

Airports Commission

Discussion Paper 05:

Aviation Noise

About ADS

ADS is the trade organisation advancing the UK Aerospace, Defence, and Security industries with Farnborough International Limited as a wholly-owned subsidiary. ADS encompasses the British Aviation Group (BAG) and jointly sponsors, with Intellect, UKspace. ADS is also a member of the Sustainable Aviation coalition of airports, airlines, aerospace manufacturers and the UK's air navigation service provider NATS.

ADS was formed on 1 October 2009 from the merger of the Society of British Aerospace Companies (SBAC), the Defence Manufacturers Association (DMA) and the Association of Police and Public Security Suppliers (APPSS). ADS comprises around 900 member companies within the industries it represents. Together with its regional partners, ADS represents over 2,600 companies across the UK supply chain.

ADS welcomes the opportunity to respond to the consultation by the Airports Commission on their Discussion Paper 05: Aviation Noise, and would note that we have already made significant responses to the Government's "Scoping Document on Developing a Sustainable framework for UK Aviation", and "Draft Aviation Policy Framework" consultations, which provide additional information on the aerospace industry, and the noise impacts of aviation, which should be referenced for additional information.

UK Aerospace

The UK aerospace manufacturing sector is the second largest in the world (17% market share), and one of the UK's few world-class manufacturing industries being worth nearly £24.2 bn to the UK, of which £18 bn (75%) is exported world-wide. The sector is a high value, highly skilled sector directly employing over 100,500 directly and supporting a workforce of around 360,000, plus another 46,000 overseas, in 2011¹.

An important contribution from the industry is in the regionalisation of commercial aviation, generating employment in many regional areas – a good example is Bombardier in Belfast, who provides employment to around 5,000 employees, generating almost 10% of Northern Ireland's manufacturing exports.

Connectivity to emerging markets and those with growth levels greater than the UK, such as Brazil, the Russian Federation, India and China (the BRIC countries) are vital for the future prosperity and welfare of UK plc. A recent report has noted that companies do 20 times the amount of business with countries connected by air, than those that are not. As noted by

¹ ADS "2012 UK Aerospace Industry Survey", ADS 2012.

Prime Minister David Cameron (at the Farnborough Airshow²): UK Aerospace has a crucial role and is “... **a vitally important industry for the United Kingdom and for the future of our country and our economy**”, he also noted that “**We [Government] are determined to do everything we can to back UK aerospace...**” In this respect, we welcome this statement by the Prime Minister, but believe that the UK is still losing out to its European neighbours who have already latched on to, and support, the vital role that aviation plays.

Aircraft Noise Technology and the SA Noise Road-Map³

ADS is a member of the Sustainable Aviation coalition of airports, airlines, aerospace manufacturers and the UK's air navigation service provider NATS, and have provided significant input into a number of their technical documents. The one most pertinent to this consultation is the Sustainable Aviation 'Noise Road-Map', which was launched on 23rd April 2013, which demonstrates how the aviation industry intends to limit and, where feasible, reduce the number of people affected by noise from aircraft operations between now and 2050, in line with Government policy.

Noise contours around major UK airports have reduced significantly over the past years, and aircraft today are significantly quieter than they were in the past. For example, the noise performance of aircraft such as the new 550 seat A380 are setting new paradigms for noise performance – its QC 0.5 classification on arrival being equal to that of older 150 seat types, and a quarter of that of the aircraft types it replaces. The necessity of creating the newer QC 0.25 group for the London Airports night restrictions scheme also demonstrates that newer aircraft are quieter than their predecessors, at the 'quieter' end of the scale as well.

ADS would note that globally, it would be more environmentally and financially efficient to invest in research and development of low noise engine and airframe technology, which will have a world-wide impact on reducing aviation's global noise impact whilst at the same time bringing back significant benefit to the UK economy, rather than promoting local restrictions which will only result in limited improvements and serve to harm the UK economy.

The industry is also not resting on its laurels, but is investing heavily in the future. R & D expenditure by the UK aerospace manufacturing sector was maintained at £2.20 bn per year in 2011, and new concepts such as those highlighted in “The future by Airbus” demonstrates that the industry is not frightened of forward thinking. Government support through the Aerospace Growth Partnership (AGP) is crucial for the industry to retain world leadership in this area. ADS looks for cross-party support for the AGP so that UK Aerospace is able to continue to deliver for the UK economy.

Aircraft and aero-engine manufacturers have been aggressively researching low-noise technology for at least the past 50 years, and this is resulting in the dramatically reduced noise levels of the aircraft now entering service as outlined above. It should be noted that

² PM David Cameron “Prime Minister's speech opening the 2012 Farnborough Airshow”
<http://www.number10.gov.uk/news/speech-opening-farnborough-air-show/> 02/09/2013, last accessed 24/10/2012.

³ Sustainable Aviation “The SA Noise Road-Map – a blueprint for managing noise from Aviation sources to 2050”, Sustainable Aviation, April 2013

these significant improvements have been achieved whilst simultaneously reducing fuel burn and carbon dioxide as well as other emissions.

Operationally, a UK industry group has published guidance on “Reducing the Environmental Impacts of Ground Operations and Departing Aircraft – an Industry Code of Practice”⁴, complimenting the “Code of Practice” for arriving aircraft⁵. Both these documents have sought to identify techniques and procedures to reduce the noise and other environmental impacts from aircraft operations, and promote them throughout the industry primarily through Sustainable aviation. To promote them to the international community, details of the Departures Code of Practice have been also added to the ICAO list of world-wide examples of Voluntary Measures on their public website⁶.

Answers to specific Airports Commission questions:

- **What is the most appropriate methodology to assess and compare different airport noise footprints? For example:**
 - **What metrics or assessment methods would an appropriate ‘scorecard’ be based on?**

ADS would note that the 57 dB $L_{Aeq, 16hr}$ contour has been in place for over 20 years and has become the *de facto* standard for describing aircraft operational noise impacts at airports in the UK. The level of 57 dB $L_{Aeq, 16hr}$ was set at a level to be consistent with the ANIS study and the 35 NNI contour which was in place for a significant period before this. As a result there is a consistent history of noise impacts around the designated airports, going back many years which a change to any new metric would almost certainly compromise, and so ADS would strongly advocate retaining this measure to assess and compare different airport noise footprints.

There are a number of other concerns with moving to new metrics, such as the 55 L_{DEN} of the Environmental Noise Directive (END), which are averaged over longer periods. The L_{DEN} is a 24-hour metric, rather than being purely for the 16-hour day, and therefore would be relatively insensitive to period where there are a low number of noise events, such as those at night, as seen at some of the major airports.

In this respect, the current system in use at the Designated London airports where the 57 dB $L_{Aeq, 16hr}$ contour is used to assess and, at Heathrow limit, the noise exposure during the daytime coupled with the QC system which addresses individual events at night, would seem an appropriate and effective method to use.

⁴ “Reducing the Environmental Impacts of Ground Operations and Departing Aircraft – an Industry Code of Practice”, <http://assets.dft.gov.uk/publications/reducing-environmental-impacts-ground-operations-departing-aircraft/reducing-environmental-impacts-ground-operations-departing-aircraft.pdf>, DcOP WG, June 2012, last accessed 02/09/2013

⁵ “Noise from Arriving Aircraft – an Industry Code of Practice” second edition, <http://www.dft.gov.uk/pgr/aviation/environmentalissues/arrivalscodeofpractice/noisefromarrivingaircraft.pdf>, ACoP WG, last accessed 02/09/2013

⁶ ICAO “Voluntary Measures”, http://www.icao.int/environmental-protection/Documents/VoluntaryMeasures-Responses/UK-ADG-Group_en.PDF, ICAO, last accessed 02/09/2013.

- **To what extent is it appropriate to use multiple metrics, and would there be any issues of contradiction if this were to occur?**

ADS notes, however, that annoyance due to noise is a complex and much faceted issue which depends as much on the individual reaction to the noise levels as on the noise levels themselves. In this respect, we do support the use of **supplementary** noise metrics, such as L_{DEN} , N70, Flight-track information, etc. where they are shown to be useful in describing the different aspects of noise impacts of aircraft operations to local communities, and other stakeholders. However, great care must be taken to ensure that a plethora of metrics are not developed and published causing added confusion rather than being more instructive.

ADS would also note that the communication of noise impacts, in the wider sense, is of paramount importance and would strongly support the key messages outlined in the Sustainable Aviation 'Noise Road-Map', especially those related to identifying and resolving gaps related to their 'Noise challenge' diagram.

- **Are there additional relevant metrics to those discussed in Chapter 3 which the Commission should be aware of?**

ICAO provides guidance on commonly used noise metrics⁷ (as does the CAA⁸), though gives no firm advice on which one to use. The concept of the number of events (flights) above a certain threshold level is an interesting one. For instance, if the threshold were set at 10 dB above the ambient noise level (L_{90}), then this would give an indication when aircraft noise would be noticeable. A study would still be required, however, to determine the level above the audible threshold at which noise became annoying, or 'highly' annoying. This would have the advantage of automatically adjusting to time of day, urban or country environments and differing background noise levels, regardless of where they were situated.

Note that the so-called " L_{night} " is not an appropriate metric to use when there are relatively few noise events (flights), as it fails to characterise the noise nuisance properly – a single extra event will have little impact on the L_{night} value even though it may have quite a significant impact on night-time annoyance.

- **What baseline should any noise assessment be based on? Should an assessment be based on absolute noise levels, or on changes relative to the existing noise environment?**

ADS would suggest that the simple answer is both, and would depend on the purpose of the noise assessment. When noise levels are very high, then absolute values need to be assessed to ensure that significant thresholds are not breached. However, at lower levels, those close to ambient levels, or those determined as non-harmful, then levels relative to the existing noise environment are necessary to determine the extra level of noise annoyance that may result (this is similar to the process of Noise Exposure Category that was employed by the now out-of-use PPG 24).

⁷ ICAO "Environmental Assessment Guidance For Proposed Air Traffic Management Operational Changes" document source CAEP/9-WP/29, dated 20/11/12

⁸ ERCD Report 0904 "Metrics for Aircraft Noise"

<http://www.caa.co.uk/application.aspx?catid=33&pagetype=65&appid=11&mode=detail&id=3384> last accessed 02/09/2013.

- **How should we characterise a noise environment currently unaffected by aircraft noise?**

There are a number of ways in which the noise environment can be categorised in areas unaffected by specific noise sources, such as aircraft noise. Perhaps the most widely used in the L_{90} metric which is often used to describe “Background noise”, and is the metric specified in BS 4142 – Rating Industrial Noise affecting Mixed residential and Industrial areas” to define background noise levels. Additionally, the EC Environmental Noise Directive (2002/49/EC) stipulates the use of the L_{DEN} and L_{night} metrics for the generation of Strategic Noise Maps by Member States⁹.

ADS would note that we do not have the expertise to answer this question in a meaningful way, and would point towards more informed responses from the airports and aircraft operators.

- **How could the assessment methods described in Chapter 4 be improved to better reflect noise impacts and effects?**

Experience suggests that the way that individuals react to aircraft operational noise is highly variable, and this is borne out in Figure 4.1 of section 4 of the Airport Commissions discussion Paper on Noise, which shows that there is a considerable scatter of results of respondent’s annoyance for both surface transport and aircraft noise. The Sustainable Aviation ‘Noise Road-Map’, has identified a number of reasons for this which are outlined in their ‘Noise Challenge’ diagram, noting that a number of these reasons are not under the control or influence of the aviation industry, or necessarily any other body. As a result it would appear that further significant research is necessary to identify, and quantify, some of the more subjective reasons for noise annoyance, before arriving at any firm conclusions.

However, ADS would note that we do not have the expertise to answer this question in a meaningful way, and would point towards more informed responses from the airports and aircraft operators.

- **Is monetising noise impacts and effects a sensible approach? If so, which monetisation methods described here hold the most credibility, or are most pertinent to noise and its various effects?**

The principle appears to be reasonable in its concept as long as the methods described in chapter 4 are robust enough and fully capture the benefits of the aviation sector, although there is some doubt that required levels of robustness can actually be achieved. However, ADS would note that we do not have the expertise to answer this question in a meaningful way, and would point towards more informed responses from the airports and aircraft operators.

⁹ European Commission “The Environmental Noise Directive (2002/49/EC)”, <http://ec.europa.eu/environment/noise/directive.htm>, last accessed 02/09/2013

- **Are there any specific thresholds that significantly alter the nature of any noise assessment, e.g. a level or intermittency of noise beyond which the impact or effect significantly changes in nature?**

This really depends on the metric used. The “Schultz – curve” (see page 31 of the report) suggests that for L_{DN} , the value should be somewhere around 65 dBA L_{DN} , however there is considerable scatter in the results. It should be noted that the 57 $LA_{eq 16hr}$ now used by the Government¹⁰ for characterising the onset of significant annoyance, was also justified based on similar reasoning.

- **To what extent does introducing noise at a previously unaffected area represent more or less of an impact than increasing noise in already affected areas?**

ADS would note that we do not have the expertise to answer this question in a meaningful way, and would point towards more informed responses from the airports and aircraft operators.

- **To what extent is the use of a noise envelope approach appropriate, and which metrics could be used effectively in this regard?**

ADS understands that noise is the primary concern for communities close to airports, and would again point towards the significant improvements already made by the industry and projected in the future in addressing aircraft noise. We do believe that the Airports Commission needs to be mindful of the numerous interrelationships between noise and other environmental impacts and, indeed, between environmental and non-environmental concerns.

We believe that certification standards have had more impact on aircraft design than noise contour areas where there is little, if any, evidence to suggest that these have had any input into new aircraft or engine design. As a result, we feel that the most appropriate and effective way of minimising aircraft noise impacts whilst having due regard for other impacts, both environmental and non-environmental, is in the setting of international standards at ICAO’s CAEP. We would note that noise standards agreed at international level will have a global impact, whilst local ones will have only a very restricted benefit, and perversely may result in unintended consequences due to numerous trade-off issues.

We note that a significant amount of work has already been carried out to identify interdependencies and would point towards the Sustainable Aviation policy discussion paper “Inter-dependencies between emissions of CO₂, NO_x & Noise from aviation”¹¹ and Chapter 8 “Interrelationships associated with methods for mitigating environmental impacts” of the ICAO “Airport Air Quality Manual”¹², ICAO’s “Effects of PNS-OPS Noise Abatement Departure Procedures on Gaseous Emissions”¹³ amongst others. In this respect we would

¹⁰ CAA “CAA Guidance on the Application of the Airspace Change Process”, CAP 725, CAA Directorate of Airspace Policy, <http://www.caa.co.uk/docs/33/CAP725.PDF>, last accessed 02/09/2013

¹¹ Sustainable Aviation “Inter-dependencies between emissions of CO₂, NO_x & Noise from aviation”, Sustainable Aviation, September 2010

¹² ICAO “Airport Air Quality Manual”, ICAO Doc. 9889, first edition, ICAO 2011.

¹³ ICAO “Effects of PNS-OPS Noise Abatement Departure Procedures on Gaseous Emissions”, ICAO Cir 317 AT/136, first edition, ICAO 2008.

also ask the UK Government for support with any future work item on identifying interrelationships at ICAO CAEP.

ADS would again stress that it is vitally important to engine and airframe manufacturers that any noise limitation at airports is consistent with internationally agreed standards, such that the engine/airframe combination configuration can be chosen to minimise fuel burn, whilst at the same time being able to meet or better those requirements. The approach taken at ICAO's Committee on Aviation Environmental Protection (CAEP), which is based on clearly defined noise standards, provides a cost-effective method of ensuring that low-noise technology is incorporated into new aircraft. The terms of reference of the ICAO CAEP note that "In its work the Committee shall take into account the following:

- a. effectiveness and reliability of certification schemes from the viewpoint of technical feasibility, economic reasonableness and environmental benefit to be achieved;
- b. developments in other associated fields, e.g. land use planning, noise abatement operating procedures, emission control through operational practices, etc.;
- c. international and national programmes of research into control of aircraft noise and control of gaseous emissions from aircraft engines; and
- d. the potential interdependence of measures taken to control noise and to control engine emissions."¹⁴

In respect of rotorcraft, the use of a noise envelope might be practical, but it would need to be balanced such that it is not unduly detrimental to any particular aircraft or technology type (e.g. jet, open rotor, turboprop, or rotary wing) based on false pre-conceptions of their noise performance.

Although noise contours, for instance those at Heathrow and Gatwick, have proven to be effective in reducing operational noise impacts around these airports as demonstrated by the significant reduction in the noise contour areas as published by DfT¹⁵, this does not provide a clear route for designing requirements for individual aircraft or engine types. As a result, they are not really effective in driving reductions in the noise performance of new products, unlike the approach adopted by ICAO CAEP.

The main issue with noise envelopes is that the basis on which they are calculated have been criticised by industry and have always been an issue for local communities, demonstrating that noise exposure is a complex and very subjective issue. In this respect, it is more than probable that a number of metrics would be necessary to characterise noise impacts and we recommend that the Airports Commission carries out further research into the communication of noise impacts and metrics, similar to that published by Airservices Australia for major Australian airports¹⁶. It is also important to note that any restriction should

¹⁴ ICAO "Environment Branch – Committee on Aviation Environmental protection – Terms of Reference", http://legacy.icao.int/icao/en/Env2010/Caep_TermsRef.htm, ICAO, last accessed 14/10/2011.

¹⁵ DfT "Noise exposure contours around London airports", <https://www.gov.uk/government/publications/noise-exposure-contours-around-london-airports>, last accessed 02/09/2013.

¹⁶ Airservices Australia "Airport information packs", Airservices Australia, <http://www.airservicesaustralia.com/aircraftnoise/airport-information/>, last accessed 02/09/2013.

fully take into account the UK's international obligations under the ICAO "Balanced Approach"¹⁷, and (relevant) EU noise directives.

It is also of paramount importance to note that without properly enforced land-use management and planning controls, any noise envelope would be of no use in reducing population exposure. In this respect, housing developments normally rejected as part of the local governments assessment following Planning Policy Guidance note 24 (PPG 24)¹⁸, needs to be enforced properly and not overturned on appeal by the Secretary of State, as anecdotal evidence from local Environmental Health Officer's suggests happens at present. This should in turn be coupled with noise statements on buying a house within the noise "envelope", contour, such that prospective house buyers are made well aware of the proximity of the airport and flights paths, etc. when deciding where to live, in order to make an informed decision on where to balance their need for a residence and the noise associated with their choice.

ADS would note that without appropriate land-use planning in place any improvements in noise technology, that aerospace airframe and engine manufacturers make, would be significantly eroded.

- **To what extent should noise concentration and noise dispersal be used in the UK? Where and how could these techniques be deployed most effectively?**

If proper, effective land use planning controls existed, then it would be preferable to concentrate aircraft noise along noise preferential routes, as we believe that these are easier to implement for ATC and aircraft operators. This would also ensure that areas of population are not subject to the higher noise levels due to aircraft operations close to airports. However, the case at the moment does not afford protection as the lack of enforcement of PPG 24 has proven it to be ineffective in reducing or preventing population encroachment in noisy areas close to, or under aircraft flight-paths¹⁹. It is important to note that there are a number of systems that could enable either sharing or concentration, that are not currently being used due to airspace management constraints.

One example is P-RNAV (RNAV1 as defined in ICAO PBN manual²⁰) where consistency of aircraft track keeping has been demonstrated in trials at Heathrow in the early mornings which could be used for either concentration of aircraft flight-paths, or dispersion along a number of pre-defined flight-paths²¹, where the system will ensure accurate tracking to meet aircraft separation criteria necessary to ensure safe operations.

As a result, ADS believes that the final decision to use noise preferential routes or widely dispersed flight paths is a matter for the stakeholders involved in airport and associated land use planning authorities, along with the Secretary of State for the "Designated Airports", as

¹⁷ ICAO "Guidance on the Balanced Approach to Aircraft Noise Management", ICAO Doc. 9829,AN/451, ICAO 2008.

¹⁸ Department for Communities and Local Government "Planning Policy Guidance 24: Planning and Noise", HMSO 2004.

¹⁹ ICAO "Report: Population/Housing encroachment in the vicinity of airports", CAEP/6-WP/21, ICAO 2004.

²⁰ ICAO "Performance-based Navigation (PBN) Manual", ICAO Doc. 9613, AN/937, ICAO 2008.

²¹ Morris K. M. "Airline approach to noise management with particular reference to Continuous Descent Approach procedures", Proceedings of the Institute of Acoustics, Vol. 26. Pt 2. 2004, IOA 2004.

both techniques could be workable using current aircraft systems technology. ADS would note that we do not have the expertise to answer this question more comprehensively, but would point towards more informed responses from the airports and aircraft operators.

- **What constitutes best practice for noise compensation schemes abroad and how do these compare to current UK practice? What noise assessments could be effectively utilised when constructing compensation arrangements?**

ADS would support the principle that, for compensation schemes, aircraft noise should be treated no differently to other noise sources. However, ADS would also note that we do not have the expertise to answer this question in a meaningful way, and would point towards more informed responses from the airports and aircraft operators.

I hope this assists the Airports Commission in its work. Please do not hesitate to contact me at Kevin.morris@adsgroup.org.uk or on 020 7091 4530 if you have any questions on our submission, or if ADS can be of any further assistance to the Commission.

Yours sincerely,

A handwritten signature in black ink, appearing to be 'KM', followed by a long, horizontal, slightly wavy line that extends to the right.

Kevin Morris
Aviation and Environment Manager
September 2013

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