

Omega

Aviation in a sustainable world

Attitudes to Aircraft Noise Workshops

Thematic Area: Economics



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About Omega

Omega is a one-stop-shop providing impartial world-class academic expertise on the environmental issues facing aviation to the wider aviation sector, Government, NGO's and society as a whole. Its aim is independent knowledge transfer work and innovative solutions for a greener aviation future. Omega's areas of expertise include climate change, local air quality, noise, aircraft systems, aircraft operations, alternative fuels, demand and mitigation policies.

Omega draws together world-class research from nine major UK universities. It is led by Manchester Metropolitan University with Cambridge and Cranfield. Other partners are Leeds, Loughborough, Oxford, Reading, Sheffield and Southampton.

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www.omega.mmu.ac.uk

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Executive Summary

Notwithstanding increasing concerns about air quality and climate change, aircraft noise and the way that it is handled by the aviation industry has been and continues to be an issue of major importance for many people living in areas around major airports. The recent Attitudes to Noise from Aviation Sources in England (ANASE) study carried out for the Department for Transport provided statistically representative data suggesting that levels of reported annoyance around airports in England had not been reduced by as much as might have been expected based on the considerable reductions in aircraft event sound levels which have been achieved over the last 20 or 30 years, and might even have increased in some areas with the most traffic growth.

Partly because of the high profile of the ensuing technical debate within the industry and amongst local interest groups, Omega decided to sponsor a workshop intended to present the relevant factual information from the ANASE study and other research to as wide a range of interested stakeholders as possible. The aims were to disseminate knowledge, to allow people to make up their own minds about the relevant studies, and to discuss specific areas requiring further research. A broad discussion of the ANASE work and related studies helped to identify a number of areas where further research could usefully be carried out, including the following:

- Values attributed to operation changes
- Understanding the psychology of small changes
- Significance of change
- Metrics
- Onset of annoyance

This report summarises the Omega sponsored Attitudes to Aircraft Noise workshop and a subsequent technical meeting for European Researchers and sets out the key conclusions arising from those events.

There is no doubt from these activities and others carried out under the Omega banner that understanding of attitudes to noise is not fully mature. A number of specific areas have been defined for future examination and a deeper dialogue is needed amongst experts as well as with affected communities and those responsible for delivering solutions.

1.0 Introduction

Aircraft noise continues to be a significant issue of concern around UK airports, especially with expectation of continued growth. The issue is challenging for the sector in delivering quieter aircraft and operations and for Government in applying policies that balance legitimate interests. Despite the increasing concerns about air quality and climate change, aircraft noise is set to remain a key driver of aviation environmental policy and research both on noise impacts and mitigation actions.

Continuing growth in civil aviation depends on a consensus that the economic and social benefits outweigh the environmental costs such as increased noise. The recent Attitudes to Noise from Aviation Sources in England (ANASE) study carried out for the Department for Transport provided a considerable amount of statistically representative data suggesting that levels of reported annoyance around airports in England might not have been reduced by as much as might have been expected based on the considerable reductions in aircraft event sound levels which have been achieved over the last 20 or 30 years, and might even have increased in some areas with the most traffic growth. These findings stimulated a considerable degree of interest amongst relevant stakeholder communities, some of whom have suggested that the methods currently adopted by the CAA for carrying out aircraft noise assessments for the Department of Transport might need to be adapted accordingly.

Further interest was generated by the critical comments made by the peer reviewers and published on the Department of Transport website contemporaneously with the ANASE report. Also available on DfT's web site is a statement issued by its Chief Economist. Whilst recognising the significant analytical challenges that the study faced - and acknowledging it contained innovative and ground breaking work making it a valuable contribution in this field - the Chief Economist also recorded that some material differences of view between the study team and the peer reviewers on the interpretation of the study's findings: in particular that the peer reviewers had counselled against using the detailed results and conclusions from the study in the development of Government policy.

The workshop was widely advertised and persons expressing an interest to attend such as academic researchers, industry professionals, NGOs, planners, and consultants were then sent formal invitations. Attendance was by invitation only

because it had been decided to place a limit on overall numbers at 60 to prevent the workshop discussions from being unmanageable. Slightly more than 60 people actually turned up on the day and a few latecomers had to be squeezed in at the back. The workshop was held in a hotel near to Heathrow Airport to facilitate travel arrangements for people wishing to attend.

The morning sessions covered the historical and technical context from the 1963 Wilson Report on the Problem of Noise, through to the CAA Aircraft Noise Index Study carried out in 1982 and reported in 1985, to the most recent ANASE study which was mostly carried out in 2005 and reported in 2007. The broad aim was to stimulate informed discussion and exchange of views amongst the interested stakeholder community on the current state of knowledge with particular emphasis on defining a road map of future knowledge and evidence requirements which will facilitate further progress in this general area. Attendees were encouraged to ask questions and contribute to an exchange of views in structured workshop sessions which were scheduled for most of the afternoon.

A number of points emerged during the attitudes to aircraft noise workshop which indicated the potential benefits of getting together with European researchers who have carried out similar studies to the ANASE study in recent years. A follow up European Researchers technical meeting was held at Heathrow on 22nd September and is also reported herein.

2.0 Outline of Workshop and Summary of Presentations - 29th May 2008¹

The results of further reviews carried out by the peer reviewers after the data collection phase had ended were published on the Department for Transport website at the same time as the final report and technical appendices of the ANASE study were published. All relevant material was provided to workshop attendees on CD-Rom. Most of the issues previously raised by the peer reviewers - were debated, in some cases at considerable length.

The majority of the morning's presentations were given by Dr Ian Flindell from ISVR.

¹ It should be noted that the presentations can be found on the Omega website at www.omega.mmu.ac.uk

Dr Flindell was one of the researchers who carried out the ANASE study for the Department for Transport. Dr Flindell reviewed the theoretical background and historical context leading up the ANASE study by explaining that the main research problems revolved around two main issues; a) how to describe the overall amount of aircraft noise; and b) how to describe attitudinal response.

Qualitative research has shown that the three main determinants of aircraft noise are; the sound levels (and character) of the separate aircraft noise events; the numbers or frequencies of those events; and the different times of the day, evening, or night during which those events occur. The variability of aircraft noise at different times of day and night and under different weather conditions can also be important, although this is much harder to quantify and the effects tend to be more uncertain. Combining these variables in different ways to generate overall single number indicators such as LAeq,16 hours (the 16 hour average A-weighted sound level, which is currently used for aircraft noise assessments carried out by the CAA for the Department for Transport), Lden (the 24 hour day evening night sound level specified by the EC under the 2002 Environmental Noise Directive), or the NNI (The Noise and Number Index, which was used until 1990 by the CAA for aircraft noise assessments) produces numerically different values for exactly the same overall amount of aircraft noise, and may emphasise different aspects of the overall noise environment in different ways.

Attitudes can also be measured in lots of different ways. The most common way of measuring attitudes is by means of standardised questionnaires where the same questions are put to lots of different people who are representative of populations resident within a range of different environments. Detailed differences in the precise wording of the questionnaire, or in the type of subjective scale used, can have significant effects on the results. In addition, the different ways in which respondents might be selected, or sampled, from the overall population can introduce all kinds of different biases. If the sample of respondents is not statistically representative of the overall population, then their questionnaire responses might not be statistically representative of the overall population either. Samples obtained by distributing copies of questionnaires for optional completion are likely to be biased whereas samples that are obtained by some form of randomised pre-selection, provided that a high response rate can be achieved are not.

Going back over the last 40-50 years, techniques have been improved to the extent that there is now an ISO standard method for the measurement of reported noise

annoyance which should at least eliminate differences due to using different questionnaires and subjective scales. The recent ANASE study used fully randomised statistical sampling and followed the latest ISO recommendations on questionnaire wording and administration. The detailed design of the sampling procedures and the questionnaire wording was extensively piloted and reviewed by various steering groups established by the Department for Transport before the go-ahead for the main study was given.

Exposure response relationships illustrate the observed relationship between the amount of aircraft noise and the resulting proportions of the exposed population expressing or reporting defined degrees of annoyance. All such relationships are highly dependent on the particular metrics chosen for the x (sound level) and y (attitudinal response) axes when plotted on a chart. Any differences observed between the exposure response relationships found in different research studies could be representative of genuine differences in the pattern of subjective response between the different studies or they could simply be an unavoidable consequence of measuring the input variables in different ways. The designers of research studies have to balance the need to maintain comparability against data obtained in previous or historic studies against the need for continual improvement as new techniques become available. The recent international agreements on standardised methods of measurement have helped in this respect although they cannot by themselves overcome the problems of comparison against previous studies which were designed before the standardised methods became available. It is not, unfortunately, possible to go back in time and re-do earlier studies using the newer standardised methodologies.

Dr Flindell then summarised the findings of the recent ANASE study, with particular reference to the previous ANIS study carried out by the CAA in 1982. Because of detailed differences in experimental design over the intervening 23 years, and because the overall patterns of aircraft noise exposure observed in 1982 have also changed, it is not possible to make precise like-for-like comparisons between the two studies. However, by making conservative assumptions about comparisons between the two sets of input data, it had been possible to show that in 2005, people, on average, seemed to be reporting higher levels of annoyance at the same or similar levels of aircraft noise measured in LAeq,16 hours than in 1982 when the ANIS study was carried out. This could either mean that in 2005, people had become relatively more annoyed by aircraft noise than they were in 1982, or it could mean that annoyance was unchanged but the method of measuring aircraft noise, LAeq,16

hours, was wrong, or a combination of both. There are a number of reasons to hypothesise that people in general could have become more inclined to complain or tend to have higher expectations for peace and quiet, particularly as general or average prosperity has increased.

On the other the hand, from 1982 to 2005, the average sound levels for separate aircraft noise events became considerably quieter while the number of aircraft noise events has increased in line with increasing traffic. Further analysis of the combined ANIS and ANASE datasets suggested that whereas in 1982 people in general seemed to be more concerned with the sound level of the separate events rather than with the number of events variable, in 2005, the overall pattern had changed, with people being much more concerned about the number of events variable than with the sound levels of those events. This finding suggests that no single metric or indicator which employs a fixed relationship between the relative importance of the average event sound level and number of events variables can expect to be equally useful under the wide range of different noise exposure conditions that might exist over extended time periods in practice.

Dr Chris Pownall and Jenny Taylor from mva consultancy presented the monetary valuation parts of the ANASE study. The original specification for the ANASE study required that the stated preference (SP) method should be used to measure monetary valuations of aircraft noise. The project team developed an SP questionnaire format that could be used to establish individual preferences between different hypothetical scenarios including different patterns of aircraft noise exposure and varying amounts of monetary compensation, based on extensive pilot testing and steering group review. Based on the results of the pilot testing and in compliance with steering group approval, it was decided that the final SP questionnaire would include audio-visual presentations of different aircraft types to ensure consistency of interpretation of the hypothetical scenarios. One possibly significant difference between the ANASE study and the previous ANIS study, as raised by the peer reviewers, was that, in 1982, the underlying emphasis of the ANIS questionnaire on aircraft noise was concealed until the specific questions on aircraft noise were introduced. At the time, this was felt to reduce any possibility of bias caused by encouraging respondents to consider aircraft noise outside of its more general wider context. For the ANASE study it was necessary to explain exactly what the questionnaire was about right at the start, and also to introduce the loudspeakers that would be used later in the questionnaire. This was for two reasons, firstly, to conform to current international best practice as set out in ISO

recommendations, and secondly, because to do otherwise might have compromised efforts made to obtain response rates as high as possible. Practical experience shows that respondents are much less likely to agree to participate in questionnaire based surveys under present day conditions than they were in 1982 unless they understand exactly what they are committing themselves to. This was, presumably, not so much of a problem in 1982, at a time when statistically representative sampling was not so much of an issue either. There was no evidence either from the extensive pilot studies, or from limited statistical comparisons between different parts of the overall ANASE database, that the procedures adopted in 2005 had in fact biased the results in any way.

The results from the SP part of the study were generally consistent and statistically reliable, although the implied monetary values per each additional aircraft event were an order of magnitude higher than equivalent values derived by more 'traditional' methods such as hedonic price studies. These large differences suggest either that one or other of the SP valuations or the hedonic price valuations must be wrong, or, alternatively, that the two research methods are measuring essentially different things.

There was a high level of interest throughout the morning's presentations and a number of potentially interesting discussions had to be curtailed owing to the amount of material that needed to be presented before the scheduled afternoon workshop sessions.

3 Workshop Discussions

All persons attending were encouraged to contribute their own views and experiences to the afternoon workshop sessions which were addressed to the key topics of 'attitudes' and 'metrics' as discussed in the morning presentations. The original schedule for the workshop assumed that the two generic topics would be discussed separately in two break-out groups with a final discussion in plenary at the end. However, it became clear during the morning sessions that most attendees were interested in both topics and it was therefore decided, by a show of hands, to combine the two discussion groups into one. In theory, this would normally be considered more difficult because of the large numbers in one room, but in practice everyone who had something to say was given an opportunity to contribute and feedback after the event suggested that a number of people contributed who

probably hadn't even realised that they had an opinion beforehand.

There was considerable debate about how much of the observed difference between the 2005 ANASE study and the 1982 ANIS could be attributed to real changes in attitudes and expectations and how much could be attributed simply to changes in research methodology and the different measurements of both attitudes and noise levels that were used. A number of issues arose that could only be resolved by carrying out further research.

Attendees were also encouraged to contribute additional data or any other type of evidence from their personal experience that might be consistent or not with the general pattern of response found in the 2005 ANASE study. The general feeling from attendees who were professionally involved in dealing with the public resident around airports was that aircraft noise continued to be an important issue for many residents and that the significant increase in traffic which has occurred over the past few years has been an important factor. As found in the ANASE study, people around airports do, in general, seem to be much more concerned about increased traffic than they were 25 years ago when average event sound levels were much more of a problem than they are today. Complaints about aircraft noise outnumber complaints about air quality or climate change issues by huge margins.

A number of specific areas for further research were identified as follows;

Values attributed to operation changes - with significant cost and complexity attached to changes in operational procedures, an improved understanding of the potential noise benefits and any resulting changes in attitudes and opinions is required before those changes can be fully evaluated. One example would be the current high level of interest in steeper glide slopes on approach. Increasing the angle of approach provides proportionately greater noise benefits at increasing distances from the landing runway where sound levels are lower anyway. There is little or no attitudes data available which could inform predictions of the likely effects.

Understanding the psychology of small changes - research to date has not been able to separately quantify the effects of actual changes from the effects of 'expectation of benefit'. Anecdotal evidence suggests that subjective benefits including reduced annoyance can occur even where the supposed 'benefits' are too small to be objectively measurable, providing only that there is an expectation of perceived benefit, and that nothing happens to undermine those expectations.

Examples which were shared at the workshop included the potentially disproportionate effects (in either direction) on attitudes of small percentage changes in the achievement of satisfactory continuous descent profiles on approach, irrespective of whether or not there are any objectively measurable differences in average aircraft event sound levels.

Significance of change - the effects of both actual change and also anticipated or expected change on the attitudes of persons living within aircraft noise affected environments should not be under-estimated. Research has found that people are often fearful of change and even just the prospect of change can raise suspicion. Habituation and adaptation may on the other hand, ease concerns. This suggested a need for improved communications about the actual effects of any proposed or anticipated change.

It should be noted that the ANASE SP data related to monetary valuation of hypothesised change, whereas the more traditional hedonic price data relates to actual prices paid (hence the term; revealed preference), and can only be applied to hypothetical situations by extrapolation. However, hedonic price data relates only to the small proportion of the overall population who are active in the housing market at any one time (and who, all other things being equal, might in high noise areas be expected to be less sensitive to aircraft noise than average) whereas the SP data was statistically representative of all persons resident in each sampling area.

Metrics - the ANASE study data suggested that as average aircraft event sound levels have been reduced over the past 25-30 years, the numbers of events have become progressively more important. It may be helpful, particularly in terms of communicating noise matters to the interested public, if the standardised methods for measuring aircraft noise could be adapted to reflect this change. This conclusion mirrored a parallel study being carried out by MMU and ISVR for Omega on the relative usefulness of different kinds of graphic presentations such as aircraft noise contour maps, etc. to illustrate aircraft noise to the public.

Onset of annoyance - many people have an interest in defining or establishing an objective threshold above which reported annoyance either starts to become significant or is assumed by regulators and other authorities to become significant. The aircraft noise event exposure conditions under which the currently defined onset of significant annoyance threshold was defined at around 57 LAeq,16 hours no longer exist. However, a direct comparison of the relative percentages of annoyed or

highly annoyed persons in 1982 and 2005 suggests that under 2005 conditions a similar level of annoyance occurred at around 51 LAeq,16 hours, when both attitudes and aircraft sound levels are measured in as closely similar ways as possible. (In their report the peer reviewers broadly acknowledge that this would be the case if the study's findings were taken at face value. However as previously explained the peer reviewers expressed concerns about the overall robustness of the study, and counselled against using the detailed results and conclusions from the study in the development of Government policy.)

At first sight, this finding suggests that under present day conditions, there could be large numbers of people living outside of the areas defined by the 57 LAeq,16 hours aircraft noise contour as representing the 'onset of significant annoyance' who could also consider themselves to be significantly annoyed. This finding is consistent with the fact that in general, there are often as many noise complaints from people living outside the 57 LAeq,16 hours aircraft noise contour as from people living inside the 57 LAeq,16 hours aircraft noise contour. On the other hand, and even if the differences in levels of reported annoyance are true, they don't necessarily represent equivalent degrees of actual interference or disturbance to overall quality of life. Key issues are; what is 'significant annoyance'; and might it have changed over the 23 years between the two studies (ANIS in 1982 and ANASE in 2005)?

There was general agreement that the workshop had provided a comprehensive background to the technical issues underlying the current debate about levels of aircraft noise annoyance, and most attendees left the workshop having benefited not only from the formal presentations, but also from the lively and stimulating technical debate which had exposed a wide range of different technical positions to a public forum. All attendees were given a CD-ROM containing copies of the ANASE final reports and all relevant correspondence and peer review comments which had been published on the Department for Transport website at the same time.

4 European Researchers Workshop 22nd September 2008

This meeting was convened to discover to what extent, if any, that the findings from the 2005 ANASE study either agreed or disagreed with the findings of similar studies carried out around Schiphol Airport at Amsterdam in The Netherlands and around Frankfurt Airport in Germany within similar time frames. The technical objective was to investigate what work might need to be done to follow up the preliminary

suggestion made by one of the principle researchers of the Frankfurt Airport study at the 29th May workshop that the Frankfurt data appeared to overlap with the ANASE data, i.e. that both data sets appeared to be mutually consistent. This suggestion was interesting because, if found to be robust after further detailed technical audit, it would imply that while attitudes to aircraft noise in England may have changed from 1982 to 2005, in 2005, they were consistent with attitudes to aircraft noise in other European countries, which might or might not be found to have changed in similar ways.

The first half of the day was spent in reviewing the key findings from the 2005 ANASE study, the 2005 Frankfurt study, the 1996, 2002 and 2005 Schiphol studies and a study carried out in Paris in 1998 (as advised by RIVM). There were many similarities between the different studies, but there were also a number of detailed differences which would require more detailed technical audit to ensure that the calibration of any combined analysis would be fully justifiable. Dr Schreckenbergr presented an updated chart showing a high degree of consistency between the ANASE and Frankfurt site level reported annoyance data when overlaid on common axes. Dr Houthuijs presented a chart showing a similar high degree of consistency between the ANASE, Frankfurt, Schiphol and Paris data with the site level data aggregated by common sound level bands. It should be noted that these comparisons should not be considered definitive until or unless they have been subjected to detailed technical audit to ensure consistency of assumptions and interpretation.

The second half of the day comprised a round table discussion in which the following consensus findings were reviewed;

1. While all airport noise research can be controversial in terms of the policy implications of the results, the other European Researchers had not encountered the same level of detailed criticisms in their own countries as had been raised about the ANASE study in the UK.
2. Subject to more detailed technical audit, the pattern of response appears to be broadly similar across all the recent European Studies (ANASE, Schiphol, Frankfurt, Paris);
3. RIVM and Zeus consulting have separately compared their own data against standardised European dose-effect curves derived from meta-analysis of less recent studies. Both comparisons have shown significantly higher reported annoyance in the recent studies than predicted based on the standardised European curves. It should be noted that the standardised European curves

are necessarily based on historic data, much of which might now be considered to be somewhat out of date. These findings appear to be consistent with the significantly higher reported annoyance observed in ANASE when compared against the previous mainly Heathrow ANIS study carried out in 1982.

4. The Schiphol and Frankfurt studies were not designed to test the effect of the number variable separately. For this reason it would be difficult to test the significance of this variable observed in the ANASE study against the existing European data. However, a number of suggestions for possible further analyses of the ANASE database emerged from the discussion which could throw further light on this issue. For example, further detailed analyses of the ANASE data (not reported in the final report) had shown significant differences in the relative importance of the number variable between Heathrow and the non-Heathrow airports which could be consistent with the Schiphol and Frankfurt data.

The future

There was general agreement, in principle, that further collaboration/exchange of data would be beneficial. However, there are a number of contractual/political issues which would need to be resolved first:

1. The findings of RIVM's 1996-2005 studies at Schiphol have been generally accepted and taken into account in current Netherlands civil aviation policy. RIVM have been able to carry out their own comparisons against ANASE (and other studies) using the published data, and RIVM would therefore need to consider exactly what the actual benefits of further collaboration based on previous studies might be. However, RIVM are always interested in possible collaboration in future studies, such as might be supported by the EU in the future.
2. Zeus consulting is amenable to further collaboration, but this could be limited at present because the Frankfurt research has been completed and they are not currently funded to carry out any further work on attitudes to aircraft noise.
3. Any substantial further work to be carried out by mvaconsultancy (the prime contractors for the ANASE study) would require funding support.
4. The University of Southampton has some opportunities to carry out further analysis on the ANASE dataset and on combined datasets, but these would be mainly limited to student projects unless further funding could be obtained.

It should be noted that there are other projects which could contribute to a limited amount of further collaboration/data exchange. Dr Flindell is now working on a contract on noise and health for Defra which will support a limited number of technical visits to European researchers such as RIVM. Dr Schreckenbergr and the University of Southampton (amongst many others) are partners in a European aircraft noise sound quality project (COSMA) which is currently under negotiation with the Commission.

Appendix 1: Workshop Flyer

Jurys Inn, Heathrow, Thursday 29 May 2008

Continuing growth at UK airports depends on a consensus that the economic and social benefits of civil aviation outweigh the environmental costs, such as increased noise. Recent research has shown that, on average, people are reporting higher levels of annoyance than 25 years ago. The data suggests that, under present-day conditions, people seem to be more concerned with the number of events and less concerned with sound levels than they used to be. The findings have been controversial because they suggest that the previous consensus in favour of continuing airport growth may have started to shift.

The Omega partnership of nine leading universities is sponsoring a free one-day workshop on Attitudes to Aircraft Noise at Heathrow on Thursday 29 May for researchers, industry professionals, planners and consultants. The workshop will cover the historical and technical context from the 1963 *Wilson Report on the Problem of Noise* to the recent **ANASE** or *Attitudes to Noise from Aviation Sources in England* study. The aim is to stimulate informed discussion and exchange amongst the interested stakeholder community on the current state of knowledge; the aim is also to define a roadmap of future knowledge and evidence needs to facilitate further progress in this area. Attendees will be encouraged to ask questions and contribute to an exchange of views and opinions in structured workshop sessions. Presenters will include principal authors of the recent **ANASE** study and attendees will receive a full set of printed documentation to take away with them.

The workshop will run from 9.30 am until 4.00 pm with lunch and refreshments provided throughout the day and with plenty of opportunities for networking amongst attendees. The venue has free car parking and is easy to access by public transport.

Please contact Ieish Gamah at the University of Southampton on telephone number +44 (0) 2380 592885 email address: ig@isvr.soton.ac.uk or ig@soton.ac.uk to request an invitation. Please contact us as soon as possible; to ensure successful debate, we have set a strict limit on the number of people that we will be able to invite.

The Omega partnership is funded by the Higher Education Funding Council for England's Higher Education Innovation Fund to undertake knowledge transfer activities; to initiate collaborative studies across academia and with the aviation sector and others; and to disseminate study findings to the widest possible stakeholder community. The partnership is managed by a team at Manchester Metropolitan University and works closely with Government, industry and NGO stakeholders.



Appendix 2: Workshop Programme

Time	Item	Content
0900	Arrival	Coffee and Bacon Rolls (Vegetarian alternative available).
0930	Welcome and Introduction	Omega partnership. Aims and Programme for the day.
0945	Theoretical background and historical context	How to predict attitudes from sound levels. This depends on measured exposure-response relationships. What are the possible alternatives for measuring sound levels (metrics) on the x-axis, and attitudes (annoyance, etc) on the y-axis and the possible relationships between them. The 1963 Wilson Report on the Problem of Noise and the Noise and Number Index (NNI). The 1982 ANIS study and Leq. What is feasible (and not feasible) in practical research?
1030	Coffee	
1100	ANASE study- annoyance	Objectives. Piloting and review. Contrast ANASE (2005) with ANIS (1982). Sampling, sound levels measurement, questionnaires. The data suggests people are more concerned with number and less with sound level than 25 years ago. Implications for LAeq as an indicator of aircraft noise. Alternative explanations (reference other data where relevant).
1145	ANASE study - valuation	Methodology. Run through Stated Preference questionnaire so that attendees can understand exactly what was going on. The monetary values were consistent and statistically reliable BUT were implausibly high compared to other methods. Explain. Alternative explanations (reference other data where relevant).
1230	Lunch (provided)	
1330	Parallel workshops; Attitudes Metrics	Attitudes workshop will discuss consistency of attitudes reported in statistically representative research against attendee experiences from meetings, complaints, etc. Metrics workshop will discuss consistency of current and possible alternative metrics against attendee experiences from meetings, complaints, etc. How could future research be 'improved' or perhaps better targeted to specific questions? Discussions summarised by rapporteurs in plenary session.
1430	Tea	
1500	Workshop - mitigation	Various mitigation methods exist, but effectiveness varies. Some methods appear to affect sound levels more than attitudes and vice versa. What can be done about this problem? Questions for future research. Discussion summarised by rapporteur at the end.
1600	Meeting close	Meeting room available until 1700 for people who might wish to continue the discussion, or network with others.