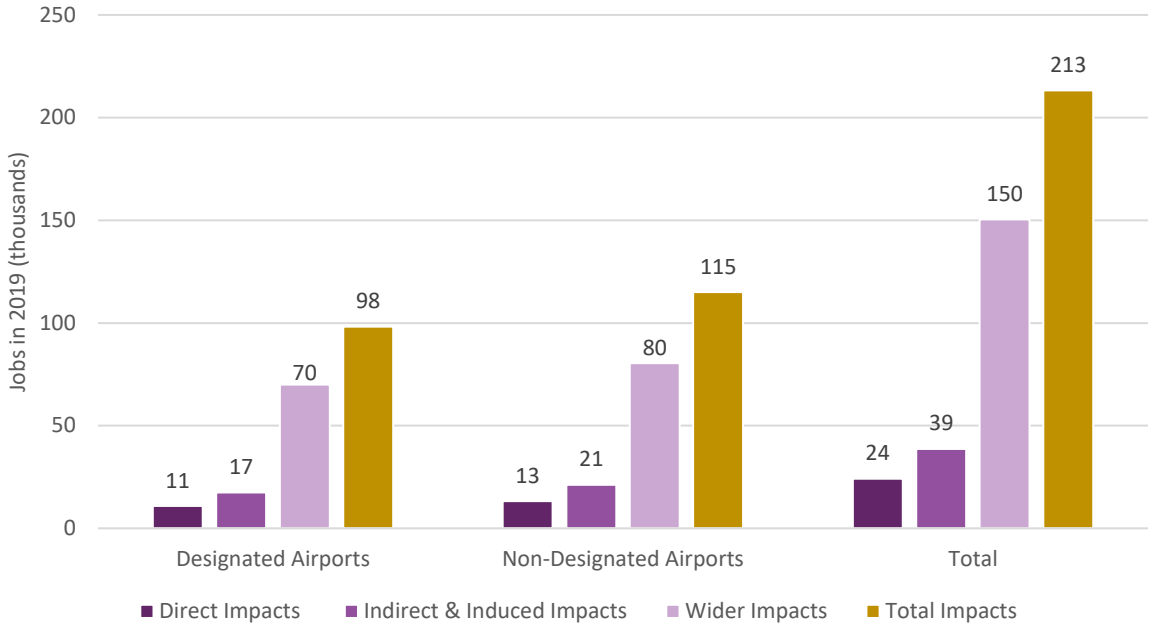
4.27. Figure 4.10 details the total GVA impacts that are generated by passenger and cargo related activity at UK airports throughout the night. The total GVA impact accruing from designated and non-designated airports is approximately £7.6 billion and £8.8 billion, respectively.

Figure 4.10: Total GVA Impacts Generated by Aviation Activity at UK Airports During the Night in 2019

Source: York Aviation.

4.28. Figure 4.11 shows that night operations at designated airports support approximately 98,000 jobs, with the majority of jobs generated by wider impacts. Night operations at non-designated airports supported approximately 115,000 jobs, with the majority of jobs also generated by wider impacts.

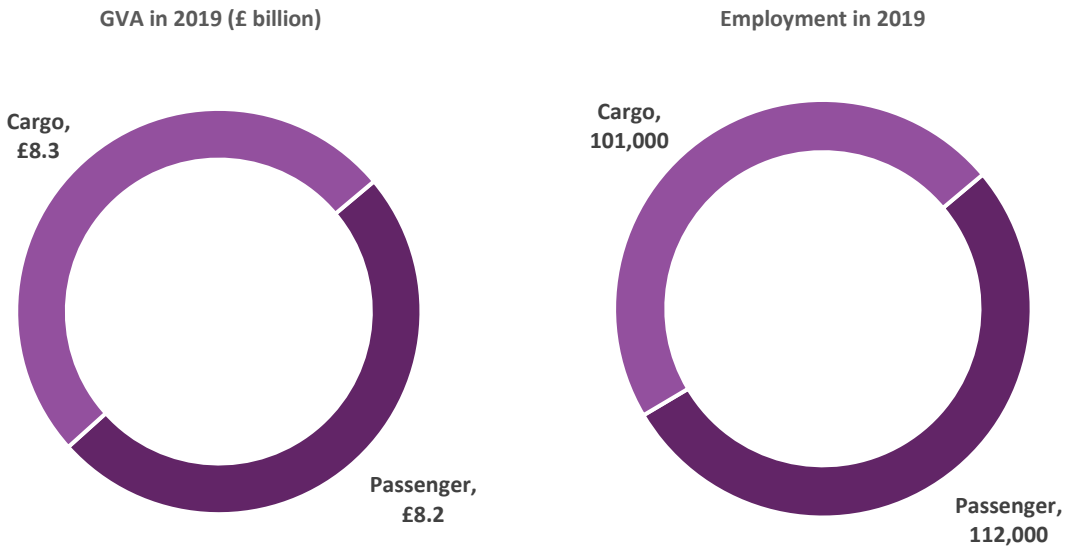
Figure 4.11: Total Employment Supported by Aviation Activity at UK Airports During the Night in 2019



Source: York Aviation.

4.29. Figure 4.12 presents the GVA impacts generated separately by cargo and passenger operations at UK airports during the night. Cargo and passenger operations during the night contribute a similar total of just over £8 billion each, but in terms of wider GVA impacts, cargo operations generate approximately £7.8 billion compared to £5.3 billion for passenger operations. In total, cargo and passenger operations support approximately 101,000 and 112,000 jobs respectively across the entire economy.

Figure 4.12: GVA Impacts Generated by Cargo and Passenger Aviation Activity at UK Airports During the Night in 2019



Source: York Aviation.

Conclusions

4.30. The operation of passenger and cargo flights at UK airports during the night generates significant GVA and employment benefits that extend throughout the economy. Direct impacts account for around £1.4 billion in GVA and 24,200 jobs. These direct impacts are supplemented by around £2.0 billion and 38,700 jobs in indirect and induced impacts. When wider impacts are included, the total economic impact of aviation activity during the entire night period (23:00 to 06:59) is estimated to be around £16.5 billion in terms of GVA in 2019, supporting approximately 213,200 jobs.

4.31. Aviation activity during the NQP (23:30 to 05:59) alone generates a total of approximately £8.7 billion of GVA impact and supports approximately 110,200 jobs. This includes direct impacts account of around £0.6 billion in GVA and 10,700 jobs. These direct impacts are supplemented by around £0.9 billion and 17,100 jobs in indirect and induced impacts. The operations of express cargo and general cargo services form a significant component of the economic impact during the NQP, reflecting the intensity of cargo operations that occur during this period that are fundamental in supporting their business models.

4.32. Despite forming just an hour and a half of the day, the economic impact generated during the Other Night period (23:00 to 23:29 and 06:00 to 06:59) is considerable. Direct impacts account form around £0.8 billion in GVA and 13,400 jobs. These direct impacts are supplemented by around £1.1 billion and 21,500 jobs in indirect and induced impacts. When wider impacts are included, aviation activity during this period supported approximately 103,000 jobs in 2019 and generated around £7.8 billion in GVA across the entire economy. The scale of the economic impact generated during the Other Night period compared to the NQP, which forms a longer duration, is notable. The period between 06:00 to 06:59 is central to outbound passenger volumes at UK airports across the entire day, which drives significant economic impact. Furthermore, this period is also the peak for inbound bellyhold cargo arriving to the UK, which again is a key driver of economic benefit.

5. The Impact of Restricting Night Flying

Introduction

5.1. This section presents our modelling of the economic impacts that would occur under four hypothetical scenarios that would further constrain the levels of night flying that occurs at UK airports:

- Night Ban – a total ban on all aircraft movements between 23:00 to 06:59;
- NQP Ban – a total ban on all aircraft movements during the NQP (23:30 to 05:59);
- NQP Ban, 50% Night Reduction – a total ban on all aircraft movements during the NQP (23:30 to 05:59), and a 50% reduction in aircraft movements between in the Other Night period (23:00 to 23:29 and 06:00 to 06:59);
- 50% Night Reduction – a 50% reduction of aircraft movements between 23:00 and 06:59.

5.2. Each of the four scenarios considers aviation activity related to cargo and passenger operations. Night flying constraints are applied universally across designated and non-designated airports.

5.3. These scenarios are, of course, simplified and illustrative. In particular, they assume that increased restrictions are applied across the UK and, hence, there is no shifting of demand between UK airports. It should also be recognised that while the approach does consider 'knock-on' effects to day time operations, it does not necessarily identify the full range of less quantifiable 'shadow effects' that might come with night curfews or similar tight restrictions.

5.4. The economic impact that would occur under each scenario is estimated in terms of employment that is put at risk and GVA foregone, alongside the volume of passengers and cargo tonnes that would be lost. We also quantify the additional generalised journey costs that passengers would bear as a consequence of each of the four scenarios.

Estimating the Impact on Passenger and Cargo Throughput

5.5. The economic impact of any of the constraint scenarios is ultimately driven by the extent to which the additional night time restrictions reduce overall passenger and cargo throughput across the whole of the day. In other words, the economic effects of each scenario take into account the extent to which airlines are able to mitigate against the restrictions by retiming activity but also the extent to which any re-timing then knocks on to operations throughout the rest of the day. The first effect reduces the economic effect of any restriction, while the second increases the effect. The extent to which any airline is able to retime activity is dependent on a combination of:

- the availability of slot capacity in key hours in which displaced flights need to move to;
- the likely revenue value of long-haul versus short-haul flights, whereby long-haul movements are assumed to displace short-haul movements if required;
- the reliance on specific timings to support the overall business model. These have been based on discussions with individual airlines and reviews of wider research.

5.6. For passengers, the modelling essentially considers the day at 30 UK airports, starting at 04:00, and how increased night flying restrictions would force changes in flying patterns as a cascade through different time periods in the day. For instance, if flying were to be banned in the NQP, the model examines the extent to which airlines are able to shift capacity into the 06:00 to 06:59 period, then to the 07:00 to 07:59 period and then into the rest of the day.

5.7. In each time period, the extent and nature of existing flying has been identified using data collected from participating airports, OAG schedules, CAA Statistics and CAA Passenger Survey data. This forms the basis for understanding what needs to be rescheduled and also the use of capacity in periods into which airlines might seek to retime. This picture of what is happening in the baseline position is combined with an assessment of the available capacity at each airport in any given time period. This capacity has been assessed as follows:

- for the slot coordinated airports in the UK[14], we assessed Start of Season reports published by Airport Coordination Limited (ACL) that present the number of slots allocated to carriers at coordinated airports versus the declared capacity of the airport by each clock-hour for a peak week in Summer 2019;
- for uncoordinated regional airports we used a percentage average of the capacity available in each clock hour across the larger coordinated regional airports and applied this percentage to assume the remaining capacity at each uncoordinated regional airport.

5.8. Passenger airlines are assumed to attempt to re-time their operations if they are affected by night constraints. Long haul movements are assumed to either take up existing capacity in unrestricted periods or, if necessary, to displace existing short-haul operations (these, in turn, then have to be retimed). These services are unlikely to be cancelled, ultimately, given their value to airlines and passengers. Retiming does, however, make them less attractive to passengers, particularly transfer passengers, and as a consequence there is assumed to be a second-round impact on demand related to the delay to passengers' travel associated with retiming[15]. A generalised cost penalty equal to the monetised length of the retime is applied the existing journey and the impact on demand calculated using a price elasticity taken from the Department for Transport's UK Aviation Forecasts 2017. This secondary effect is designed to reflect the less attractive timing and the loss of transfer opportunities.

5.9. For short-haul operations, the same broad approach applies but with some additional considerations. Again, in the first instance, airlines will seek to retime operations, but given the importance of early morning departures to aircraft utilisation and the overall operating models of short-haul airlines, there are cut-offs in relation to the extent that airlines are prepared to attempt to retime. After these cut-offs, the services are assumed to be cancelled and the based aircraft associated with the relevant early morning movements removed from the airport. Short-haul services that are displaced by night restrictions are assumed to be retimed if there is available capacity before 08:00. Short haul flights that have been displaced by long-haul flights affected by night restrictions are assumed to be accommodated only if there is available capacity within the next time period. If services are cancelled and the based aircraft lost, then all the rotations associated with that movement through the day are lost. However, the slots released later in the day are assumed to be become available for inbound aircraft to use to some degree. At Heathrow and Gatwick, all released slots are assumed to be filled, while at Stansted this is limited to 75%. At all other airports, 50% of released slots are assumed to be filled. As with long-haul services, in addition to any losses resulting from services having to be cancelled because they cannot realistically be retimed, there is assumed to be a second-round effect stemming from the retiming of services that continue to fly. Again, where services are forced to operate later, as a result of re-timing, there is assumed to be a generalised cost penalty to passengers equal to the length of that delay, which is applied to the existing generalised cost of travel on these services. In addition, for short-haul services, there is a further additional cost to passengers resulting from the reduced aircraft utilisation suffered by short-haul airlines. The model estimates the reduction in the average number of rotations that can be achieved in a day at each time based on the extent to which the average operating day is truncated by night flying restrictions. This is assumed to be equal to the reduction in aircraft utilisation suffered by short-haul airlines at the airport. The corresponding increase in fixed costs per passenger

[14] The UK's slot coordinated airports are Heathrow, Gatwick, London City, Stansted, Luton, Manchester, Birmingham. Bristol is also coordinated during the daytime in summer seasons.

[15] When passengers are forced to change their plans by night flying restrictions, they will arrive or depart later in the day than is their original preference. In transport economics the time that they are delayed is a cost to that passenger. This cost can be expressed as a monetary value by multiplying the length of the delay experienced by the passenger by the passenger's so-called value of time. The value of time is the opportunity cost of the time that a traveler spends on his/her journey. In essence, this makes it the amount that a traveler would be willing to pay in order to save time, or the amount they would accept as compensation for lost time. In this analysis values of time identified by the Airports Commission have been used (Airports Commission (2015). Economy: Transport Economic Efficiency Impacts. Page 16). These values have been updated to reflect increases in the real value of time and updated to a 2019 price base in line with WebTAG guidance.

on a typical short flight is then passed on via an increase in air fares. The impact on demand is then again calculated using a price elasticity taken from the Department for Transport UK Aviation Forecasts 2017.

5.10. As we have seen above, cargo airlines are more reliant on night time operations than passenger airlines, and their ability to retime is very limited given the primary purpose of cargo night flying to facilitate international next day time definite deliveries. The modelling for cargo activities is, therefore, more binary around the ability to retime volume in to the day, as opposed to accepting that next day services cannot be delivered without the relevant and simply shifting activity to trucks instead, thereby losing the speed and certainty benefits associated air cargo.

5.11. For express freight operators, only 10% of volume and movements are assumed to be able to be retimed. This reflects the segments very high reliance on night flying to deliver its services. For general air cargo, the ability to retime is assumed to be considerably higher at around 75%. This reflects the lower reliance on night flying, the less urgent nature of what is being shipped in many cases (accepting that all air freight is urgent to some degree) and the fact that ultimately activity is likely to be less tied to particular UK airports and, hence, there may be greater flexibility in the event of restrictions. Transfer freight is assumed to be completely lost in the event of a need to retime, as it is likely that a more efficient routing could be found outside of the UK in the event of restrictions.

5.12. Based on this modelling approach, our assessment of each of the scenarios described is set out below.

Impact on Passenger and Cargo Throughput

5.13. Table 5.1 outlines the passengers and cargo tonnes that are estimated to be lost across designated and non-designated airports under each of the four scenarios at 2019 demand levels.

5.14. All of the scenarios would have considerable costs to the UK aviation industry, an outright ban during the entire night period (23:00 to 06:59) would be the most damaging, with an estimated 13.1 million passengers and 200,000 tonnes of cargo foregone each year between the three designated airports. Under the same scenario, non-designated airports would lose approximately 7.6 million passengers and 280,000 tonnes of cargo per annum.

5.15. Even the least constrained scenario, whereby aircraft movements would be reduced by 50% across the entire night period, has significant implications, with an estimated 4 million passengers and 260,000 tonnes of cargo lost between designated and non-designated airports.

Table 5.1: Annual Passengers and Annual Cargo Volumes Foregone by Constraint Scenario at 2019 Demand Levels

Scenario	Airport Category	Total Passengers (millions) Foregone	Total Cargo (Tonnes) Foregone
Scenario 1: Night Ban	Designated Airports	13.1	200,000
	Other Airports	7.6	280,000
	Total	20.7	480,000
Scenario 2: NQP Ban, 50% Other Night Reduction	Designated Airports	6.8	130,000
	Other Airports	3.5	260,000
	Total	10.3	400,000
Scenario 3: NQP Ban	Designated Airports	2.7	80,000
	Other Airports	1.0	250,000
	Total	3.6	320,000
Scenario 4: 50% Night Reduction	Designated Airports	3.4	100,000
	Other Airports	0.6	160,000
	Total	4.0	260,000

Source: York Aviation.

Impact on GVA and Employment

5.16. Operations at airports in the UK during the night deliver considerable GVA and employment impacts that extend across the wider economy. The impact of restricting night flying will, similarly, be felt across the UK economy and most keenly amongst the users of passenger and cargo air services.

5.17. Figure 5.1 shows the GVA and employment impact of the four scenarios described above split between the different types of effect within analytical framework. In each case, there is a core of economic impact stemming from direct, indirect and induced GVA foregone and employment put at risk. The potential economic impacts in the wider economy stemming from reduced productivity then significantly magnify this initial effect.

Figure 5.1: Economic Impact of Constrained Night Flying Scenarios at 2019 Demand Levels by Type of Effect

Source: York Aviation.

5.18. The economic impact that would result under each of the four scenarios is significant. Unsurprisingly, the most stringent constraints on night flying leads to largest negative economic impacts as carriers have less ability to re-time displaced flights. An outright ban on aircraft movements between 23:00 and 06:59 would have the most significant consequences. It would result in around £1.0 billion in direct GVA foregone and 16,000 jobs put at risk, with indirect and induced impacts increasing this impact by around £1.3 billion in GVA and 26,000 jobs. If wider impacts are then included as well, a total of approximately £12.4 billion of GVA is forgone and up to 158,000 jobs put at risk. In each case, the majority of economic impacts are related to wider impacts.

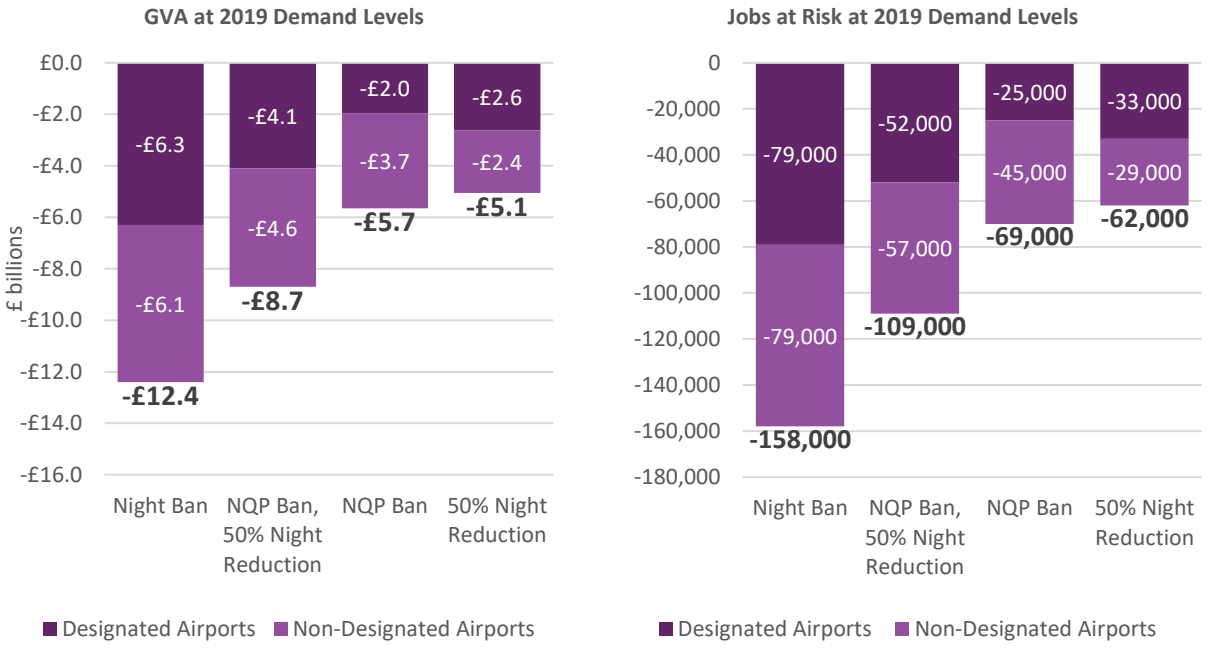
5.19. A ban on flying during the NQP and a 50% reduction in the number of movements during the Other Night period would result in an economic impact of £0.5 billion in direct GVA foregone and 9,000 jobs put at risk, with indirect and induced impacts increasing this effect by £0.8 billion in GVA and 15,000 jobs. If wider impacts are included, the total impact on foregone GVA increases to approximately £8.7 billion with around 109,000 jobs being put at risk.

5.20. An outright ban on aircraft movements during the NQP alone would result in an economic impact of £0.3 billion in direct GVA foregone and 4,000 jobs put at risk, with indirect and induced impacts increasing this effect by £0.4 billion in GVA and 7,000 jobs. If wider impacts are included, the total impact on foregone GVA increases to approximately £5.7 billion of GVA with put approximately 69,000 jobs at risk.

5.21. A 50% reduction of aircraft movements throughout the entire night period would result in an economic impact of £0.3 billion in direct GVA foregone and 4,000 jobs put at risk, with indirect and induced impacts increasing this effect by £0.4 billion in GVA and 7,000 jobs. If wider impacts are included, the total impact on foregone GVA increases to approximately £5.1 billion with around 62,000 jobs being put at risk.

5.22. Figure 5.2 shows the same analysis but with the impacts split between designated and non-designated airports. In most scenarios, the impacts are relatively evenly split between designated and non-designated airports. The exception being the NQP Ban, where impacts are weighted towards non-designated airports, reflecting the particular effect on the national freight hub at East Midlands Airport.

Figure 5.2: Economic Impact of Constrained Night Flying Scenarios at 2019 Demand Levels – Designated and Non-Designated Airports



Source: York Aviation.

Impact on Passengers

5.23. In Table 5.2 we consider the potential impacts on individual passengers of the different night restriction scenarios described above. It shows:

- the average time cost to passengers[16] on flights that are retimed as a result of night time restrictions. This is shown for both short-haul and long-haul passengers. The total cost to passengers retimed is also shown;
- the percentage impact on short-haul fares for all passengers still flying at the airport after the imposition of additional night restrictions. The total cost to short haul passengers from fare increases is also shown.

5.24. The average re-time cost per passenger remains broadly similar across all the scenarios. This reflects the fact that in many ways the primary effect in each scenario comes from the cancellation of flights. Those that are re-timed are re-timed by a broadly similar amount. The cost of re-timing for short-haul passengers ranges between around £16 and £18. This results in total retime costs to passengers of between £28 million and £219 million annually For long-haul passengers, the average retime cost ranges between £17 and £21, with a total cost to passengers of between £40 million and £234 million each year.

5.25. The impact on average fares shows greater variation, ranging from around 0.1% in Scenario 4 up to around 0.8% in Scenario 1. It should be remembered that these increases are paid by all short-haul passengers at the airports, not just those directly affected night flight restrictions. The total additional fare costs to passengers are estimated to be between £43 million and £118 million annually. It is also worth noting that the impacts at designated airports are higher than those at non-designated airports, reflecting the fact that there is less flexibility to re-time at these airports in the main.

[16] As above, when passengers are forced to change their plans by night flying restrictions, they will arrive or depart later in the day than is their original preference. In transport economics the time that they are delayed is a cost to that passenger. This cost can be expressed as a monetary value by multiplying the length of the delay experienced by the passenger by the passenger's so-called value of time. The value of time is the opportunity cost of the time that a traveler spends on his/her journey. In essence, this makes it the amount that a traveler would be willing to pay in order to save time, or the amount they would accept as compensation for lost time. In this analysis values of time identified by the Airports Commission have been used (Airports Commission (2015). Economy: Transport Economic Efficiency Impacts. Page 16). These values have been updated to reflect increases in the real value of time and updated to a 2019 price base in line with WebTAG guidance.

Table 5.2: Average Cost of Re-Timing and Increase in Air Fares by Constrained Night Flying Scenario at 2019 Demand Levels

		Scenario 1: Night Ban	Scenario 2: NQP Ban, 50% Night Reduction	Scenario 3: NQP Ban	Scenario 4: 50% Night Reduction
Average Cost of Retiming Short-Haul Flights	Designated Airports	£17	£17	£18	£17
	Non-Designated Airports	£18	£16	£16	£16
	Average	£18	£17	£17	£16
	Total Cost (£ million)	£219	£133	£28	£116
Average Cost of Retiming Long-Haul Flights	Designated Airports	£21	£18	£18	£18
	Non-Designated Airports	£19	£14	£14	£14
	Average	£21	£17	£17	£17
	Total Cost (£ million)	£234	£141	£40	£121
Average Rise in Air Fares (Short-Haul)	Designated Airports	1.0%	0.8%	0.3%	0.2%
	Non-Designated Airports	0.7%	0.5%	0.2%	0.1%
	Average	0.8%	0.6%	0.2%	0.1%
	Total Cost (£ million)	£118	£106	£43	£18

Source: York Aviation.

Other Potential Impacts of Restrictions on Night Flying

5.26. As we have highlighted, the potential impacts on the market of night flying restrictions are highly complex. The impacts set out above are based on a stylised model that considers a range of effects but cannot reflect all of the potential effects of increased restrictions. There are a number of such effects that are worth highlighting in particular:

- the analysis considers the GVA and employment impact on the economy from lost freight activity. However, it should also be recognised that, in the limited circumstances where freight is able to be retimed, then there will be a generalised cost effect on freight users from that retiming (similar to that for passengers) that will ultimately impact on demand. It has not been possible through this work to identify a value of time for freight users to enable this analysis but this is potentially an area for further research;
- if night time restrictions were to include a 'hard stop' at the beginning of the night period, such that aircraft are actually turned away from the airport in the event of missing the time cut-off, this has the potential to create a 'shadow period' in the schedule before the beginning of the night period in which airlines will be reluctant to schedule services. This would have the effect of increasing negative economic impacts through the channels we have described as it would reduce the length of the operating day by proxy;
- similarly, increased night time restrictions have the potential to simply increase the number of flights being 'night-stopped' or diverted. Again, this would have additional negative impacts to those described above;
- we have already noted that the importance of the night period for airlines in terms of resilience and recovering from delays, however, it is also worth noting that a reduced operational day which leads to an increased concentration of flights is, of itself, likely to result in increased delays in general, with corresponding economic costs. This, again, is something that has not been factored into this analysis;

- the reduction in airport capacity resulting from additional night restrictions at constrained airports has the additional potential to result in increased fares for all passengers as a result of further constraint in supply.

Conclusions

5.27. We have modelled the impact of four scenarios that constrain night flying operations at UK airports to varying degrees. A ban of aircraft movements during the hours of 23:00 and 06:59 would have the most significant impact on the aviation industry and the wider UK economy, with 20.7 million passengers and 480,000 tonnes of cargo per annum lost, which would result in around £1.0 billion in direct GVA foregone and 16,000 jobs put at risk, with indirect and induced impacts increasing this impact by around £1.3 billion in GVA and 26,000 jobs. If wider impacts are then included as well, a total of approximately £12.4 billion of GVA is forgone and up to 158,000 jobs put at risk. Furthermore, consumers would face increased generalised costs as they are forced to travel at less optimal times and as airlines increase air fares for short-haul services by an estimated 0.8%. The total impact on passengers is estimated to be around £571 million at 2019 demand levels.

5.28. A ban on flying during the NQP and a 50% reduction in the number of movements during the Other Night period would result in an economic impact of £0.5 billion in direct GVA foregone and 9,000 jobs put at risk, with indirect and induced impacts increasing this effect by £0.8 billion in GVA and 15,000 jobs. If wider impacts are included, the total impact on foregone GVA increases to approximately £8.7 billion with around 109,000 jobs being put at risk. Air fares would rise by an estimated 0.6% for short-haul passengers, and re-timing costs are estimated to range between £14 and £18 per passenger. The total impact on passengers is estimated to be around £380 million at 2019 demand levels.

5.29. An outright ban on aircraft movements during the NQP alone would result in an economic impact of £0.3 billion in direct GVA foregone and 4,000 jobs put at risk, with indirect and induced impacts increasing this effect by £0.4 billion in GVA and 7,000 jobs. If wider impacts are included, the total impact on foregone GVA increases to approximately £5.7 billion of GVA with put approximately 69,000 jobs at risk. Air fares would rise by an estimated 0.2% for short-haul passengers, and re-timing costs are estimated to range between £14 and £18 per passenger. The total impact on passengers is estimated to be around £111 million at 2019 demand levels.

5.30. Even a 50% reduction of aircraft movements throughout the entire night period would result in an economic impact of £0.3 billion in direct GVA foregone and 4,000 jobs put at risk, with indirect and induced impacts increasing this effect by £0.4 billion in GVA and 7,000 jobs. If wider impacts are included, the total impact on foregone GVA increases to approximately £5.1 billion with around 62,000 jobs being put at risk. Air fares would rise by an estimated 0.2% for short-haul passengers, and re-timing costs are estimated to range between £14 and £18 per passenger. The total impact on passengers is estimated to be around £255 million at 2019 demand levels.

6. Conclusions

6.1. Night flying is an essential part of the air transport market in the UK. There is a significant minority of passengers that fly at night, with approximately 31 million passengers arriving at or departing UK airports during the night in 2019. The second busiest hour for passengers departing UK airports in 2019 was between 06:00 and 06:59. The busiest hour is the following hour, 07:00 to 07:59, which is outside the night period. Freighter aircraft operations fly a considerably higher percentage of their volumes at night. This is particularly true for freighter aircraft flown by express freight operators, for which night operations are critical for the enabling of next-day delivery services. Bellyhold cargo arriving and departing from UK airports throughout the day is intrinsically linked to the schedules of passenger airlines. However, the peak for bellyhold cargo arriving at UK airports is between 06:00 and 06:59, at the end of the night period. This is driven by long-haul arrivals, especially into Heathrow.

6.2. Ultimately, flying at night is about demand and consumer preferences. Airlines fly at night to meet the requirements of their customers. For passenger airlines, flying at night is about maximising 'on the ground' time for customers, about competing effectively with other European hubs, and about counteracting some of the innate difficulties in operating from the UK that come from the time difference between the UK and Europe. For short-haul flying, it is also an essential element in enabling airlines to maximise aircraft utilisation and operate efficiently, which is the heart of providing connectivity at a price that is acceptable to consumers. Having to retime services would have significant consequences for airlines, passengers and the wider economy. For long haul flying, night operations are an essential pre-requisite of serving distant markets in different time zones at times of day that passengers want and need to travel. The ability to arrive into the UK early in the morning is particularly important for services to economically important Asian destinations. Being able to serve these markets effectively is central to the UK Government's Global Britain agenda.

6.3. For express freight operators, flying at night is fundamental to their business model. It is simply not possible to offer the time definite, next-day delivery services that are in such high demand in modern economies without being able to fly at night. Without night flying the value of flying at all is lost. It becomes more efficient to simply truck freight and accept that next day services are not possible, with corresponding loss of time and productivity for users. The ability to retime for express freight operators is extremely limited. This also applies to express freight being carried in the bellyhold of passenger aircraft. General air freight is also reliant on night operations but to a lesser extent and there is likely to be a greater ability to retime.

6.4. The operation of passenger and cargo flights at UK airports during the night generates significant GVA and employment benefits that extend throughout the economy. Direct impacts account for around £1.4 billion in GVA and 24,200 jobs. These direct impacts are supplemented by around £2.0 billion and 38,700 jobs in indirect and induced impacts. When wider impacts are included, the total economic impact of aviation activity during the entire night period (23:00 to 06:59) was estimated to be around £16.5 billion in terms of GVA in 2019, supporting approximately 213,200 jobs.

6.5. Aviation activity during the NQP (23:30 to 05:59) alone generates a total of approximately £8.7 billion of GVA impact and supports approximately 110,200 jobs. This includes direct impacts that account of around £0.6 billion in GVA and 10,700 jobs. These direct impacts are supplemented by around £0.9 billion and 17,100 jobs in indirect and induced impacts. The operations of express cargo and general cargo services form a significant component of the economic impact during the NQP, reflecting the intensity of cargo operations that occur during this period that are fundamental in supporting their business models.

6.6. Despite forming just an hour and a half of the day, the economic impact generated during the Other Night period (23:00 to 23:29 and 06:00 to 06:59) is considerable. Direct impacts from aviation activity during this period account for around £0.8 billion in GVA and 13,400 jobs. These direct impacts are supplemented by around £1.1 billion and 21,500 jobs in indirect and induced impacts. When wider impacts are included, aviation activity during this period supported approximately 103,000 jobs in 2019 and generated around £7.8 billion in GVA across the entire economy. The scale of the economic impact generated during the Other Night period compared to the NQP, which forms a longer duration, is notable. The period between 06:00 to 06:59 is central to outbound passenger volumes at UK airports across the entire day, which drives significant economic impact. Furthermore,

this period is also the peak for inbound bellyhold cargo arriving to the UK, which again is a key driver of economic benefit.

6.7. We have modelled the impact of four scenarios that constrain night flying operations at UK airports to varying degrees. A ban of aircraft movements during the hours of 23:00 and 06:59 would have the most significant impact on the aviation industry and the wider UK economy, with 20.7 million passengers and 480,000 tonnes of cargo per annum lost, which would result in around £1.0 billion in direct GVA foregone and 16,000 jobs put at risk, with indirect and induced impacts increasing this impact by around £1.3 billion in GVA and 26,000 jobs. If wider impacts are then included as well, a total of approximately £12.4 billion of GVA is forgone and up to 158,000 jobs put at risk. Furthermore, consumers would face increased generalised costs as they are forced to travel at less optimal times and as airlines increase air fares for short-haul services by an estimated 0.8%. The total impact on passengers is estimated to be around £571 million at 2019 demand levels.

6.8. A ban on flying during the NQP and a 50% reduction in the number of movements during the Other Night period would result in an economic impact of £0.5 billion in direct GVA foregone and 9,000 jobs put at risk, with indirect and induced impacts increasing this effect by £0.8 billion in GVA and 15,000 jobs. If wider impacts are included, the total impact on foregone GVA increases to approximately £8.7 billion with around 109,000 jobs being put at risk. Air fares would rise by an estimated 0.6% for short-haul passengers, and re-timing costs are estimated to range between £14 and £18 per passenger. The total impact on passengers is estimated to be around £380 million at 2019 demand levels.

6.9. An outright ban on aircraft movements during the NQP alone would result in an economic impact of £0.3 billion in direct GVA foregone and 4,000 jobs put at risk, with indirect and induced impacts increasing this effect by £0.4 billion in GVA and 7,000 jobs. If wider impacts are included, the total impact on foregone GVA increases to approximately £5.7 billion of GVA with put approximately 69,000 jobs at risk. Air fares would rise by an estimated 0.2% for short-haul passengers, and re-timing costs are estimated to range between £14 and £18 per passenger. The total impact on passengers is estimated to be around £111 million at 2019 demand levels.

6.10. Even a 50% reduction of aircraft movements throughout the entire night period would result in an economic impact of £0.3 billion in direct GVA foregone and 4,000 jobs put at risk, with indirect and induced impacts increasing this effect by £0.4 billion in GVA and 7,000 jobs. If wider impacts are included, the total impact on foregone GVA increases to approximately £5.1 billion with around 62,000 jobs being put at risk. Air fares would rise by an estimated 0.2% for short-haul passengers, and re-timing costs are estimated to range between £14 and £18 per passenger. The total impact on passengers is estimated to be around £255 million at 2019 demand levels.

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