

Reduced Night Noise Trial Plan

London Gatwick Airport Limited

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Version 1.0

7th December 2018

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Introduction

Overview

Gatwick Airport has investigated through the NMB the opportunity to reduce night noise through the use of Area Navigation (RNAV) technology, in order to reduce the number of people disturbed by night arrivals.

Background

Gatwick Airport commissioned an Independent Arrivals Review in 2015 to address community concerns regarding noise from aircraft arriving at the airport. The review made a number of recommendations to reduce noise around the airport, including the following:

The adoption of carefully designed routes from the approach holding fixes used for Gatwick, to the ILS final approach tracks, provides real opportunity to reduce noise, to disturb fewer people, to deliver fair and equitable dispersal of noise, and, to deliver well defined respite measures. The London Airspace Management Programme should be developed by NATS and GAL to incorporate alternative proposals, to those published in 2013, as soon as reasonably possible, for consultation, agreement and implementation for Gatwick arrivals.

This recommendation was adopted by the Noise Management Board (NMB) and was included in the NMB 2017/18 workplan. At the 5th meeting of Gatwick's NMB in April 2017, members agreed that opportunities for night noise respite should be further explored to reduce the number of people disturbed by night arrivals.

The following engagement has taken place with the NMB and industry to discuss and define trial aims, objectives and design considerations, as well as safeguarding criteria and the engagement strategy:

1. An Industry workshop (July 2017) to explore potential options for night noise reduction.
2. An NMB briefing and discussion on the Reduced Night Noise (RNN) initiative at NMB/7 (September 2017), originally known as 'Quiet Night Arrivals'.
3. Discussion at NMB/8 (November 2017), including a review of Community Noise Group (CNG) pre-conditions.
4. A review of RNN trial next steps at NMB/9 (January 2018).
5. An Industry workshop (February 2018) to assess the feasibility of the proposed trial and to identify any potential constraints. This included representatives from Helios, GAL, ANS, Airlines, CAA, NATS, Trax and DfT
6. An NMB RNN workshop (March 2018) to discuss the proposed RNN initiative, including an overview of the trial, the concept of RNAV operations, and the design considerations.
7. An industry workshop (March 2018) to further discuss possible concepts of operation and the Instrument Flight Procedure (IFP) design process. This included representatives from Helios, GAL, ANS, Airlines, Trax and BALPA.
8. An overview of RNN trial discussions and proposed next steps was provided to NMB/10 (April 2018) and NMB/11 (June 2018).

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9. An NMB RNN ad-hoc meeting (July 2018) was held to resolve outstanding items raised at NMB/11 and to conclude discussions with CNG and agree a way forward for the RNN trial.
10. An industry workshop (September 2018) to review indicative trial routes and potential airspace issues and constraints, discuss the IFP design process, and to consider ATC and airline trial procedures. This included representatives from Helios, GAL, Airlines, Trax and NATS.
11. The RNN Trial Statement of Need was submitted to the CAA on 28 September.

CAP1616 trial approval process

This document is the trial plan as required to be submitted to the CAA as part of the CAP1616 trial approval process.

The CAA's CAP1616 document describes the process to be undertaken for both permanent and temporary airspace changes and airspace trials. Since the proposed activity is a trial, it will follow CAP1616 trial procedures.

Terminology note: 'RNAV'

In this trial plan, the trial procedure is described as 'RNAV'. If the trial is undertaken, it may be more appropriate to use an 'RNP' procedure. Both PBN specifications have the same track-keeping accuracy. It is not yet determined whether advanced functionality such as "Radius to Fix" would be implemented. Despite the possibility of an 'RNP' procedure in the trial, the terminology 'RNAV' is maintained until a final decision is made.

Trial overview

Introduction

This section presents an overview of the proposed trial.

The trial has been discussed at numerous meeting with NMB members, the Noise and Track Monitoring Advisory Group (NaTMAG), wider community groups/representatives and at public meetings. The following elements have been discussed at these forums and changes have resulted from the feedback received.

The trial details are not fixed and may be subject to revision.

Objectives

The primary objective of the trial will be to assess the extent that RNAV technology can be used to deliver noise benefits (to arriving aircraft) during the night period by reducing the number of aircraft flying unduly noisy profiles and/or flying at unnecessarily low altitudes, thus reducing the number of people disturbed.

The following additional objectives are also defined:

- To assess if RNAV procedures can reduce the peak noise levels generated by arriving aircraft.
- To compare the 'with RNAV' and 'without RNAV' noise environment by placing RNAV routes inside the existing night time arrivals swathe.
- To identify planning and executional challenges to inform future use of RNAV.
- To evaluate new community engagement initiatives and processes.

Principles of the trial

To help clarify the objectives of the trial, the following trial principles have been presented to the NMB.

Table 1: Trial principles

| The purpose of the trial is to: | The purpose of the trial is <u>not</u> to: |
|--|---|
| Demonstrate the noise benefits of RNAV by comparing the 'with' and 'without' RNAV noise environment. | Identify routes for use in future airspace design. |
| Inform future planning as to the impacts of RNAV. | Overfly people currently outside of the night time arrivals swathe. |
| Gather data on RNAV operational performance and noise impacts. | Move the minimum night-time ILS joining point from 10NM. |
| Further develop the NMB's understanding of arrivals RNAV. | Optimise routes for capacity improvements or efficiency. |
| Evaluate new community engagement initiatives and processes. | Evaluate future mechanisms for higher-density sequencing, Fair and Equitable Distribution (FED), respite or other concepts. |
| | Introduce an airspace change without consultation. |

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Trial parameters

The following trial parameters have been discussed with the NMB:

1. Operate the trial between 01:30-05:00 (local time).
2. Run the trial for 6 months in total.
3. Design RNAV routes to both ends of the runway.
4. Use the Southern Runway only.
5. Use noise monitors to capture real data, both before (baseline) and during the trial.
6. On completion of the trial, revert to pre-trial operation.

Success Criteria

The following metrics will be measured using recorded noise data at noise monitor locations and will be calculated for each aircraft type participating in the trial.

- Objective 1: The loudest outliers¹ reduced by 90%.
- Objective 2: The lowest outliers reduced by 90%.
- Objective 3: A reduction in X% of N60 events. (See Note 1)

Note: Objective 3 must still be quantified. Noise monitors close to the airport will measure more N60 events (60dB L_{max}) than those further away. At some locations, there will be no change to the N60 events, for example because no aircraft exceed 60dB L_{max} either before or during the trial. For this reason, these targets will be set individually for each noise monitor later in the trial planning process and may not be appropriate at all noise monitor sites.

Safeguarding measures

The following reassurances have been provided by GAL to address CNG concerns about safeguarding:

- The trial will propose four routes for both westerly and easterly arrivals to be taken through the design process. The proposals will have the intention of minimising concentration and dispersing arrivals whilst not creating newly overflown. **Indicative trial routes are shown in Annex B.**
- ATC procedures will use the most appropriate route given the country of origin and considering any operational constraints. The distribution of traffic across the routes will be reported to NMB.
- The proposed trial routes taken forwards for procedure design will be designed so they do not overlap or cross before joining the extended centreline.

¹ For the purpose of the trial, outliers are defined as those in the 'worst performing' 5% of aircraft, i.e. the loudest 5% (within the aircraft category) or the lowest 5%.

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- The route designs, operational procedures and trial findings will be shared with the NMB and NaTMAG through interim updates in line with an agreed engagement strategy and trial plan under CAP1616.
- The trial hours will not be extended during the trial without engaging with the NMB and the approval of the CAA through the CAP1616 process.
- The trial will be halted if it is not achieving, or not close to achieving, the quantitative objectives agreed and established for the trial. GAL will collate, monitor and report on the level and content of complaints once the airspace trial commences, and on the basis of these, and not just how many have been made, will take the appropriate action as defined in CAP1616. A process will be defined as part of the trial planning and preparation phase.
- Future trials and airspace change proposals will be undertaken in full accordance with CAA requirements and Government policy.
- The trial report will be an objective factual report based on the trial findings assessed against the agreed trial criteria and objectives to give a comprehensive and balanced assessment of the trial performance and noise data. A process will be defined as part of the trial planning and preparation phase.
- Noise monitors will be located to allow the trial results to allow a valid before/after comparison.
- The trial will be suspended to evaluate any safety concerns that are raised by operational staff. A process will be defined as part of the trial planning and preparation phase.

Trial preparation and planning activities

Introduction

This section describes the activities to be undertaken to prepare for the trial.

Preparation and planning activities

The following list identifies the main activities required by CAP1616 and otherwise, to prepare for the trial:

- Management – including planning, managing tasks and co-ordination of CAP1616 trial process.
- Statement of need and trial plan – Prepare and submit to CAA.
- Industry consultation – Preparation of strategy and documents, approval by CAA of consultation strategy and documents, undertaking consultation, and review responses.
- Update trial plan – Prepare based on consultation feedback and submit to CAA.
- Routes and procedure design – High level route analysis, IFP design, simulator database code production, IFP validation, develop CAA submission package, IFP approval by CAA and AIP publication.
- ATC procedures – Prepare ATC instruction, prepare ATC system requirements, training and briefing and trial suspension procedures.
- Airline procedures – Survey of airline equipage, airline briefings, definition of procedures
- Noise monitors – Selection of monitoring locations and siting of noise monitors.
- Environmental assessment – Conduct noise modelling, determine expected traffic patterns (frequency and overflight) during the defined trial period, and submit to CAA.
- Engagement – Identify key stakeholders and develop an engagement strategy. Engage with the NMB via the Gatwick website and other means.
- Safety assessment – Conduct and submit to CAA.
- Trial data collection procedure definition – including noise monitor data gathering, ATC recording of trial suspension and non-participating aircraft, ATCO survey, pilot survey and complaint statistics.
- Definition of trial reporting procedures - statistics reporting during the trial and post-trial report.
- Definition of procedures in the case of noise increases during the trial.

Gantt chart

The above activities are shown on the following Gantt chart with indicative timescales:

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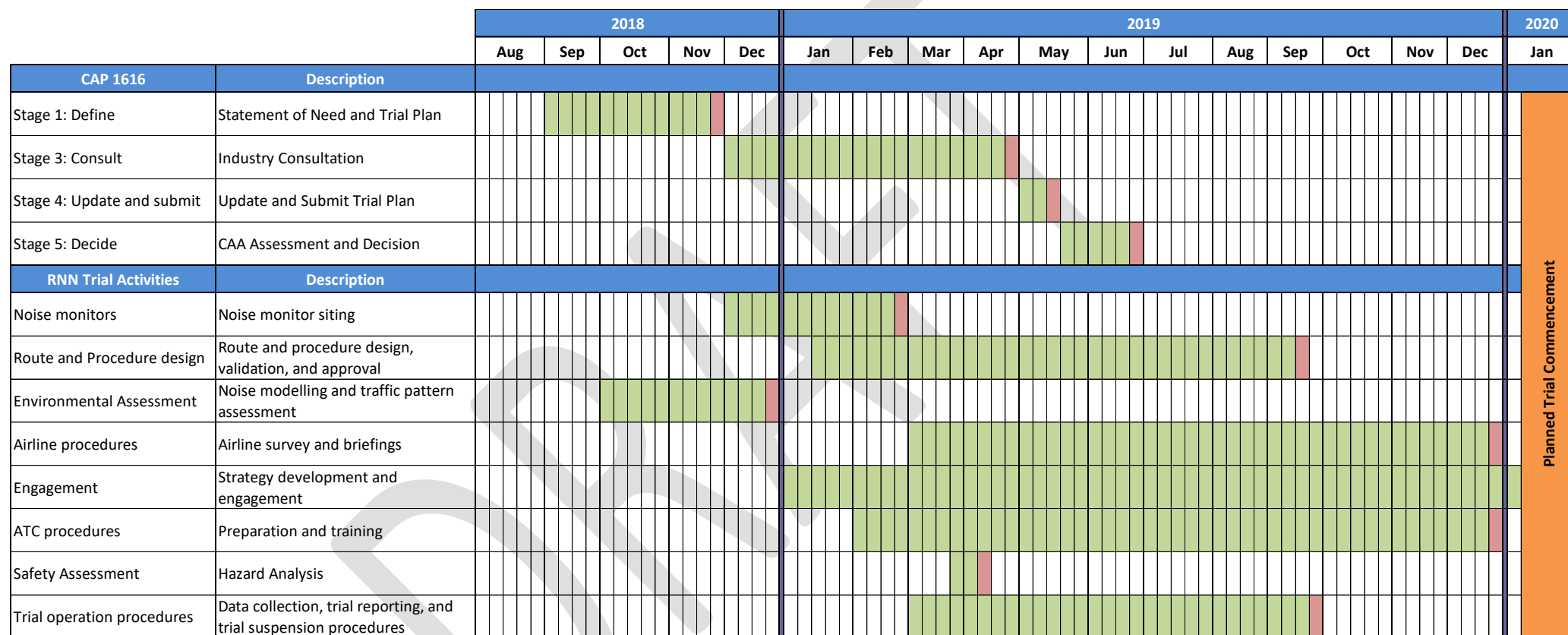


Figure 1. RNN Trial Preparation and Planning Gantt Chart (indicative timescales only) - Updated as of November 2018

Annex A: Analysis of traffic data

Introduction

This section presents the traffic data analysis that was presented at the industry and NMB workshops in March 2018.

Traffic numbers and characteristics

The following tables show the number of arrivals to Gatwick between **January – June 2017, 01:30-05:00 (local)**. We refer to this period as the ‘comparison period’.

This data gives an indication of the likely traffic numbers if the trial is run during the same months in another year, although actual numbers can vary because of:

- 1) growth or reduction in overall traffic numbers, and
- 2) factors that can move day time arrivals into the night (eg weather disruption).

Table 2: Arrivals per month/night in comparison period

| Month (2017) | No. of arrivals | Average per night |
|--------------|-----------------|-------------------|
| Jan | 56 | 2 |
| Feb | 63 | 2 |
| March | 60 | 2 |
| Apr | 177 | 6 |
| May | 337 | 11 |
| Jun | 453 | 15 |
| Total | 1146 | |

Note: The number of night flights in the defined trial period (01:30-05:00 local) increases moving from winter through to summer.

Table 3: Arrivals per hour/30 mins in comparison period

| Time (local) | Arrivals per hour | | | | | | Total |
|--------------|-------------------|-----------|-----------|------------|------------|------------|-------------|
| | Jan | Feb | Mar | Apr | May | Jun | |
| 0130-0159 | 15 | 13 | 17 | 100 | 130 | 165 | 440 |
| 0200-0259 | 9 | 10 | 8 | 48 | 110 | 152 | 337 |
| 0300-0359 | 4 | 6 | 6 | 18 | 61 | 86 | 181 |
| 0400-0459 | 26 | 34 | 29 | 11 | 35 | 50 | 185 |
| 0500 sharp | 2 | 0 | 0 | 0 | 1 | 0 | 3 |
| Total | 56 | 63 | 60 | 177 | 337 | 453 | 1146 |

Note: The busiest period generally appears to be the first 30 mins of the trial period, from 0130-0159 local.

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Table 4: Nights with more than 15 / 20 arrivals in comparison period

| No. of aircraft | Nights with >15/>20 arrivals | | | | | | Total |
|-----------------|------------------------------|-----|-----|-----|-----|-----|-------|
| | Jan | Feb | Mar | Apr | May | Jun | |
| >15 | 0 | 0 | 0 | 1 | 5 | 11 | 17 |
| >20 | 0 | 0 | 0 | 0 | 2 | 5 | 7 |

Note: The number of night flights in the defined trial period (01:30-05:00 local) increases moving from winter through to summer. The summer schedule is introduced in March.

Table 5: Arrival split by originating direction and runway in comparison period

| | Originating direction | | | | | | | |
|-----|-----------------------|----|----|----|---|----|---|----|
| | SE | | SW | | E | | N | |
| Rwy | 8 | 26 | 8 | 26 | 8 | 26 | 8 | 26 |
| % | 14 | 31 | 16 | 36 | 0 | 1 | 1 | 1 |

Note: The majority of arrivals approach the airport from the South East and South West. More aircraft use runway 26 than runway 08 (69% - 31% respectively).

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Pre-trial traffic distribution

Figure 2 shows heatmaps of the arrival swathes to the east and west based on Jan – Jun 2017 data for flights arriving 01:30 to 05:00 local. Only traffic below 7,000ft is shown. Areas with <1% of overflights have been removed.



Figure 2: Arrivals heatmaps for Jan-Jul 2017 01:30 – 05:00 (local), traffic below 7000ft

Indicative trial routes

In order to meet the trial objectives and principles described earlier, the following objectives are proposed for the routes:

- Design multiple RNAV routes to aid dispersal and to reduce the effects of concentration.
- Design 4 RNAV routes to both ends of the runway.
- Design RNAV routes to the Southern Runway only.
- Position RNAV routes within existing arrivals swathes.
- Position RNAV routes over the areas of current highest density traffic.
- Minimise overlap of 'overflight' areas, (i.e. areas of approximately equal noise), consistent with CAP1498 and CAP1378

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Based on these agreed objectives, routes have been proposed to illustrate approximate route locations and their limit of overflight. Figure 3 presents the routes which have been discussed at the NMB and through NaTMAG.



Figure 3: Indicative routes, presented to the NMB

Annex B: Expected trial benefits

Introduction

This section presents analysis of trial benefits presented to the NMB.

The analysis is indicative of the expected impact of RNAV, although there may be additional factors affecting real traffic. The trial results may therefore be different from those shown below.

Approach to analysis

The analysis presented in this section is based on arrivals noise data gathered from August to October 2017 at two mobile noise monitors placed at Crowborough and Penshurst. During this time, the noise from aircraft was measured at these locations as well as the altitude and vertical profiles of their arrivals.

From the arriving aircraft, those with 'RNAV-like' vertical profiles were selected. These are aircraft that are within 500ft of the defined optimum altitude when flying over the noise monitor and descending at 3 degrees +/- 10%.

The noise produced by the current profiles and the 'RNAV-like' ones were compared.

Analysis results

Figure 4 shows the noise (in Lmax dB) produced from arriving aircraft as measured at Crowborough and Penshurst. The 'outliers' (the loudest 5% and the lowest 5%) are shaded in dark grey in both figures. The left hand figures (Column A) show all arrivals whilst the right hand figures (Column B) show those flying an 'RNAV-like' profile.

It demonstrates that almost all of the outliers are removed from the 'RNAV-like' profiles.

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Column A

Column B

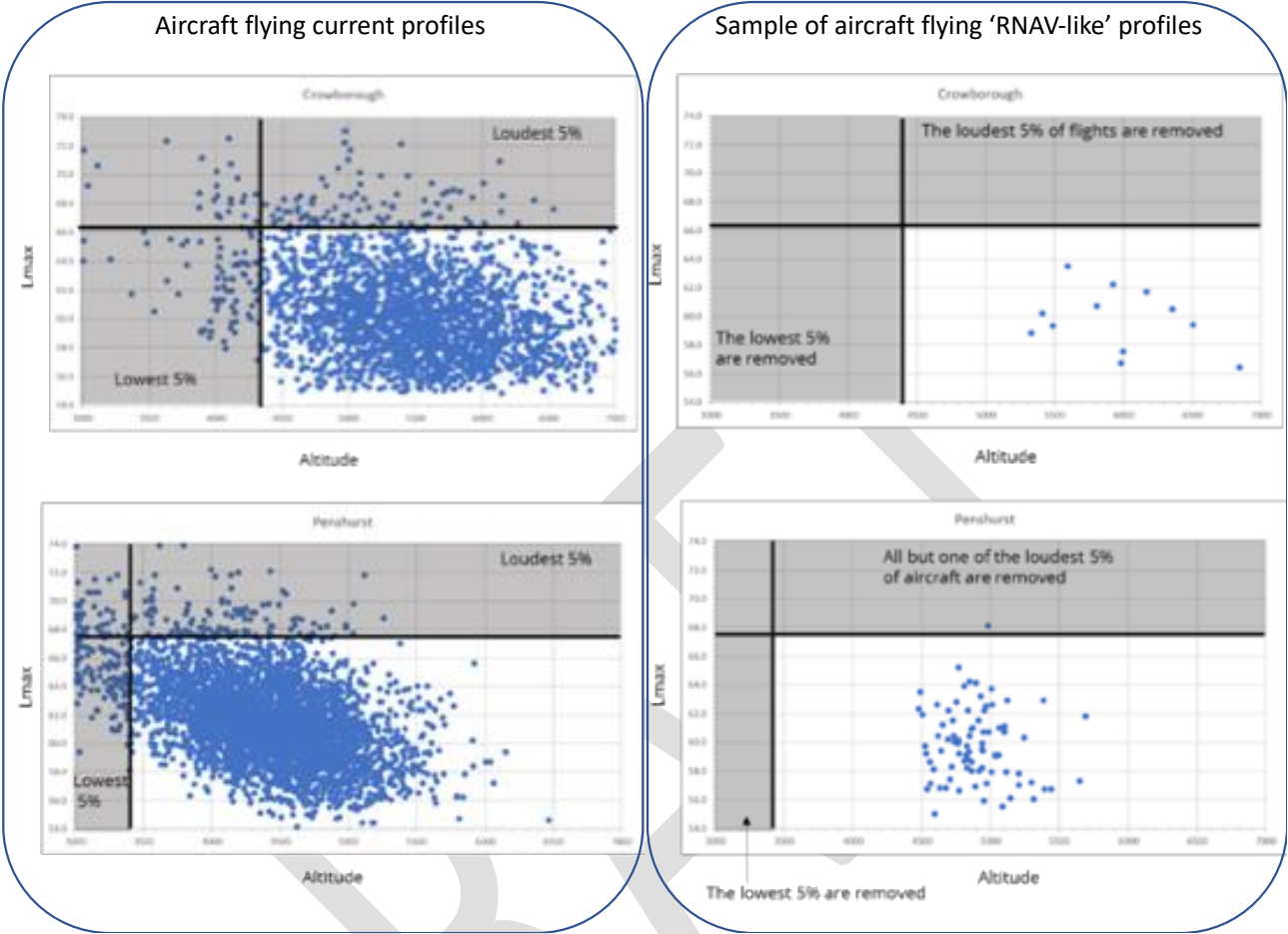


Figure 4. Noise analysis results for Crowborough and Penshurst