Gatwick Airport Northern Runway Project

Capacity and Operations Summary Paper

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Contents

1 Introduction

1.1. Purpose of this Document

1.1.1 The purpose of this paper is to:

- Outlines the Northern Runway infrastructure and the concept for the operation of the airport infrastructure;
- Describes the factors which influence aircraft throughput capacity at the airport;
- Sets out the future baseline aircraft throughput capacity (in the absence of the project) and explains the basis for the assumptions which have been made under this scenario;
- Sets out the aircraft throughput capacity under the Northern Runway Project DCO application and explains the basis for the assumptions made under this scenario.

1.1.2 Section 2, by way of context, provides an explanation of air traffic control, the airfield operation and the operation of the airport's arrival and departure routes. Section 3 sets out current operating performance, capacity declaration and planned operating and infrastructure improvements for deployment ahead of the dual runway operation. Section 4 introduces the dual runway operation and Section 5 sets out the dual runway operating performance.

1.2. Dual Runway Operational Concept Summary

1.2.1 The proposed dual runway concept of operation will bring London Gatwick's Northern Runway (runway 26R/08L) into routine use alongside the Main runway (runway 26L/08R). This dual runway operation (DRO) assumes that the runways will be operated as parallel dependant runways. Aircraft departures and arrivals will have the same airspace separation requirements as they do for single runway operations.

1.2.2 In the DRO configuration, the Northern Runway will only be utilised for departures during normal operations. All arrivals and some departing aircraft would use the Main runway. The benefits of the concept are realised through departing an aircraft on the Northern Runway whilst the Main runway is occupied by an arriving aircraft, which in single runway operation would be unutilised time. This results in an increase in overall runway capability.

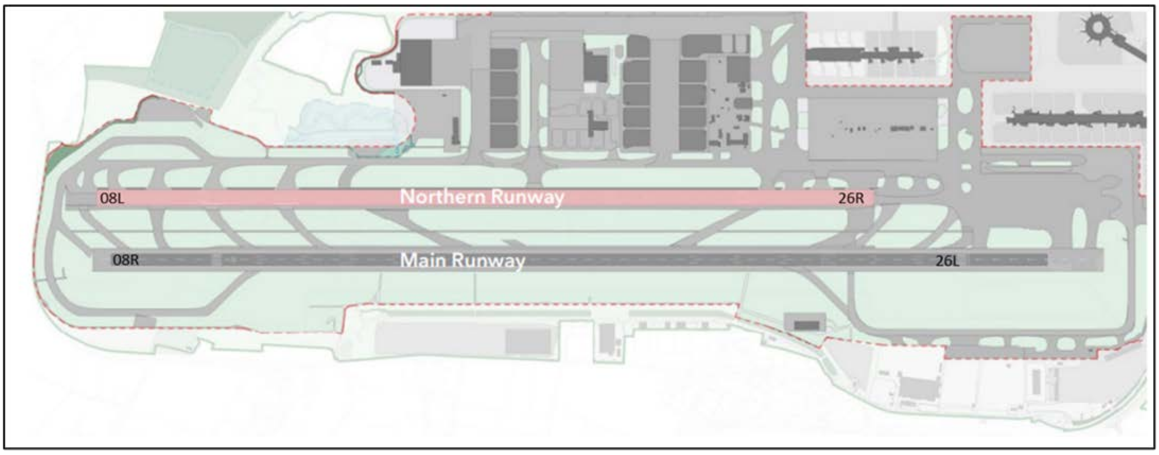

Figure 1. Main Runway (26L/08R) and Northern Runway (26R/08L).

1.2.3 As with the current single runway operation, the DRO concept relies on the use of multiple holding points with direct access to the runway. This enables optimised departure sequencing to make the most efficient use of the SIDs, given the departing aircraft routing requirements, and therefore maximises runway throughput. This principle applies to both westerly operations, from runway 26, and easterly operations from runway 08.

1.2.4 Today London Gatwick's peak hour declared capacity is 55 ATM/hour. The peak hour capability of the Main and Northern runways in DRO is assessed to be circa 70 ATM/hour, slightly in excess of the planned peak hour declared capacity of 69 ATM/hour based on stand time (See Section 5). The additional aircraft throughput capacity achieved through the DRO configuration is forecast to deliver 330k commercial ATMs in FY 2029 and 382k commercial ATMs in FY

2038. This is an uplift of c.60,000 commercial ATMs in FY 2038 compared with the future baseline without the NRP.

1.2.5 The determining factors on aircraft throughput capacity are:

- The capability of the ground infrastructure and operation to facilitate optimal aircraft throughput capacity.
- The capacity of the single mixed-mode runway and dual runway operations to accommodate all arriving and departing aircraft.
- The capacity of the Standard Instrument Departure routes (SIDs) from the runway to accommodate departing aircraft.
- The capacity of the London airspace to accommodate additional demand.

1.2.6 Of these, in terms of design, the single mixed-mode runway operation at London Gatwick is currently the constraining factor on aircraft throughput capacity.

1.2.7 Today's single mixed-mode runway operation reliably accommodates 55 air traffic movements per hour (ATM/hour) during periods of peak demand, making it the most efficient single runway operation in the world. London Gatwick has demonstrated this over a number of years, with our ability to optimise aircraft departure to departure separations being a key contributing factor to this efficiency.

1.2.8 If the single runway operation was not a constraint, with optimum sequencing, and operating a Medium sized aircraft fleet, London Gatwick airspace is theoretically capable of achieving up to 60 departures per hour and, with arriving aircraft optimally separated at 3nm (nautical miles) intervals on the approach to the runway, could additionally achieve 48 arrivals in the same hour. This creates a *theoretical* airspace maximum capacity for arrivals and departures of 108 ATM/hour.

1.2.9 Through the Northern Runway Project, London Gatwick has designed an optimised ground infrastructure and an operating concept for a dual runway operation capable of delivering a sustained rate of 69 ATM/hour with the expected mix of aircraft types and a realistic combination of arrivals and departures, whilst average holding times remain manageable.

1.2.10 In practice the current structure of the SID routes that link the airport to the air traffic route network will, with the ground infrastructure enhancements and operational improvements to further optimise the sequencing of departing aircraft, enable 48 departures per hour.

1.2.11 For the operation of the airspace beyond the immediate vicinity of London Gatwick, NATS has existing measures in place to efficiently manage any increase in the flow of traffic in the current London Terminal Manoeuvring Area (LTMA) airspace.

1.2.12 Capacity in the LTMA and airspace beyond will benefit significantly from the Government sponsored airspace modernisation programme, the earliest deployment of which for London Gatwick is currently scheduled in Q1 2027.

1.2.13 This Paper is supported by a detailed Appendix: Airfield Capacity Study (Doc Ref. 10.7). This appendix sets out, through fast time simulation and data analysis, the detailed evidence to support the current performance and future (in the absence of the project) performance and the Northern Runway Project concept of operation aircraft throughput capacity.

2 Current Operation

2.1. Background to Operations at London Gatwick

2.1.1 In order to fully understand how aircraft throughout capacity is generated, it is necessary to understand the factors that influence it; these include the air traffic control operation, the capability of the ground infrastructure, the capacity of the runway and the configuration and operation of the airport's arrival and departure routes.

2.2. Air Traffic Control and the Airfield Ground Operation

2.2.1 Aviation, like any safety critical industry, is highly regulated by an independent regulator, the Civil Aviation Authority (CAA), which oversees compliance with UK and international safety standards.

2.2.2 London Gatwick Air Traffic Control (ATC) is certified and regulated by the CAA from a safety and operational perspective. The ATC operation is audited by the CAA on safety management, change management, health and safety and air traffic controller competency. For example, in the 12 months following the NATS takeover in October 2022 of responsibility as the air navigation service provider at London Gatwick they have been audited 3 times by the CAA.

2.2.3 The high-level regulatory framework for the provision of air traffic services is set out in the Manual of Air Traffic Services (MATS) Part 1. The MATS Part 2 is the document that sets out the air traffic services rules and restrictions specific to an aerodrome (like London Gatwick) or air traffic control unit. While the MATS Part 1 is common across the whole UK, the MATS Part 2 is only relevant to one aerodrome or air traffic control unit.

2.2.4 ATC services for the ground and runway operation are provided at London Gatwick in the air traffic control tower. Radar services for arriving and departing aircraft are provided from the London Terminal Control Centre at Swanwick. The tower air traffic control service is provided to London Gatwick under a 10-year contract. Radar services to aircraft departing and arriving London Gatwick are contracted separately (not by London Gatwick), this is known as the London Approach Service. Under the Transport Act 2000 the Government issued a licence to NATS (En Route) plc (NERL) to provide en-route air traffic services in the UK; it is under this licence that the London Approach Service is provided.

Air Traffic Control Officers (ATCOs)

2.2.5 A key component of the airport's ability to deliver capacity and capability comes through its air traffic control operation. The role of an ATCO is to manage traffic flows in the safest, most orderly and expeditious way while complying with the rules and regulations set out by the CAA and in the MATS Part 1 and MATS Part 2.

2.2.6 The operation of the ATC tower requires a complement of 60 staff of which 33 are ATCOs but also includes engineers, support staff and the management team. ATCOs at London Gatwick are highly trained operators who are able to apply their skills to optimise an already efficient ground and runway operation.

Ground Operation

2.2.7 The 'Air Controller' position manages the use of the runway and local flights crossing the airspace in the immediate vicinity of London Gatwick. The 'Ground Movement Controller' (GMC or Ground) position manages the entire manoeuvring area. The Ground Movement Planner (GMP or Planner) manages the aircraft on stand and releases them to GMC at the appropriate time when they are ready to push back. GMC is the control position that manages anything that moves on the aerodrome, excluding the runway. A Tower Supervisor has overall accountability for the safety of the operation over the period of the shift.

2.2.8 The partnership between Ground (which is responsible for the integration of all aircraft on the taxiway system) and the Planner (which manages flight plans, clearances for aircraft to join the air traffic route network and regulates the flow of departures onto the Ground controller) is key in delivering an optimised sequence of aircraft to the runway.

2.2.9 In consultation with ATC and the airlines, the airport declares a maximum hourly movement capacity for each hour made up of a combination of arrivals and departures. (See Section 3, Table 1)

2.2.10 On the basis of that declaration, airlines will create a schedule based on slots allocated to them by ACL during the slot coordination process. ACL is the chosen slot coordinator for London Gatwick. It acts as an independent body ensuring slots are allocated in a neutral, transparent, and non-discriminatory way within the airport's declared parameters.

2.2.11 On the day of operation, the airline will file a flight plan for each of its flights aligned to that pre-defined schedule. That flight plan is assessed by the Eurocontrol Network Manager Operations Centre[1] (based on a view of the capacity of the entire European air traffic management network). At schedule minus 40 minutes the flight plan is presented to the Planner.

[1] The Network Manager Operations Centre (NMOC) located in Brussels is responsible for the optimisation of air traffic flows by constantly balancing capacity supply and demand while ensuring the safe and efficient operation of flights going to and over Europe.

2.2.12 Around 15 minutes before the planned aircraft pushback time the pilot will call the Planner for a clearance to join the air traffic route network, the response to which will include the allocation of a departure route or Standard Instrument Departure (SID) and any associated time restriction, i.e. a Calculated Take Off Time (CTOT) which is based on the Eurocontrol Network Manager Operations Centre assessment of the air traffic route network capacity.

2.2.13 When the pilot reports ‘ready’, the Planner will make an assessment as to whether the flight will be able to depart within any time constraints (e.g. a CTOT which has a defined time tolerance of -5 to +10 minutes) and when the flight is likely to fit into the runway sequence or be able to have a clear route to the runway. This assessment is based on the complexity of the ground operation and runway demand. Other factors such as weather are also taken into account. If the aircraft is able to depart (and achieve any CTOT), the pilot will be approved to pushback with the Ground controller. If not, the Planner may hold the aircraft on stand for a few minutes, or request a revised CTOT for the aircraft if necessary.

2.2.14 The Ground controller is responsible for the integration of arriving, departing and under tow aircraft on the taxiway system. In order of priority the Ground controller will feed the runway, facilitate arriving aircraft onto stand to maintain schedule performance and then towed movements are prioritised to maintain stand planning.

2.2.15 Constraints on this part of the operation might include access to taxiways, if there is work in progress; taxiway restrictions, for example the width of taxiways for large aircraft such as the A380; jet blast from aircraft pushing back from stand (or to get going again if they have stopped). An enhancement used at London Gatwick - that is not always possible at other aerodromes of a similar size and complexity - is the ability to push back multiple adjacent stands at the same time due to the design of some of the taxiways.

2.2.16 Air traffic controllers are assisted by ground movement radar and mode S transponder tracking (GPS type locators) to provide a dynamic map of aircraft and vehicles moving around the airfield. This toolset is key in maintaining a higher tempo of operation in poor visibility/weather and at night.

2.2.17 The Ground controller manages the priorities for moving traffic around the aerodrome, taking into account any constraints and using the set procedures and available tools to optimise the flow of ground traffic.

2.2.18 For both westerly and easterly runways (26L and 08R) the essential features to optimise departure sequencing (explained in the next section) are the same.

These include the ability to create a good plan for the runway sequence (either manually, or with assistance from a tool), and the ability to follow the plan through the use of parallel taxiways (such as the Juliet bypass in the DRO) or alternative holding areas (such as the Alpha box today, or Charlie box in DRO) that allow aircraft to 'go by' each other. Multiple access points to the runway enable air traffic controllers to tactically react to operational constraints (either making it easier to follow the original plan or adjusting the plan to deal with a changing situation).

2.2.19 The Ground controller will guide aircraft into the holding area (the Alpha box or Mike) taking into account factors such as departure time (CTOT), departure route (SID), and aircraft type (aircraft speed and wake vortex separation considerations). In this way the Ground controller is able to optimise the pre-departure sequence to allow the Air controller maximum flexibility to achieve the most efficient aircraft departure sequence. This factor is key is in delivering the current 55 ATM/hour and the future aircraft throughput capacity in the dual runway operation.

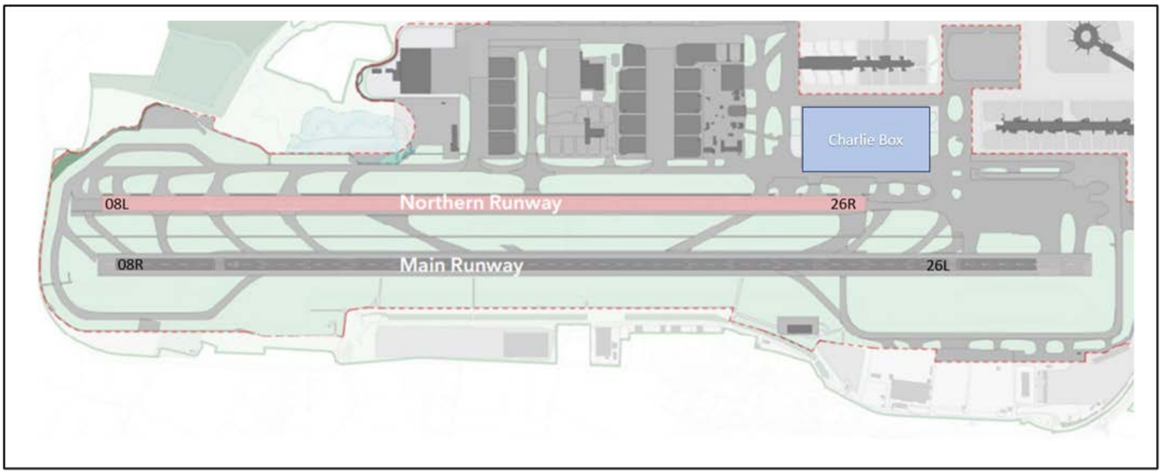

Figure 2. Multiple runway access points and the Charlie box provide holding points that optimise departure sequencing efficiency.

2.3. Runway Operation

2.3.1 The Main runway at London Gatwick (runway 26L/08R) is operated in mixed-mode, which means it accommodates both arriving and departing aircraft. The runway is controlled by the Air controller, who integrates arrival and departure traffic using the runway.

2.3.2 Departures can only enter the runway when the preceding arrival has safely passed the runway entry point or the previous departure is far enough down the runway to enter the runway safely, and the Air controller has issued clearance to line up on the runway. The departing aircraft will then be able to depart once the preceding arrival is completely clear of the runway (this takes ~60s[2]), or the preceding departure has taken off (which takes ~45s), and/or any other constraints are met, and the Air controller has issued a clearance to take off. The Air controller will issue clearance for an arriving aircraft to land if the runway is clear, before it reaches the start of the runway (usually about 25s before, but sometimes less if a previous arrival or departure took longer than normal to vacate the runway).

2.3.3 The simplest form of constraint that can impact time between departures is the need to maintain safe separation between aircraft to ensure no risk of collision. In its simplest form, if the Air controller and pilot of a second aircraft (in a departure - departure sequence) can see the leading aircraft, they can maintain separation visually. When air traffic controllers and pilots are not able to maintain visual contact (e.g. due to low cloud or poor visibility), air traffic controllers must rely on radar and aircraft must be separated by a minimum horizontal distance. This horizontal distance changes by airspace sector. In the lower altitude airspace sectors around London Gatwick, horizontal separation minimum is normally 3nm (unless 1000ft vertical separation is achieved) before passing aircraft to the radar controller.

2.3.4 The time separation between each departure is aimed to achieve this minimum lateral separation, thus 60s should achieve a minimum lateral separation of 3nm between aircraft of a similar speed. For aircraft following a similar route 120s is aimed to achieve a minimum of 5nm, the lateral separation required in airspace sectors away from the immediate vicinity of London Gatwick. The specifics of diverging Standard Instrument Departures (SIDs) is explained in Section 2.5 and the departure – departure separations are described in Section 2.8.1.

2.3.5 When the Air controller is using visual separation instead of radar, they are using a procedure called 'Reduced Separation in the Vicinity of the Aerodrome'

[2] Runway occupancy time (ROT) is the duration an aircraft is considered as utilising the runway. Arrival ROT is only 60s at London Gatwick due to the optimal siting of Rapid Exit Taxiways (RET), this is not the case for all airports.

(RSVA). RSVA cannot be relied upon when planning future capacity because poor weather is common in the London Gatwick area at all times of year.

2.3.6 Larger and heavier aircraft create a significant disruption to the air behind them, known as a wake vortex or wake turbulence. If an aircraft following the same path is of a similar size and weight, it can safely follow with normal separations (60s, or less using RSVA), but if the following aircraft is much smaller it will need an increased separation from the leading aircraft to prevent dangerous turbulence effects.[3]

2.3.7 When an increased separation time is required for airspace constraints (SID, speed group, or wake turbulence), that only applies to pairs of departures (or pairs of arrivals in the case of wake turbulence or a very slow aircraft on final approach). With the mixed-mode runway operation at London Gatwick, many of these potential airspace constraints do not impact the operation because departures that would otherwise constrain each other can be sequenced either side of an arrival. This means that while it would be difficult to achieve the theoretical limit of 60 departures per hour (constrained by airspace) or 48 arrivals per hour (jointly constrained by runway occupancy and airspace minimum radar separation requirements), achieving a mixed-mode operation of 55 ATM/hour (constrained by the runway occupancy alone) is achievable, as is regularly demonstrated at London Gatwick. A full explanation of current runway performance is in Section 3.1.

2.3.8 With the proposed DRO, the Air controller could clear a departure to take off on the Northern Runway immediately after an arriving aircraft lands on the Main runway, rather than waiting for the arrival to exit the runway. As such, the runway would no longer be the constraining part of the system (because two aircraft can safely travel along the parallel runways on the ground at same time), and the spare airspace capacity becomes available to increase the airport's aircraft throughput capacity.

[3] Time based longitudinal separation minima are defined in the MATS Part 1 section 8D. MATS is published by CAA and is a guidance document on the means of achieving compliance with UK regulatory requirements and ICAO Standards and Recommended Practices (SARPS) and Procedures for Air Navigations Services (PANS).

2.4. Day of Operation Plan

2.4.1 The ATC Supervisor considers the strategy for demand over the next few hours, this can include the application of an arrival regulation to deliver the strategy. For example, there can be a bias towards either departing aircraft or arriving aircraft; for the first wave in the morning there is a bias towards departures. The Supervisor will engage with the Terminal Control (TC) operations Supervisor at Swanwick to agree the arrival strategy based on demand. They will agree what the arrivals aircraft spacing should be, to either prioritise arrivals or departures or to achieve an equal balance of arrivals and departures. If the airspace capacity is exceeded, then an arrival regulation will be applied (i.e. a measure to control the flow of arrival traffic).

2.4.2 For example, in order to achieve an arrival biased strategy, the traffic may be biased proportionately 2:1 arriving aircraft versus departing aircraft. This would be an Arrival, Arrival, Departure, Arrival sequence of aircraft or AADA. This requires the Gatwick Director (radar) controller to deliver spacing of not less than 3nm between arriving aircraft (to allow the landing aircraft to vacate the runway before the second arrival touches down) and to deliver a 5.3nm 'gap' to allow the departing aircraft to take off between arrivals.

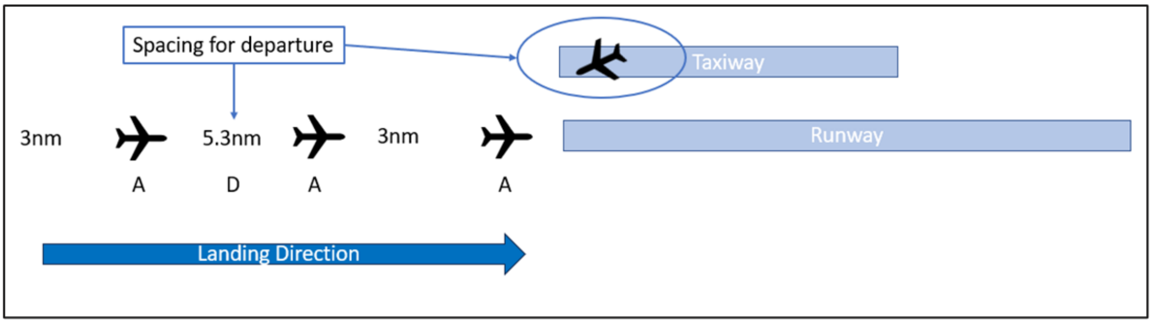

Figure 3. Arrival Biased Strategy - Arrival, Arrival, Departure, Arrival (AADA) sequence diagram.

2.4.3 Alternatively, a departure biased strategy would be biased proportionately 2:1 departing aircraft versus arriving aircraft. This would be an Arrival, Departure, Departure, Arrival ADDA sequence.

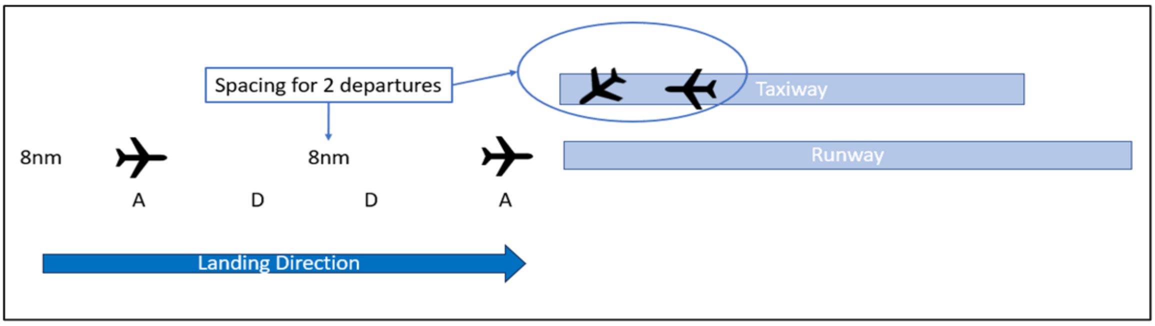

Figure 4. Departure Biased Strategy - Arrival, Departure, Departure, Arrival (ADDA) sequence diagram.

2.4.4 This strategy is then enacted by the Air controller and delivered by the Gatwick Director controller at the Terminal Control Centre at Swanwick.

2.4.5 Regardless of demand, the Ground controller will ensure optimisation of the aircraft sequence at the holding area is achieved. This is to allow the Air controller to optimise throughput on the runway.

2.4.6 When the strategy is arrival demand heavy then the optimisation of the departing aircraft sequence is less important because there are arriving aircraft between departures that will generate a sufficient gap between departures. When demand is either departure heavy or balanced then optimisation of the departing aircraft sequence in the holding area is critical. This allows the Air controller to select the optimal departure mix to achieve maximum aircraft throughput with separation based on route, speed, wake turbulence and time (CTOT).

2.5. Airspace - Departure and Arrival Route Configuration and Operation

2.5.1 As set out in Section 1.2.5, the other determining factors which are relevant to aircraft capacity throughput relate to the airspace and in particular the capacity of the SID routes from the runway to accommodate departing aircraft. The sections below explain this in more detail; however, it is also important to consider the role of the Ground controller in exploiting the factors around configuration and operation to best effect, which provides the optimised sequence, see paragraph 2.2.19.

2.6. Departures Configuration

2.6.1 A Standard Instrument Departure (SID) route is a published departure procedure designed to guide the flow of departing air traffic from the runway to the air traffic route network. At London Gatwick, the SIDs align to Noise Preferential Routes (NPRs). These are nominal flight paths established as Statutory Instruments by the Government in the 1960s to manage noise impact by avoiding over-flight, where possible, of built-up areas. Often, when describing these routes, the SID is referred to by its NPR route identifier, rather than using the technical SID designation used in aircraft and air traffic control data systems. For example, the FRANE 1Z SID follows Route 5. See the SID/NPR decode table in Figure 5.

2.6.2 There are design features of the SIDs which, when brought together in a configuration of SIDs for each runway (26L and 08R), are fundamental to how aircraft can be safely separated on departure; in turn these design features directly impact the operation of the runway and aircraft throughput capacity. These design criteria impact the achievement of the minimum separation standards as follows:

- If SIDs diverge by at least 45° immediately after departure (and no other constraints exist), aircraft are able to depart 60s apart (to achieve a minimum safe separation of 3nm), these are immediately diverging SIDs.
- If the SIDs follow a similar direction or diverge by less than 45° immediately after departure additional time is required between subsequent departing aircraft (to achieve a minimum safe separation).

2.6.3 Further detail on the operational application of these criteria - including same SID departures - are set out in Departure Operations Section 2.8.

2.6.4 The SID configuration at London Gatwick provides 2 divergent route sets for runway 26 (westerly operations): Routes 4 and 9; and Routes 1, 7 and 8. For runway 08 (easterly operations) there are 3 divergent route sets: Routes 3 and 6; Route 5; and Route 2. (See Figure 5).

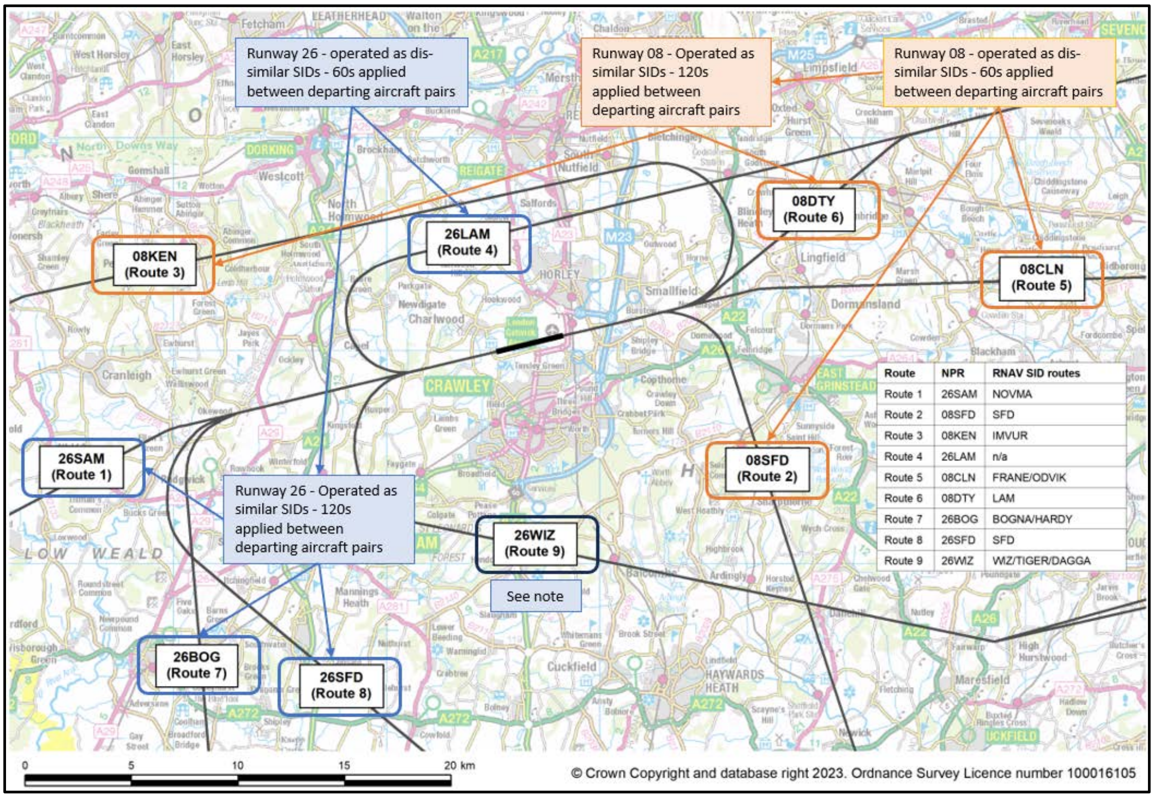

Figure 5. Standard Instrument Departure (SID) routes diverge diagram.

Note: The SID structure will not change as a result of the Northern Runway Project, nor will the way the SIDs are operated. Most SIDs are available for departures 24 hours a day. However, the WIZAD (or Route 9) SID is a tactical routing, meaning that it is not flight plannable. In practice, aircraft usually plan and fly via Route 4. However, Route 9 SIDs may be dynamically allocated by air traffic control instead of Route 4 to alleviate airspace congestion or to avoid hazards to the north of the aerodrome, such as poor weather. This normally happens at a late stage of taxiing to aircraft allocated a FRANE/MIMFO/LAM (or Route 4) SID. It is not used from 23:30 to 07:00 local time.

2.7. Arrivals Configuration

2.7.1 Unlike the initial stages of flight for departing aircraft, there are no set routes to follow for inbound aircraft for the final portion of the flight before establishing on the instrument approach procedure for the runway. Aircraft arriving in the London Terminal Manoeuvring Area (LTMA) airspace for London Gatwick follow Standard Arrival Routes (STAR) routes until reaching an arrival hold waypoint, ~25-50nm from touchdown.

2.7.2 At this stage, if the airport is busy, or during adverse weather, aircraft may be required to airborne hold before being cleared to continue the approach to the runway. This takes place in fixed race-track patterns known as a Terminal Hold. London Gatwick has two Terminal Holds, WILLO and TIMBA (See Figure 6). Aircraft in the hold are stacked vertically at 1000ft intervals from a base level around 7000ft before being instructed by the Gatwick Director (radar) controller - at the Terminal Control Centre at Swanwick - to start the final approach.

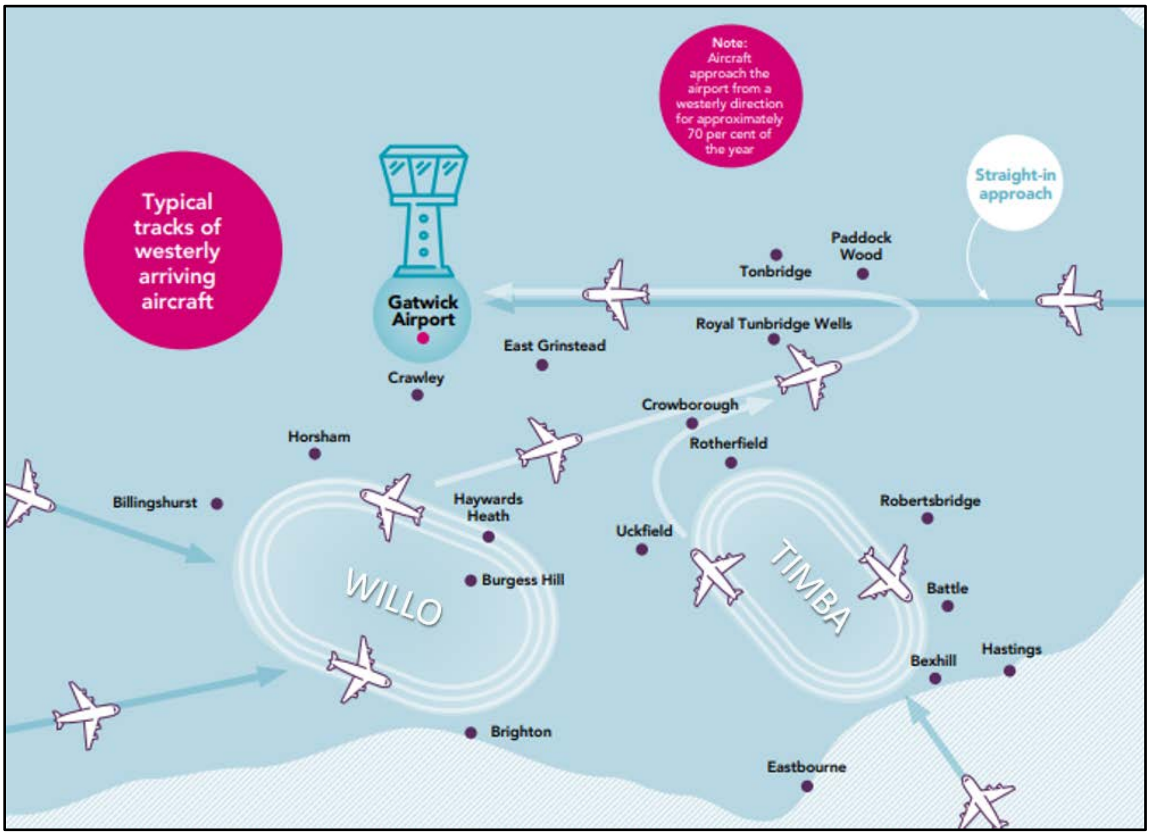

Figure 6. The WILLO and TIMBA airborne holds.

2.7.3 Gatwick Director will sequence aircraft by providing speed and direction instructions to join the instrument approach which is used to guide the aircraft to the runway. To achieve an optimised delivery of aircraft onto the runway, Gatwick Director uses a defined area of airspace, called the Radar Manoeuvring Area (RMA), which is located between the arrival holds and the runway. There are no pre-defined routes inside the RMA. Through this process the Gatwick Director ensures that the arriving aircraft are safely and optimally spaced whilst being directed to the instrument approach, ordinarily the Instrument Landing System (ILS) which aircraft will intercept 8-14nm from touchdown on the runway extended centreline. The separation between aircraft on final approach is dictated by the agreed strategy to manage demand on the day (see Section 2.4 Day of Operation Plan). In normal circumstances to achieve the requisite separation between pairs of arriving aircraft a minimum of 3nm is required. However, a variety of factors (such as wind) mean this distance may need to be varied to ensure the leading aircraft has sufficient time to land and vacate the runway before the following aircraft lands (See Section 2.3 Runway Operation)

2.8. Departure Operations

2.8.1 It is the combination of the SID design features and the SIDs configuration (set out in Section 2.6) for each runway (26L and 08R) with the operating procedures that create the SID capability delivered in the operation. Whether operating on a single runway or dual runway the overall departures capability is restricted by achievable departure separation times.

2.8.2 As previously explained, by design the standard sequential departure – departure separation time on diverging SID routes is 60s and for departures following on a similar or the same route it is 120s. However, ATC may reduce these separation times given the relative speeds of departing aircraft provided that safe separation distances are achieved. Equally speed asymmetry between aircraft pairs or wake turbulence considerations may require an increase in separation times.

2.8.3 The Wake Turbulence Category of each aircraft may increase the separation time between sequential departure – departure separations. Larger and heavier aircraft create a significant disruption to the air behind them, known as a wake vortex or wake turbulence. For Wake Turbulence Category separation purposes aircraft are categorised (as Super, Heavy, Medium, Light) and separation criteria are set out in MATS Part 1. Excepting the A380 aircraft type, which is classified as Super, most of the aircraft operating from London Gatwick are categorised as either Medium or Heavy. If an aircraft following the same route is of a similar category, it can safely follow with normal separations, but if the following aircraft is much smaller, increased separation from the leading aircraft should be applied to prevent the effects of wake turbulence.

2.8.4 If the leading departure (of a departure – departure sequence) is a significantly slower aircraft than the following aircraft, these separation requirements increase to ensure the following aircraft does not catch up with the leading departure. Medium and Large aircraft all travel at similar speeds.

2.8.5 All these factors need to be taken into account by the Air Controller. However, London Gatwick's fleet mix and mixed mode operation means there is usually little delay or impact experienced due to speed group or wake turbulence constraints. Current operational data demonstrates that in peak departure hours, ATC achieve on average a departure – departure separation time of 60s on diverging routes and 106s on the same route, i.e. below the 120s same SID standard. See the Appendix: Airfield Capacity Study (Doc Ref. 10.7).

2.8.6 A 'Free Flow' concept is also applied at London Gatwick. Free flow is the ability to depart aircraft unconstrained into the London airspace. Although not unique to London Gatwick, other London airports are serviced by departure routes which require 'release subject to radar'. This is due to capacity and complexity in the airspace, some departure routes conflict with other London airspace route structures and holds which require an air traffic controller to take a decision on whether an aircraft may be released for departure. London Gatwick has Free flow in place for departures at all times except in very specific circumstance, for example during a runway change.

2.9. Arrival Operations

2.9.1 For arrivals, the separation minima applied between aircraft changes due a number of factors but in broad terms as the aircraft descends from the air traffic route network into the terminal airspace separation may be reduced. In the air traffic route network the separation minima applied is normally 5nm. In the final phase of approach, wake vortex / turbulence is the main factor determining the minimum distance between two aircraft in an arrival – arrival sequence. A pair of Medium sized aircraft can be separated by 3nm in the final phase, providing no other factors apply; however, a Medium aircraft following a Heavy aircraft must maintain at least 5nm separation in the final phase.

2.10. Departure and Arrival Capability

2.10.1 The rules set out in Sections 2.6 and 2.8 allow the quantification of theoretical and practical limits of the current immediate airspace structure around London Gatwick. The theoretical limit of the airspace (which does not change for the single runway and dual runway scenarios) for departures in both runway directions (from runway 26 and 08) is 60 ATM/hour, which would assume uniform departure demand of only Medium sized aircraft with a perfect 50:50 split of divergent route delivery, resulting in all departing aircraft achieving 60s separation between each other.

2.10.2 Having set out the theoretical, when taking into consideration “real life” constraints, such as availability of divergent routeing options, different types and sizes of aircraft and a route demand bias towards the westerly SIDs which are in practice evidenced at London Gatwick, the practical limit for departures reduces the (theoretical) 60 to 53 departures / hour from runway 26. From runway 08, where there are more divergent SID options, the practical limit for departures is 58 departures / hour.

2.10.3 For arrivals, as arrivals structure broadly remains unchanged by the Northern Runway Project proposal, i.e. single arrival runway, no airspace change as result of DCO, the current performance can be used as an indicator for future practical performance. Therefore, the airspace has a practical limit of 48 arrivals per hour.

3 Current Performance

3.1. Current Operating Performance

3.1.1 There are two modes of operation at London Gatwick, westerly where aircraft take off and land on the 26L (Main) and 26R (Northern) runways and easterly where operations are from the 08R (Main) and 08L (Northern) runways. Westerly is the more common mode of operation, driven by the prevailing wind direction, with 68% of flights in 2019 operating in a westerly direction. The primary runway in use is the Main runway, 98% of flights operated from the Main in 2018.

3.1.2 Using the existing infrastructure and current concept of operations described below in FY 2018, 285.9k ATM were handled, of which 281.7k were commercial passenger flights.

3.1.3 For the purposes of airline scheduling, London Gatwick declares a maximum capacity of 55 ATMs for its peak hours.[4] London Gatwick has been declaring capability of delivering 55 ATM/hour since the Summer 2014 declaration. In the Summer 2016 declaration there were five hours declared at a capability of 55 ATM/hour and this has continued through to the latest declaration (Summer 2024), although these have not always been the same hours. Table 1 shows the summer declared capacity for the years leading up to COVID and the latest summer declaration.

Start of Hour (UTC)	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	17hr (05-21)
S18	29	49	54	52	51	49	55	55	55	53	51	52	55	55	54	46	43	41	29	30	870
S19	29	50	54	52	50	49	55	55	55	53	51	52	55	55	54	46	43	41	29	30	870
S24	29	53	55	52	50	51	55	54	55	54	52	52	55	55	54	49	46	40	29	30	882

Table 1. Declared runway capability for Summer 2018, 2019 & 2024.

3.1.4 The runway throughput is driven by the number of aircraft which present for arrival/departure and the runway aircraft throughput capability. The aircraft throughput capability of the runway is driven by a number of factors, key is the separation criteria applied between aircraft using the runway and thus is affected by the mix of air traffic in each hour, primarily influenced by the proportion of arrivals versus departures and the wake turbulence separation requirements.

3.1.5 In a balanced arrival/departure hour the sequence delivered on the runway alternates between arrival and departure aircraft. Based on the separation parameters applied at London Gatwick, one arrival and departure pair can typically be delivered in 130 seconds (one movement every 65 seconds), after 130 seconds the runway is ready to accept the following arrival and departure

[4] An explanation of the capacity assessment criteria is in the Appendix Section 3.

pair. In a 60 minute period this results in 55.4 aircraft movements being delivered. If an hour does not have a balance between arrivals and departures, arrivals or departures will need to be sequenced consecutively. 55 ATM/hours can still be achieved with small variations in the proportion of arrivals and departures. Consecutive departures in alternating directions will allow a movement every 60 seconds increasing throughput, although consecutive arrivals only allow a movement every 90 seconds – due to the need for landing aircraft to vacate the runway at a safe speed – reducing throughput. Hours with significant imbalances in arrivals and departures will see a reduction in capability from the 55 ATM/hour, the declaration reflects this.

3.1.6 Runway capacity assessments are undertaken at London Gatwick as part of every declaration, to ensure the declaration considers the traffic mix when declaring runway capacity in each hour. The hours declared at 55 are on the basis of the traffic mix accommodating 55 ATM/hour.

3.1.7 In peak hours, London Gatwick consistently achieved a busy hour aircraft throughput of 55 ATM/hour, in some cases more than 55 ATMs in a single hour are operated. The graph in Figure 7 illustrates how many times 55 or more ATM/hour was achieved in August 2018 in the preceding 60 minutes measured on a rolling 15 minute basis i.e., measure every 15 minutes. It is necessary to show this on a rolling basis as whilst the declared clock hour is 55, this is based on stand time rather than runway time. The time which the 55 movements present to the runway may not align exactly with the clock hours. In addition, off-schedule activity will also change the number of aircraft presenting. The 55 ATM/hour were typically delivered around peak hours when warranted by demand, the most common period of 55 ATM/hour is 06:30:00-07:29:59 UTC based on a 15 minute rolling measure.

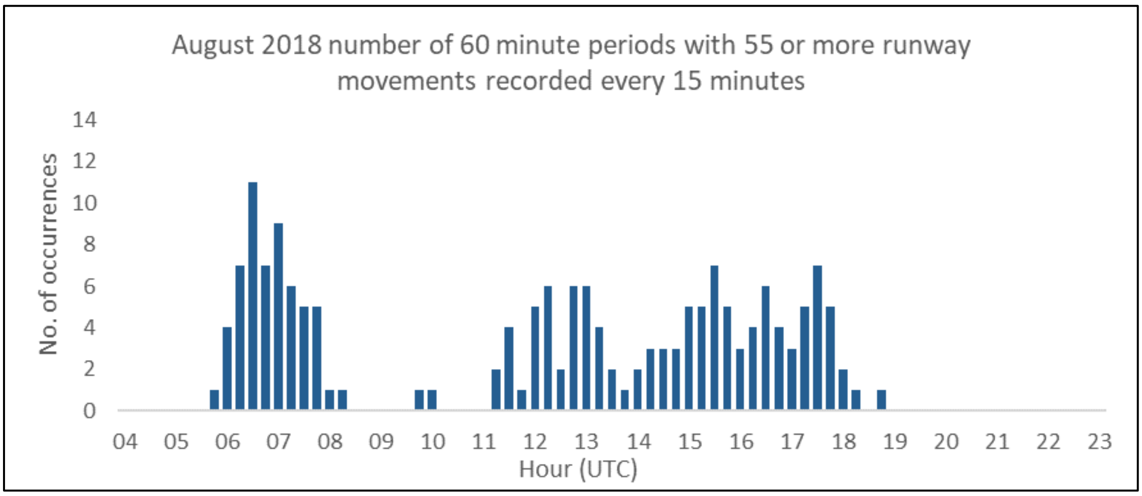

Figure 7. Count of 55 ATM/hour hours in August 2018.

3.1.8 Figure 8 shows the actual runway throughput on a busy day in August 2018 (17/08/2018). On this day 55 ATM/hour or over was reached on three occasions.

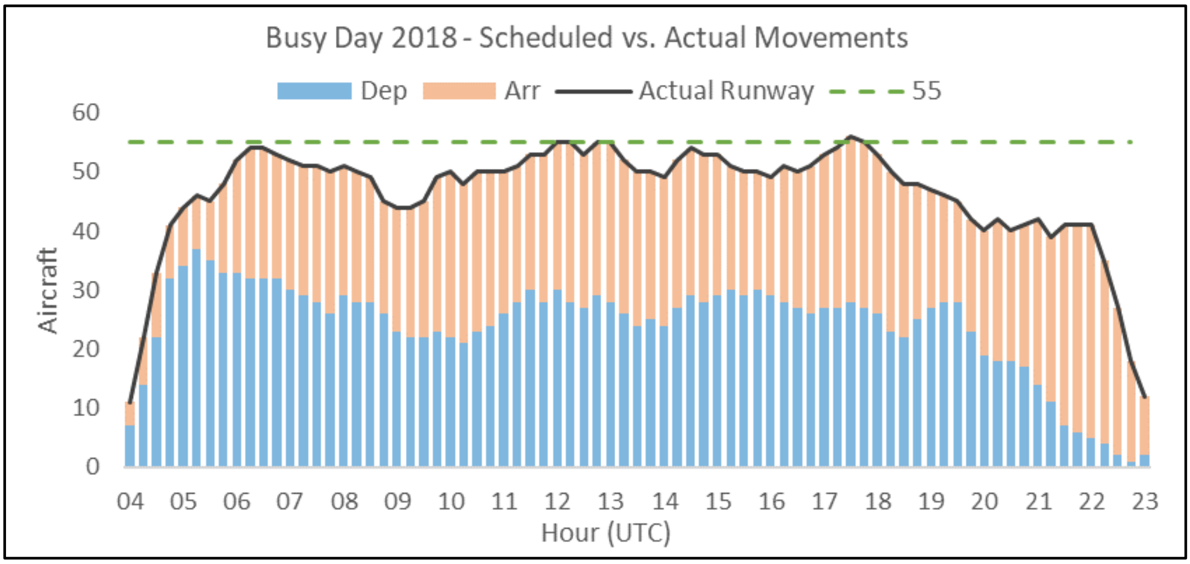

Figure 8. 2018 Busy Day 2018 runway throughput.

3.2. Capacity Declaration

3.2.1 London Gatwick is a Level 3 airport under Worldwide Airport Slot Guidelines (standards published by IATA, Airport Council International and the Worldwide Airport Coordinators Group[5]). Level 3 status is used when demand significantly exceeds the airport's capacity, and allocating slots to airlines must be managed according to standardised rules, by an independent slot coordinator. As per the requirements of a Level 3 airport, twice a year London Gatwick carries out a capacity assessment analysing the airport wide available capacity compared to the forecasted demand. The capacity assessment informs the declared capacity for each season (Summer and Winter). The independent coordinator will then use the declared parameters to allocate slots within the declared capacity. An independent coordinator is required to ensure slots are allocated in a fair, transparent, and non-discriminatory manner. The slot coordination process is designed to facilitate consumer choice, improve connectivity, and enhance competition at congested airports whilst maximising capacity utilisation. All Level 3 airports should seek to enhance capacity in order to adequately meet the demand.

3.2.2 This capacity declaration process is carried out together with NATS and ACL (the Slot Coordinator) and consulted on through a Coordination Committee,

[5] https://www.iata.org/en/programs/ops-infra/slots/slot-guidelines/

comprising GAL, NATS, ACL and the Scheduling Committee (London Gatwick airline scheduling representatives).

3.3. Improvements to Current Aerodrome Operations

3.3.1 As the world's most efficient single runway airport, London Gatwick relentlessly seeks to improve operations when there is a significant gap between optimal and achieved performance. Whilst increased pressure on the operation typically leads to improved separation performance there are also four live projects that will assist in improving performance characteristics for certain flights: reduced departure separation, improved sequencing capability, the addition of a new rapid exit taxiway and time based separation for arriving aircraft.

3.3.2 These innovations to optimise the Main runway operation will focus on enhancing resilience (rather than increasing aircraft throughput capacity) and enable London Gatwick to deliver more peak 55 ATM/hour periods without the need to reduce movements in consecutive hours to manage excess holding times in the schedule to allow recovery from 55 ATM/hours during which delays to the schedule are encountered.

3.3.3 Of the future initiatives described both the rapid exit taxiway and reduced departure separation benefits are included when assessing the future Baseline and DRO capacity in this paper, the Appendix: Airfield Capacity Study (Doc Ref. 10.7) also includes results without the future initiatives. Both sequencing capability and time based separation are excluded from the capacity assessments. The improvements to sequencing capability are excluded due to the capability of the simulation software and time based separation is excluded because there benefits are yet to be accurately quantified at London Gatwick.

Reduced Departure Separation

3.3.4 The Reduced Departure Separation project will reduce the time between successive departures on similar routes. While aircraft departing on immediately diverging SIDs must be separated by 60s (unless visual separation can be achieved) and aircraft following the same SID must be separated by at least 120s, flights following similar but not identical routes have a different separation standard agreement between London Gatwick Tower and the Terminal Control Centre at Swanwick which is based on ensuring the minimum required horizontal safety separation (3nm) is achieved. In practice 60s between departures may provide more than the required 3nm and London Gatwick's Air controllers currently deliver an average of 20% more distance between similar direction departures than required. This project will provide 'tool support' to enable the Air controller to provide more consistent separation - at just above the standard separation minima - between departing aircraft.

Sequencing Capability

3.3.5 This project will reduce the number of times that London Gatwick needs to send two successive departures in similar directions. Currently, the Air controller makes sequencing decisions one or two departures in advance based on what aircraft are available at the runway holds. The Ground controller makes and executes a plan to 'load' the runway holds in a way which gives the Air controller enough flexibility to create an efficient departure sequence. While runway sequencing for the Air controller is complicated, air traffic controllers are exceptionally well trained, and under normal conditions the runway sequences that air traffic controllers create cannot be made more efficient. However, when conditions are changing or challenging (for example, due to local weather changes, or significant restrictions in European airspace that constrain the ability of high volumes of air traffic to depart), the process can lead to reduced sequencing efficiency because humans cannot process all the information available to them in a short time. An air traffic controller support tool, DMAN ('Departure MANager'), has been enhanced to provide sequences that are more comparable to those an air traffic controller would create if they could process all the information available. In normal conditions there will be no significant impact on sequence efficiency, but this project will improve resilience when conditions are changing/challenging by assisting in efficient runway sequencing with reasonable fairness between aircraft.

Rapid Exit Taxiway

3.3.6 The new Rapid Exit Taxiway (RET), Echo Romeo (ER), will replace the Echo (E) exit when operating in single runway mode on 26L. When planning arrival gaps, air traffic controllers must make decisions based on outlier performance rather than average performance, and the typical behaviour of outliers on 26L is that they plan to exit at E (a medium speed exit) but are going slightly too fast, then by the time they can exit at FR (a rapid exit, 500m further along the runway) they are moving very slowly, and have a very high runway occupancy time, which prevents an aircraft behind being given clearance to land or take off. As the next arrival will already be lined up with the runway centreline expecting to land, any significant delay from the previous runway movement is likely to cause the following arrival to perform a 'go around' manoeuvre (safely aborting the landing, which is inefficient). The Air controller therefore plans arrival spacing as close as is reasonable while being confident that there will be few go arounds. To improve runway occupancy time consistency, a rapid exit (ER) will be opened in Q1 2024 in the optimal location based upon pilots' braking behaviours.

Time Based Separation on Arrival

3.3.7 Intelligent Approach - known as Advanced Mixed Mode in the initial deployment at London Gatwick - is a suite of tools that allow air traffic controllers to significantly improve the consistency of spacing between arriving aircraft, standardising performance across different air traffic controllers and weather conditions. The software generates markers between arriving aircraft on the Gatwick Director controller's display based on the weather conditions and individual aircraft type, so the optimum spacing can be more readily achieved. The markers may be based on either time or distance-based intervals. Intelligent Approach will evolve to support air traffic controllers in optimising the arrival spacing by also taking into account the departing aircraft type - this is known as Optimised Mixed Mode at London Gatwick.

3.3.8 The air traffic management and airfield infrastructure measures that London Gatwick is implementing to optimise the operation, including the initiatives listed above, increases confidence in the plans to improve resilience on the existing runway.

3.4. Future Baseline

3.4.1 The future baseline growth scenario remains a single runway operation with two key operational changes from 2018:

- The addition of the new rapid exit taxiway Echo Romeo and associated removal of Echo for 26L runway operations.
- The reduced departure separation project.

3.4.2 As a result of the operational changes the runway capability in 26L operations is expected to increase to 56 ATMs/hour whilst 08R remains at 55 ATMs/hour. The forecast demand based on scheduled clock hour will be limited to a maximum of 55 movements. This will add to the resilience of the schedule and allow for more hours to be declared at 55. There is a minimal increase in busy day traffic to 954 ATMs forecasted by 2038, an additional 20 compared to the 2018 busy day.

3.4.3 The future baseline is provided for comparison purposes for the DRO growth scenario.

4 Dual Runway Operation

4.1. Introduction

4.1.1 The dual runway operation (DRO) can deliver 1132 movements, an additional 198 movements on a peak day compared to a 2018 busy day on single runway operations, due to the increased capability achieved from using the Northern Runway in conjunction with the Main runway allowing the peak hour aircraft throughput capacity to increase from 55 to 70 ATM/hour and the declared capacity to increase from 55 to 69 movements.

4.2. CONOPS Overview – Comparable cases and safety work with the CAA

4.2.1 The dual runway concept of operation will bring London Gatwick's Northern Runway into routine use alongside the Main runway. This DRO assumes that the runways will be operated as parallel dependant runways when demand requires. Aircraft departures and arrivals will have the same airspace separation requirements as per single runway operations. The benefits of the concept are gained through departing an aircraft on the Northern Runway whilst the Main runway is occupied by an arriving aircraft which in single runway operation would be unutilised time. This results in an increase in overall runway capability.

4.2.2 As with the current single runway operation, in DRO the use of multiple holding points with direct access to the runway is key to enabling optimised departure sequencing and therefore to maximising runway throughput. This applies to both westerly operations, from runway 26, and easterly operations from runway 08, albeit sequencing of departures from runway 08 is less vital due to the SID route configuration.

4.2.3 It is proposed that the aerodrome infrastructure is modified to support the concept of operations to enable holding between the runways, create end around runway taxiways and improve the holding points at the end of each runway to increase the sequencing flexibility available to the Air controller - whilst enabling the concept, these modifications are ultimately a matter for the CAA. A Statement of Common Ground has been agreed with the CAA in relation to Safety and Operations.

A Comparator Dual Runway Operation – Dubai

4.2.4 The relationship between two key factors defines the aircraft throughput capacity of a dependent dual runway system. The runway (e.g. you cannot land on an occupied runway) and the airspace (in airspace terms, two runways that are closely spaced are treated as a single runway, it is not possible to take off aircraft from both runways at the same time). While dependent DROs are common, there are not many airports in the world that employ a dependent DRO as the sole modus operandi and that have high demand throughout the day, requiring that demand be managed through a capacity declaration process, similar to that in place at London Gatwick today.

4.2.5 In terms of a capacity declaration, the most comparable airport in 2023 to the dependent DRO London Gatwick would operate in 2038 is Dubai International Airport. In the Summer 23 season, Dubai declared a peak of 66 ATM/hour (London Gatwick in Summer 2023 peaked at 55 ATM/hour), with a sustained 65.5 ATM/hour averaged over a 4 hour period (London Gatwick was 54.5 ATM/hour), and 1040 air traffic movements declared capacity over a 17 hour period (London Gatwick 2023 was 882).

4.2.6 Dubai typically operates in segregated mode, with one runway for departures and the other for arrivals. While Dubai has a taxiway between its two runways and London Gatwick will not, many taxiing aircraft at Dubai still cross an active runway on their way to or from the terminal. At Dubai, some crossings require a pause in runway operations if there is not a natural gap in the sequence, but not all aircraft need to cross the second runway. At London Gatwick, most runway crossings will take place without pausing runway operations, but every arrival will need to cross the departure runway, and a few will require a departure to hold. At Dubai, there are departure airspace constraints caused by nearby military airspace creating a narrow funnel of 70-80° (depending on runway direction), which restricts divergence and essentially creates two independent SID groups. This is similar to London Gatwick's degree of limitation in its SID configuration when operating on runway 26 (the more constrained runway direction). As a result, there is little meaningful aircraft throughput capacity difference between the two systems in terms of runway occupancy time caused by runway crossings.

4.2.7 There are two key differences between Dubai and London Gatwick's proposed system that affect the aircraft throughput capacity and which support the increased capability identified under the DRO at London Gatwick:

4.2.8 Fleet mix. Dubai operates approximately 12% A380s and 38% other Heavy aircraft, with almost all other aircraft being in the Medium category. London Gatwick will operate <1% A380 and approximately 20% Heavy aircraft, with almost all other aircraft being in the Medium category. This means the airspace at Dubai is impacted significantly more due to wake turbulence constraints, and sequencing is more constrained (an A380 has a large impact on a Medium aircraft and impacts sequencing options for a Heavy aircraft). The A380 also has a longer runway occupancy time, for both arrivals and departures, than most other aircraft. As London Gatwick operates a predominantly Medium category aircraft fleet mix, a peak operating capacity of the dual runway system is expected to be higher.

4.2.9 Due to the length of its secondary runway and general aerodrome layout, London Gatwick expects Heavy departures to generally operate from the Main runway, which will also handle all arrivals. When a departure takes off from the Main runway, it is the equivalent of going to a single runway operation temporarily, meaning these flights reduce aircraft throughput capacity compared to Dubai. This factor will cause London Gatwick's capacity declaration to peak higher above a sustained 4 hour average than in Dubai's declaration, as when there are fewer Heavy aircraft the aircraft throughput capacity of the system is higher. This factor is also a helpful source of restorative resilience - if the runway queue builds up, it is easier to sequence more efficiently, so if a large queue forms, it is easier to catch up to the plan than it would have been with the single runway system.

4.2.10 In London Gatwick's DRO the peak movement hour will be declared at 69 ATM/hour, with a sustained 65 ATM/hour and 1042 air traffic movements declared over a 17 hour period. The sustained air traffic movements and total declared movements over the 17 hour core period are similar to the levels already being delivered by Dubai, even with its high proportion of widebody traffic. In regard to the peak hour movements, Dubai can operate 66 ATM/hour with a higher proportion of wide body aircraft than London Gatwick, given London Gatwick's traffic mix it has been concluded that 70 ATM/hour is achievable, as proven by the aircraft throughput capacity modelling detailed in the Appendix: Airfield Capacity Study (Doc Ref. 10.7).

4.3. Dual Runway Operations

4.3.1 With the Northern Runway being used by departures only, it provides an increased capability when handling a mix of arrivals and departures. Fundamentally this is because a departure can line up and take off on the Northern Runway while the preceding arrival is still on the main runway as opposed to having to wait for it to vacate before clearance to take off is given.

4.3.2 With only medium sized aircraft and an even mix of arrivals and departures, the dual runway should then theoretically be capable of handling up to 80 movements per hour with arrivals spaced at 90s and a departure sequenced between each arrival. This reduces when there is an asymmetry between arrivals and departures or when heavy aircraft, requiring greater than 90s inter-arrival spacing, are introduced into the mix. In most hours the capability falls below the theoretical capacity of 80 movements leading to a peak of 69 declared movements.

4.3.3 Apart from the very start and end of the day when first and last wave narrow-body departures and arrivals dominate, there is an even mix of arrivals and departures. When the runway is loaded up by forecast pipeline demand to the extent that the available aircraft throughput capacity is fully utilised with modelled holding times similar to those currently achieved, it accommodates up to 70 ATM/hour.

4.4. Dual Runway Airspace

4.4.1 The Northern Runway Project does not require airspace change to operate (see CAA airspace change proposal ACP-2019-81). London Gatwick's current airspace design includes SIDs and arrival procedures for both the 26L/08R (Main) and 26R/08L (Northern) runways. London Gatwick's Northern Runway Project will operate using the existing airspace routeings and infrastructure; NATS has no plans to change any of the air traffic route network associated with London Gatwick's arrival and departure routes as part of the project.

4.4.2 As a service provider NATS work to accommodate growth and demand wherever possible, in line with the key requirements of its licence obligations. As such, NATS has existing measures in place to manage the flow of air traffic in the London Terminal Manoeuvring Area (LTMA) airspace efficiently and to ensure the sector/airspace loading remains within safe operational parameters should peaks in demand exceed available capacity.

5 Future Performance

5.1. Simulation Results

5.1.1 This section summarises the results of modelling future aircraft throughput capacity of the airfield and local airspace at London Gatwick for 2038 under the future baseline and DRO, in comparison to August 2018 actuals.

5.1.2 The DRO busy day aircraft throughput capacity is forecast to be fully utilised by 2038, delivering an increase of 198 ATMs compared to the 2018 busy day schedule, and an additional 178 compared to the 2038 baseline scenario. The detailed results and an explanation of the modelling assumptions and schedules are presented in the Appendix: Airfield Capacity Study (Doc Ref. 10.7).

5.1.3 The baseline model was built and calibrated using August 2018 busy day schedule and August 2018 performance data.

5.2. Runway 26 (Westerly)

5.2.1 The actual performance for 2018, detailed in section 3.1, demonstrates London Gatwick's ability to deliver 55 ATM/hour in both 26L and 08R runway direction operations, hence the calibrated model for fast time simulation was also able to deliver 55 movements. The future baseline simulation results, shown in Table 2, demonstrate that the sustained maximum aircraft throughput achievable from runway 26L increases from 55 ATM/hour in 2018 to 56 ATM/hour in the future with the benefit of future performance initiatives. The future performance initiatives include the new rapid exit taxiway (Echo Romeo) and reduced departure separation detailed in Section 3.3.

5.2.2 The future baseline schedule remains at a maximum of 55 movements, based on block times. The increase in throughput capability to 56 ATM/hour is used to add resilience to the operation by reducing the holding time compared to 2018, as demonstrated by the simulation results. There is a minor increase in arrival taxi time, of approximately 0.5 minute, compared to 2018 which is offset by the 1.4 minute improvement in airborne holding. The reduction in arrival holding is also due to the increase in runway throughput capability.

5.2.3 The DRO fast time simulation results, shown in Table 2, confirm the airfield's ability to process 70 ATM/hour, in runway direction 26, from an input schedule with a maximum of 69 movements in a clock hour. Whilst the scheduled demand remains at 69, the demand presented to the runway may exceed 69, hence the need to process 70 ATM/hour at certain times of day. The simulation results also demonstrated an improvement in total departure and arrival holding compared to 2018 busy day and the 2038 baseline. This is mainly due to the increase in aircraft throughput capability gained from the Northern runway. Both the 2038 baseline and DRO scenario also benefit from the future initiatives for reduced departure separation, when compared to 2018. There is a slight increase in arrival taxi time, of approximately 0.8 minutes, compared to 2018 which is offset by the 1 minute improvement in airborne holding.

5.2.4 In conclusion, for runway 26, both the baseline and DRO see performance improvements compared to 2018 and DRO performs better than the baseline growth scenario for departures and has equivalent arrival performance.

Measure	Category	Type	Actual 2018	Baseline 2038	DRO 2038
Scheduled demand	Total	Max	55	55	69
Runway Throughput per hour	Total	Ave. Max	55	56	70
Total taxi time (min)	Departures	ave.	19.6	17.2	13.9
	Arrivals	ave.	8.2	8.7	9.0
Departure holding(min)	Runway	ave.	9.7	6.4	3.8
Arrival holding (min)	Airborne	ave.	4.4	3.0	3.4

Table 2. Fast time simulation results for busy day future performance in westerly (runway 26) direction configuration.

**The numbers shown in green indicate a 10% or higher performance improvement compared to 2018, blue indicates similar (between -10% and +10% difference) performance to 2018 and orange indicates a reduced performance by 10% or more in comparison to 2018. Black illustrates where no comparison is available due to lack of actual data.*

5.3. Runway 08 (Easterly)

5.3.1 Runway 08 is not the preferred mode of operation at London Gatwick, in August 2018 it was only used for c.10% of movements. Due to the low number of operations from runway 08 the actual data available to compare the simulation results to is low. The 2018 busiest day available for runway 08R had 918 movements scheduled compared to the 934 on a runway 26L busy day, hence the actual data available for comparison is lower than expected for a busy day operation. Further, runway holding data is not available for runway 08 actuals, due to gaps in the runway 08 measurement systems, although this is encompassed in the total departure taxi time measurement.

5.3.2 The future baseline simulation results, shown in Table 3, demonstrate that the sustained maximum aircraft throughput achievable from runway 08 single runway remains at 55 ATM/hour with the future performance initiative reduced departure separation (detailed in Section 3.3). The runway 08 future baseline does not have the benefit of a new RET, which is available for the runway 26 operation, hence maximum sustained throughput remains at 55.

5.3.3 The future baseline scenario results, for runway 08, indicate the departure holding increases across the day compared to 2018 as the maximum number of movements which can be processed remains the same whilst additional movements are added to the shoulder periods of the busy day reducing the ability to recover holding time. The average airborne holding and arrival taxi time remain similar to 2018 performance.

5.3.4 The DRO fast time simulation results, shown in Table 3, confirm the airfield's ability to also process 70 ATM/hour from runway 08. In this scenario the departure taxi time outperformed the 2038 Baseline scenario, although there is a slight increase in departure taxi time compared to 2018 due to the sequencing limitation of the simulation software and the complexity of sequencing for runway 08, detailed further in Appendix: Airfield Capacity Study (Doc Ref. 10.7). Arrival taxi time is slightly higher than the 2038 Baseline although it remains similar to 2018 performance and there is no significant variation in airborne holding.

5.3.5 In conclusion for runway 08, both the 2038 baseline and DRO departure performance decreases marginally compared to 2018 actual data whilst arrival performance remains equivalent to 2018. The decrease in departure performance is largely due to the actual data for 08 not reflecting the busy days. It is recognised that sequencing in the DRO scenario requires a higher degree of forward planning, due to the reduction in holding capability compared the baseline which has the use of the Northern Runway as a taxiway for sequencing, although it is important to note that the DRO scenario outperforms the baseline based on departure performance. The sequencing capability is discussed further in Appendix: Airfield Capacity Study (Doc Ref. 10.7).

Measure	Category	Type	Actual 2018	Baseline 2038	DRO 2038
Scheduled demand	Total	Max	55	55	69
Runway Throughput per hour	Total	Ave. Max	56	55	70
Total taxi time (min)	Departures	ave.	20.2	24.1	21.9
	Arrivals	ave.	5.8	5.0	6.0
Departure holding	Runway	ave.	-	7.9	4.3

(min)				
Arrival holding (min)	**Airborne ave.**	5.3	4.9	5.0

Table 3. Fast time simulation results for future performance in easterly (runway 08) direction configuration.

6 Conclusion

6.1.1 This paper has explained that the single mixed-mode runway operation is the most significant constraint on airport's aircraft throughput capacity and that the London Gatwick terminal airspace, used to manage the flow of arriving and departing aircraft, is capable of accommodating air traffic movement numbers in excess of current flight numbers.

6.1.2 Today's operation can accommodate 55 ATM/hour during periods of peak demand. Disregarding the constraint of the runway, with optimum sequencing operating 60s splits could theoretically achieve 60 departures per hour. Arriving aircraft optimally separated at 3nm intervals on the approach, would allow 48 arrivals per hour. This gives a theoretical airspace capacity for arrivals and departures of 108 ATM/hour. In practice this theoretical aircraft throughput capacity ceiling is reduced by factors such as the mix of departures and arrivals, the combination of Medium and Heavy aircraft and sequencing opportunities. However, the theoretical capacity gives the basis to understand that increased airfield capacity can be accommodated by London Gatwick's system of arrival and departure routes.

6.1.3 In the future baseline without the Northern Runway Project, the assessment of aircraft throughput capacity - taking into account the factors that constrain the operation and the improvements to current aerodrome performance (such as the new Rapid Exit Taxiway) - shows a slight increase on runway 26 to 56 ATM/hour and for runway 08 it remains at 55 ATM/hour. Increases to the busy day ATMs are achieved by adding movements to the shoulder periods, thereby increasing the number of hours scheduled at 55 movements in the day.

6.1.4 Through the Northern Runway Project plans and its operational performance improvement initiatives London Gatwick is able to create an operation capable of delivering a sustained rate of 69 ATM/hour.

6.1.5 The ground operation, enabled by the new optimised infrastructure (including the Charlie box and the Juliet bypass) delivered by the Northern Runway Project and a supporting concept of operation which includes complementary improvements to the operation (such as the Reduced Departure Separation tool), will be capable of delivering a sustained rate of 69 ATM/hour.

6.1.6 London Gatwick has assessed that the current structure of the Standard Instrument Departure routes that link the airport to the air traffic route network (whilst sub-optimal) will, with the ground infrastructure enhancements and operational improvements to optimise the sequencing of departing aircraft, enable a sustained movement rate of 69 ATM/hour.

6.1.7 NATS has existing measures in place to manage the increased flow of traffic in the London Terminal Manoeuvring Area (LTMA) efficiently. Furthermore, airspace capacity in the LTMA airspace will benefit significantly from the Government sponsored airspace modernisation programme, the earliest deployment of which for London Gatwick is currently scheduled in Q1 2027.