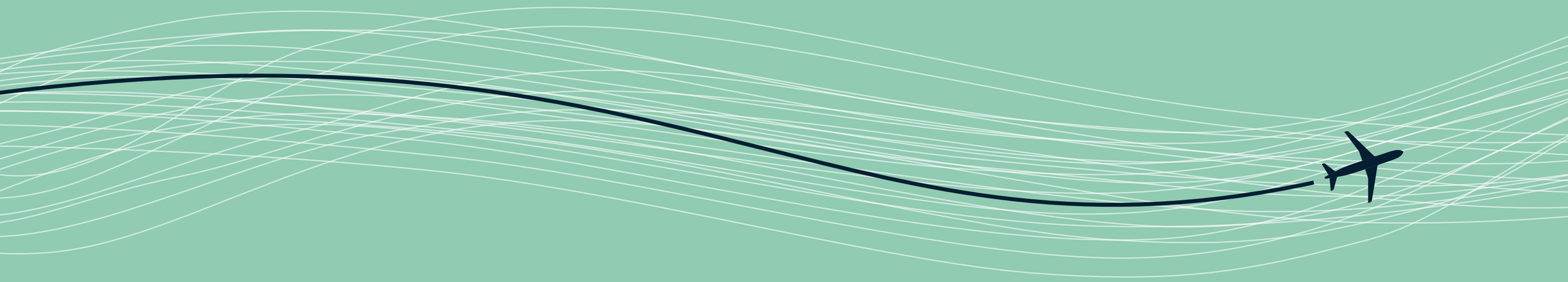
suono

# Noise Monitoring Weston-on-Trent 2025

**DRAFT FOR COMMENT**



MAG
East Midlands
Airport

# Key Facts and Figures

Summary information from the Weston-on-Trent noise monitoring position (M1), which monitored for 92 days between 16th June and 15th September 2025. Data presented is a summary of, and should be read in conjunction with, this report. Noise data presented on this page is assessed to be from aircraft only, with noise from other sources having been excluded.

## Aircraft Noise Levels

See Table 6 for more information

**45 dB** during the daytime ($L_{Aeq,16\ hour}$)

**51 dB** during the night-time ($L_{Aeq,8\ hour}$)

## Position of Weston-on-Trent Noise Monitor


## Number of Aircraft Noise Events
during the 92-day summer period

See Section 4.0 for more information

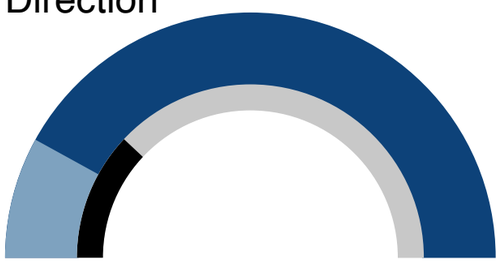
**1,859** total measured events

**332** daytime events above 70 dB $L_{Amax}$

**547** daytime events above 65 dB $L_{Amax}$

**967** night-time events above 60 dB $L_{Amax}$

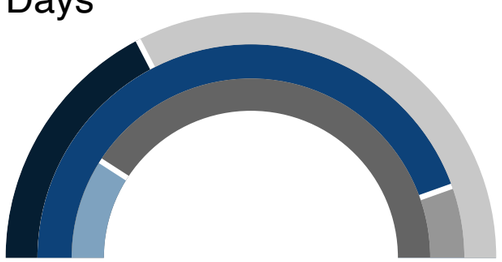
## Operating Direction



| Detail | Runway 09 | Runway 27 |
|---|---|---|
| Monitoring period | 20% | 80% |
| Last 5 years | 24% | 76% |

See Section 2.0 for more information

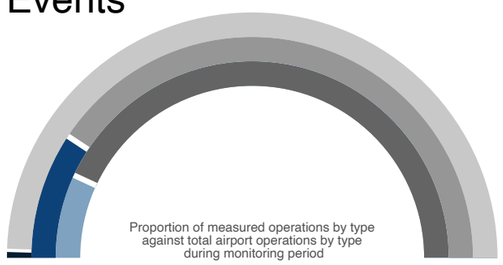
## Operating Days



| Detail | Days with Aircraft | Days without Aircraft |
|---|---|---|
| Arrival | 32 | 60 |
| Departure | 82 | 10 |
| Circuit | 17 | 75 |

See Section 2.0 for more information

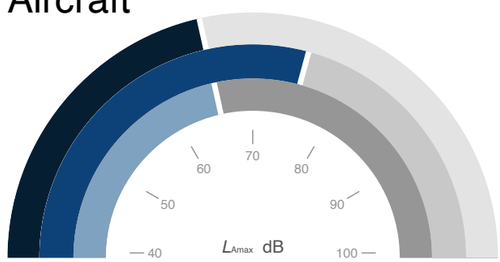
## Measured Events




| Detail | Arrival | Departure | "T" Movements |
|---|---|---|---|
| Movements Measured | 87 | 1,579 | 77 |
| Total Airport Movements | 8,496 | 8,486 | 563 |

See Section 2.0 for more information

## Noisiest Aircraft




| Detail | Arrival | Departure | Circuit |
|---|---|---|---|
| Average $L_{Amax}$ | 64 dB | 75 dB | 67 dB |
| | Boeing 737 MAX 8 | Boeing 737-400F | Boeing 737-800 |

See Section 5.0 for more information

# Noise Monitoring Weston-on-Trent 2025

prepared for East Midlands Airport, Castle Donington, Derby DE74 2SA

## Document Details

| | |
|---|---|
| **Title** | Weston-on-Trent 2025 |
| **Project** | Noise Monitoring |
| **Reference** | 27BA.RP.12 |

| Revision | Date | Author(s) | Reviewer |
|---|---|---|---|
| 1st DRAFT | 12 December 2025 | FD | BHo |
| 2nd DRAFT | 26 January 2026 | FD | BHo |



## Contents

1.0 Introduction ..... 1

2.0 Number and Location of Aircraft Movements ..... 2

3.0 Aircraft Types and Operators ..... 5

4.0 Measured Noise Levels ..... 6

5.0 Maximum Noise Levels ..... 7

Appendix A: Glossary ..... 8

Appendix B: Survey Data ..... 9

Noise Data ..... 9

Weather Data and Omitted Data ..... 9

Correlated Event Data ..... 9

Survey Data: 16 June to 5 July 2025 ..... 10

Survey Data: 6 July to 25 July 2025 ..... 11

Survey Data: 26 July to 14 August 2025 ..... 12

Survey Data: 15 August to 3 September 2025 ..... 13

Survey Data: 4 September to 15 September 2025 ..... 14

## Report Summary

This is an A3 sized report and is intended to be read on a computer screen or on A3 sized paper.

### Section 1: Introduction

**Section 1** provides information on the permanent noise monitoring location which this report focuses on, the reasons for the report and context on the monitoring location in relation to East Midlands Airport and the surrounding area.

### Section 2: Number and Location of Aircraft Movements

**Section 2** sets out the number of movements over Weston-on-Trent and displays where movements are located in relation to the noise monitor and Weston-on-Trent.

### Section 3: Aircraft Types and Operators

**Section 3** discusses the different aircraft types and operators using East Midlands Airport over Weston-on-Trent.

### Section 4: Measured Noise Levels

**Section 4** sets out ambient noise analysis at Weston-on-Trent and investigates number above analysis.

### Section 5: Maximum Noise Levels

**Section 5** displays maximum noise levels from aircraft over Weston-on-Trent and breaks down the aircraft types producing the highest noise levels.

### Appendix A and B

**Appendix A** is a glossary of acoustic aviation terms to assist the reader.

**Appendix B** summarises the raw noise data recorded for the entire monitoring period and an analysis of the weather conditions.

# 1.0 Introduction

1.1 East Midlands Airport has a permanent noise monitor at location M1 on the outskirts of Weston-on-Trent which is approximately 4.7 km from the runway to the northwest of the Airport.

1.2 This report is based on data from this permanent noise monitor between 16th June to 15th September 2025. This allows for comparison against annually produced noise contours.

1.3 The most up to date noise contours of the Airport can be seen on the community noise portal at Our current noise contour – East Midlands Insightfull. Other information and explanations on airport operations can also be found via this website.

1.4 Monitoring was undertaken to gain a better understanding on aviation activity affecting the noise climate of the area and as part of the Airport's ongoing commitment to monitor noise from its activities.

1.5 From analysis of the measured data, key noise metrics and information have been calculated and are presented in this report.

1.6 **Image 1** shows the location of M1 in relation to its local surrounds. The location can also be seen via Webtrak at WebTrak : East Midlands Airport.

1.7 A representation of the Airport's runway can be seen in **Image 2** indicating the direction of departures and arrivals.

1.8 For the summer period, runway usage was split as follows due to wind conditions:

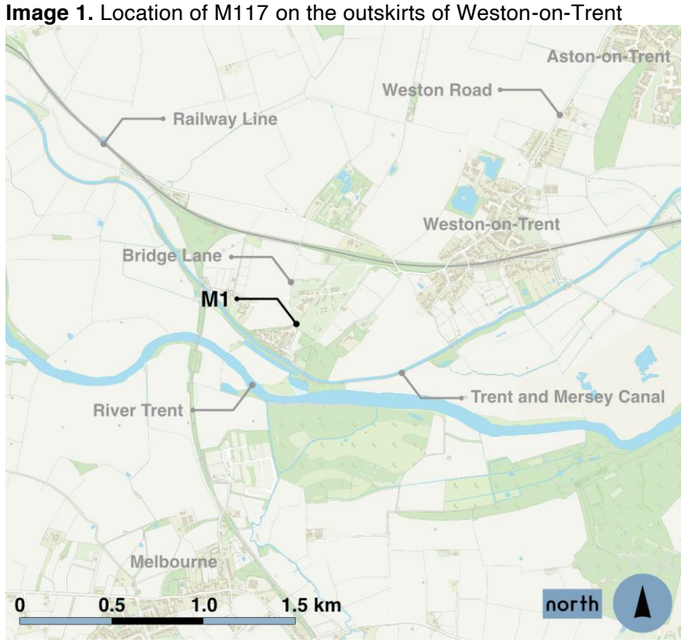
- **Runway 09 (easterly direction): 20 % of the time**
- **Runway 27 (westerly direction): 80% of the time**

1.9 Over the past 5 years, this split has been 24% / 76% on average meaning the 2025 summer period was broadly comparable with a slightly higher percentage in the westerly direction.

1.10 Monitoring predominately recorded departures from runway 27 within the Trent Noise Preferential Route (NPR) and training flights on the northern training circuits. Some light aircraft operations and arrivals to runway 09 were also recorded.

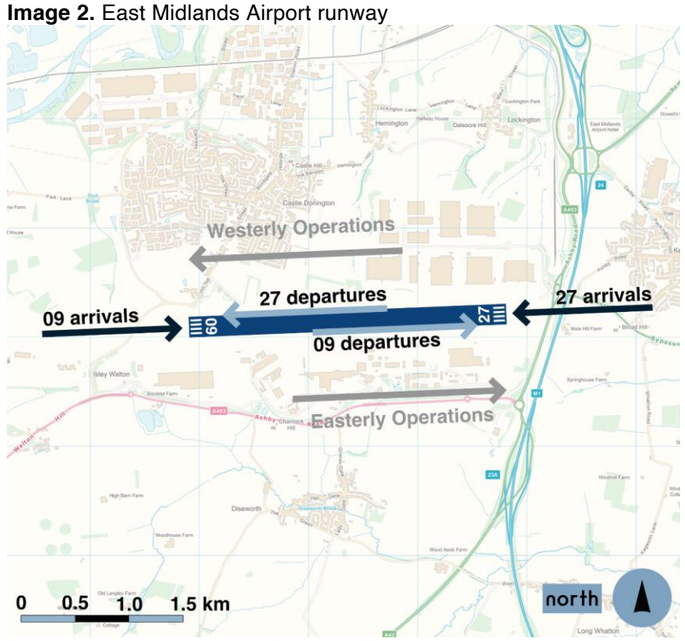
1.11 Two indicative circuit routes can be seen on **Image 3** along with the Trent NPR for runway 27 departures in relation to the Airport, Weston-on-Trent and the monitoring position.

**Image 1.** Location of M117 on the outskirts of Weston-on-Trent




Background map courtesy of *Ordnance Survey*

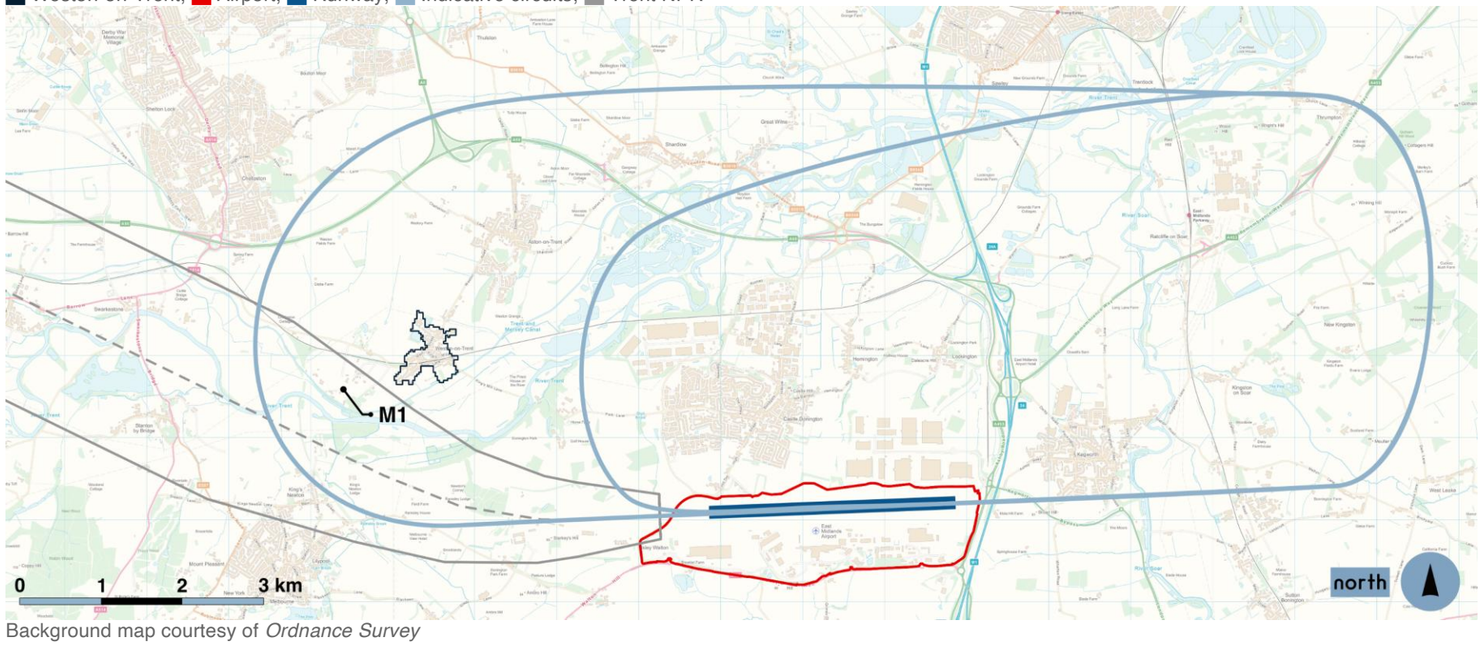
**Image 2.** East Midlands Airport runway




Background map courtesy of *Ordnance Survey*

**Image 3.** Location of Weston-on-Trent and the measurement position relative to the Airport, the indicative northern training circuits and the Trent NPR

Weston-on-Trent, Airport, Runway, Indicative circuits, Trent NPR




Background map courtesy of *Ordnance Survey*

# 2.0 Number and Location of Aircraft Movements

2.1 During the summer period, a total of 17,545 movements occurred at the Airport as shown in **Table 1**.

**Table 1** Total East Midlands movements

| Departures | Arrivals | "T" Movements |
|---|---|---|
| 8,486 | 8,496 | 563 |

2.2 The noise monitor measured noise levels for 1,743 of these movements as split in **Table 2** using a virtual 'gate' located above the monitor in combination with the Airport Noise and Operations Monitoring System (ANOMS).

2.3 The gate is a virtual rectangular shape stretching from ground level up to 7,000 ft and is four nautical miles wide.

**Table 2** Movements that triggered the noise monitor

| Departures | Arrivals | "T" Movements |
|---|---|---|
| 1,579 | 87 | 77 |

2.4 **"T" movements** are those that depart and arrive to the Airport during the same operation. This can include "Touch-and-Go's", training flights or police operations as examples.

## Arrivals, Departures and Movements Not Associated with East Midlands

2.5 The noise monitor also measured noise levels from 72 aircraft that were not associated with East Midlands Airport.

2.6 **Image 4** to **Image 6** show how arrival, departure and non-East Midlands movements were split over each hour of the day. We note the difference in y-axis. **Image 7** to **Image 9** show the locations of movements through the gate in relation to the noise monitor.

2.7 **Table 3** shows the number of days where none of the respective operations were measured during the 92-day summer period.

**Table 3** Number of days with no movements measured

| Departures | Arrivals | Non-East Midlands Movements |
|---|---|---|
| 10 | 60 | 50 |

**Image 4.** Departures by hour
In terms of number of movements (y-axis) against hour (x-axis)

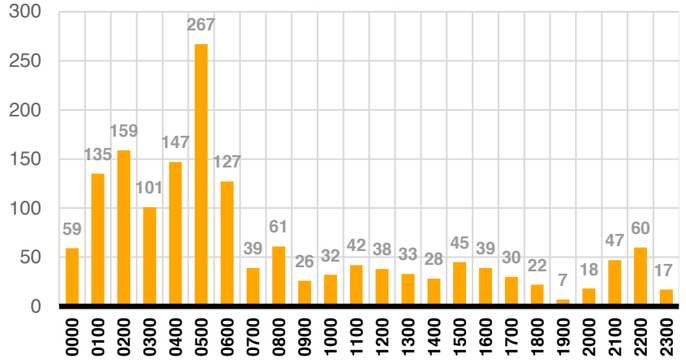



**Image 5.** Arrivals by hour
In terms of number of movements (y-axis) against hour (x-axis)

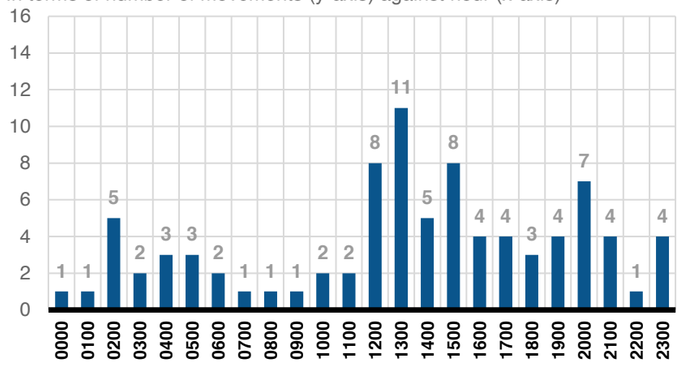



**Image 6.** Movements not associated with East Midlands by hour
In terms of number of movements (y-axis) against hour (x-axis)

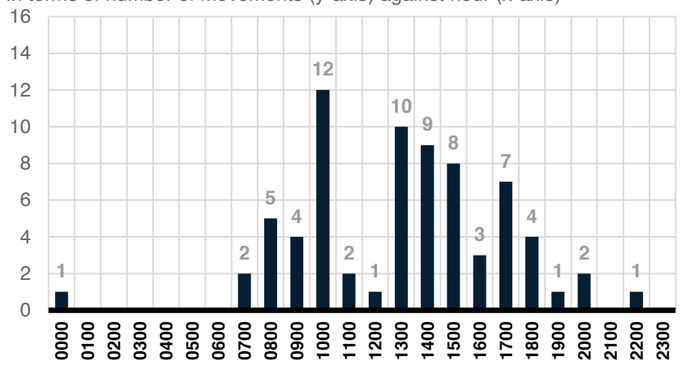



**Image 7.** Height and lateral distance of depatures from M1
1,579 flights in terms of lateral distance (x-axis, m) against height (y-axis, ft)

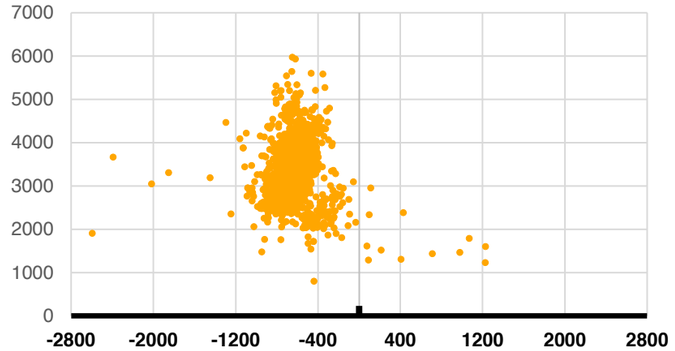



**Image 8.** Height and lateral distance of arrivals from M1
87 flights in terms of lateral distance (x-axis, m) against height (y-axis, ft)

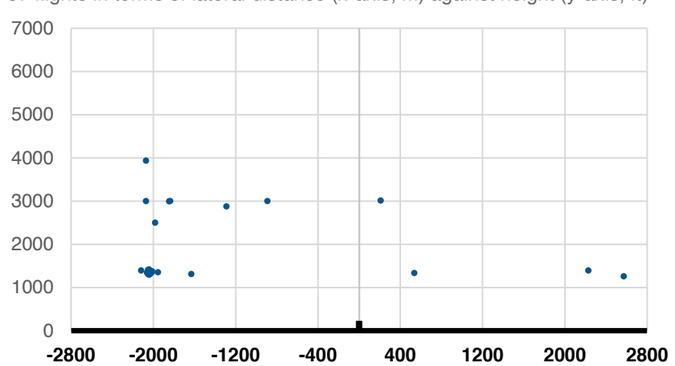



**Image 9.** Locations relative to M1 of non-East Midlands events
72 events in terms of lateral distance (x-axis, m) against height (y-axis, ft)

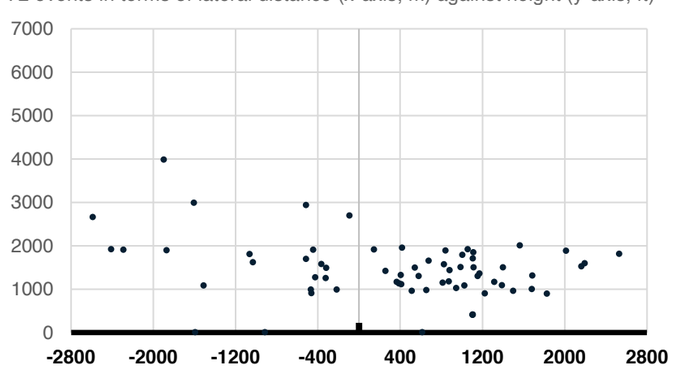


**Image 10.** Height and lateral distance of training circuits from M1
147 events in terms of lateral distance (x-axis, m) against height (y-axis, ft)

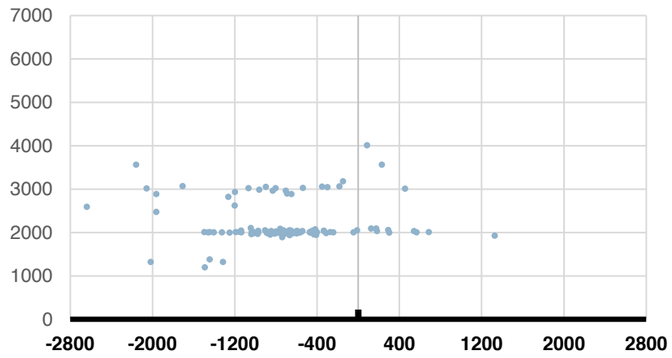



**Image 11.** Training circuits by hour
In terms of number of movements (y-axis) against hour (x-axis)

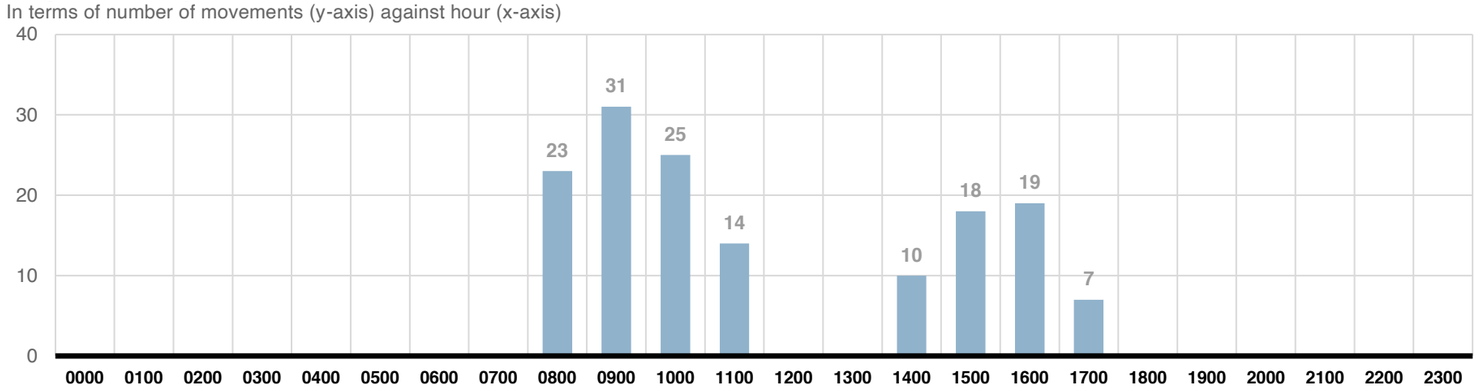



**Image 12.** Other “T” movements by hour
In terms of number of movements (y-axis) against hour (x-axis)

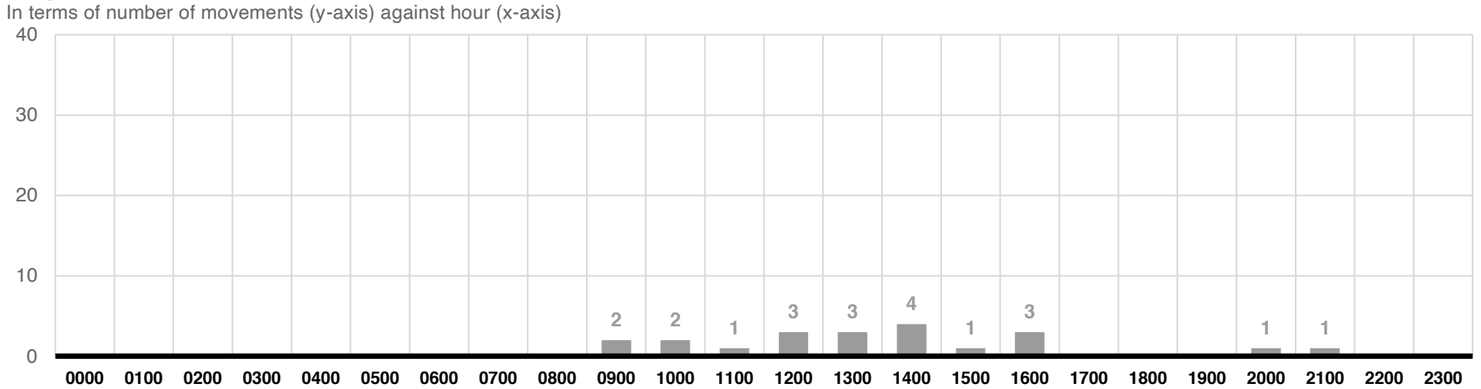
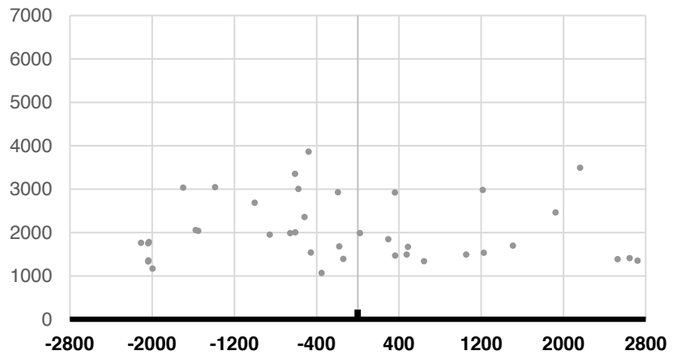



**Image 13.** Height and lateral distance of other “T” events from M1
46 events in terms of lateral distance (x-axis, m) against height (y-axis, ft)




## “T” Movements

2.8 Training of aircrew is sometimes undertaken at East Midlands Airport. Aircrew training is vital for airlines and whilst most training is undertaken using flight simulators, some flying is mandatory to meet Civil Aviation Authority (CAA) standards.

2.9 The final part of a pilot’s training is to complete a number of ‘training circuits’ which repeat take-off and landing procedures. Locally based jet operators and some light aircraft operators sometimes complete this type of operation at East Midlands Airport.

2.10 Of the “T” movements detailed in **Table 2**, 56 were jet engine aircraft training flights. These 56 training flights carried out a total of 147 training circuits that were measured.

2.11 **Image 10** shows the locations of these circuits through the gate in relation to the noise monitor and **Image 11** shows how they were split over each hour of the day.

2.12 There were 75 days throughout the monitoring period where no training flights were captured.

2.13 Training circuits occur between the hours of 0800 to 1200 and 1400 to 1800 only.

2.14 How the other 21 “T” movements were split over each hour of the day can be seen in **Image 12**. These movements led to 46 noise events at the monitor and the locations of these events through the gate can be seen in **Image 13**.

2.15 Other “T” movements can include the following:

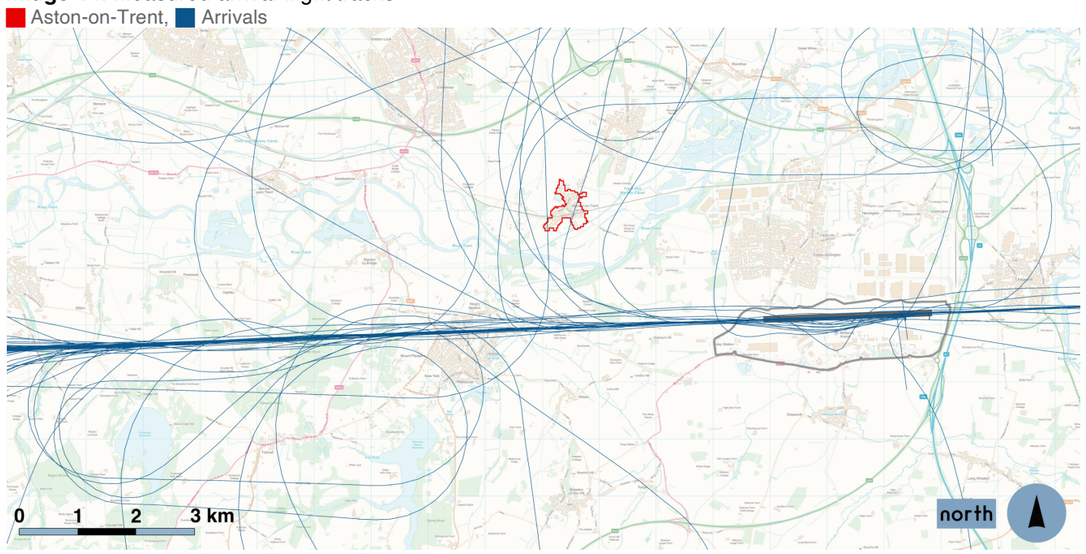
- Operations from flying clubs based at East Midlands,
- Private flights,
- Surveying services,
- Medical flights, and
- Police flights.

2.16 All these movements were by small aircraft types during the daytime period (0700 – 2300).

## Aircraft Density Plots

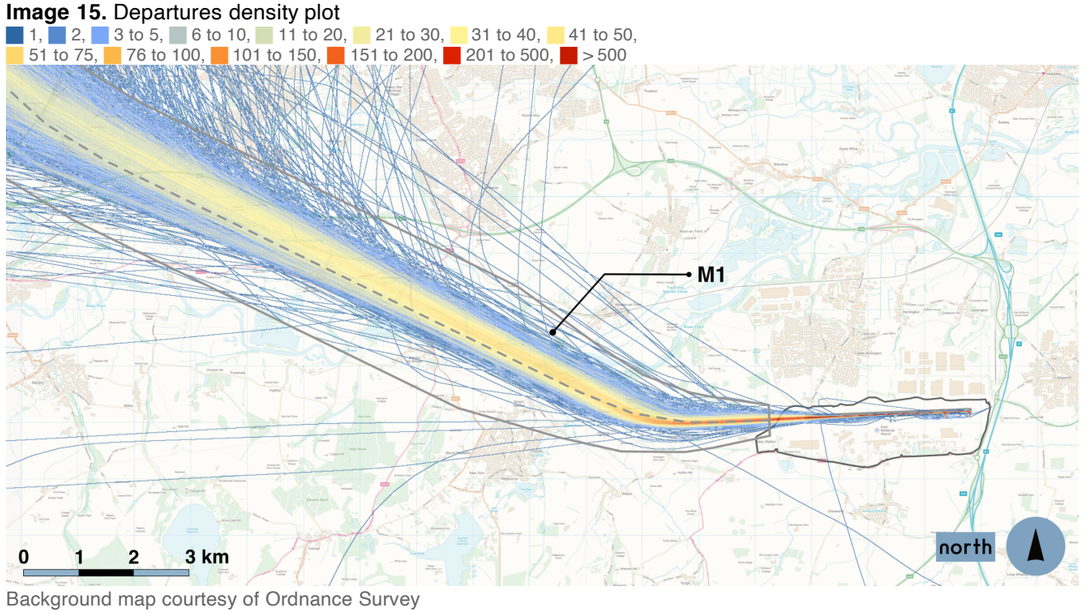
2.17 Flight tracks for the measured arrivals can be seen in **Image 14**.

**Image 14.** Measured arrival flight tracks




Background map courtesy of Ordnance Survey

**Image 15.** Departures density plot



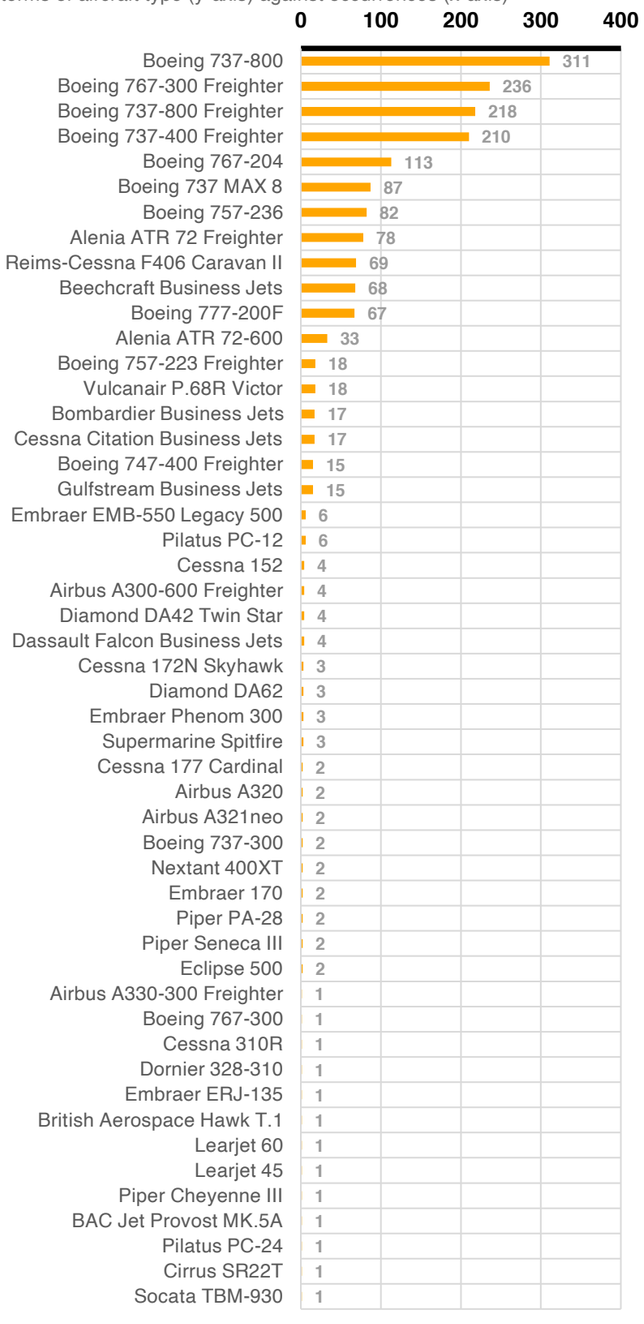

Background map courtesy of Ordnance Survey

2.18 Density plots derived from flight track data for measured departures and training flights can be seen in **Image 15** and **Image 16**. These were derived by counting number of flight tracks in cells of a 10x10 m grid.

**Image 16.** Training circuits density plot


Background map courtesy of Ordnance Survey

**Image 17.** Aircraft types
In terms of aircraft type (y-axis) against occurrences (x-axis)




# 3.0 Aircraft Types and Operators

3.1 The aircraft types and operators measured by the monitor operating to and from East Midlands can be seen in **Image 17** and **Image 18** respectively.

3.2 The number of different aircraft types and operators measured were as follows:

- Aircraft types: **73 different aircraft types**
- Operators: **75 different operators**

3.3 The top three aircraft types were as follows:

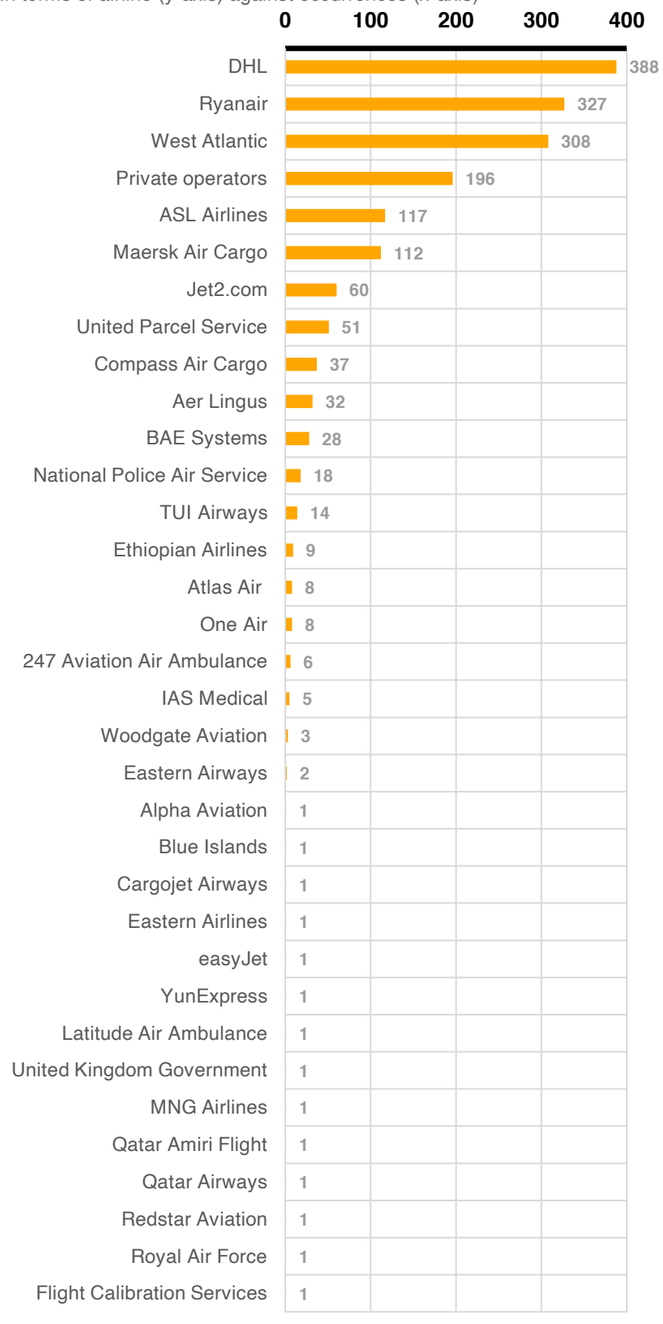
- **Boeing 737-800**, 18% of movements.
- **Boeing 767-300 Freighter**, 14% of movements.
- **Boeing 737-800 Freighter**, 13% of movements

3.4 The top three operators were as follows:

- ***DHL***, 22% of movements.
- ***Ryanair***, 19% of movements.
- ***West Atlantic***, 18% of movements

3.5 *Private operators* consists of 38 different business jet or small aircraft operators. The most common of these operators formed 6% of the fleet.

**Image 18.** Aircraft operators
In terms of airline (y-axis) against occurrences (x-axis)



# 4.0 Measured Noise Levels

4.1 Results on this page omit movements during periods of adverse weather conditions and noise events that were identified as not being aircraft using audio recordings, as is described in **Appendix B**. Non-East Midlands movements are also not included.

## Ambient Noise Analysis

4.2 **Table 4** indicates the ambient noise levels over the monitoring period averaged over the whole summer period for both the daytime (0700-2300) and night-time (2300-0700).

4.3 Aircraft only noise levels:

- **45 dB(A) during the daytime**
- **51 dB(A) during the night-time**

4.4 Daytime aviation activity has little impact on daytime ambient noise levels. During the night-time, aviation noise is above other ambient noise sources affecting the monitoring location.

## Number Above Analysis

4.5 The N70, N65 and N60 Number Above contours relate to different noise impacts and simply apply when a maximum $L_{Amax}$ noise level of an aircraft passby is registered as being above 70 dB(A), 65 dB(A) or 60 dB(A) respectively.

4.6 N70 and N65 apply during the daytime only and N60 applies during the night-time only.

4.7 The following number of events meeting or exceeding the relevant thresholds were measured:

- N70: **332 events** (42% of daytime movements)
- N65: **547 events** (69% of daytime movements)
- N60: **967 events** (99% of night-time movements)

4.8 **Table 5** shows theses metrics over the summer period.

4.9 How these three metrics were spread across the summer period can be seen in **Image 19**, **Image 20** and **Image 21** as stacked bar graphs.

**Table 4** Aviation noise metrics, dB

| Metric | Measured Results | Without Aircraft | Aircraft Only |
|---|---|---|---|
| Daytime, $L_{Aeq,16hour}$ | 53 | 52 | 45 |
| Night-time, $L_{Aeq,8hour}$ | 52 | 45 | 51 |

**Table 5** Number Above metrics

| Metric | Daily Range |
|---|---|
| N70 (day) | 0-11 |
| N65 (day) | 0-26 |
| N60 (night) | 0-20 |

**Image 19.** N70 by day

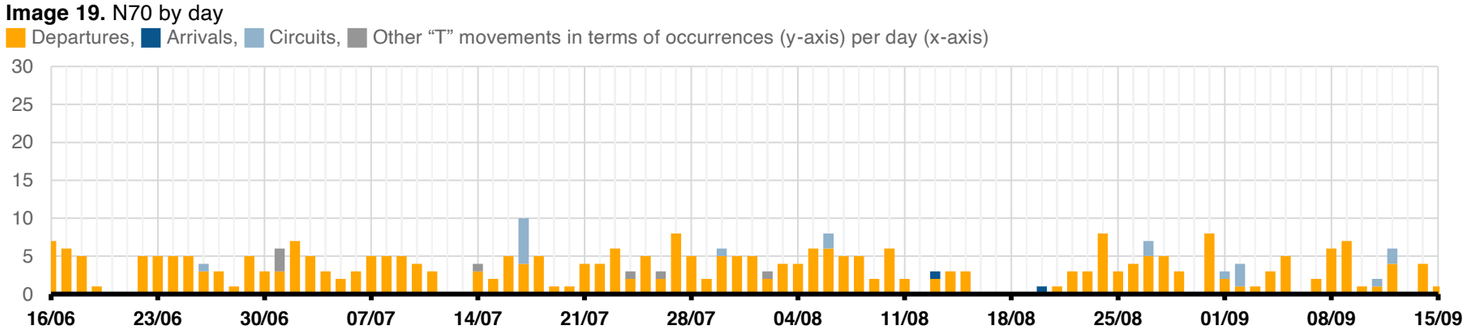



**Image 20.** N65 by day

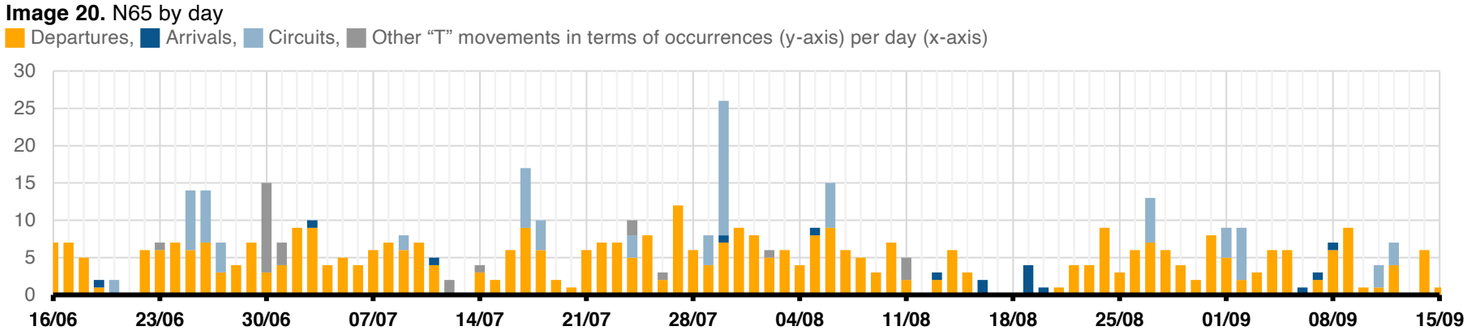
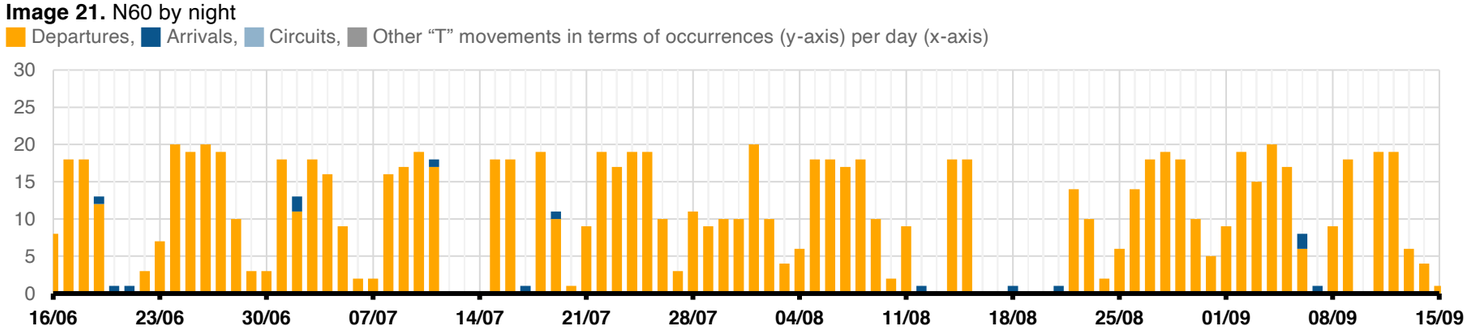



**Image 21.** N60 by night



# 5.0 Maximum Noise Levels

5.1 Results on this page omit movements during periods of adverse weather conditions and noise events that were identified as not being aircraft using audio recordings, as is described in **Appendix B**. Non-East Midlands movements are also not included.

5.2 The aircraft type with the highest noise levels on average are as follows along with the number of occurrences in brackets:

- **Departure, $L_{Amax}$: 75 dB, Boeing 737-400F (201)**
  **Three during the daytime, 198 during the night-time**
- **Arrival, $L_{Amax}$: 64 dB, Boeing 737 MAX 8 (6)**
  **Five during the daytime, one during the night-time**
- **Circuit, $L_{Amax}$: 67 dB, Boeing 737-800 (136)**
  **All movements during the daytime**

5.3 Aircraft types that were captured less than five times throughout the summer period have not been considered within the above analysis.

5.4 The Boeing 737-800 was the only jet engine aircraft measured on the training circuits.

5.5 The single movements that produced the highest noise levels over the monitoring period are as follows:

- **Departure, $L_{Amax}$: 81 dB, Boeing 747-400F**
- **Arrival, $L_{Amax}$: 73 dB, Cessna F406 Caravan II**
- **Circuit, $L_{Amax}$: 73 dB, Boeing 737-800**

5.6 All of the above movements occurred during the daytime period.

5.7 **Image 22** to **Image 24** show the distribution of departure, arrival and training circuit $L_{Amax}$ noise events respectively throughout the 92-day summer period.

**Image 22.** Distribution of departure maximum noise events
In terms of frequency occurrence (y-axis) against noise level (dB, x-axis)

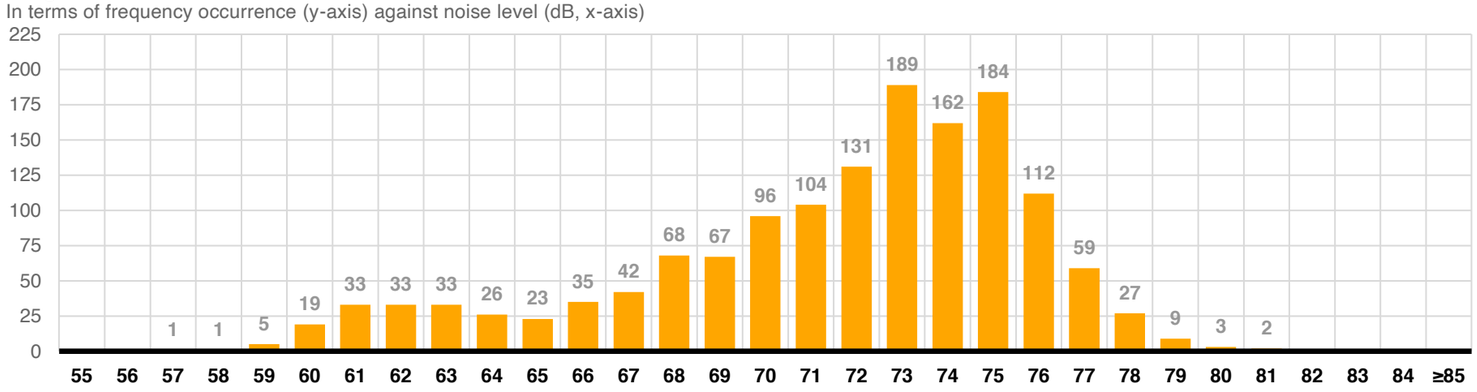



**Image 23.** Distribution of arrival maximum noise events
In terms of frequency of occurrence (y-axis) against noise level (dB, x-axis)

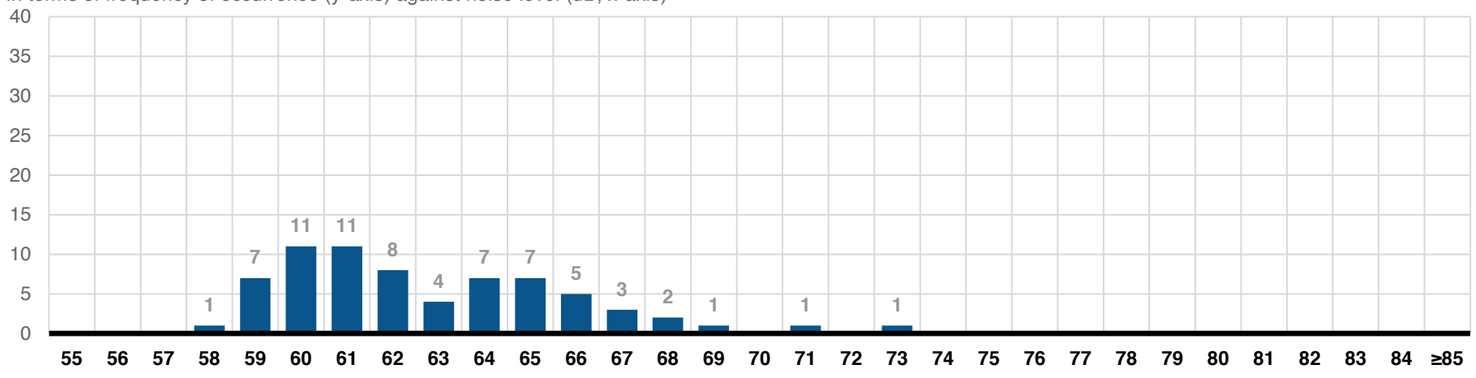
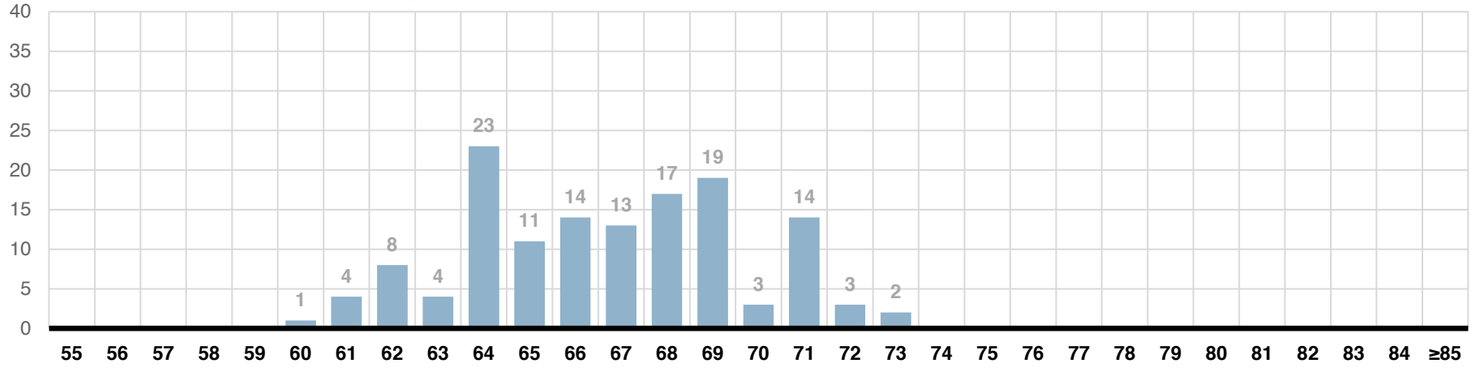



**Image 24.** Distribution of training circuit maximum noise events
In terms of frequency of occurrence (y-axis) against noise level (dB, x-axis)



# Appendix A: Glossary

## Acoustic Aviation Terms

**Annoyance**
The principal health effect relating to daytime (7 am to 11 pm) aircraft noise, where someone is to some extent bothered, annoyed or disturbed.

**Sleep disturbance**
The health effect relating to night-time (11 pm to 7 am) aircraft noise, usually taken to be where someone experiences an awakening.

**Summer 92-day period**
16th June to 15th September inclusive, representing the busiest period of activity at UK airports.

**Shoulder periods**
The time period either immediately before (6 am to 7 am) or after (11 pm to 11:30 pm) the daytime.

**Noise contour**
A line around an airport where all points on the line have the same noise level, representing a particular metric.

**ANOMS**
The Airport Noise and Operations Monitoring System. ANOMS collects data from the airport's noise monitors and radar systems to correlate noise levels and physical locations for individual flights. Weather and flight data are also collected.

**NPR**
Noise Preferential Routings are established departure routings that aircraft must follow, unless extenuating circumstances apply (such as being instructed otherwise by Air Traffic Control for safety reasons or due to inclement weather).

**Touch and Go**
A manoeuvre where an aircraft lands on the runway and then takes back off again in one motion. It is typically undertaken in training but can also be used during an aborted landing.

**Training flights**
Training flights are the operation of an aircraft for training purposes, this can be one training circuit or many circuits.

**Training circuit**
A singular loop of the track flown that is usually repeated a number of times to make up a training flight.

## Noise Metrics and Indices

**$L_{Aeq,T}$**
The hypothetical steady sound, containing (or equivalent to) the same sound energy as the actual fluctuating sound over the chosen measurement period, *T*.

**$L_{Aeq,16hour}$**
The equivalent sound level over a 16-hour day (7 am to 11 pm) calculated using the average movements over the daytime summer 92-day period. The metric recognised by the UK government for making evidence-based decisions, due to it correlating best with annoyance.

**$L_{Aeq,8hour}$**
The equivalent sound level over an 8-hour night (11 pm to 7 am) calculated using the average movements over the night-time summer 92-day period.

**Number Above (Nx)**
The number of aircraft events generating noise levels above *x* dB $L_{Amax,s}$ (typically 65 or 70 dB during the day and 60 dB at night). A useful communication metric as it correlates well to annoyance.

**$L_{Amax,s}$**
Simply the highest measured noise level during an aircraft event, with the sound monitoring equipment taking a measurement every one second (known as a slow response). All references to $L_{Amax}$ in this report refer to $L_{Amax,s}$, unless otherwise stated.

## Other Terms

**CAA**
The UK Civil Aviation Authority.

**ERCD**
The Environmental Research and Consultancy Department of the CAA.

**ERCD Report 0904**
Metrics for Aircraft Noise, published by CAA, 2009.

**CAP1506**
Survey of Noise Attitudes (SoNA), published by CAA, 2021.

**ANIS1982**
A previous study comparable to that in CAP1506, and is useful for showing how UK noise attitudes have changed over time.

**CAP2161**
Survey of Noise Attitudes: Aircraft noise and sleep disturbance, published by CAA, 2021.

**CAP1767**
An investigation into the influence of background ambient noise levels on attitudes to aircraft noise, published by CAA, 2019.

**Noise Action Plan**
East Midlands Airport Noise Action Plan 2024-2028.

# Appendix B: Survey Data

## Noise Data

Noise data collected by the monitoring position is presented in this appendix using the $L_{Aeq,1hour}$ metric. A 1-hour period shows how noise levels change hour by hour, allowing for greater inspection than longer period metrics.

Three values are presented, all of which are calculated by the monitoring equipment software. All are measured in dB $L_{Aeq,1hour}$ and are:

- Total noise level – all noise measured by the monitoring position uncorrected. Presented as continuous black line.
- Without aircraft noise level – total noise level minus any influence from correlated aircraft events. Representative of community noise levels if aircraft noise was not present. Presented as dashed grey line.
- Aircraft only noise level – the difference between total and community noise levels. Representative of noise purely from correlated aircraft events. Presented as continuous orange line.

## Weather Data and Omitted Data

Weather data has been provided alongside the noise data. East midlands Airport has two weather monitors, with data provided being that from Weather Monitor 2, as this station measures rainfall.

Wind speed (knots), wind direction (degrees) and rainfall (inches) have been provided for the survey duration for every 15-minute period.

We have condensed this data down into 3-hourly periods, by averaging the wind speed and direction and summing the rain.

Multiple periods of data have been omitted from noise analysis due to weather, where material rainfall or wind speeds are present and had the potential to contaminate the data.

Using audio recordings of each measured event, data has been omitted from noise analysis where the event was not caused by aircraft such as lawn mowers.

## Correlated Event Data

Correlated aircraft events are those where an increase in noise level corresponds to a movement passing through the gate.

The noise monitor in Weston-on-Trent was triggered when levels met or exceeded 55 dB(A).

The data presented below shows the number of correlated events that have occurred in each hour of monitoring, split by arrivals and departures.

Non-East Midlands activity has also been included to provide context where there is an increase in ‘aircraft only’ noise levels with no East Midlands movement present.

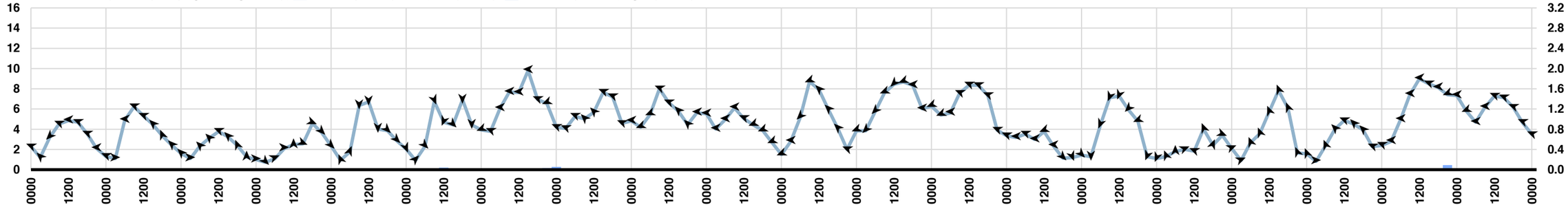
Inclusion of these correlated events allows for the weather and noise data to be compared, when looking at which direction the runway is operating in, as well as how movements are split by hour and day.

# Survey Data: 16 June to 5 July 2025

Data presented at intervals available against date and time (hhmm, x-axis)

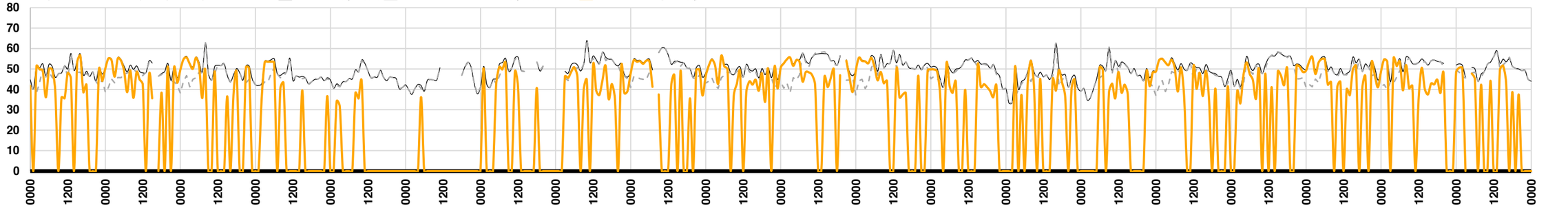
**Weather Data**

Wind direction (with top of page being north), Wind Speed (knots, left y-axis), Rainfall (inches, right y-axis)



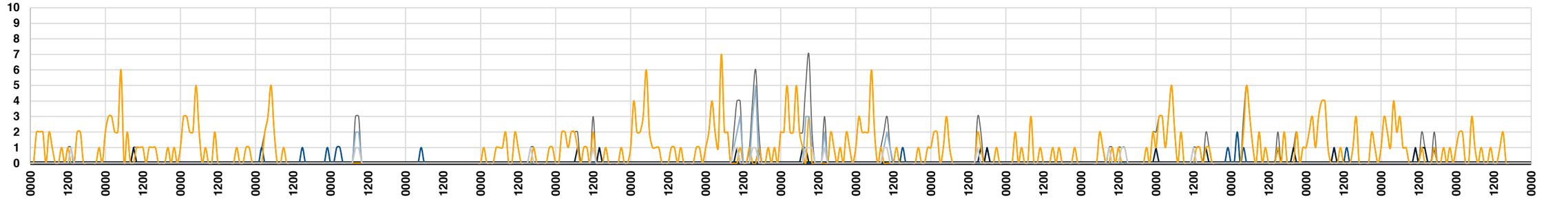

**Noise at Monitoring Position (M1)**

Sound pressure level (dB, y-axis) in terms of total $L_{Aeq,1hour}$, without aircraft $L_{Aeq,1hour}$, and aircraft only $L_{Aeq,1hour}$




**Correlated Aircraft Events**

Number of movements (y-axis) in terms of Arrivals, Departures Training circuits, Other “T” movements, Not associated with East Midlands and All movements

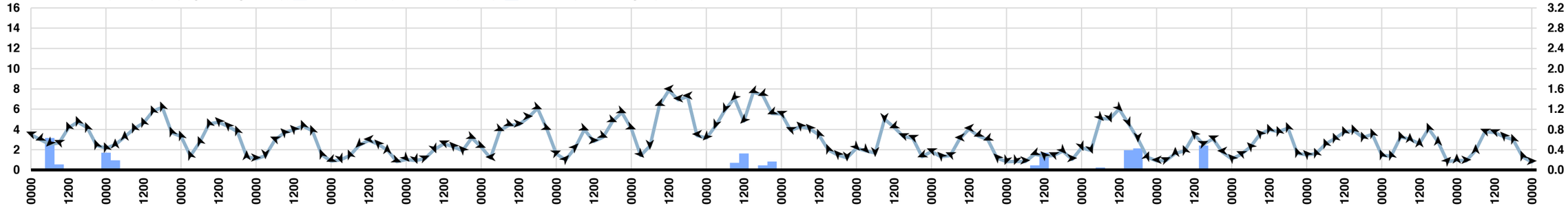


# Survey Data: 6 July to 25 July 2025

Data presented at intervals available against date and time (hhmm, x-axis)

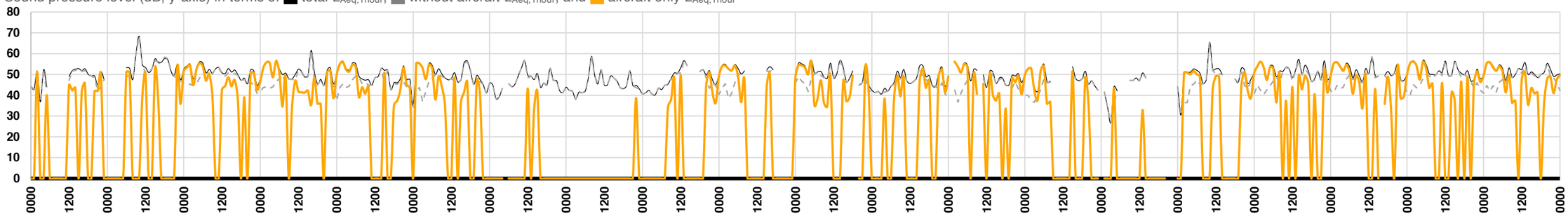
**Weather Data**

Wind direction (with top of page being north), Wind Speed (knots, left y-axis), Rainfall (inches, right y-axis)



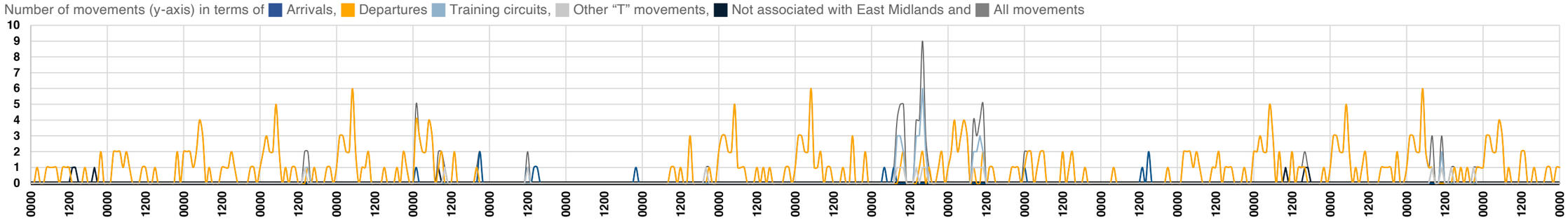

**Noise at Monitoring Position (M1)**

Sound pressure level (dB, y-axis) in terms of total $L_{Aeq,1hour}$, without aircraft $L_{Aeq,1hour}$, and aircraft only $L_{Aeq,1hour}$




**Correlated Aircraft Events**

Number of movements (y-axis) in terms of Arrivals, Departures, Training circuits, Other "T" movements, Not associated with East Midlands and All movements

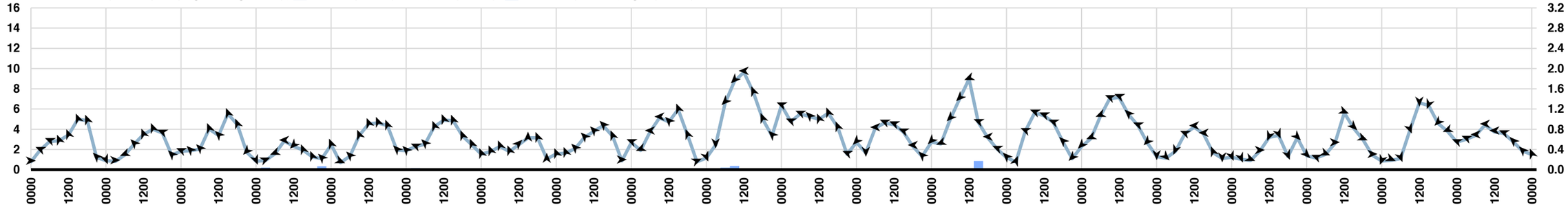


# Survey Data: 26 July to 14 August 2025

Data presented at intervals available against date and time (hhmm, x-axis)

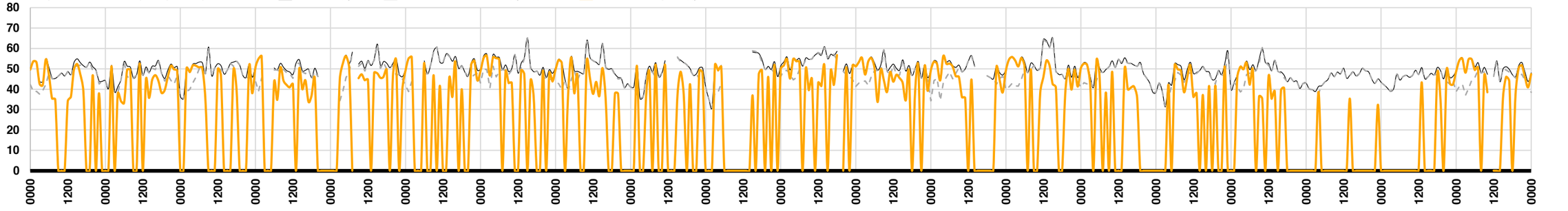
**Weather Data**

Wind direction (with top of page being north), Wind Speed (knots, left y-axis), Rainfall (inches, right y-axis)



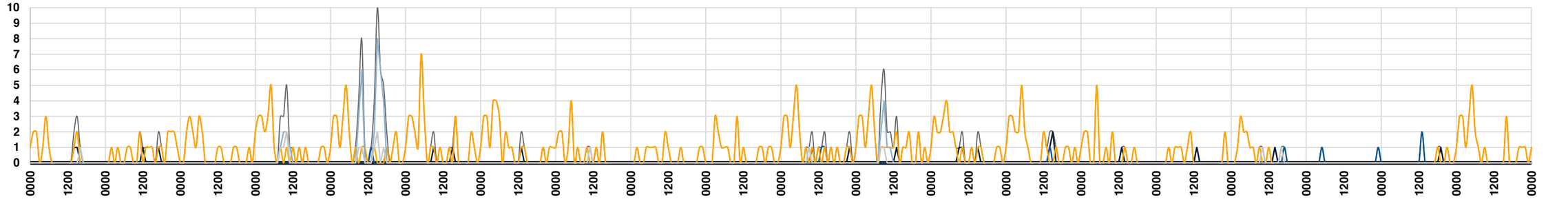

**Noise at Monitoring Position (M1)**

Sound pressure level (dB, y-axis) in terms of total $L_{Aeq,1hour}$, without aircraft $L_{Aeq,1hour}$, and aircraft only $L_{Aeq,1hour}$




**Correlated Aircraft Events**

Number of movements (y-axis) in terms of Arrivals, Departures, Training circuits, Other "T" movements, Not associated with East Midlands and All movements

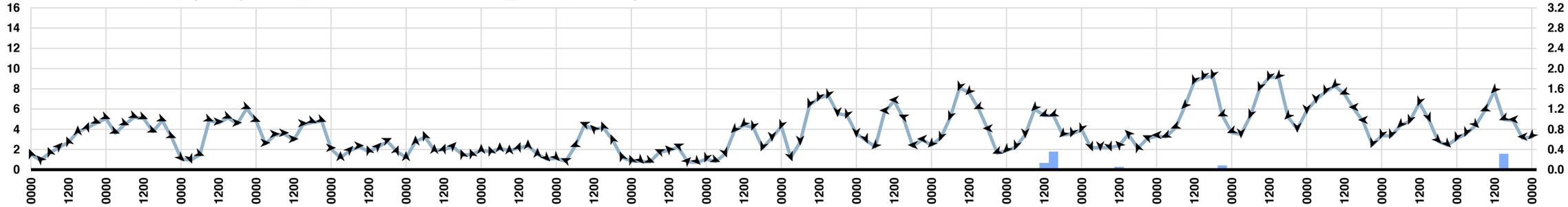


# Survey Data: 15 August to 3 September 2025

Data presented at intervals available against date and time (hhmm, x-axis)

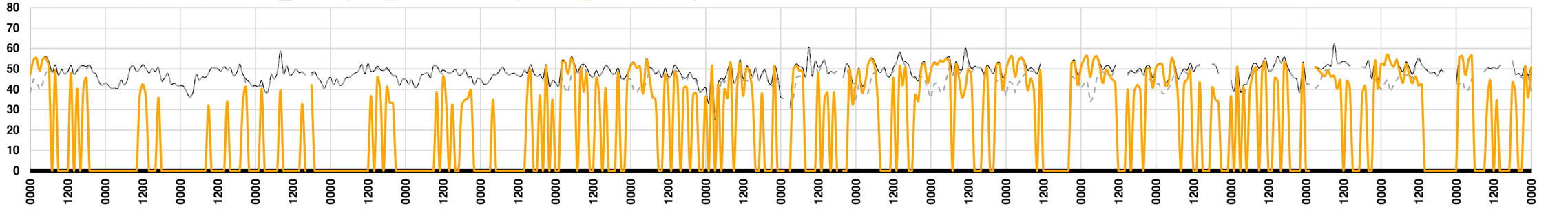
**Weather Data**

Wind direction (with top of page being north), Wind Speed (knots, left y-axis), Rainfall (inches, right y-axis)



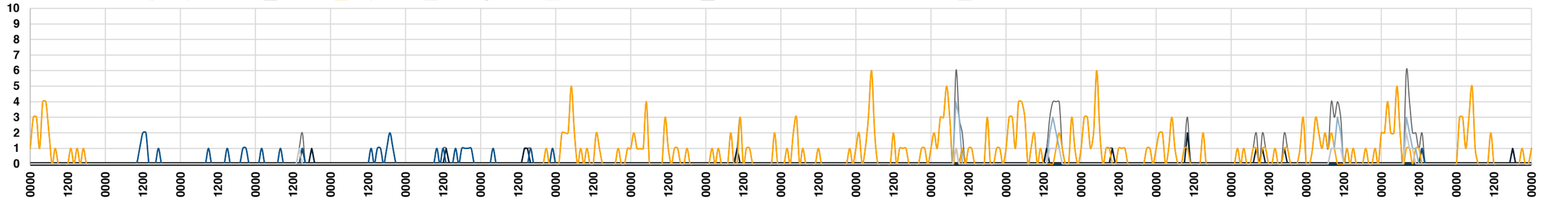

**Noise at Monitoring Position (M1)**

Sound pressure level (dB, y-axis) in terms of total $L_{Aeq,1hour}$, without aircraft $L_{Aeq,1hour}$, and aircraft only $L_{Aeq,1hour}$




**Correlated Aircraft Events**

Number of movements (y-axis) in terms of Arrivals, Departures Training circuits, Other “T” movements, Not associated with East Midlands and All movements

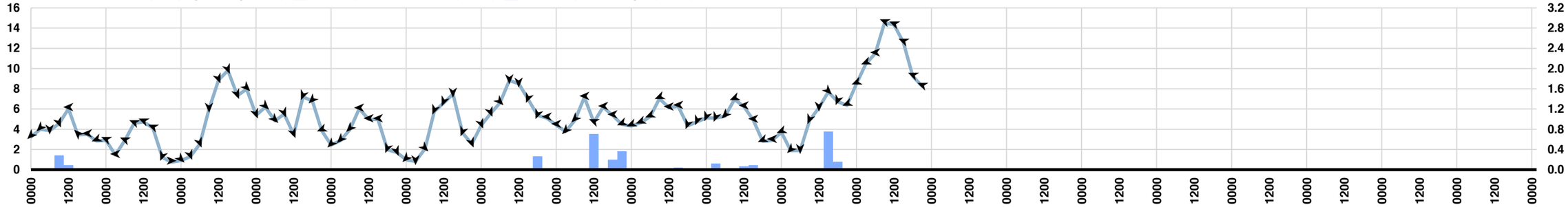


# Survey Data: 4 September to 15 September 2025

Data presented at intervals available against date and time (hhmm, x-axis)

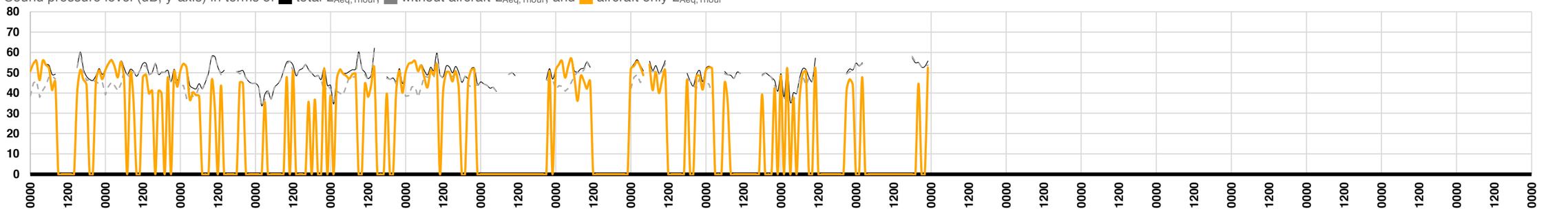
**Weather Data**

Wind direction (with top of page being north), Wind Speed (knots, left y-axis), Rainfall (inches, right y-axis)



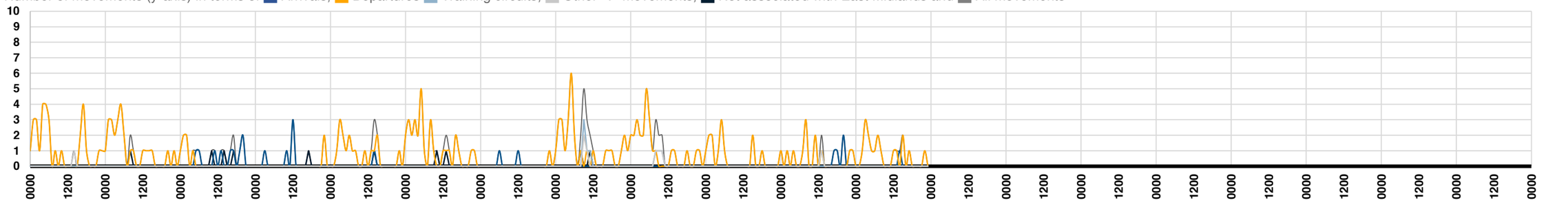

**Noise at Monitoring Position (M1)**

Sound pressure level (dB, y-axis) in terms of total $L_{Aeq,1hour}$, without aircraft $L_{Aeq,1hour}$, and aircraft only $L_{Aeq,1hour}$




**Correlated Aircraft Events**

Number of movements (y-axis) in terms of Arrivals, Departures Training circuits, Other “T” movements, Not associated with East Midlands and All movements



suono

decoding the science of sound