Comparison of maximum noise levels of New Generation and Old Generation aircraft in use at London City Airport - a Citizen Research Study

Summary

London City Airport (LCA) plans to expand its operating hours into Saturday afternoons and evenings. These periods are currently banned under its Planning Permissions in order to protect Londoners from City Airport's airplane noise at weekends. The airport persists in freely describing the 'new generation' planes it proposes to use more extensively as 'quieter and cleaner'. We set out to discover by measurement and analysis if they really are noticeably quieter in flight over our area.

We took 265 different maximum noise readings of London City-bound planes at several points under its concentrated arrivals flight path over SE London. This included both new and old generation planes. Our readings indicate that the new generation planes are not consistently quieter than old generation planes under this flight path, and that London City's claim is misleading and inaccurate.

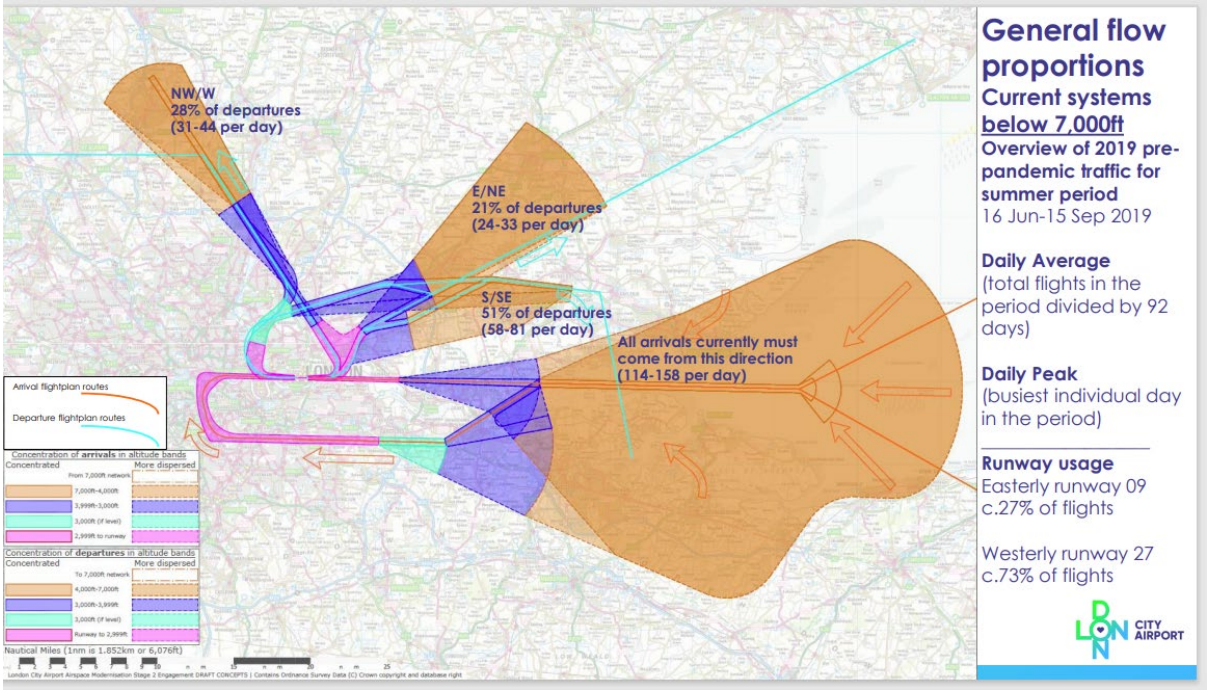
The implication of our findings is that certainly for SE London and perhaps for any London community overflown by London City aircraft at 1800-2500ft (550- 760m) above Mean Sea Level, increasing the number of overflights will increase the noise disturbance in direct proportion; it makes no noticeable difference whether the type of plane used is new or old generation.

A great deal of London City Airport's justification for its expansion plan relies on its claim that new generation planes will be quieter for the overflown, as old generation planes are replaced by new generation ones over time. This study provides evidence that LCA claims in this area are unreliable. As a result we believe that the airport must provide significant new evidence-based noise data before policymakers give any consideration to expansion of flight volumes or changes of operating hours. This new evidence should cover areas across London under each of their flight paths. LCA currently focuses nearly all of its noise analysis on a narrowly defined 'noise contour' area close to the runway.

In the light of this study, even with additional data no consideration should be given to the change of London City Airport's operating hours or permitted plane movements. First, they should deliver tangible noise relief to overflown Londoners by implementing new flight paths that stay higher for longer and provide alternating relief routes. This, they say, is due by 2027/28.

Flight Path

The LCA flight paths are set out by the airport below. In easterly wind conditions the airport uses a low (at or around 2000ft) concentrated single arrivals route over SE London then turning north towards the airport, shown by the pink east-west line.



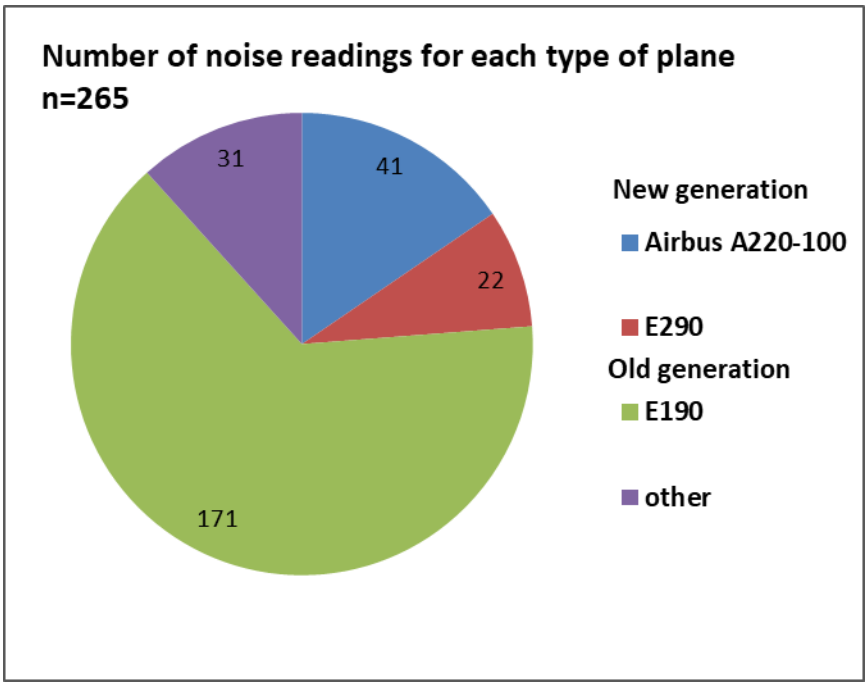
The observed aircraft for this study vary in altitude above Mean Sea Level (MSL) from around 2400ft/740m in Mottingham in the east to 2000ft/610m at Horniman museum in the west. However London City aircraft have been recorded on the airport's tracking system as low as 1600ft/488m above MSL along this flight path.

With a hilly terrain in SE London, the height of observed planes above ground level varied from around 690m in Mottingham to only 540m at Horniman Gardens.

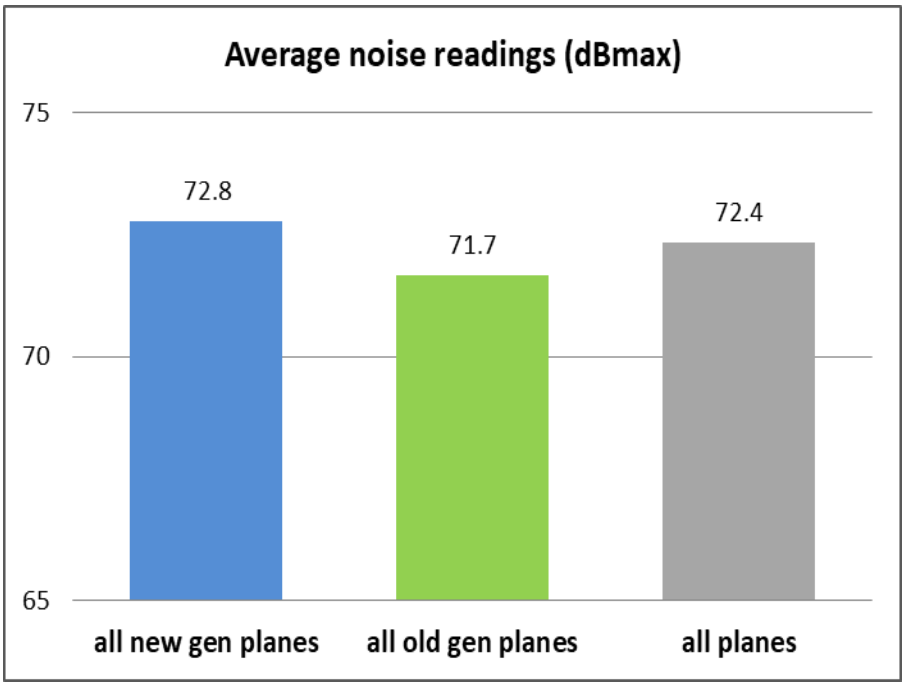
On westerly wind days aircraft approach and land directly from the east, low over the Thames Estuary and Thamesmead.

Results

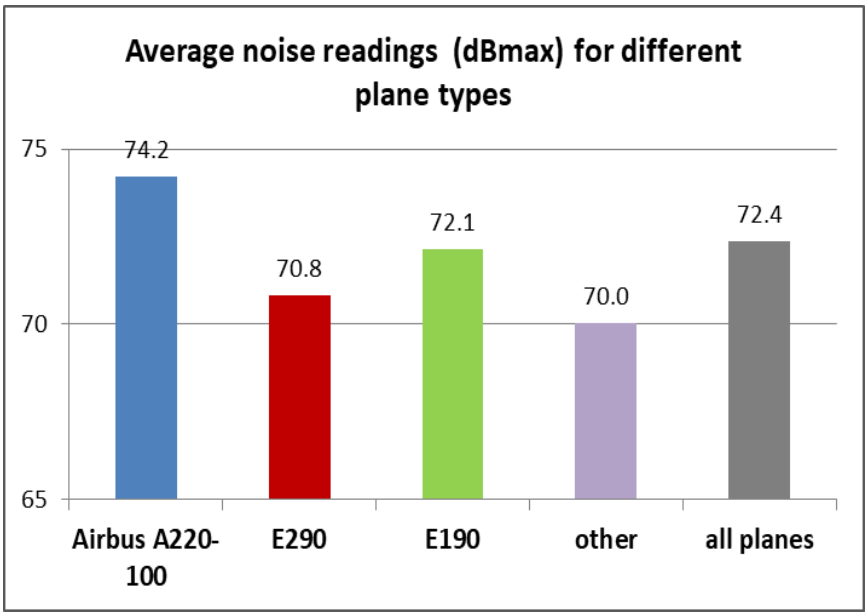
1.We took 265 noise readings for the different aircraft types as set out below.



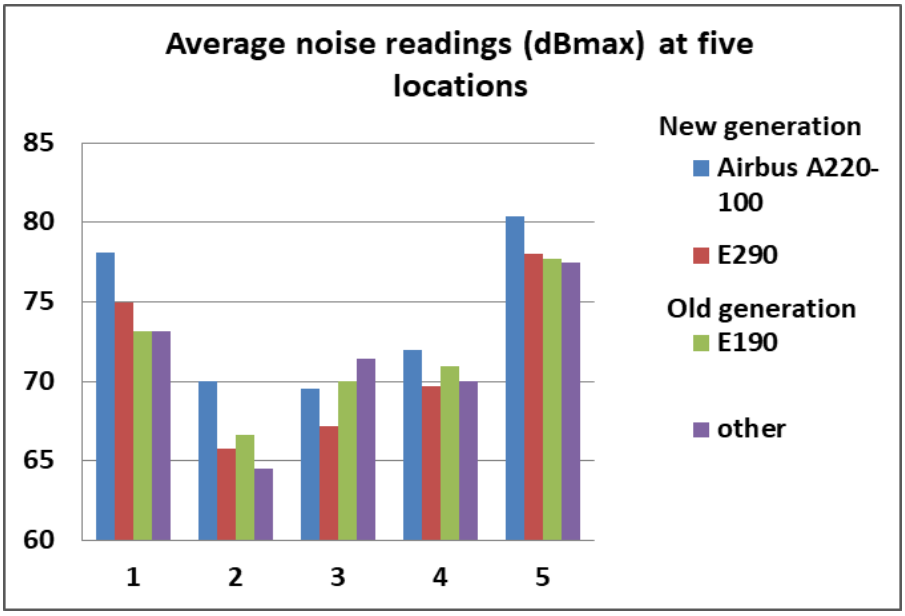
2. Across all locations and observations, there was a 1.1 dBmax average difference between new generation and old generation planes. This difference would not be noticeable to the human ear.



3. The noisiest plane, on average, was the new generation Airbus A220-100 – claimed by London City Airport to be a 'quieter' plane**.** The new generation Embraer E290 was on average 1.3 dBmax quieter than its predecessor, the Embraer E190. However this difference would not be noticeable to the human ear.



4. The noisiest location was at location 5 in the table below, the Horniman Museum and Gardens, one of SE London's most treasured public park spaces, on a hill directly under the low flight path but still 22km flying distance from the airport. Readings here from all plane types were very high, most readings around 77-80 dBmax. Perhaps this is the noisiest place under London City's flight path, excluding in the immediate vicinity of the airport runway.



Analysis and Conclusions

At consultation events LCA has consistently claimed that under the SE London arrivals flight path we should expect new generation aircraft to be 2-3 decibels quieter than old generation aircraft. We did not find this to be the case. If new generation aircraft are at all quieter then it is by a very small margin, perhaps as little as 1 dBmax. A change of 3 decibels is 'just noticeable to the human ear' according to the Civil Aviation Authority (see **Appendix 1**). So any new generation plane overflying densely populated SE London will make the same noise impact on the ground as an older generation plane. There is no benefit to these overflown areas from the airport's promise that only new generation planes will fly in any extended operating hours.

If the airport is permitted to change its operating hours to include Saturday afternoons and evenings, the overflown of SE London will be condemned to a new weekend intrusion and an ever increasing frequency of noise and disturbance incidents. The airport plans to expand from the current level of around 50,000 movements per year (source, LCA) to 110,000. Doubling plane numbers means doubling the frequency and level of disturbance, whether London City Airport's airlines fly new or old generation aircraft.

It is very questionable whether the new generation Airbus A220-100 can be viewed as 'quieter' at all. All observers noted an intermittent but loud 'whale noise' from this aircraft, and this will be reflected in its average dBmax levels. Looking for why this might be, it is easy to discover pilot groups and citizen groups, in Switzerland for example, who ever since its introduction have noted the strange and loud noises from this plane as observed from the ground.

The airport is currently planning introduction of an even bigger Embraer plane, the E195-E2 to fly this arrivals route. Given the alarming noise measurements shown here and the apparently exaggerated claims the airport has made about noise from new generation aircraft, we should be very concerned about this new threat. The airport should provide policymakers and all overflown communities with significant new data and impact assessments to justify their claims about quieter planes.

London City Airport makes frequent claims in its consultation documents that new generation planes are cleaner and quieter. It says that they will be "*sharing the benefit of quieter aircraft with the local community*." Additionally, that "*the benefit of quieter aircraft will be felt by local residents throughout the week*". This study indicates that these claims are misleading if read at face value. It shows that there is no noise benefit to be shared under the two arrivals flight paths over densely populated parts of London.

In their consultation documents is a carefully worded explanation. What they actually mean is that new generation aircraft give a "*reduced departure noise footprint*"- that is in a small departure area at either end of the runway. This study demonstrates that even if they do have a smaller departure noise footprint, new generation aircraft are not noticeably quieter than old in other stages of flight, such as under the two narrow arrivals flight paths low over densely populated parts of Greenwich, Lewisham, Southwark, Lambeth and Bexley.

We should also note the cumulative noise impacts of the crossing of LCA flight paths with Heathrow; most of the above communities under London City Airport's arrivals or departure flight paths are also overflown by Heathrow, sometimes simultaneously at different heights.

Our citizen research study concludes that there is no noticeable reduction in noise for the overflown communities of SE London from new generation planes. London City Airport should therefore withhold any expansive plans or change in operating hours until the situation for the overflown is improved by the introduction of new flight paths. New flight path priorities should include the introduction of Continuous Descent Approaches (see **Appendix 1**) and alternative flight paths so that overflown communities receive genuine noise reduction, planned quiet times and noise respite.

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for HACAN East
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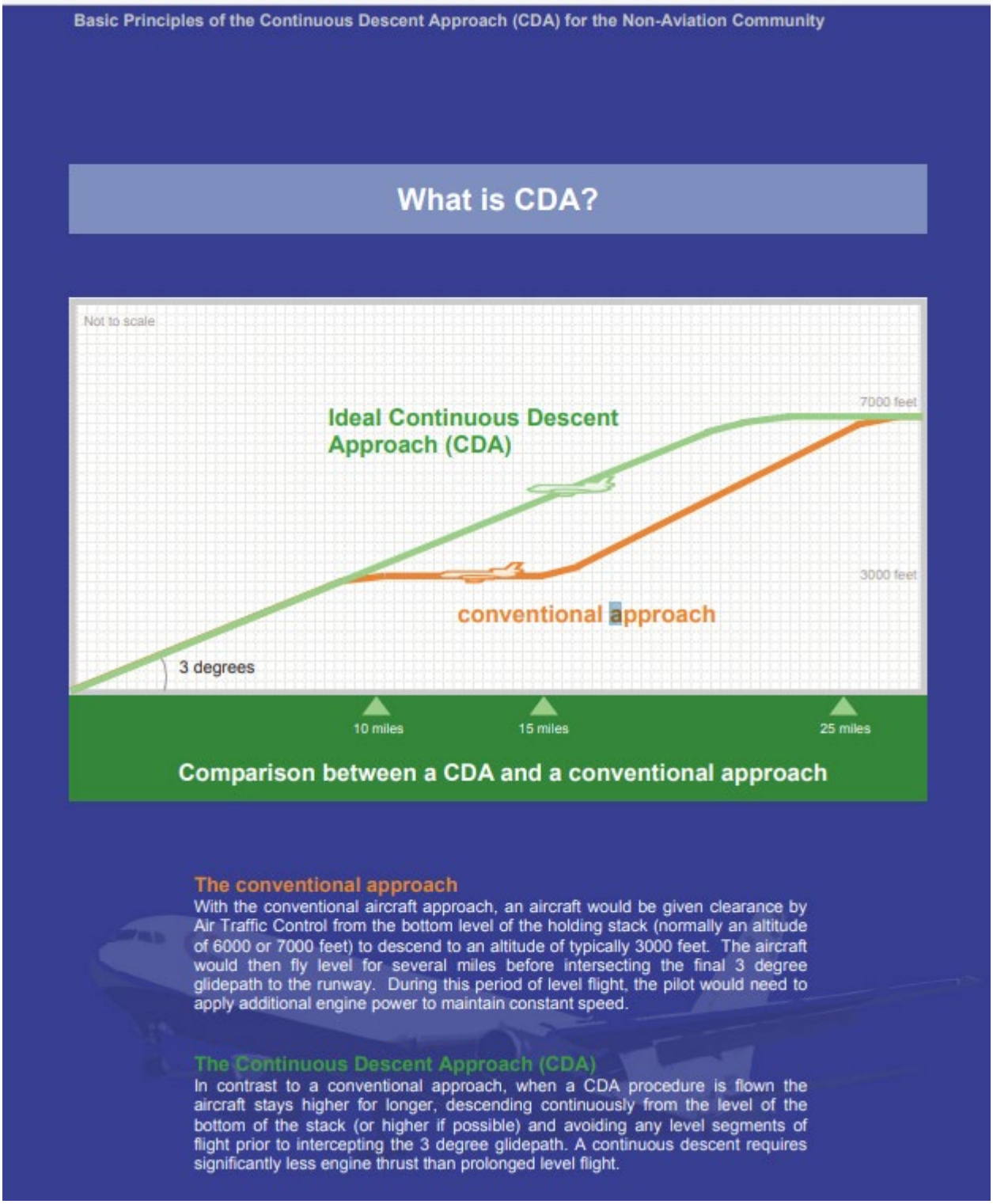
Appendix 1. Continuous Descent Approaches, aka Continuous Descent Operations (CDO)

London City arrivals in east winds use a Conventional Approach to reach Sidcup, about 20 miles from landing, at around 2300 feet. Flying level or in small steps over all of SE London requires additional thrust, creating more noise, as illustrated by the Civil Aviation Authority below.



A change of 3 decibels is ‘just noticeable to the human ear’ according to the CAA. Yet new generation planes are not measured at even 3 decibels quieter over Lewisham. But flight paths using a Continuous Descent Approach could give up to 5 decibels of noise benefit.

Basic Principles of the Continuous Descent Approach (CDA) for the Non-Aviation Community

What are the benefits of CDA?

Higher for longer
Because the aircraft flying a CDA is higher above the ground for a longer period of time, the noise impact on the ground is reduced in certain areas under the approach path.

Less engine thrust
Noise on the ground is reduced further because a CDA eliminates the period of level flight when additional engine thrust would have been used.

Noise reductions up to 5 decibels
Depending on the location and aircraft type, the noise benefit from a CDA compared to a conventional approach could be up to about 5 decibels *(a change of 3 decibels is just noticeable to the human ear)*.

Fuel savings and reduced emissions
There can be significant fuel savings (for the final arrival phase of flight) with a CDA because less engine power is required - this also means that aircraft emissions will be reduced.

What are the limitations of CDA?

Aircraft can still be heard
When an aircraft flies a CDA, it does not mean that its noise levels will be so low that it cannot be heard. A CDA simply provides a noise benefit compared to the conventional approach procedure, in certain regions under the approach path.

Noise benefits only in certain locations
The noise benefits that a CDA offers are restricted to locations typically around 10 to 25 miles from the runway. There is no difference between a CDA and a conventional approach once the aircraft using the latter joins the final 3 degree glidepath.

Little effect on airport noise contours
Because the benefits of CDA are only experienced relatively far away from the airport, consistent use of the CDA procedure will not usually have a significant effect on the size and shape of standard airport noise contours.

Cannot always be flown
It may sometimes not be possible to fly a CDA due to airspace constraints or overriding safety requirements. Also, when flying a CDA an aircraft may still require a short segment of level flight in order to reduce speed or to reconfigure.

Appendix 2. Methodology

A new generation aircraft is defined by London City Airport as an Embraer 290 or an Airbus A220-100. There are a very small number of these aircraft using the airport regularly, flying from Geneva and Zurich. An equivalent old generation aircraft used at the airport very frequently is the Embraer 190.

We asked volunteers at five separate locations along or just off the flight path to take sets of decibel max (dBmax) readings including new generation and old generation planes. The locations were along a five mile section of the flight path, including Mottingham (SE9) 29km from landing to Catford (SE6) 26km from landing and the gardens of the Horniman Museum (SE23) in the west, 22km from landing. Monitoring sites were mostly directly under the path, with one offset to the side by a kilometre.

To make the measurements we used a noise measurement app, Explane, devised and calibrated for this purpose in the Netherlands. Over July and August 2022, we compiled 265 individual measurements. Batches of readings were taken by each observer over short periods with similar wind and weather conditions. A variety of readings were taken including at different times of day and across variable wind and weather conditions. Plane types were checked against LCA's tracking system, and the recorded dBmax for different plane types recorded for each day and location when measurements were made.

Once we had sufficient observations of each plane type, we took average dBmax levels for each to assess each aircraft type against the others.