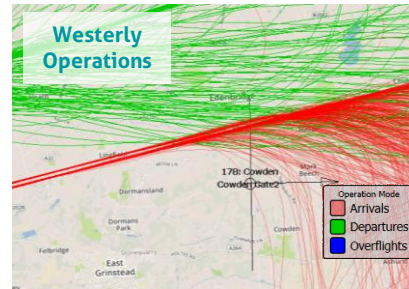
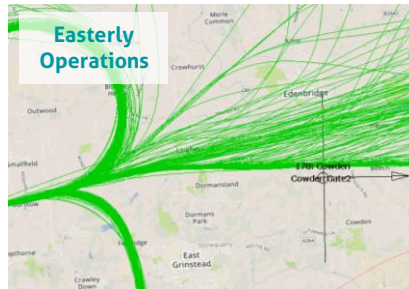


Community Noise Information Report Cowden

1st April – 31st August 2019

Cowden lies approximately 18km (~10 nautical miles) to the east of Gatwick Airport. Consequently, some, but not all, easterly departures pass close to Cowden. Due to the prevailing wind, this occurs approximately 25% of the time. For the remainder, the westerly arrivals pass Cowden further to the north.

A mobile noise monitoring terminal (NMT) was installed by Gatwick Airport approximately 2km (1.1 nautical miles) north of Cowden in 2014. This report presents an analysis of operational and noise data over a period between 1st April and 31st August 2019, together with operational data from the equivalent period in 2015 for comparison.

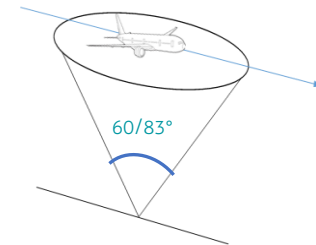


collected in 2019 with the equivalent period during the previous four years. Since Cowden is close to both easterly departures and westerly arrivals, this section has two parts.

- **Section 4 – Noise Monitor Data** presents an analysis of aircraft noise event and overall community noise levels as measured at the noise monitor. Noise data are analysed only for the monitoring period. Comparison with a historic period is not possible as monitoring has not previously taken place at the same location.
- **Section 5 – Appendix** presents information related to the pre-processing of the noise monitor data. A number of noise events are excluded from the analysis; the appendix details how many events have been excluded and the corresponding reasons.

Overhead aircraft – At various points in this report, reference is made to overhead aircraft. Defining whether an aircraft is overhead or not is a subjective matter; however, in February 2017 the CAA published guidance (CAP 1498) recommending the use of an imaginary cone over the receiver with an apex of 60 or 83 degrees as shown below.

Flights are considered overhead if the aircraft pass within cone above the noise monitor



Wherever this report refers to overhead aircraft, the 83° cone has been used.

The report is set out as follows:

- **Section 2 – Summary** presenting key findings from Sections 3 & 4.
- **Section 3 – Operations and Trends** provides an overview of how the airport and aircraft have operated during the monitoring period. This analysis has been performed by drawing an imaginary 2D plane in space (a gate) centred on the noise monitor and recording the position and details of any flight that passes through the gate. As flight track data have been collected for many years in the airport's noise and track-keeping (NTK) system, it has been possible to analyse and compare data

Operations and the community

Cowden is primarily affected by arrivals on westerly operations and departures during easterly operations. The 10-year average suggests that approximately 74% of operations out of Gatwick are westerly.

On full days of easterly operations in 2019, 140 departures, on average, passed near Cowden; no change from 2015. On full days of easterly operations in 2019, 444 arrivals, on average, passed near Cowden; an 8% increase on 2015.

The position of the main concentration of flights on westerly operations has not changed, but the swathe has widened towards the south so more aircraft passed over the monitor location (and thus closer to Cowden) in 2019 compared to 2015. There has been a slight change in the concentration of aircraft near Cowden during easterly operations with the main concentration of flights moving approximately 250m to the north; a result of a slight route change in 2017.

During daytime hours during easterly operations in 2019, there were between approximately 4 and 10 departures passing near Cowden each hour. On westerly operations, there were between approximately 20 and 25 arrivals passing to the north of Cowden each hour. During night-time hours (23:00-07:00), there were, on average, 15 movements through the gate during easterly operations and 83 on westerly operations.

In 2019, departing aircraft during easterly operations passed over Cowden, on average, at 5,800ft, whilst arriving aircraft during westerly operations pass over at 3,000ft. The average altitude during easterly and westerly operations has not changed over the last 5 years.

Noise levels in the community based on measurements at Cowden noise monitor

Over three quarters of noise events recorded at the Cowden noise monitor were from departing aircraft during easterly operations. The remainder were from arriving aircraft during westerly operations. Over 90% of noise events were recorded from overhead aircraft.

During days of full easterly operations, there were, on average, 34 aircraft noise events recorded per day. During days of full westerly operations, there was an average of 7 aircraft noise events per day.

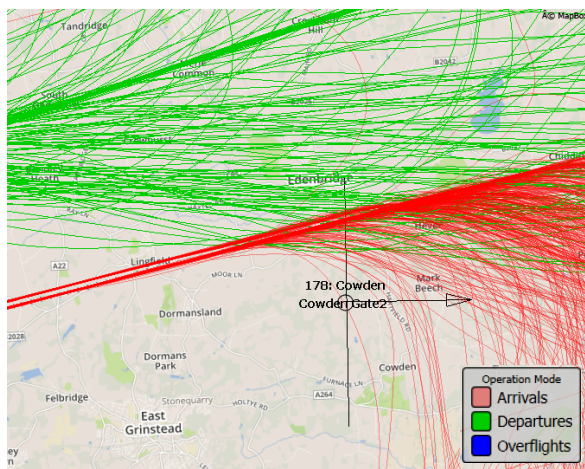
Based upon aircraft passing overhead on easterly departures, the A380 was the loudest aircraft type at Cowden. On westerly arrivals the B747 was loudest.

During daytime hours during easterly operations, there were, on average, up to around 3 aircraft noise events per hour. The busiest hour in terms of number of noise events was between 06:00 and 07:00. On westerly operations, there were no more than 1 noise event per hour with the busiest hour being 21:00-22:00. Most noise events during easterly and westerly operations were from aircraft passing overhead and were less than 70dB.

The direction of operation at the airport affects the overall average noise levels (from all sources) at the Cowden noise monitor. The average daytime level ($L_{Aeq,16hr}$) was 50dB on westerly operations and 48dB on easterly operations. The average night-time level ($L_{Aeq,8hr}$) was 44dB on westerly operations and 42dB on easterly operations. Although there are greater number of noise events on easterly operations, westerly arrivals, which are more frequent but a lower noise level, appear to contribute more to the average noise level at Cowden compared to easterly departures.

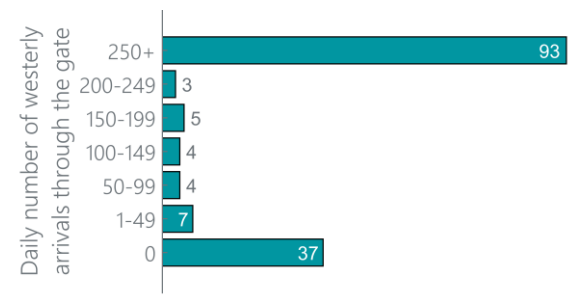
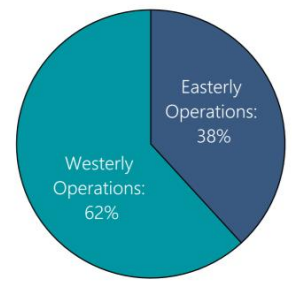
Overview of Flight Track Data Westerly Operations

Dates of analysis:
1st April – 31st August 2015 & 2019

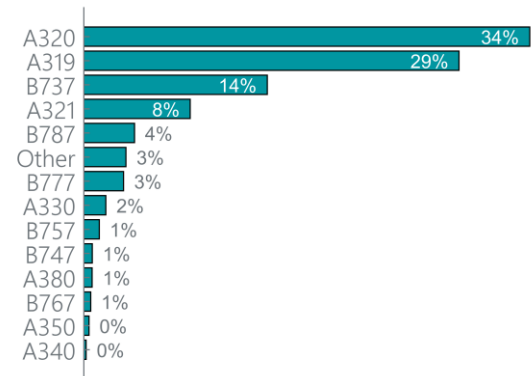


Position of gate and example day of arrival aircraft tracks in the vicinity of Cowden westerly operations

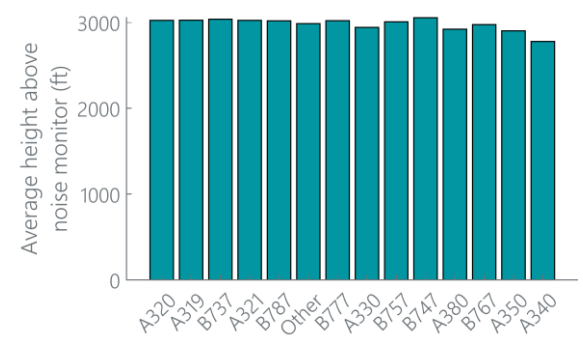
Total **132,330** operations
into Gatwick



Number of westerly arrivals per day passing through the gate (153 days in total)



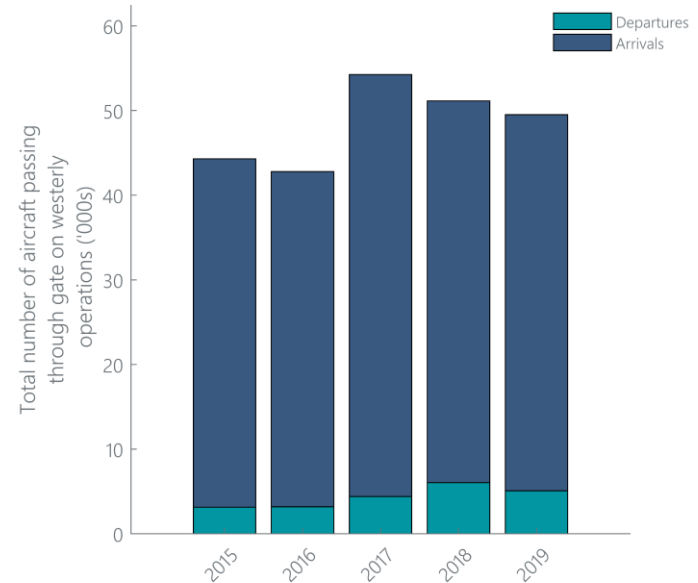
Proportion of aircraft types passing through the gate



Average height of arriving aircraft as they pass through the gate

How many aircraft pass through the gate on westerly operations?

- The figure to the right shows the total number of movements that passed through the gate (on westerly operations) in the period from 1st April to 31st August from 2015 to 2019.
- Whilst on westerly operations, between around 43,000 and 54,000 movements passed through the gate during the monitoring period each year. Over 90% of these movements were arrivals.
- Year to year changes can be attributed to fluctuations in the proportion of easterly operations (determined by wind direction), total numbers of movements operating into the airport and, to a lesser extent in this case, the proportion of aircraft flying down each departure route.
- The table indicates that the proportion of westerly operations in the 2015 period was 71%, in 2019 62%.
- On a full day of westerly operations:
 - There was the an 8% increase in arrivals (from 411 to 444) passing through the gate in the 2019 period compared to 2015; very few of these were overhead.
 - However, over the same period there was a reduction in departures both passing through gate and passing overhead.

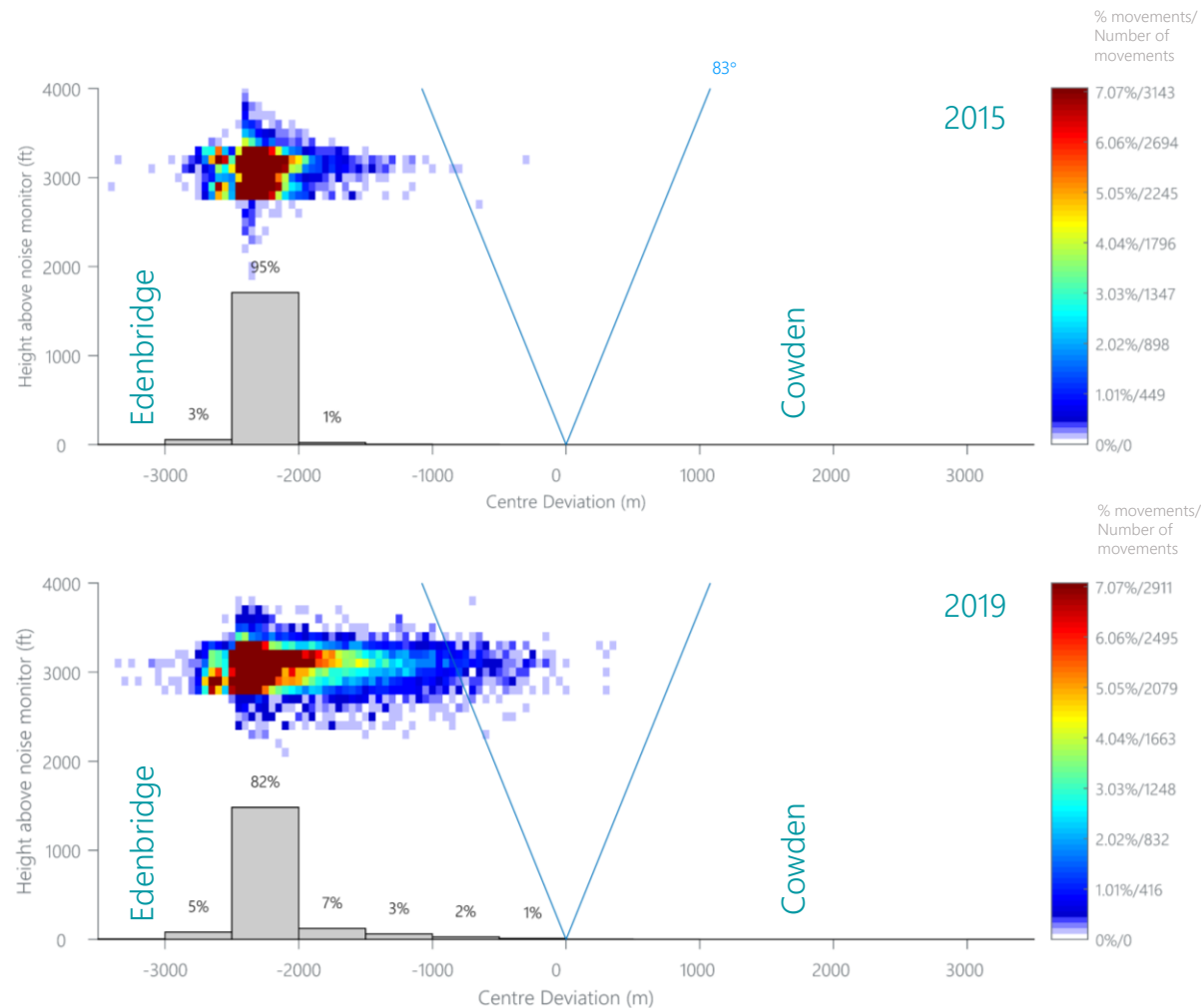


	2015	2019	Change	Change (%)
Proportion of westerly operations (all Gatwick flights)	71%	62%	-9%	N/A
Average number of arrivals passing through the gate during days of 100% westerly operations.	411 (<1)*	444 (7)*	- (-)*	+8% (+1,550%)*
Average number of departures passing through the gate during days of 100% westerly operations.	47 (28)*	34 (14)*	-13 (-14%)*	-28% (-50%)

* Overhead aircraft as determined by the 83° cone described on Page 2

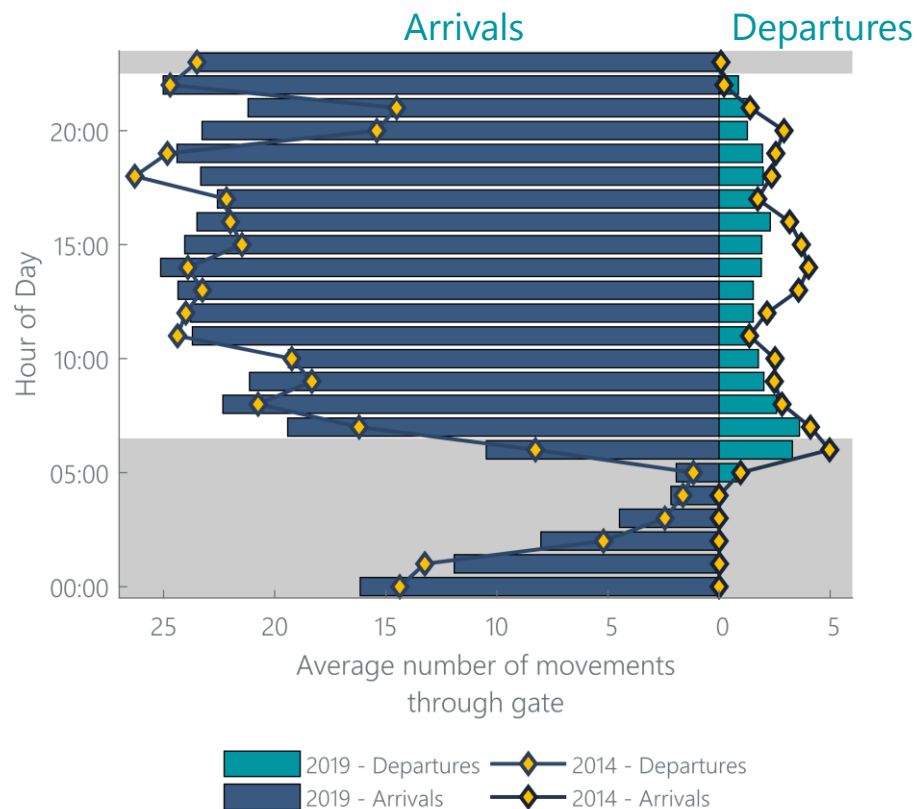
How concentrated are aircraft as they pass through the gate on westerly operations?

- The figures to the right are 'heat maps' showing the 2D concentrations of departing aircraft as they pass through the gate during the 2015 (the upper figure) and 2019 (the lower figure) monitoring periods.
- The image should be interpreted by the reader imagining themselves facing in a east-north-east direction (in the direction of the arrow on the map on Page 4).
- The gate has been designed to be approximately perpendicular to the easterly departure path and is therefore at a slight angle to westerly arrivals. It is therefore not a true representation of actual concentration but can still be used to assess changes from one year to another.
- The main centre of concentration is in the same position in both 2015 and 2019, between 2km and 2.5km north of the noise monitor.
- The full swathe is wider and less concentrated in 2019, stretching from directly above the noise monitor to 3km to the north. This is reflected in the greater number of overhead movements as presented on the previous page.
- The change in concentration is due to a change in the point at which aircraft join the final approach to the airport as a result of the Independent Review of Arrivals in 2016.



How does the number of flights over the area vary across the day on westerly operations?

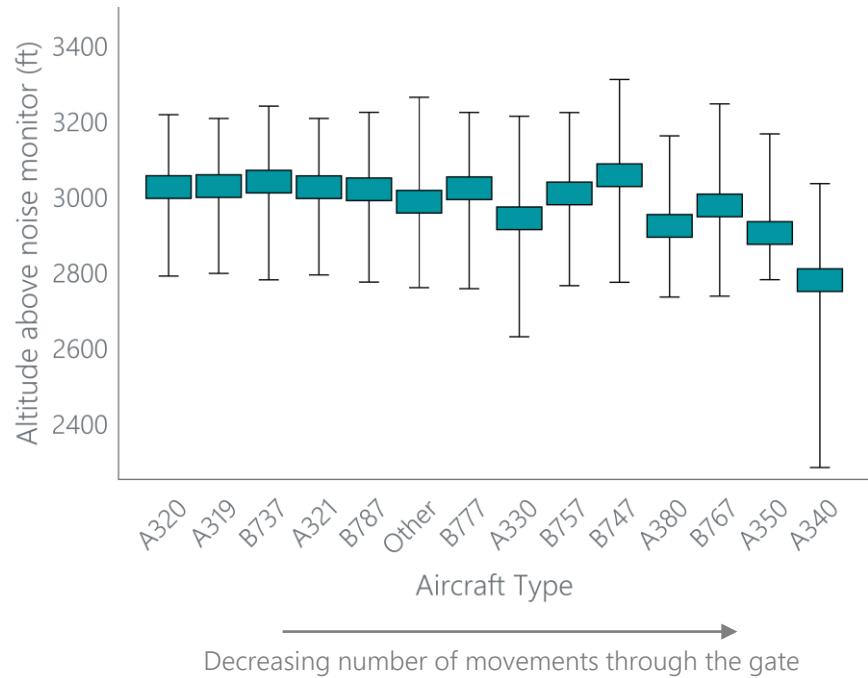
- The figure to the right presents the average number of arrivals and departures through the gate per hour in 2015 and 2019 during days of 100% westerly operations.
- As shown on previous pages, just over 90% of the movements passing through the gate on easterly operations were arrivals.
- During daytime hours (07:00-23:00) between 20 and 25 arrivals passed through the gate each hour. The 8% increase, compared to 2015, as shown on Page 10, was generally spread across the day; although, there was a significant increase in the period between 20:00 and 22:00.
- There were generally less than 4 departures through the gate each hour. The majority of the 28% decrease compared to 2015 occurred between 11:00 and 16:00.
- There were arrivals passing through the gate at all hours through the night. There were, on average, 23 movements in the hour 11:00-12:00. This decreased through the night reaching only 2 in the hour 05:00-06:00.
- There were generally no departures during the night until the first scheduled flights start at around 06:00.
- During night-time hours (23:00-07:00), there was, on average, a total of 83 flights passing through the gate (79 departures, 4 arrivals).
- Of the total 153 days in the 2019 monitoring period, 61 days (40%) were 100% westerly operations and 37 days (24%) were 100% easterly operations. The remainder had a mixture of easterly and westerly operations as the wind direction changed during the day.



What is the altitude of aircraft as they pass through the gate on westerly operations?

- The table to the right presents the average height of arriving aircraft above Cowden as they passed through the gate on westerly operations.
- This indicates that the altitude of arriving aircraft near Cowden was on average 3,000ft, with no change between 2015 and 2019.
- The figure presents the average altitude of the arriving aircraft passing through the gate on easterly operations along with the corresponding 5th and 95th percentile.
- Since most aircraft will have joined the Instrument Landing System (ILS) which provides pilots with horizontal and vertical guidance on approach, the range of altitudes and differences between aircraft types is relatively small.
- There is more variability amongst the remaining aircraft. It is not clear if this is due to size or because there were fewer movements from which the 5th and 95th values were determined. However, relative to the variation in departure heights, the variation in arrival heights is small.

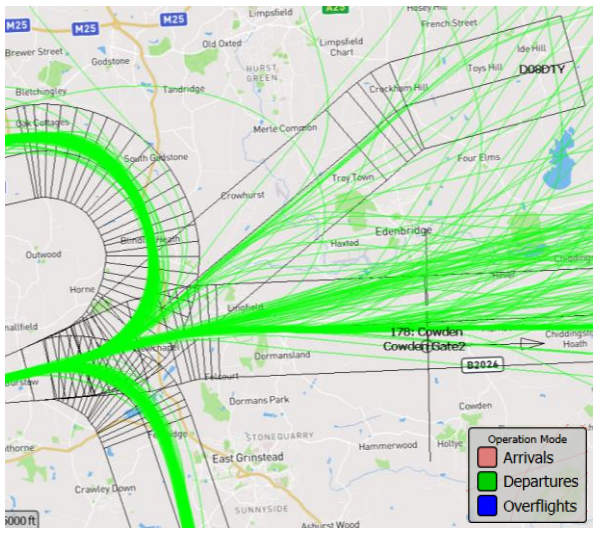
	2015	2019	Difference
Average height of arrivals through the gate on westerly operations	3,000ft	3,000ft	-



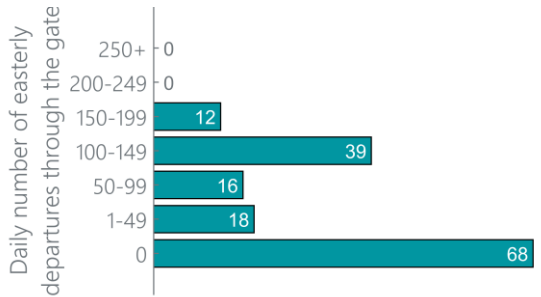
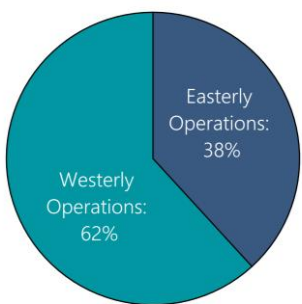
* A percentile is a measure which indicates the value below which a given percentage of observations fall. In this case, the 5th percentile indicates the altitude under which 5 percent of movements of a given aircraft type would fly through the gate.

Overview of Flight Track Data Easterly Operations

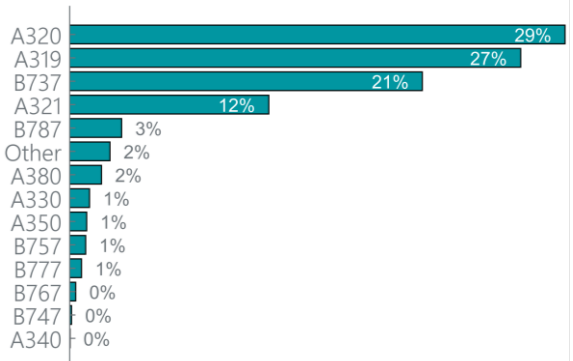
Dates of analysis:
1st April – 31st August 2015 & 2019



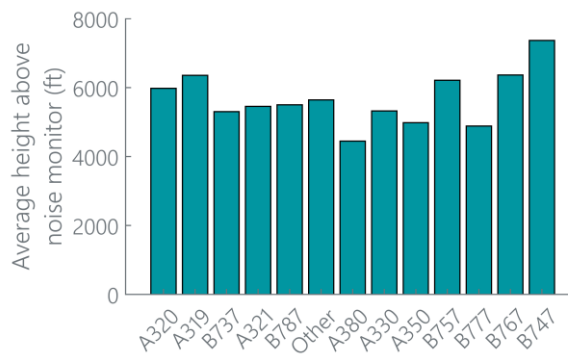
Total **132,330** operations
into Gatwick



Number of easterly departures per day (24h period) passing through the gate (153 days in total)



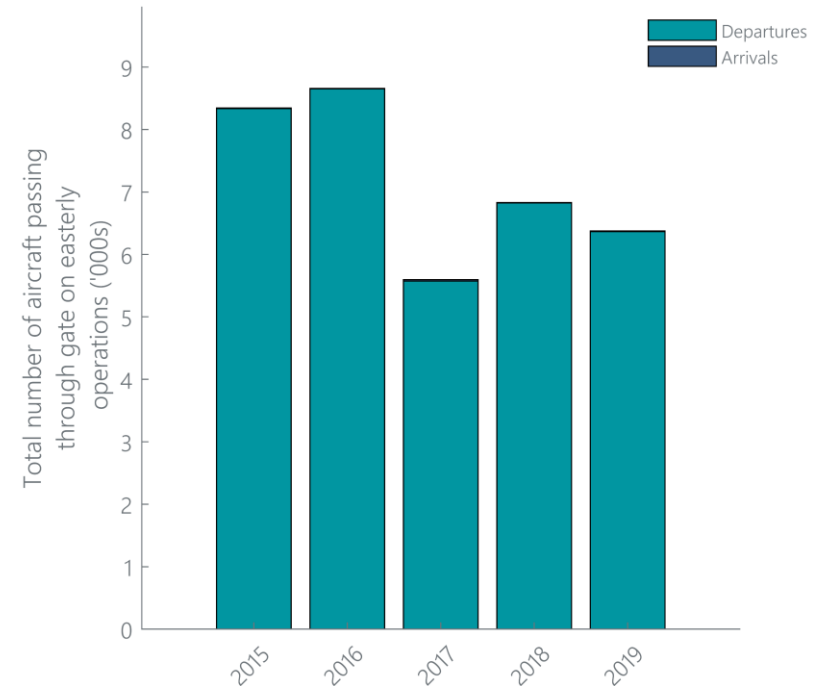
Proportion of aircraft types passing through the gate



Average height of departing aircraft as they pass through the gate

How many aircraft pass through the gate on easterly operations?

- The figure to the right shows the total number of movements that passed through the gate (on easterly operations) in the period from 1st April to 31st August from 2015 to 2019.
- Whilst on easterly operations, between around 5,600 and 8,700 movements passed through the gate during the monitoring period each year. The vast majority of these operations are arrivals.
- Year to year changes can be attributed to fluctuations in the proportion of easterly operations (determined by wind direction), total numbers of movements operating into the airport, and the proportion of aircraft flying down each departure route.
- The table indicates that the proportion of easterly operations in the 2015 period was 29%, in 2019 38%.
- On a full day of easterly operations:
 - There was the same number of departures through the gate in the 2019 period compared to 2015 despite the overall number of flights at Gatwick has grown over the same period.
 - However, a slightly lower proportion of these passed directly over the monitor (as indicated by the numbers in parentheses) with the average number each day decreasing from 110 to 107.

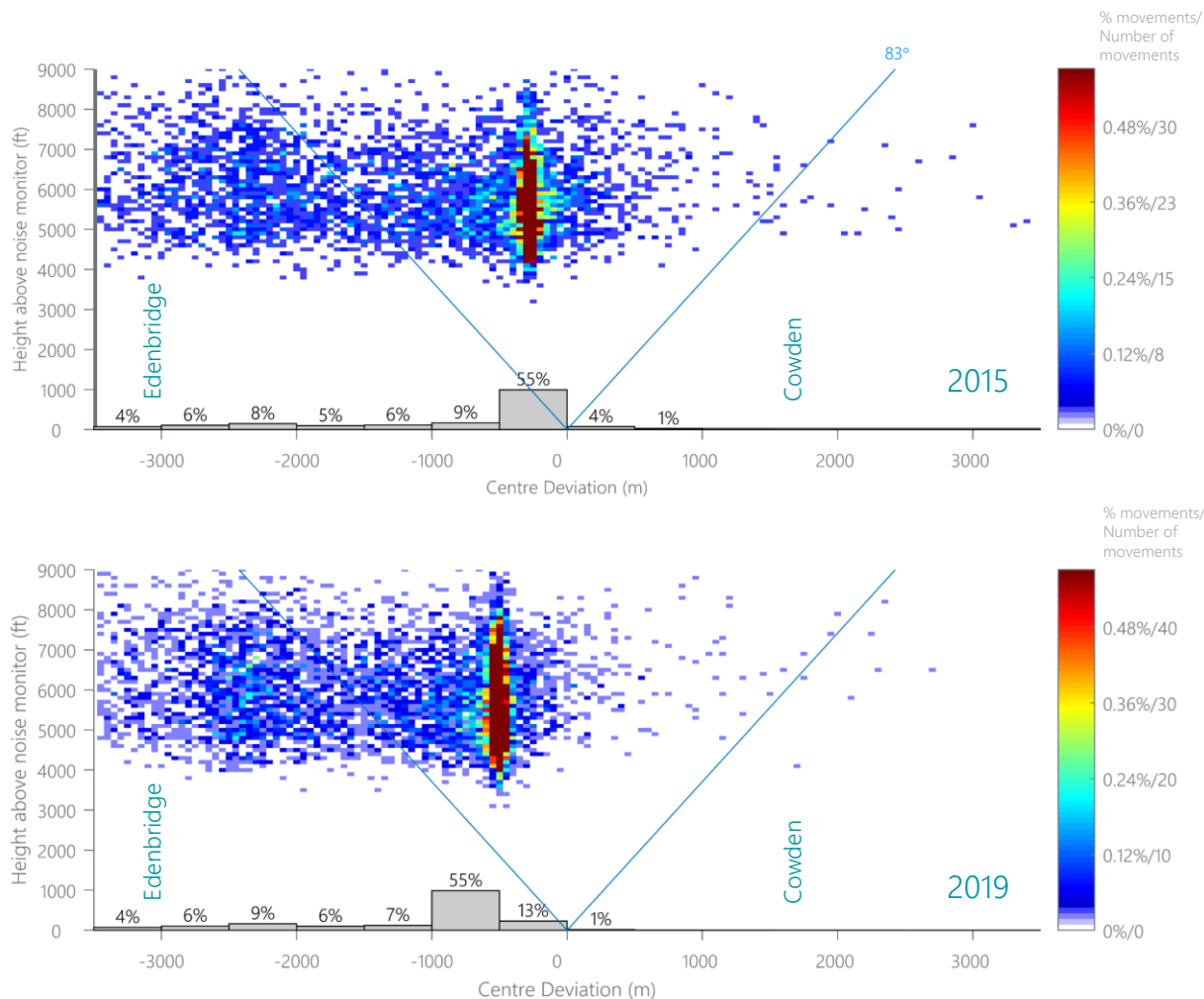


	2015	2019	Change	Change (%)
Proportion of easterly operations (all Gatwick flights)	29%	38%	+9%	N/A
Average number of departures passing through the gate during days of 100% easterly operations.	140 (110)*	140 (107)*	- (-3)*	+0% (-3%)*

* Overhead aircraft as determined by the 83° cone described on Page 2

How concentrated are aircraft as they pass through the gate on easterly operations?

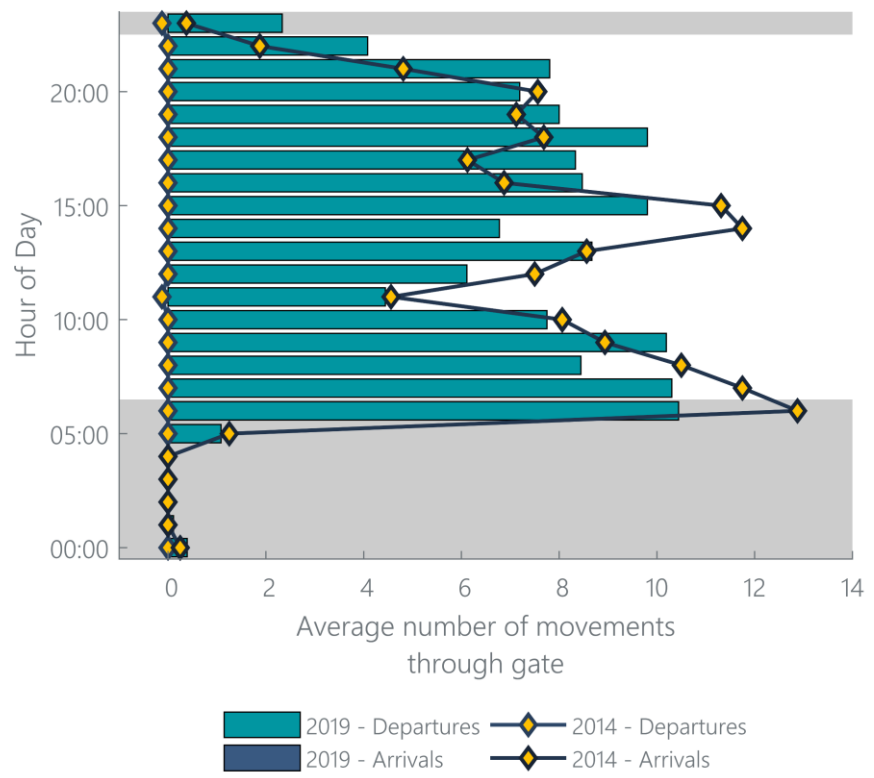
- The figures to the right are 'heat maps' showing the 2D concentrations of departing aircraft as they pass through the gate during the 2015 (the upper figure) and 2019 (the lower figure) monitoring periods.
- The image should be interpreted by the reader imagining themselves facing in a east-north-east direction (in the direction of the arrow on the map on Page 9).
- The gate has been designed to be approximately perpendicular to the easterly departure path.
- The approximate position of the village of Cowden relative to the noise monitor and gate has been marked on the x-axis.
- In both 2015 and 2019, the main centre of concentration within which more than half the movements passed, is less than 1km north of the noise monitor. In 2019, this swathe is approximately 250m further north (away from Cowden) compared to 2015. This is likely to be a result of an adjustment to the flightpath made by Gatwick in 2017 to bring aircraft closer to the centreline of the route (Route 5).
- The remainder of the flights passed through a wider swathe stretching north approximately 3.5km from above the noise monitor.



How does the number of flights over the area vary across the day on easterly operations?

- The figure to the right presents the average number of arrivals and departures through the gate per hour in 2015 and 2019 during days of 100% easterly operations.
- Across the day, there were almost zero arrivals through the gate.
- The figure shows that the first movements occurred between 05:00 and 06:00, with less than 2 flights per day on average. This has not changed significantly between 2015 and 2019.
- In 2019, there were generally up to 10 flights per hour throughout the day; although, there was significantly less traffic passing through the gate in the hour 11:00 to 12:00.
- The table on Page 5 showed that, on average, there were the same number of movements passing through the gate on a full day of easterly operation in 2019 compared to 2015. However, in general, there were more flights before 16:00 in 2015 and more flights after 16:00 in 2019.
- During night-time hours (23:00-07:00), there was, on average, a total of 15 flights passing through the gate.
- Of the total 153 days in the 2019 monitoring period, 61 days (40%) were 100% westerly operations and 37 days (24%) were on 100% easterly operations. The remainder had a mixture of easterly and westerly operations as the wind direction changed during the day.

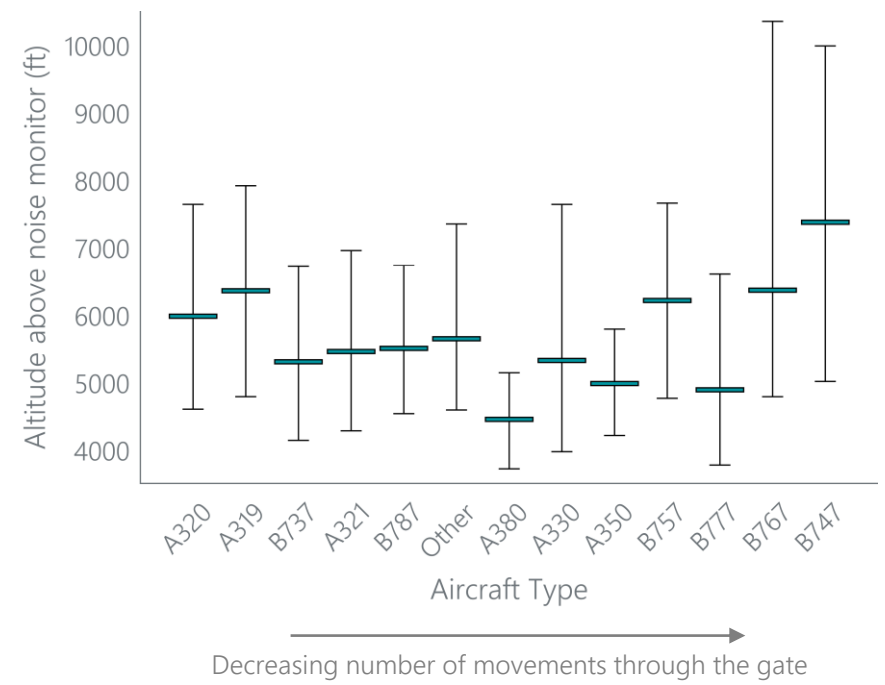
Arrivals Departures



What is the altitude of aircraft as they pass through the gate on easterly operations?

- The table to the right presents the average height of departing aircraft above Cowden as they passed through the gate on easterly operations.
- This indicates that the altitude of departing aircraft near Cowden was on average 5,800ft and has not changed between 2015 and 2019.
- The figure presents the average altitude of the departing aircraft passing through the gate on easterly operations along with the corresponding 5th and 95th percentile*.
- There is a significant range of altitudes amongst aircraft types. The A380 was, on average, the lowest aircraft type at the point it passes through the gate at about 4,500ft on average. The B747 was the highest; although, it should be noted that this is based on much fewer movements.

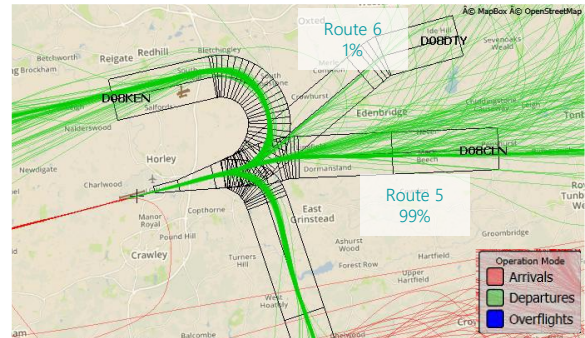
	2015	2019	Difference
Average height of departures through the gate on easterly operations	5,800ft	5,800ft	-



* A percentile is a measure which indicates the value below which a given percentage of observations fall. In this case, the 5th percentile indicates the altitude under which 5 percent of movements of a given aircraft type would fly through the gate.

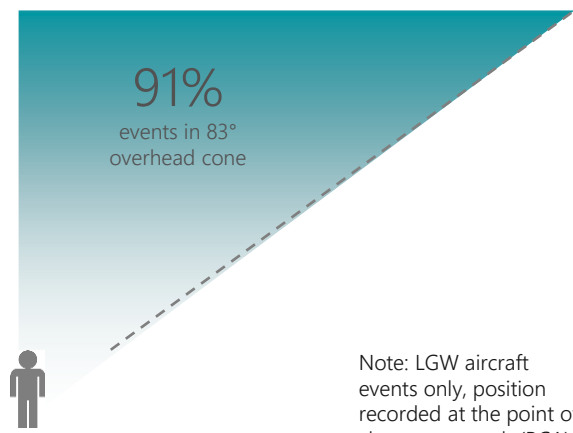
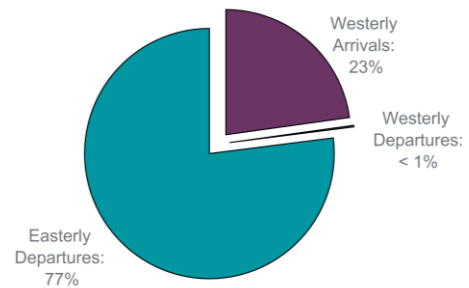
Overview of Noise Monitor Data

Dates of analysis:
1st April – 31st August 2019

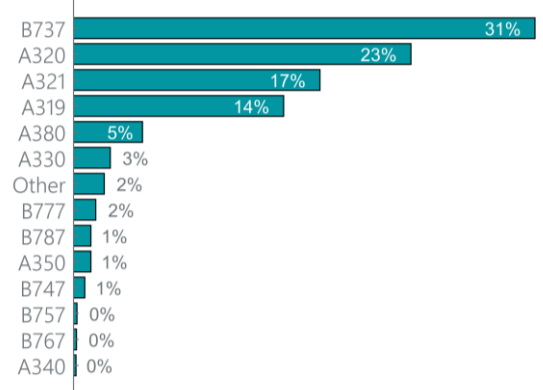


Easterly departure routes and % noise events by departure track measured at noise monitor

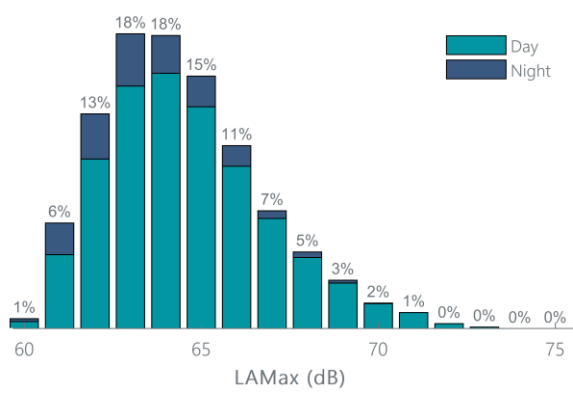
3,047 Aircraft Noise Events



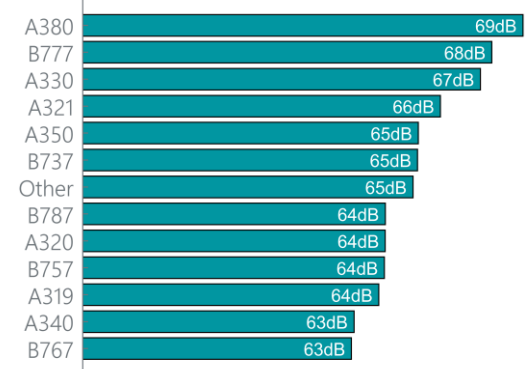
Note: LGW aircraft events only, position recorded at the point of closest approach (PCA)



Noise events by aircraft type



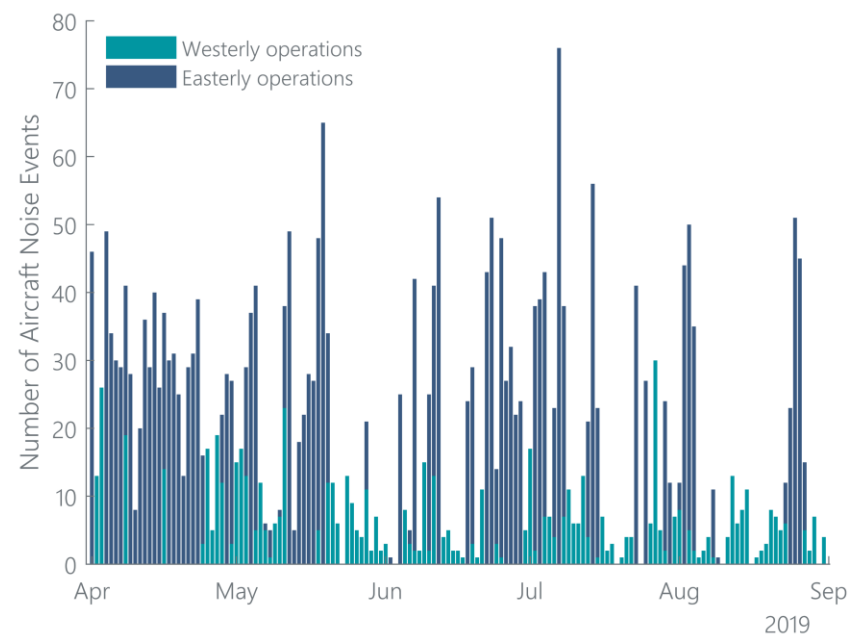
Overall distribution of L_{Amax} noise levels



Average L_{Amax} by aircraft type*
*Overhead aircraft on easterly departures only

How does wind direction affect the number of aircraft noise events?

- An aircraft noise event is recorded when the noise level at the noise monitor exceeds a pre-determined threshold for a given duration and can be matched to a passing aircraft. In this case the threshold was set at 60dB.
- Over three-quarters of noise events recorded at the noise monitor were caused by aircraft departing Gatwick on easterly operations. The vast majority of the remainder were from westerly arrivals.
- During the monitoring period, 61 of the 153 days (40%) were 100% westerly operations and 37 days (24%) were on 100% easterly operations. The remainder had a mixture of easterly and westerly operations as the wind direction changed during the day.
- During days of full easterly operations, there were, on average, 34 aircraft noise events recorded per day.
- During days of 100% westerly operations, there was an average of 7 aircraft noise events per day.
- Over 90% of measured aircraft noise events were recorded by aircraft passing within the 83° overhead cone.
- In April, there was a high proportion of easterly days resulting in over 800 events being recorded. In contrast, there was a high proportion of westerly operations in August during which less than 450 aircraft noise events were recorded.
- It should be noted that an absence of recorded aircraft noise events does not mean that aircraft would not necessarily be audible or visible. There may be aircraft further away that are audible but without meeting the detection thresholds.

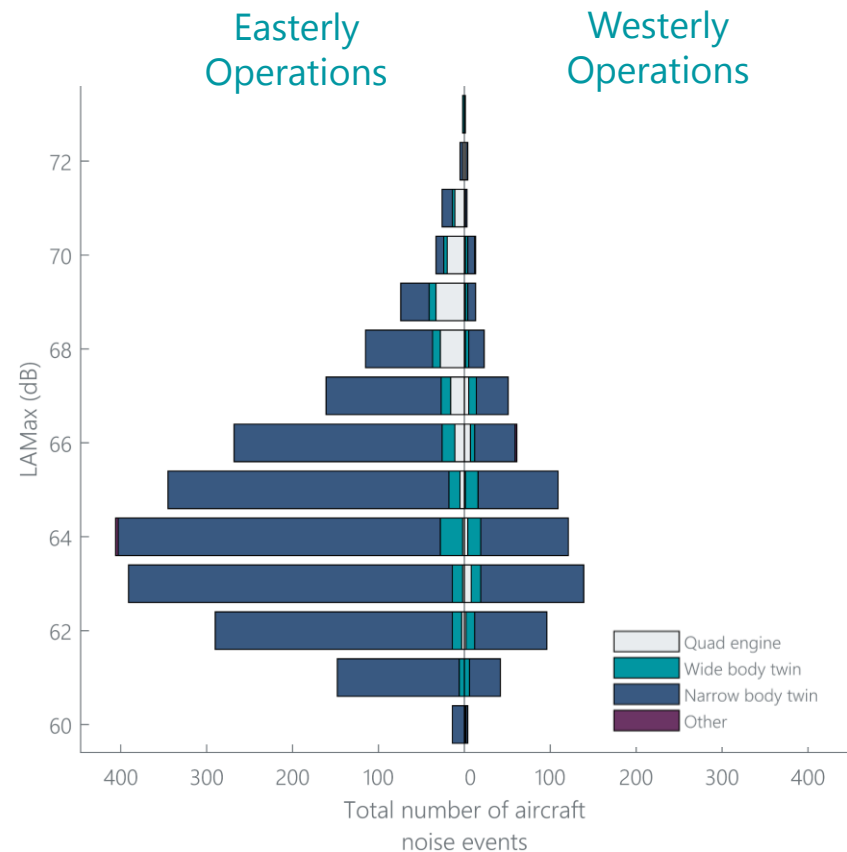


What are the noise levels of measured aircraft noise events?

- The figure to the right presents the range of L_{Amax} noise levels for all aircraft events measured at the Cowden monitor for easterly and westerly operations.
- The table below presents the average L_{Amax} levels for each aircraft type group by easterly and westerly operations.
- The average L_{Amax} levels of all aircraft events are 65.0 and 64.8dB on easterly and westerly operations respectively. The distribution of the noise levels is dependent on aircraft size with the larger aircraft generally recording louder events.

Aircraft group	Average L_{Amax} Easterly	Average L_{Amax} Westerly
Quad engine	68.6	66.0
Wide body twin engine	65.9	65.2
Narrow body twin engine	64.7	64.7
Other	64.3	67.6

- As this analysis considers ALL events measured at this monitor, regardless of distance from the monitor or route, these results cannot be used to compare the relative noise levels of aircraft types. An analysis of aircraft type noise levels is presented on Page 17.

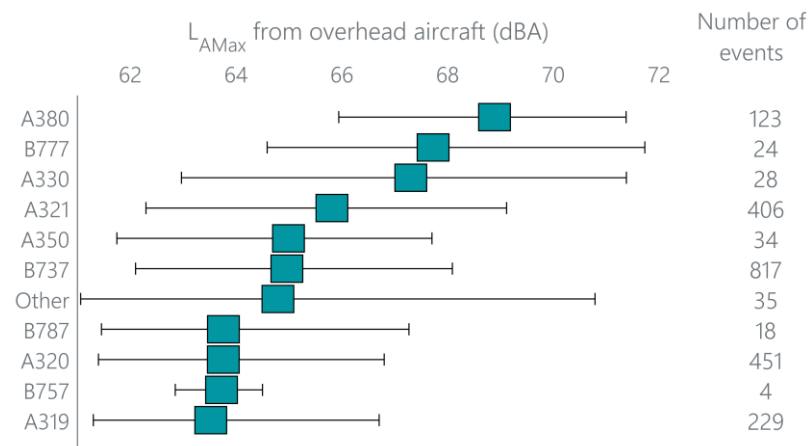


What are the average noise levels of different aircraft types?

Easterly

The upper figure right shows the average L_{Amax} of each aircraft type in addition to the range between the 5th and 95th percentile levels within the 83° overhead cone and on easterly operations.

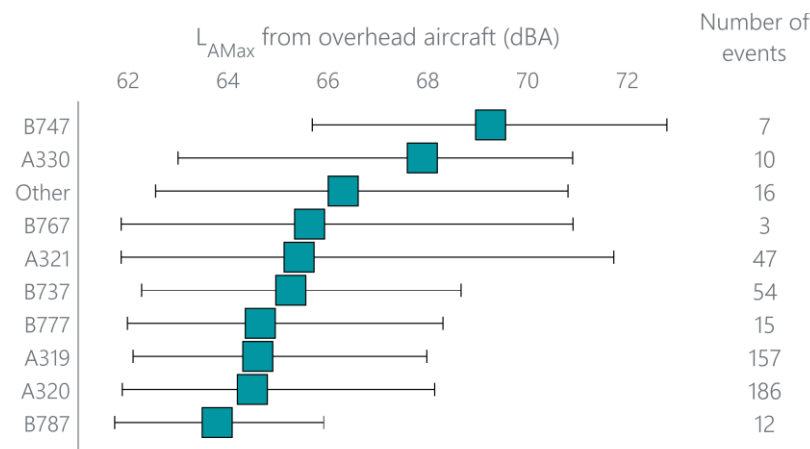
- The loudest aircraft type, on average, passing over the Cowden monitor on easterly departures is the A380 at just under 69dB, followed by the B777 and A330 between 67 and 68dB.
- Most other common aircraft types operating at Gatwick fall between 63 and 66dB.
- There is typically a range of up to around 10dB in the L_{Amax} values of each aircraft type.



Westerly

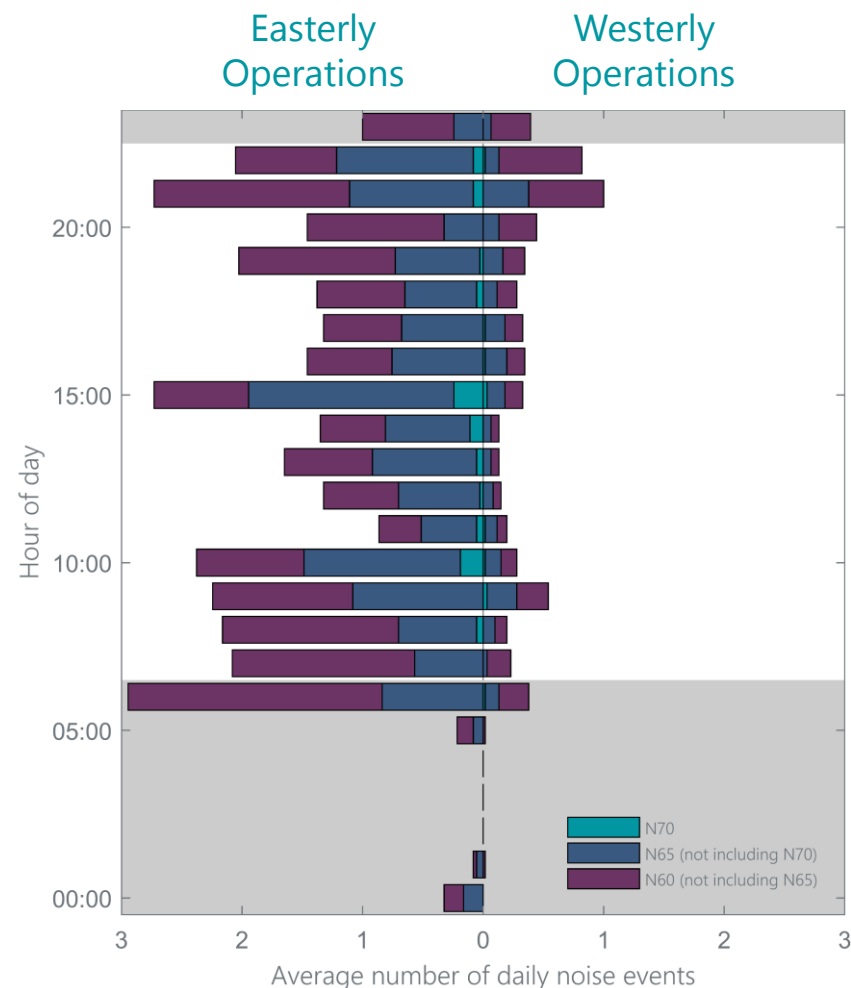
The lower figure right shows the equivalent data for the westerly operations.

- The loudest aircraft type, on average, passing over the Cowden monitor on westerly arrivals is the B747 at just over 69dB, followed by the A330 at 68dB.
- The B787 is the quietest aircraft type at 64dB.
- It should be noted that the noise characteristics of an aircraft on arrivals and departures can be quite different. On departure, engine noise tends to dominate the total noise, whereas on arrival, airframe noise comprises a relatively greater proportion of the total noise.



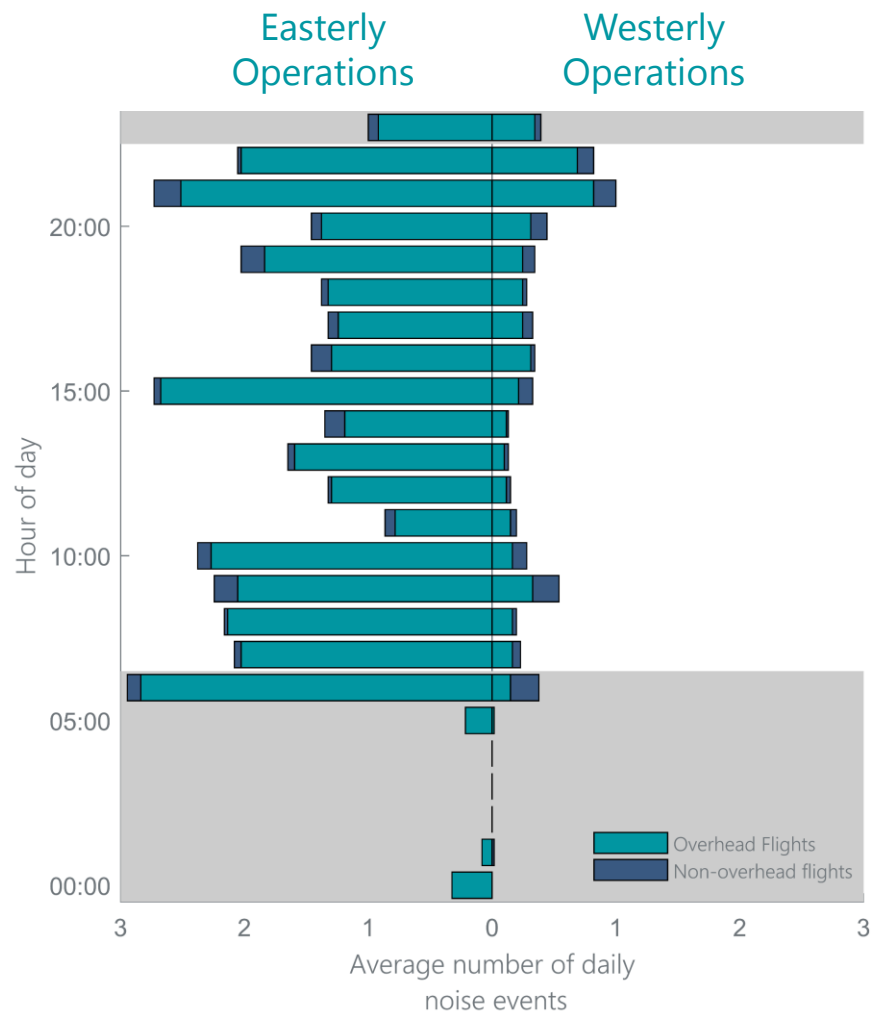
How does the number of Nabove events vary across the day?

- It is recognised that the response to aircraft noise is related to more than average noise levels alone. The number of events and their individual levels are becoming increasingly recognised as a useful indicator of community response to aircraft noise.
- The N_{above} metrics describe the number of events in a period where the L_{Amax} exceeds a given value.
- The figure to the right shows the average hourly N60, N65 and N70 values across an average 24h day for days of 100% of easterly and westerly operations.
- On easterly days, the first noise events ($L_{\text{Amax}} > 60\text{dB}$) occur just before 06:00. The hour between 06:00 and 07:00 is the busiest of the day in terms of noise events at an average of just less than 3 events. There are between 0.8 and 2.7 aircraft noise events each hour for the remainder of the day.
- The majority of noise events are less than 70dB; however, there are a small number of louder noise events ($> 70\text{dB}$) in the hours 11:00-12:00 and 15:00-16:00.
- On westerly days, there were no more than an average of one event per hour across the day, with the busiest hour in terms of number of registered noise events occurring between 21:00 and 22:00.
- On an average easterly day, the N65 during the 16h day period (07:00-23:00) was 29; the N60 during the 8h night (23:00-07:00) was 5.
- On an average westerly day, the N65 during the 16h day period (07:00-23:00) was 6; the N60 during the 8h night (23:00-07:00) was 1.



How does the number of aircraft noise events vary across the day?

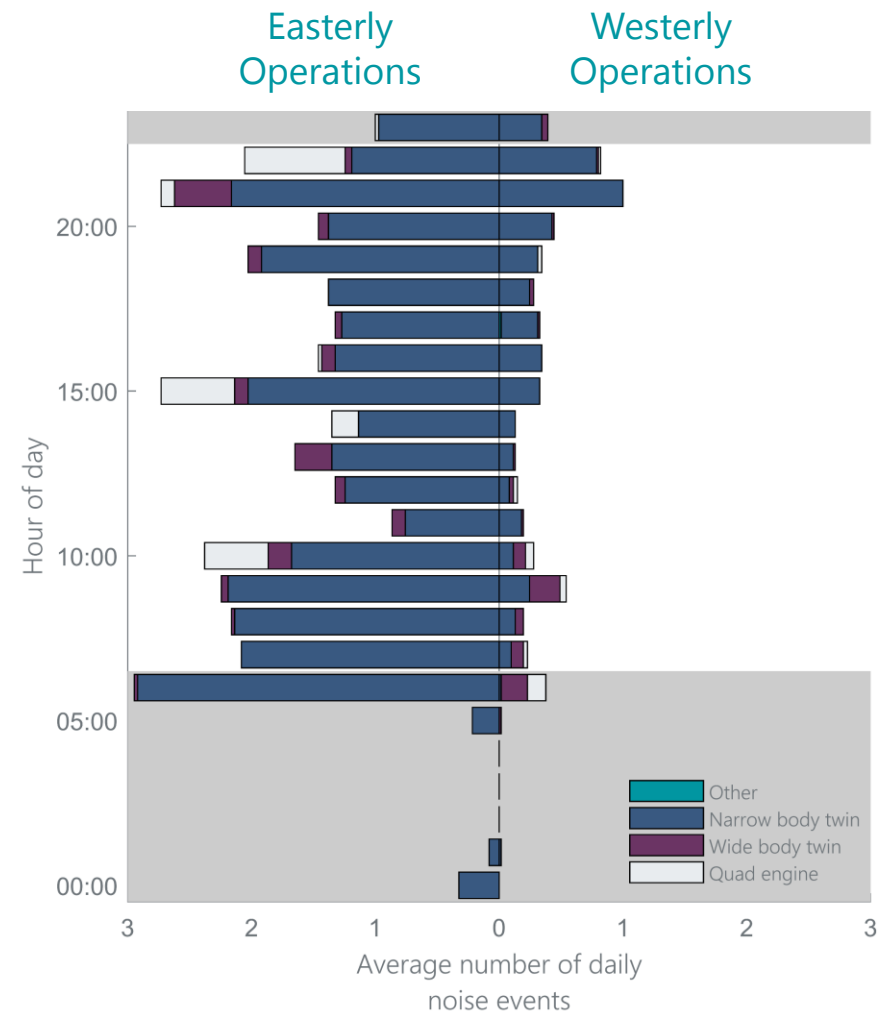
- The figure to the right shows the number and proportion of noise events from overhead aircraft during each hour of the day on full days of both easterly and westerly operations.
- On easterly operations, over 95% of noise events were from aircraft passing overhead. There was no period during which there was a significantly lower proportion of overhead aircraft.
- As shown on previous pages, there are fewer noise events on full days of westerly operations. Compared to easterly operations, there was also a lower proportion of noise events registered from aircraft passing overhead.



* Defined as those aircraft passing through the 83° cone above the noise monitor

How does the number of aircraft noise events vary across the day?

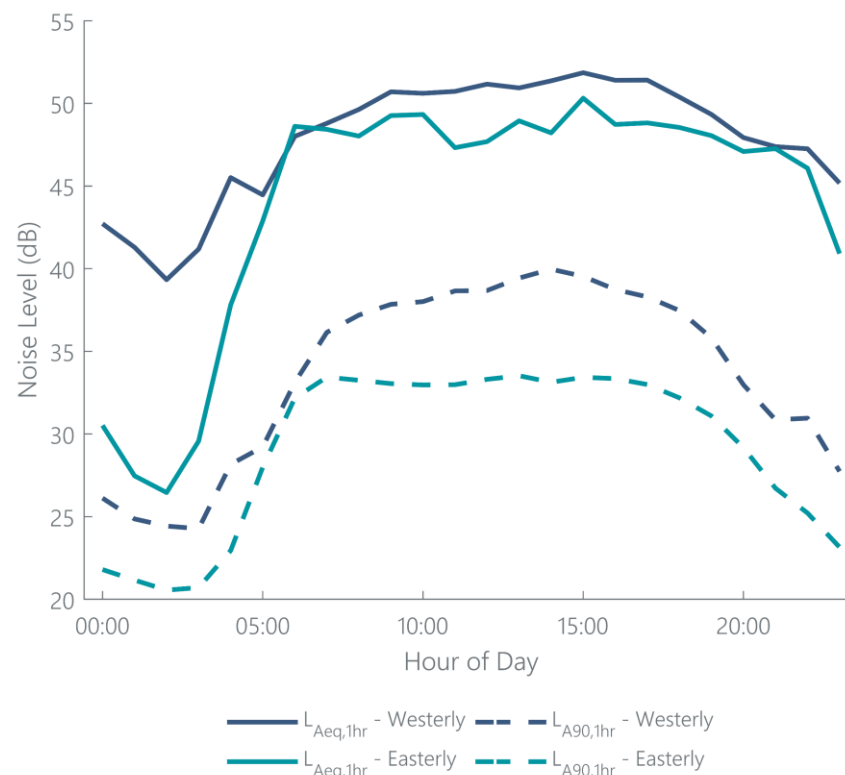
- The figure to the right shows the number of noise events from aircraft during each hour of the day on full days of both easterly and westerly operations broken down by aircraft size.
- Overall movements at Gatwick are dominated by narrow body twin engine aircraft (e.g. A320 family, B737). These aircraft therefore comprised the majority of noise events recorded on both easterly and westerly operations.
- There are certain periods, however, during which a greater proportion of noise events were recorded from larger aircraft.
- On easterly operations, there was a higher proportion of noise events from quad engine aircraft (A380, B747, A340) in the hours 10:00-11:00, 15:00-16:00 and 22:00-23:00.
- On westerly operations, the majority of the noise events from larger aircraft occurred before 11:00.



What are the overall ambient noise levels at the noise monitor?

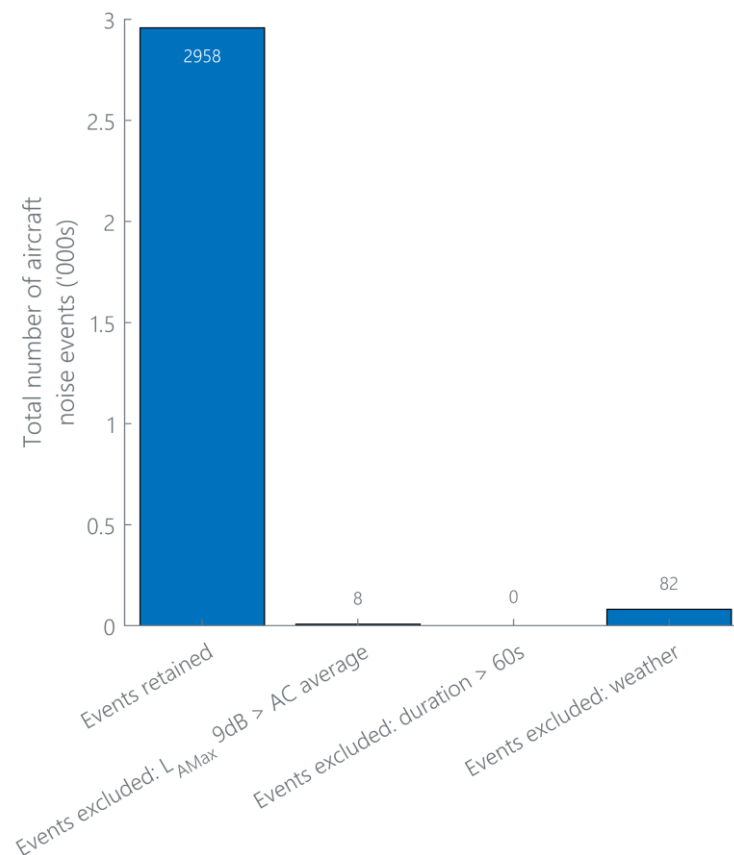
- The figure to the right shows the average hourly L_{Aeq} (ambient) and L_{A90} (background) levels on days of either 100% westerly or easterly operations. It should be noted that these metrics describe the overall noise environment including all noise sources, not just aircraft noise related to Gatwick.
- In daytime hours (07:00-23:00), the average hourly L_{Aeq} levels are between 46 and 50dB on easterly operations and between 47 and 51dB on westerly operations.
- This suggests that although there were fewer noise events recorded on easterly operations, the quieter, but more frequent, westerly operations contribute more to the overall noise environment at the Cowden noise monitor.
- The loudest average hourly noise level occurred between 15:00 and 16:00 on both easterly and westerly operations.
- During the period the monitor was in place, the average daytime $L_{Aeq,16h}$ level* between 07:00 and 23:00 was 50dB on westerly operations and 48dB on easterly operations from all noise sources.
- During the night, the average $L_{Aeq,8h}$ level between 23:00 and 07:00 was 44dB on westerly operations and 42dB on easterly operations.

* It should be noted that the $L_{Aeq,16h}$ has been calculated using the average of the hourly values for easterly and westerly days during the monitoring period. This is different to the published annual contours, which calculate the $L_{Aeq,16h}$ over a 92 day period over the summer.



Appendix A – Pre-processing of noise data

- The matching of noise events to aircraft movements is carried out in a Noise and Track Keeping (NTK) system. This relies on the time synchronisation between the noise monitor and radar. The NTK software determines whether an aircraft passed within a user-defined area around the monitor at the time of $L_{A_{Max}}$. If an aircraft is found, the software correlates the event with that particular flight.
- When monitoring aircraft noise events, it is impossible to guarantee that events are not affected by noise sources other than those generated by aircraft. Through careful placement of the noise monitor, it is possible to minimise the influence of other noise sources, such as passing cars for example; however, weather conditions should also be taken into account where possible.
- Weather data were collected at the Cowden noise monitor at 15 minute intervals from 28th May 2019 until the end of the monitoring period. Prior to this, weather data were taken from the Bellwood noise monitor 13km to the west of Cowden. The data have been used to reject aircraft noise events from the analysis in this report in instances where:
 - Average wind speeds exceed 5m/s over the 15 minute interval.
 - Precipitation exceeds 0.5mm over the 15 minute interval.
 - Event duration exceeds 60 seconds.
 - Individual aircraft event levels ($L_{A_{max}}$) are greater than 9dB above the average for the same aircraft type.
- Applying the above criteria resulted in less than 3% of noise events being omitted from the analysis in this report.



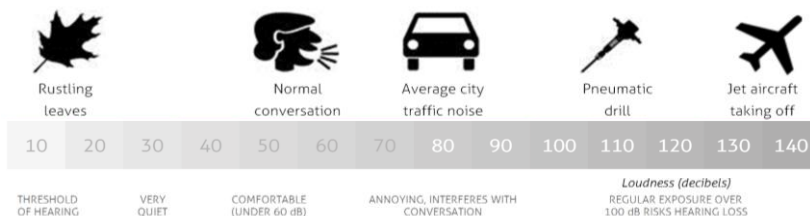
Appendix B – Noise Terminology

Sound vs Noise

- **Sound** can be measured by a sound level meter or other measuring system. **Noise** is related to a human response, and is routinely described as unwanted sound. In most reference documents, however, and, indeed, in common parlance, 'sound' and 'noise' are used interchangeably. Consequently, just because 'noise' is used doesn't necessarily mean a negative effect exists or will occur.

How is sound measured?

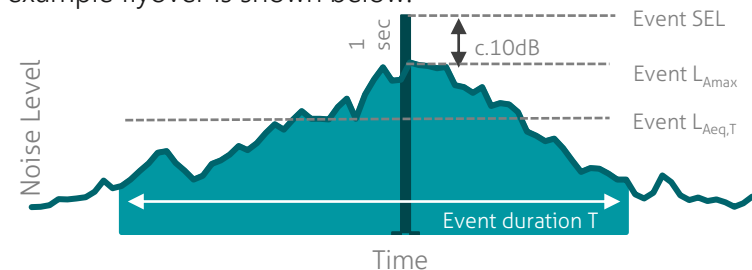
- There is a million to one ratio between the threshold of hearing and the highest tolerable sound pressure. Sound is therefore measured using a logarithmic scale, to account for this wide range, called the decibel (dB) scale. Typical levels of everyday sounds are shown in the figure below.



- The human ear (subject to age and health) is capable of detecting sound over a range of frequencies from around 20 Hz to 20 kHz; however, it does not respond equally to all frequencies, being most sensitive to sounds in the mid frequency range around 1 kHz to 5 kHz. Typically, therefore, measured sound levels are weighted across the frequency bands to broadly represent the sensitivity of the ear. The most commonly used mechanism is the A-weighting scale, hence levels are denoted as L_{Aeq} or dBA or dB(A), for example. All units in this report are A-weighted.

How is aircraft sound/noise measured and described?

- As an aircraft passes over a location, sound levels slowly increase from ambient levels, reach a maximum, and decrease back down to ambient levels. The levels and durations involved depend on a number of factors, including the level of ambient sound. An example flyover is shown below.



- There are a number of metrics that can then be used to characterise a noise event; the following being the most common:
 - The L_{Amax} is the highest sound pressure level during the event (based on a 'fast' response time of 1/8th of a second).
 - The $L_{Aeq,T}$ is the equivalent continuous sound pressure level over the period, T. It is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound. It is in effect the average noise level over the time of the event or period of interest.
 - The SEL (sound exposure level or single event level) is the sound pressure that would arise if all the energy of the event were to be delivered in 1 second. Which means if two events resulted in the same L_{Aeq} level, but one lasted longer, the SEL for the longer event would be higher. Thus it is a means of normalising event levels for comparison and some modelling purposes.