



# London Gatwick Noise Management Board

Reduced Night Noise Trial – Community Update

27 November 2023

The information provided in these slides specifically refers to London Gatwick's Reduced Night Noise Trial briefing, and should strictly not be re-purposed, taken out of context, or misused.



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## Agenda

1. Background
2. Objectives
3. Trial Plan – what will happen during the trial
4. Monitoring aircraft procedures
5. Monitoring Noise

Slide 3

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## Introduction

- In April 2017, Gatwick Airport's Noise Management Board (NMB) agreed that opportunities for reduce noise levels from arriving aircraft during the night should be explored to endeavour to reduce the impacts and the number of people disturbed by night arrivals.
- PBN is a means of modern aircraft navigation that allows the vertical profile of arriving aircraft to be controlled in a more accurate manner, which could remove outliers.
- Gatwick is therefore planning a trial to assess the extent to which PBN technology can deliver noise benefits for arriving aircraft during the night period, by reducing the number of noisy 'outliers' that are significantly lower or noisier than most aircraft.

## Overview

### High-level aim:

- Demonstrate the noise benefits of PBN, and its other impacts, for arriving aircraft through a 6-month trial
- Objectives:
  - Demonstrate that PBN can reduce the peak noise levels generated per arrival per aircraft type
  - Compare the 'with PBN' and 'without PBN' noise situation by placing PBN routes inside the existing arrivals swathe
  - Inform future airspace design and gather operational data on PBN
  - Explore new community engagement initiatives and processes

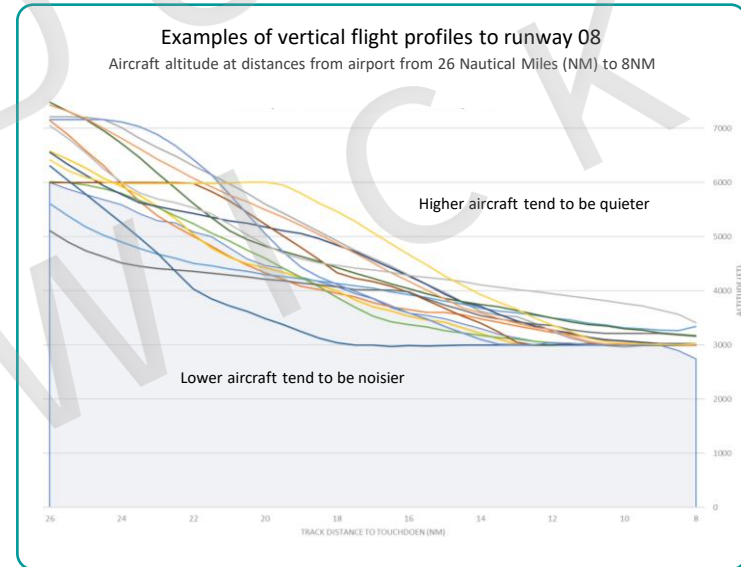
### Key features

- Introduction of PBN arrival routes ("transitions") to the final approach
- Operational between 01:30-05:00 (local time)
- 6 months January – June (inclusive) 2024
- Easterly and Westerly
- Data capture with noise monitors, before and after
- Trial on main runway only

## The RNN trial tests procedures to make flights quieter at night

RNN Trial will run for 6 months at start of 2024 between the hours of 01:30 and 05:00

- The RNN trial will test new procedures in the hours of lowest traffic
- These will keep aircraft higher and reduce engine thrust
- Procedures use PBN, a cornerstone of the UK Airspace modernisation
- The first trial of its type in the UK
- Trial has followed the CAA regulatory process for trials
- It will be for main runway arrivals using ILS
- Trial has benefit from co-operation of NATS and airlines
- On average about 4 aircraft per night are likely to participate in the trial



## The trial will start on 28 December 2023 and last 6 months



- If trial start is delayed, the trial end date will be adjusted
- If aircraft numbers are lower than expected, e.g. due to unexpected use of the Northern runway preventing trial operation, then trial could be extended
- CAA approval would be required

## Trial Monitoring

- We will produce a monthly analysis of data on the performance of aircraft
- Monthly report will be submitted to the CAA and published
- Once an initial sample of data has been analysed, the trial will be suspended if it is found that there are safety concerns or if the objectives are unlikely to be met
- If any safety concerns that are raised by operational staff, the trial will be suspended to evaluate these concerns
- NATS will provide feedback on which aircraft flew in the trial
- Note; not all aircraft will fly the trial routes each night
- A report will be produced at the end of the trial

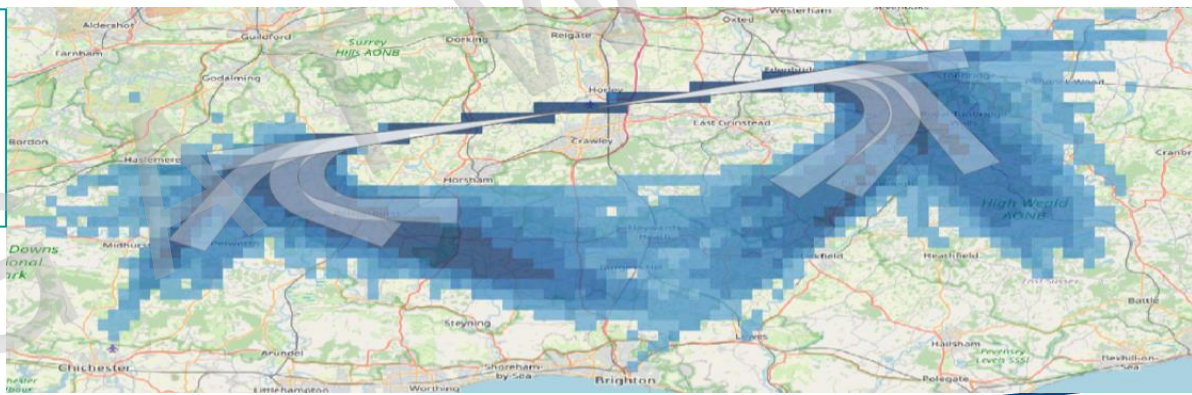


## Trial Routes

There are 8 trial routes onto the southern runway only

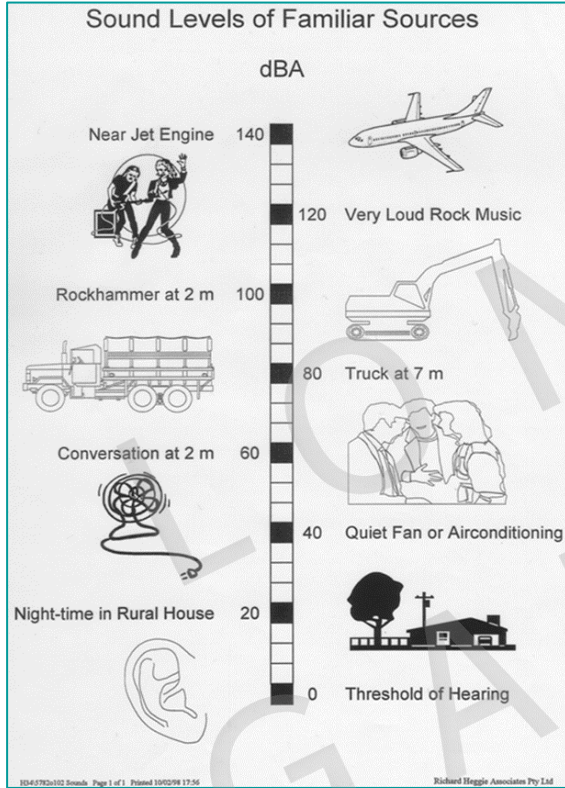


Trial routes are placed over the currently overflow areas and spaced from each other





# Monitoring Noise



The ear has a huge dynamic range, so the decibel is a very small unit.

How big are dB changes ?

3dB – just perceptible

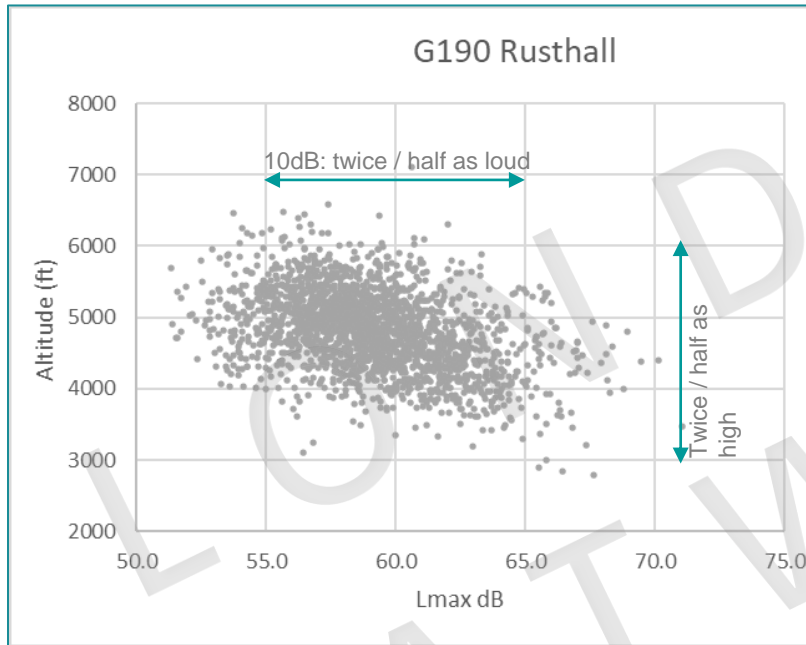
5dB – noticeable difference

10dB – twice/half as loud

The RNN uses 9 Noise and Track Keeping (NTK) monitors to measure  $L_{max}$  noise levels (ie peak noise as an aircraft flies over)



## Monitoring Noise – Baseline (approach)



There is a large spread in noise and height levels on the baseline, eg as shown here at Rusthall, 32 track km from runway 26.

Noise Outlier: noisiest 5% of flights

Height Outlier – lowest 5% of flights

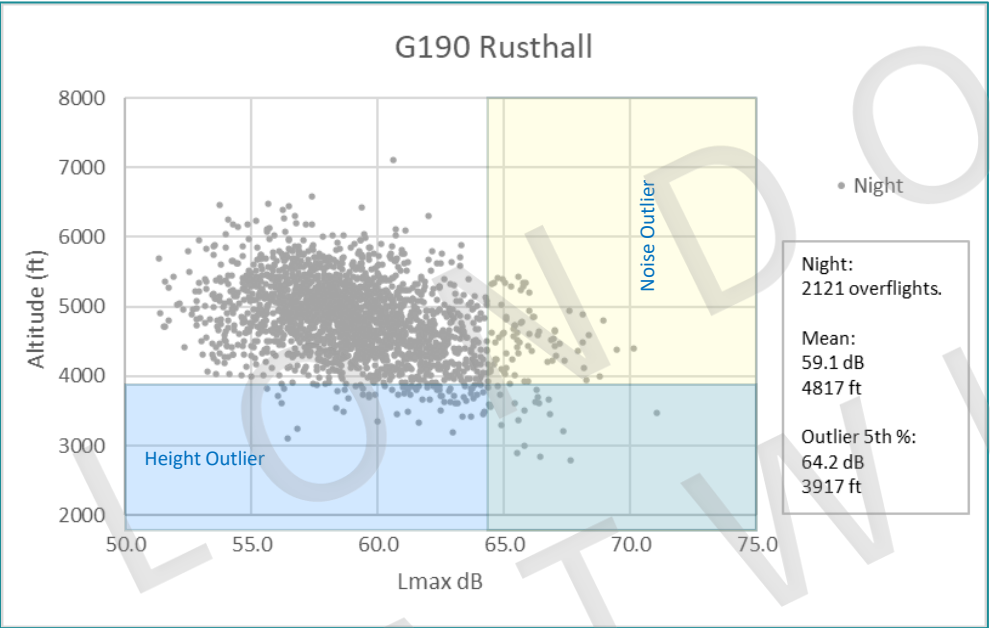
Trial Objective: To reduce the number of Outliers by 90%

The baseline survey has quantified noise Outliers and Height Outliers, against which the trial success will be judged.

The Arrivals Review in 2017 recommendation IMM-15 lead to NMB *Perception of Height and Noise Study, 2018*: One of the key findings was: '50% of the interviewees (62 out of 123) reported noticing only a limited number of "extremely low or extremely noisy" planes each day. Addressing what is causing these outliers and reducing them may potentially reap a large benefit for the community.'

The PBN procedures to be tested in this trail, directly aim to reap this potential large benefit.

# Monitoring Noise – Baseline (example)



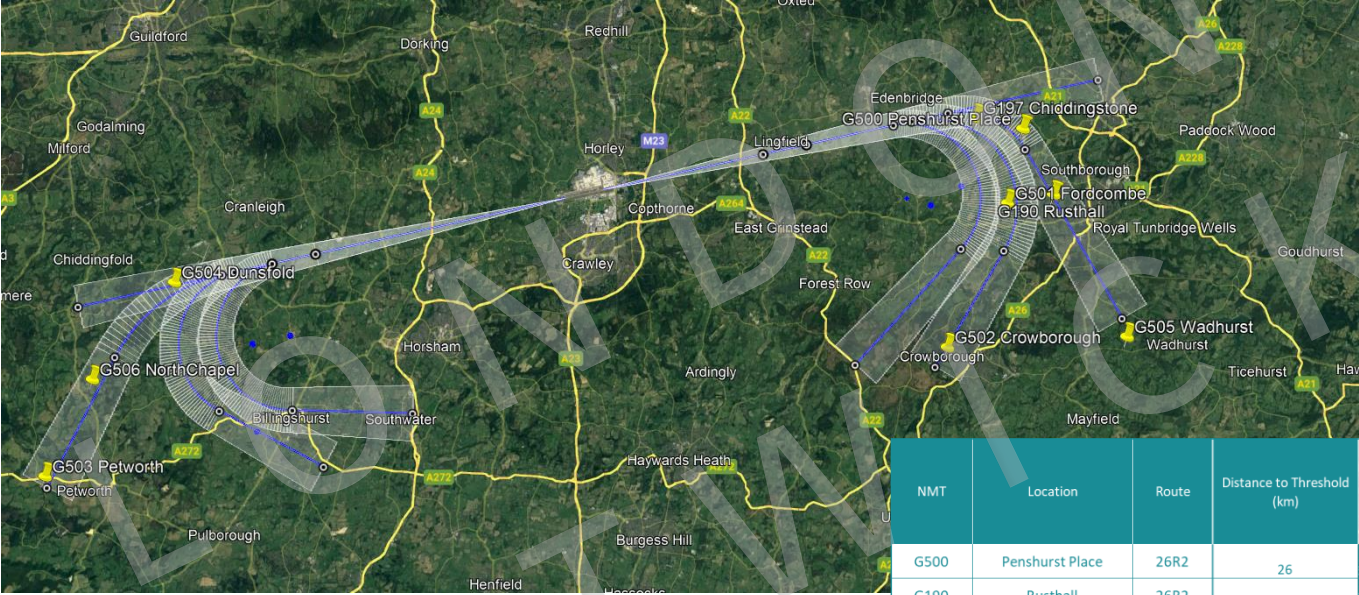
Here:

Noise Outlier – noisiest 5% of flights 64 dB

Height Outlier – lowest 5% of flights 3,917 ft

Trial Objective: To reduce the number of Outliers by 90%

# Monitoring Noise for Trial Routes



It was decided to measure baseline noise levels to be more accurate than modelling. A set of 9 Noise and Track Keeping (NTK) Noise Monitoring Terminals (NMTs) were deployed; 3 under each of 3 of the trial routes, 2 in the East and one in the West. These routes are in the most commonly flown areas.

NMT	Location	Route	Distance to Threshold (km)
G500	Penshurst Place	26R2	26
G190	Rusthall	26R2	32
G505	Wadhurst	26R2	41
G197	Chiddingstone	26R3	24
G501	Fordcombe	26R3	31
G502	Crowborough	26R3	40
G504	Dunsfold	08R2	25
G506	Northchapel	08R2	33
G503	Petworth	08R2	40

# Identifying Overflights

## Overflights

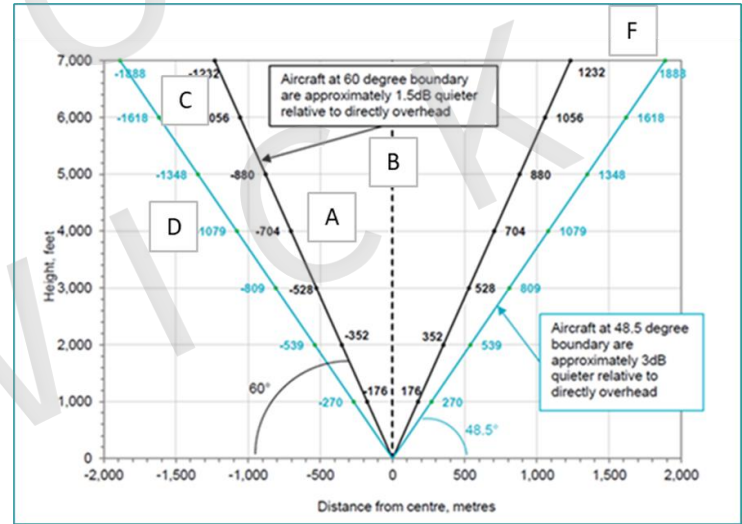
Using the CAP1498 definitions of Overflights, aircraft outside the inverted cone within which noise level deviate by less than 3dB from the level directly overhead, were removed. The upper limit of 7,000 was not applied to avoid removing very high quiet aircraft for this study. Thus, in this diagram aircraft at locations A, B, C and F were included, but D was excluded.

The same geometry was used to apply corrections (of up to 3dB) to allow for the deviation of the aircraft from overhead. This process will be applied equally during the trial when deviations are expected to be lower.

## 2022-2023 Baseline

During the 432-day baseline period between August 25<sup>th</sup> 2022 and October 31<sup>st</sup> 2023, approximately 143,000 aircraft arrived at the airport: about 99,500 on Runway 26 and 43,500 on Runway 08.

During 8-hour night over the 432-day period over 15,000 Overflights were measured at the 9 NMTs





## Baseline Lmax Outliers

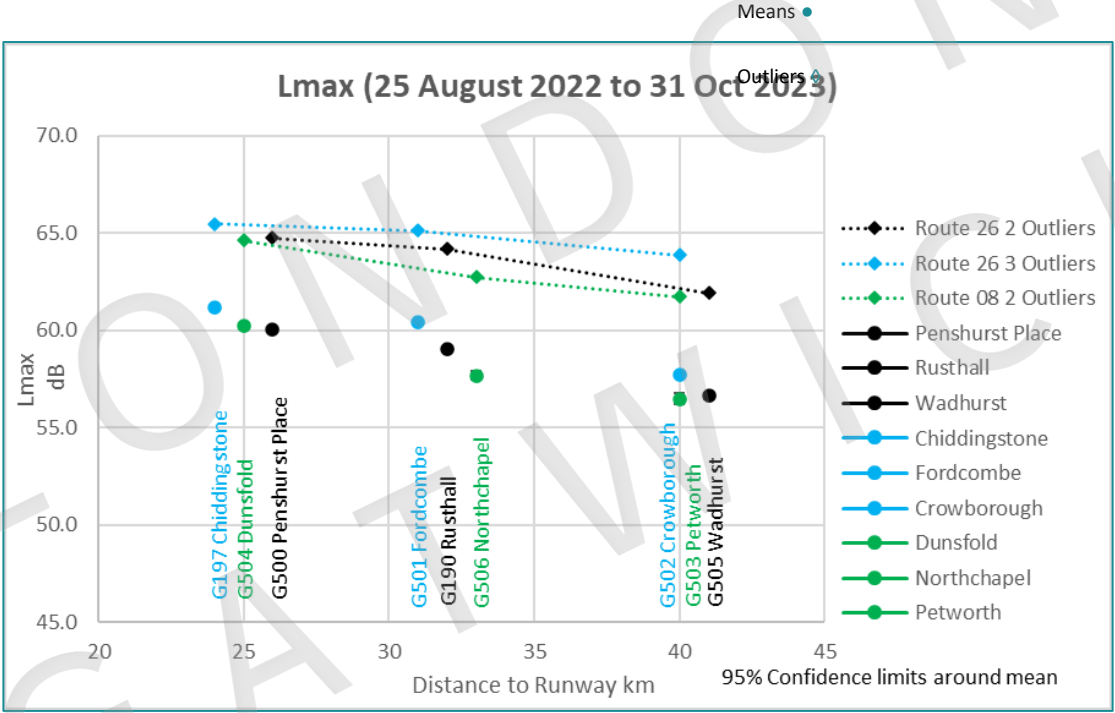
NMT	Location	Route	Lmax Outlier	95th% Confidence Limit of the mean
G500	Penshurst Place	26R2	<b>64.8</b>	0.11
G190	Rusthall	26R2	<b>64.2</b>	0.13
G505	Wadhurst	26R2	<b>61.2</b>	0.22
G197	Chiddingstone	26R3	<b>65.5</b>	0.07
G501	Fordcombe	26R3	<b>65.1</b>	0.11
G502	Crowborough	26R3	<b>63.9</b>	0.17
G504	Dunsfold	08R2	<b>64.6</b>	0.15
G506	Northchapel	08R2	<b>62.7</b>	0.23
G503	Petworth	08R2	<b>61.7</b>	0.32

5<sup>th</sup> Percentile of all overflights in 8-hour night August 25th 2022, and October 31st 2023

At each site, the Lmax Outlier level set so that 5% of aircraft are Outliers over the whole survey period

There is some seasonality, with higher %s of outliers in the winter months, when there are also few aircraft

# Baseline Lmax Outliers



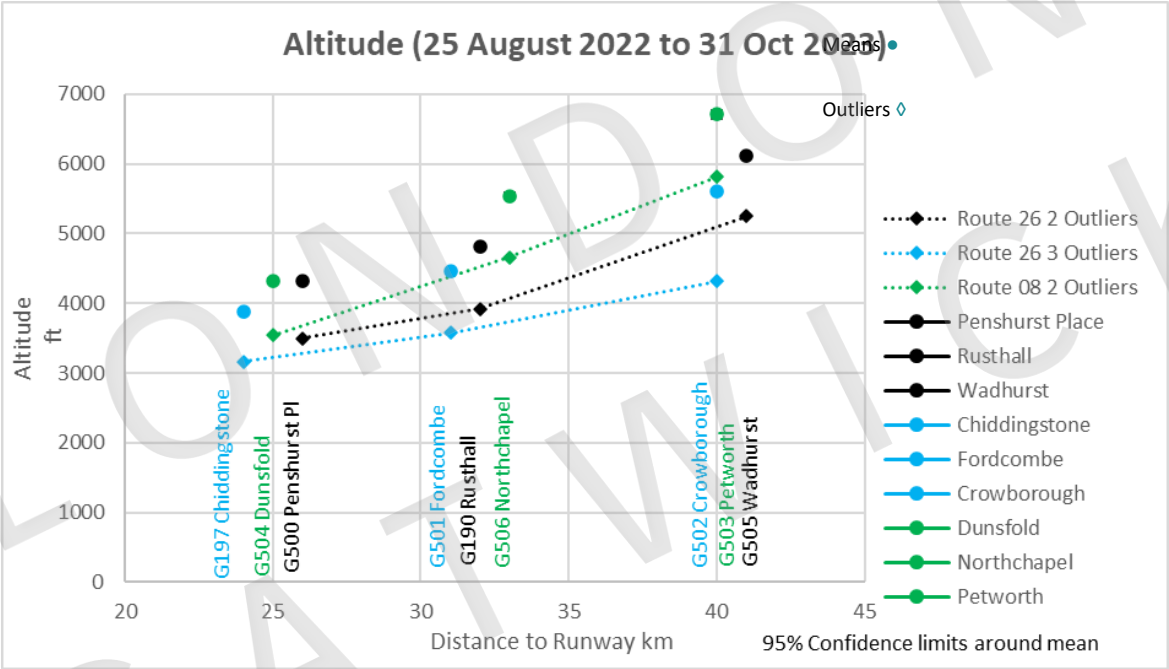


## Baseline Altitude Outliers

NMT	Location	Route	Altitude Outlier	95th% Confidence Limit of the mean
G500	Penshurst Place	26R2	3,494	19
G190	Rusthall	26R2	3,917	23
G505	Wadhurst	26R2	5,246	48
G197	Chiddingstone	26R3	3,159	12
G501	Fordcombe	26R3	3,576	22
G502	Crowborough	26R3	4,314	44
G504	Dunsfold	08R2	3,539	26
G506	Northchapel	08R2	4,655	55
G503	Petworth	08R2	5,808	72

5<sup>th</sup> Percentile of all overflights in 8-hour night August 25th 2022 and October 31st 2023

# Altitude Outliers



## Conclusions (Noise Monitoring)

In summer 2019 nine NTK monitoring terminals were deployed to measure noise and altitude data to establish the baseline for the RNN Trial.

A two-month baseline survey from January to March 2020 developed the methodology to identify and capture aircraft  $L_{\max}$  and altitudes from the 9 monitoring sites located under 3 of the 8 RNN trail routes, to generate the  $L_{\max}$  and altitude 5<sup>th</sup> % Outliers for the baseline arrivals procedures, against which the levels measured during the trial will be compared. Monitoring ceased in March 2020.

Monitoring showed a large range in  $L_{\max}$  levels (15-20dB) and altitudes (4,000 ft) at a given monitoring site, indicating a PBN arrivals procedure, as to be tested in the trial, could significantly reduce the noisiest and lowest aircraft, ie the Outliers.

Monitoring during a 432 day between August 25th 2022 and October 31st 2023 has been used to define the the  $L_{\max}$  and altitude 5<sup>th</sup> % Outlier levels at each of the 9 monitors. During this period approximately 143,000 aircraft arrived at the airport.

Using over 15,000 measurements during the 8-hour night period,  $L_{\max}$  and altitude Outlier levels have been computed for each of the 9 monitoring sites with 95% confidence limits of <0.32dB for  $L_{\max}$  and <72 feet for altitude. These are considered sufficiently robust to use for the trial.

The NTK monitors have recently been calibrated and have remained in place ready for the trial to commence.

The Trial Objective is to test the PBN procedures to see if Outliers can be reduced by 90%.