SUMMARY & CONCLUSIONS

1 This proof is restricted to an analysis of the applicants evidence relating to birdstrike risk, the impact of aircraft on local bird populations and the likely effect of aerodrome safeguarding on future bird attracting developments in the area.

2 The applicant has not carried out the research needed to properly estimate the likely birdstrike risk at the operational airport. Four one-day counts during the winter months are not sufficient to estimate the changes in the local bird populations during the year nor to determine the effects of shorter term changes due to weather, time of day etc. on the birdstrike risk.

3 The applicant has made no attempt to estimate the birdstrike risk at the new airport, relying on the fact that, 10 years ago at what was a military site, the birdstrike rate was 2 per 10 000 movements. Rate per 10 000 movements is not generally regarded as the best way to assess birdstrike risk, as it is the species and numbers of birds involved that govern the severity of individual strikes. The applicant has produced no evidence to show that the bird populations are the same now as 10 years ago and so it cannot be assumed that the background risk would be the same, nor that the bird control measures used 10 years ago would necessarily be equally effective now. The risk assessment produced by the applicant is not sufficient to estimate the birdstrike risk at the new airport nor to develop an effective mitigation plan to control that risk.

4 The applicant has used more recent birdstrike data to assert that the number of birds of conservation importance killed by aircraft would be insignificant. Only 30% of the birdstrike data presented have the species involved identified, and there is no attempt to separate strikes occurring close to Finningley from those that happened many miles away on military operations. The applicants make no mention of the use of lethal control to manage birds on airfields, which is a routine part of any effective bird control programme. It is likely that more birds would be killed by the airport's own bird controllers each year than by aircraft but this is not mentioned in the evidence. The assessment of the impact of the airport on local bird populations has, therefore, been underestimated.

5 The applicant asserts that the development will not impact on existing sites of nature conservation interest and will not prevent future developments of sites of this nature. Indeed, the applicant encourages this sort of development close to the airfield. This position underestimates the impact of the safeguarding process on the area within 13km of the airport. It is likely that the airport operators would be advised to object to proposals to create areas such as wetlands or other sites attractive to birds close to the airfield or its approaches. This process would, inevitably, restrict the development of certain types of nature conservation areas in the vicinity of Doncaster Finningley.

6 I conclude that the assessment of the bird hazard to aircraft has been inadequately carried out and is based on insufficient information to allow a valid conclusion to be drawn. The assessment of the impact of aircraft on bird populations is similarly based on inadequate information, omits to consider significant causes of bird mortality and is therefore an underestimate of the true case. The applicant has significantly underestimated the likely impact of aerodrome safeguarding on the future development of areas for nature conservation nearby.

CONTENTS

1. Qualifications

1.1 My name is Dr. John Richard Allan, BSc, PhD, M.I.Biol, C.Biol.. I am head of the Birdstrike Avoidance Team at the Central Science Laboratory (CSL), an executive agency of the Department of Environment Food and Rural Affairs (DEFRA).

1.2 I completed an honours degree in Environmental Biology at Liverpool University in 1981 and a Ph D in Animal Behaviour at the University of Wales, Bangor in 1986. I then spent a year as assistant warden at Fair Isle Bird Observatory, Shetland.

1.3 I joined CSL in 1988 and have specialised in the study of birds as hazards to aircraft for the past 13 years. I have been head of the Birdstrike Avoidance Team since 1996. The CSL Birdstrike Avoidance Team is recognised a world leader in the study of birdstrikes and their prevention. Its staff have been involved in the development of most of the main techniques for bird hazard mitigation used in the world today, such as bird repellent grass swards and bioacoustic bird scarers. BAT acts as a consultant on all aspects of birdstrike prevention to the Ministry Of Defence. This service includes providing inspection of civilian bird control contractors and advice on safeguarding issues for all RAF airfields in the UK and overseas. BAT provides similar services, including birdstrike risk assessments, to BAA, which operates airports such as Heathrow, Gatwick, Stansted etc. as well as to other UK civil airports and to airports around the world.

1.4 BAT also develops birdstrike hazard mitigation programmes for existing or new airport developments. Recent projects have included assessing airport designs and developing bird management plans for new airports in Hong Kong and Seoul. Both of these programmes involved extensive field research to gather the required data as well as detailed evaluations of airport design proposals and birdstrike risk mitigation strategies.

1.5 Other research projects currently in progress include the development of geographic information systems for the RAF to allow low flying military pilots to avoid areas of high bird numbers, analysis of the 3-dimensional structure of bird flocks to predict the severity of bird impacts (for the UK Civil Aviation Authority) and development of DNA databases to allow the identification of bird remains following strikes.

1.6 As head of BAT, I am highly skilled and experienced in all of these areas. This fact has been recognised by my vice-chairmanship of International Birdstrike Committee (the main professional body for specialists in birdstrike prevention) and my participation on the Engine Harmonisation Working Group (an international forum established to set design standards for aircraft engines) as its ornithological advisor.

2 Introduction

2.1 Collisions between birds and aircraft have been responsible for the loss of at least 55 civil aircraft and 214 lives (Thorpe 1996, Thorpe pers. comm.). Table 1 gives details of known aircraft losses due to birdstrikes in the past 20 years. The International Civil Aviation Organisation (ICAO) recommends that airports take action to reduce the birdstrike risk on their property. There is no international standard in place (Pinos 1996) but individual countries may have regulations requiring airports to reduce the birdstrike risk to a reasonable level. In the UK, the Civil Aviation Authority (CAA) requires airports to take reasonable steps to reduce the birdstrike risk to the lowest possible level, and each airport is required to produce a birdstrike management plan as part of its operating procedures. General advice on bird risk reduction is provided in the CAA publication CAP 680 Bird Control on Aerodromes (CAA 1998).

Table 1 Serious bird strikes within the past twenty years

Date	Location	Aircraft	Bird species	Result
July 1978	Kalamazoo, USA	Convair 580	Sparrowhawk	3 injured
April 1981	Cincinnati, USA	Learjet 23	Diver	1 dead
December 1982	Le Bourget, France	Learjet 35	BH Gulls	1 injured
September 1986	Madras, India	A300	Black Kite	11 injured
September 1988	Bahar Dar, Ethiopia	B737	Speckled Pigeons	35 dead
July 1990	Addis Ababa, Ethiopia	B707	Pigeons	2 injured
August 1993	Slavogorod Russia	Antonov AN12	unknown	Aircraft destroyed
December 1992	Argentina	BAC 1-11	unknown	Aircraft destroyed
January 1995	Le Bourjet, France	Falcon 20	Lapwings	10 dead
September 1995	Elmendorf, Alaska	E3A AWACS	Canada Geese	24 dead
July 1996	Eindhoven, Netherlands	Hercules	Starlings	34 dead
July 1996	Aktion, Greece	E3A Awacs	unknown	Destroyed
July 1998	St Petersburg, Russia	Antonov AN-12	Gulls?	1 injured, aircraft lost
April 2000	Zaire	Antonov 8	unknown	24 dead

2.2 As well as potentially catastrophic incidents, birdstrikes also incur significant costs to aircraft operators. Allan (in press) estimates that the cost of birdstrikes to the world's transport airliners is at least US$1.25 billion per year with an average cost per strike of US$40,000.

2.3 The fact that over 80% of all birdstrikes occur on or close to the aerodrome (Milsom & Horton 1995) means that airports have the greatest role to play in birdstrike prevention. Any new airport should, therefore, consider the requirement to manage of birds around their property at as early a stage as

possible. It is therefore necessary to consider bird management in detail during the planning application process, in order to determine the level of birdstrike risk likely to be experienced and to determine the type and extent of the mechanisms that will be put in place to control that risk. Once these processes are complete, the impact of these mechanisms on the local avifauna can be fully assessed.

2.4 This document has been prepared at very short notice and there has not been sufficient time to undertake the fieldwork necessary to complete a proper bird hazard assessment for the new airport (see section 2 below). This proof of evidence is, therefore, restricted to an evaluation of the evidence and conclusions in relation to birdstrike risk, risk management and aerodrome safeguarding submitted by the applicant in **Doncaster Finningley Airport: The Airport Proposals. Environmental Statement.**

3 Information required to conduct an evaluation of birdstrike risk and develop mitigation strategies

3.1 In order to conduct an effective birdstrike risk assessment the following information is required:

3.2 *Current bird numbers on the airport at all times of the year*

Bird populations on and around airports fluctuate throughout the year as birds move to and from breeding and wintering areas. The birdstrike risk therefore also fluctuates, with the peak period for strikes at UK aerodromes being in July and October (CAA unpublished data). Data on the number of birds using the airfield site should be gathered through a full annual cycle so that fluctuations in risk level and in the bird species causing the risk can be determined. This allows the intensity of the mitigation and the type of bird control required at different times of the year to be determined.

The environmental statement contains data from only four days spread through the winter period.

3.3 *Current bird numbers around the airport*

Within a 2-3 mile radius of the airport, it is important to know what the local bird populations are and how these populations vary seasonally. Birds within this area may attempt use the airport and will therefore contribute to the on-airport risk as well as influencing the risk to aircraft in the approaches. Additionally this would highlight any locations that are highly attractive to birds (e.g. water-bodies, feeding sites such as landfills) or any breeding colonies of birds.

No survey of bird numbers around the airport has been conducted.

3.4 *Locations of major bird concentrations within 25 miles of the airport.*

In addition to the birds immediately around the airport, it must also be remembered that birds that would normally be at some distance from the airport may create a hazard by the way that they move around the local environment. This would particularly include birds that make movements between regular feeding and roosting sites. For example, wildfowl, which may move between different water-bodies, or gulls, which will commute up to 25 miles between roost site and feeding sites (Horton *et al* 1983), or Starlings dispersing from communal roosts may cross the airfield or its approaches and create a significant short term increase in the birdstrike risk.

Once the locations of the major bird concentrations are known, it is necessary to identify any flight-lines (the routes which birds use to fly between roosts and regular feeding sites), and to determine how these will affect the birdstrike risk at the new site.

There is no comprehensive review of the major bird concentrations and no check on the presence of flightlines has been made.

3.5 *Review of current planning applications or proposals for their likely effect on the airport*

Once an airport is operational it will come under the safeguarding process, which requires any new planning applications concerning sites within 13 km of the airport to be submitted for scrutiny in order to determine whether they affect flight safety (including the potential to attract additional hazardous birds to the area). There may already be approved planning applications that will affect the risk at the airport, and these should be reviewed and taken into account when assessing the likely future birdstrike risk.

There is no review of existing planning proposals in terms of possible birdstrike risk in the Environmental Statement

3.6 *Review of any current nature conservation designations which may affect the airfield*

If any part of the airfield is designated in any way for environmental protection, such as ground water protection or nature conservation, this may effect the future bird management at the airport by placing restrictions on the management techniques that may be used. For example the use of pesticides to control insects in the airfield grassland or modification of wetland areas to deter birds may be prohibited. These designations may severely restrict the options for birdstrike risk management and they need to be considered when developing bird management strategies.

There is no review of how the current protected status of areas around the airport might affect the birdstrike risk or its mitigation.

3.7 *Additional information*

Because the proposed airport has been an active military airfield for a considerable period of time, we would expect the following information to be available.

3.8 Analysis of bird strikes

An analysis of the bird strike sample from the military base should be undertaken. This would show which were the most frequently struck species during the operational phase, and may give other information about location and altitude of birdstrikes. It should be remembered that the situation may have changed since this information was gathered.

A list of birdstrikes at RAF Finningley is included in the Environmental Statement, but, because no location data were available, it is impossible to determine where these strikes took place. This is acknowledged in the statement, but the statement proceeds to use the data as evidence for the effect of the new development on local bird populations.

3.9 *Monthly reports*

There may be bird control unit monthly reports available, which would provide information on the historical problems and on the effectiveness of the different mitigation methods used by the bird controllers at that time.

These have not been considered, but they may not have been available to the applicants.

4. Analysis of the Environmental Statement

4.1 Birdstrike or plane strike is addressed in a number of sections within the Environmental Statement. It is considered in two ways; the risk posed by birds to aircraft operating out of Doncaster Finningley and the impact on the local bird populations of the airport and aircraft. There are also issues relating to airport master planning, such as drainage, building design etc. that should be considered from the birdstrike perspective as all have the potential to attract birds if not properly designed. Birdstrike has not been considered in the proposals for many of these features.

4.2 Addressing the risk to aircraft from birds

There is no comprehensive, or indeed even an outline, risk assessment for aircraft operating out of Doncaster Finningley provided in the Environmental Statement. Instead, a birdstrike rate per 10,000, which was achieved approximately 10 years ago by military aircraft, is quoted as being indicative of the present and future hazard (Environmental Statement, Final Report,

Volume 1, section 14.4.1, p 14/18). It is assumed that this could be achieved if Doncaster Finningley becomes an operational civil airport.

4.3 It is not clear what exactly the rate indicates. There are a number of ways that birdstrike rates can be calculated. The most normal way is to take only those strikes reported on the airfield. There is an international definition of what comprises an on airfield birdstrike (Thorpe 1986), but it is known that not all airfield bird controllers are aware of this or use it to distinguish between on-airfield or off-airfield strikes. There is no indication of whether the rate quoted here is only for on-airfield birdstrikes, or whether it also includes all birdstrikes to aircraft on descent, ascent or in the visual circuit at Finningley.

4.4 The importance of this is that if an on-airfield rate is quoted, then it may be disregarding any off-airfield hazards e.g. out in the approaches, but which would affect aircraft operating out of Doncaster Finningley, and which, for the purposes of this risk assessment, should be considered.

4.5 Notwithstanding this, it is also now recognised that a single birdstrike rate per 10 000 movements is not indicative of the hazard at any particular airport, because it fails to take account of the species or numbers of birds being struck. Strikes with large birds and those with flocks are significantly more hazardous than those with single small birds. A high rate of strikes with single Swallows, for example, is far less hazardous than a much lower rate of strikes with flocks of gulls. Current risk assessment practices avoid the use of birdstrike rates, concentrating instead on the size and numbers of birds struck in each incident to estimate the risk (Milsom & Horton 1995, Rochard 2000, Allan 2000).

4.6 Furthermore, it is also not clear if the birdstrike rate quoted is still achievable. No account is taken of how the bird populations or behaviour may have changed since that rate was achieved. It was noted within the report that there have been changes which are likely to have affected the birdstrike hazard (e.g. the closure of the adjacent landfill), but there was no attempt to systematically document these, nor to establish how these changes have affected the bird hazard around the proposed new airport. It is also known that there have been national changes in populations of particular species (e.g. Canada and Greylag Geese and Lapwings) which have or are affecting the number of birdstrikes reported with these species (Allan & Feare 1994, Bell 1999). It is unlikely that Doncaster Finningley has not been affected by these national population changes. The effect of these changes is not considered.

4.7 In terms of the bird management mitigation, as would be expected given the level of knowledge about the hazard, few details are given. However the suggestions made are suitable.

4.8 On many occasions within the Environmental Statement it is recognised that bird management is an important issue. However, within the design proposals presented within the Environment Statement, there are two suggestions that would be likely to increase the bird strike risk. These are:

- Creation of a number of small ponds around the airfield perimeter which would be attractive to waterfowl and Grey Herons that may cross the active airspace when moving from one pond to another.
- Planting native woodland (which provides nesting or roosting opportunities for Rooks) next to an airfield where a Rook problem has been identified.

4.9 Addressing the impact of the airport and aircraft on birds

4.10 The impact of the proposed development on the local bird populations is dealt with in much greater detail than the risk to aircraft from bird strikes. Likely impacts are dealt with under two basic types, direct and indirect impacts.

4.11 There is only one direct impact on local bird populations identified in the Environmental Statement. This is that birds are killed by aircraft in bird-aircraft collisions.

4.12 The report attempts to assess the likely impact on local bird populations by considering the bird population on the airport, and those which lie under the centre line within 2.9 km of the airport, establishing which species there are of conservation concern and the likelihood of these birds being struck.

4.13 There are some concerns with this methodology. Firstly, all bird are assumed to be stationary objects i.e. they do not move between different sites. This means that only sites directly under the centreline are considered to be at risk. Birds can and do move between sites. This means that birds from a number of different sites may be exposed to aircraft as they transit the airfield or its approaches. Because no consideration has been given to this, the risk to the birds and some of the sites not considered is likely to have been underestimated.

4.14 Additionally, the bird strike information received from Airfield Wildlife Management Ltd. (AWM) and Inspectorate of Flight Safety (IFS) has been used to evaluate the probability of striking birds. Unfortunately, the information from AWM is nearly ten years old and may not be reflective of the current situation. There is also no indication of which bird strikes are included (on- off- or near-airfield), and it is presented as a simple rate per 10 000 aircraft movements without any indication of which species were struck. Again, the assumption has been made that the bird management programme on the proposed site will be at least as effective as that in place 10 years ago. Since there is no adequate assessment of current bird numbers or current birdstrike risk it is not possible to determine whether the outline bird management plan included in the environmental statement would be sufficient to keep the risk on a civil airport to the same level as was achieved 10 years ago at a military airfield.

4.15 The information provided by IFS is slightly more recent than that provided by AWM. The number of strikes reported against key conservation species is used to determine likely risk of future bird strikes. Unfortunately, only a third of all

strikes reported were identified, leaving two-thirds of all strikes reported from Finningley not identified. Although the assertion is made that it is more likely that large birds would be identified, there is no evidence presented to show this. Milsom and Horton (1995) suggest that it is more likely that strikes with large birds will be reported. This is not the same as correct identification of strikes. Indeed, Milsom & Horton (1995) state 'Reliable identification of the birds that have been struck is a prerequisite to the assessment of the hazard and is critical to the computation of some birdstrike statistics'. The fact that so few strikes were identified from Finningley makes assessing the likely impact of birdstrikes on local bird populations extremely difficult. Additionally, the report itself says that it is not known exactly where these birdstrikes occurred, and it is possible that some of these strikes were not associated with Finningley. This means that a risk assessment is being carried out on a set of birdstrikes, some of which are likely to have occurred at Finningley, but which ones is not known. Furthermore, of those strikes, only one third were identified. The remaining two-thirds have been discarded from the risk assessment because it is not known which species were involved.

4.16 Bird populations on the airfield have been established through a winter survey and these have been used to identify the species likely to be at risk. However, the majority of bird strikes occur in the UK between the months of July and October (CAA unpublished data). Local differences can occur on particular airports, but no evidence has been presented to show that this is the case at Doncaster Finningley. This means that there is no estimation of the likely effect on the bird populations when most strikes are likely to occur. Since airport bird populations do change seasonally, it cannot be assumed that the population present in the winter is the same one exposed to risk between July and October and at other times of year. The winter bird survey consisted of only 4 one-day visits and the more detailed information concerning the influence of weather or time of day on the birdstrike risk is missing. These factors are known to significantly influence the birdstrike at aerodromes (Allan & Milsom 1992, Manktelow 2000). There are insufficient data to estimate these effects either on the risk posed by birds to aircraft or on the impact of aircraft on birds.

4.17 Another major failing of the assessment of direct impacts is that it has failed to consider a greater source of mortality to birds around airports than the risk of being struck by aircraft. It was surprising that there was no mention of lethal control made within the Environmental Statement, as this is usually an integral part of bird management on airports in the UK. In our experience, the number of birds shot or destroyed on many airfields is greater than those killed by bird strikes in any one year, yet there has been no assessment made on the effects of this on the local bird populations. There are even direct recommendations within the report which are likely to involve culling birds (e.g. the management of Rook colonies), which makes it even more surprising that lethal control was not identified in the report as a direct impact.

4.18 Species most commonly shot on UK airfields, or which have their nests destroyed include Pheasant, Oystercatcher, Curlew, Lapwing, Herring Gull, Lesser Black-backed Gull, Common Gull, Black-headed Gull, Feral Pigeon, Woodpigeon, Starling, Rook, Jackdaw and Carrion Crow. Airports that have particular problems may apply for licences to kill other species.

4.19 All but one of these species has been recorded on Doncaster Finningley during the winter survey. Six of these species are listed as being of conservation concern.

4.20 There is also no mention of the effect of the airport development on future nature conservation proposals for the area. With the closure of RAF Finningley, this airfield stopped being safeguarded. If it is subsequently developed as a civil airport, the safeguarding process will be re-instated and it is likely that this will impact on future planning proposals, including those involving conservation developments. This is discussed in greater detail below.

4.21 Safeguarding restrictions

4.22 When RAF Finningley was sold, the existing Ministry of Defence safeguarding requirements also ended. Safeguarding is the process whereby planning applications within a certain distance of an aerodrome are assessed to insure that they are not hazardous to flight operations. There are a number of ways in which aerodromes are safeguarded; these include for height obstructions, electromagnetic interference, and also for bird attractants.

4.23 At present UK civil aerodromes are subject either to mandatory safeguarding (usually for the larger airports) or a voluntary safeguarding arrangement. It is unclear which would apply to Doncaster Finningley, but other airports of similar size are subject to mandatory safeguarding. The situation is further complicated by the current proposals on amendment of the safeguarding process for civil airports, which would see the responsibility for safeguarding moving away from the CAA to the individual airports.

4.24 Should Doncaster Finningley become a safeguarded aerodrome, any planning proposals within 13 km of the airport that may increase the birdstrike hazard should be referred to the safeguarding authority for consultation.

4.25 The direction on which types of developments are likely to be referred is given below. This is taken from The Town and Country Planning (Aerodromes and Technical Sites) Direction 1992.

> 'The primary aim is to guard against new or increased hazards caused by development. The most important types of development in this respect are: facilities intended for the handling, compaction, treatment or disposal of household or commercial wastes, which attract a variety of species, including gulls, starlings, lapwings and corvids; the

> creation or modification of areas of water such as reservoirs, lakes, ponds, wetlands and marshes, which attract gulls and waterfowl; nature reserves and bird sanctuaries; and sewage disposal and treatment plant and outfalls, which can attract gulls and other species. Planting trees and bushes normally creates bird hazard only when it takes place relatively near to an aerodrome, but a potential starling roost site further away from an aerodrome can create hazard. Mineral extraction and quarrying can also cause bird hazard because, although these processes do not in themselves attract birds, the sites are commonly used for landfill or the creation of wetland'.

4.25 This may affect the current proposals to develop some of the surrounding areas, such as Hatfield Moor or the River Idle Washlands, where proposals to improve or restore their conservation value may involve the creation of large areas of water which will attract hazardous birds (Yorkshire Wildlife Trust pers. comm.). This point is only considered briefly in the Environmental Statement.

4.26 In Volume 1, section 14.4 it is recommended that consultations are begun immediately with the Local Planning Authority to begin a safeguarding process.

4.27 In Volume 2, Appendix 11J it is

> 'recommended in this report that developments which include habitat creation elements should generally continue to be encouraged since available evidence suggests that, for example, none of the nearby wetlands present a significant bird-strike hazard.'

4.28 Unfortunately, there has been no evidence presented to show that the nearby wetlands do not present a significant birdstrike hazard. Indeed, there was no assessment made of the birdstrike hazard on or off the airfield. We would suggest that this statement, whilst laudable in its aims, shows a lack of understanding of the birdstrike hazard and the requirements of the safeguarding process. Without adequate information it is not possible to assess the potential increase in birdstrike risk caused by any development.

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