

THE BIRD STRIKE SITUATION AT THE FRANKFURT RHEIN/MAIN AIRPORT

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Abstract

The paper briefly describes the current bird strike situation at Frankfurt Rhein/Main Airport representing the total number of bird strikes from 1990-1994, the monthly distribution from 1974- 1994 and the bird species which are mainly involved.

Our present primary objectives are

- Preparation of a new biotope expertise,
- Continually extension of the long-grass areas,
- Initiating of a formal application to obtain a permission to shoot birds - when danger is imminent - even protected birds

Key Words: Statistics, Control Methods, Hazard Management, Permits

Figure 1

First, I am going to present you a geographical description of the Frankfurt Rhein/Main Airport area, which is situated within the Rhein/Main population concentration area and nevertheless surrounded by major forests. The rivers Main in the North (you can see a small section of it in the top left corner) and Rhein some what more towards the West encompass the Airport area at some distance.

The Rhein valley is - as you might know - a major route of largescale bird migration, which together with the water areas (mainly gravel pits) - in the vicinity of the Airport is also a source of local and regional bird movements.

The Airport area itself is oriented East-West with an extent of 6.5 km and a North-South extent of 5 kilometres. The total area comprises about 19 square kilometres. The grass areas between the runways (nearly 520 hectares) are divided as follows: 320 hectares long grass, 70 hectares not entirely short grass along the runways and taxiways, and 120 hectares of short grass around the radio transmitting stations of the Germann Flight Safety Authority. Due to building activities ten hectares are - on the average - seeded every year.

To the West, along the 18 west runway and to the South of the area there is the forest (property of the Airport) with its 350 hectares.

Figure 2

The next picture contains the total number of birdstrikes recorded from 1990 to 1994. On account of the very precise birdstrike statistics established by the German Lufthansa - which shares about 50 % of our air traffic - I can present you an estimated approximation of the total number of birdstrike at our Airport.

Now, we obtain for the period 1990 to 1994 the following situation:

The total number of birdstrikes is shown by the upper black line:
193 birdstrikes in 1990, 147 in 1991, 153 in 1992, 136 in 1993 and 126 in 1994
The red line represents birdstrikes that had occurred within the Airport proper.
The blue line shows the birdstrikes within a 12-kilometres radius to the Airport.
The percentage figures are the birdstrike rates per 10.000 flight movements in the various years.

Nearly 20 to 25 % incurdamages. Our worst birdstrike event - J. Thorpe reported about it in Vienna 1994 - was the collision between a buzzard and a Boeing 747 in March 1993: damage was more than 17 million D-Marks.

Figure 3

The next picture contains the monthly distribution of birdstrikes on the Frankfurt Rhein/Main Airport from 1974 to 1994.

The red line shows the birdstrikes inside and the blue line outside the Airport fence within a radius of 12 kilometres. You can clearly recognize the bird migration prevailing in spring and autumn. The major birdstrike-related danger occurs, however, after hatching in summer.

Figure 4

Here you can see which bird species are mainly involved in birdstrikes in our case. The German Military Geophysical Office in Traben-Trarbach succeeded 55 % of the birdstrikes in indentifying the species of the birds, at least, however, their genus - in my opinion a rather high rate, indeed.

Our present primary objectives

Preparation of a new biotope expertise by independent scientists, inter alia, Dr. Hild, Dr. Becker and Dr. Weitz, Traben-Trarbach.

Field research started in January 1994 is expected to be concluded by December 1996. After about July 1997 the results of this expertise will be available to my office.

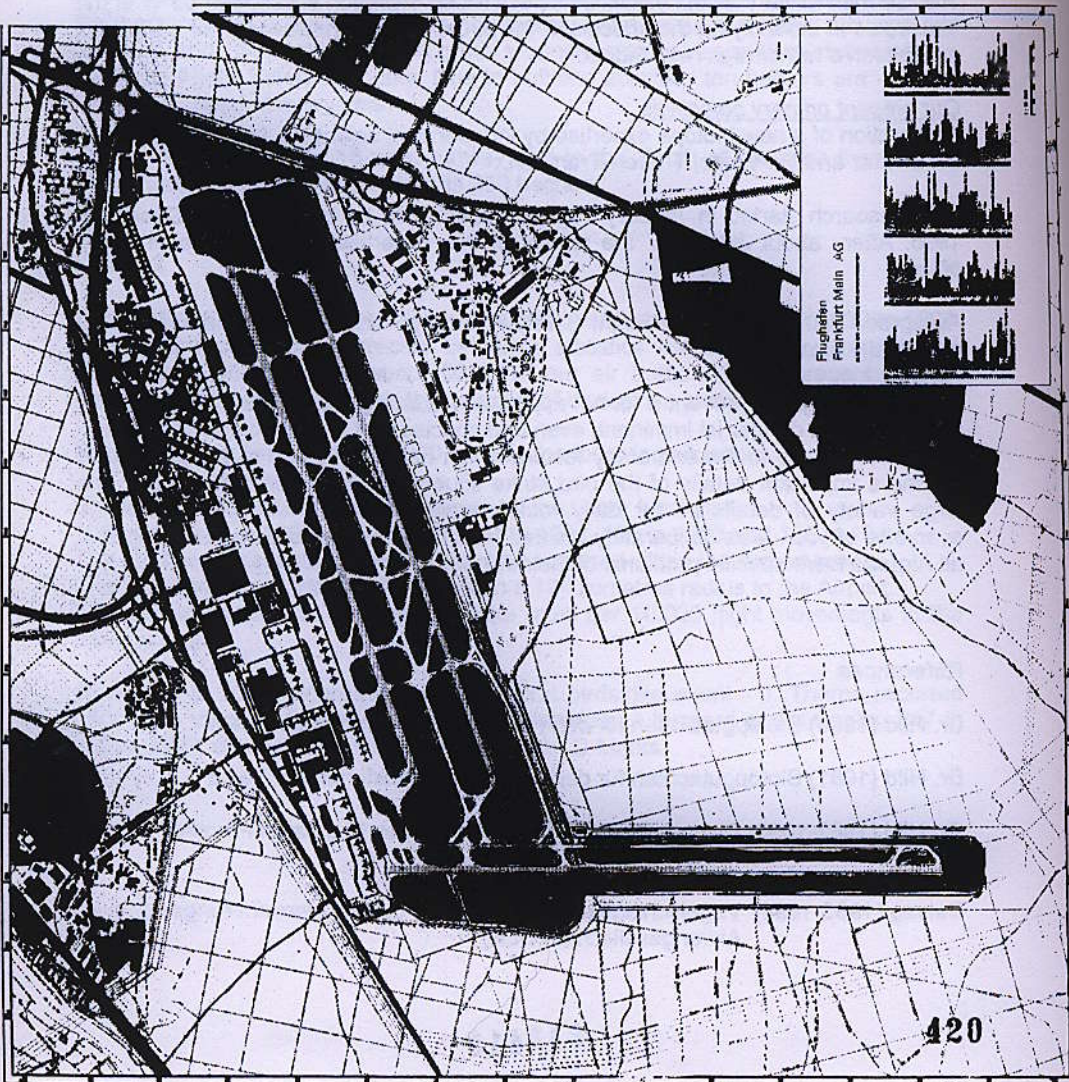
As agreed with the German Flight Safety Authority - the long-grass areas will be continually extended.

I should add that at present a formal application is being initiated to obtain a permit to shoot, when danger is imminent, even bird species that are particularly protected. Now I have come to the end of my lecture which necessarily had to be confined to the more important details of the bird strike situation at our Frankfurt Airport. The large variety of details in our daily routine work - which is sufficiently known to everyone of you - was deliberately omitted from my presentation, well knowing that all Airports have specific problems of their own.

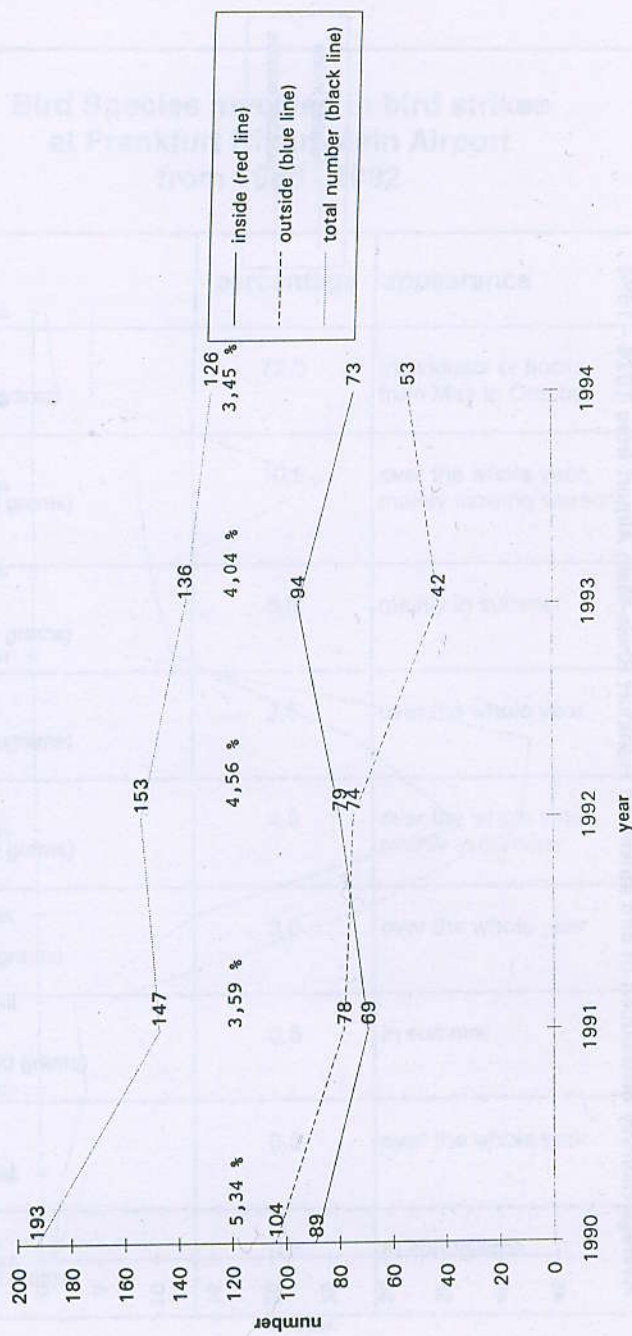
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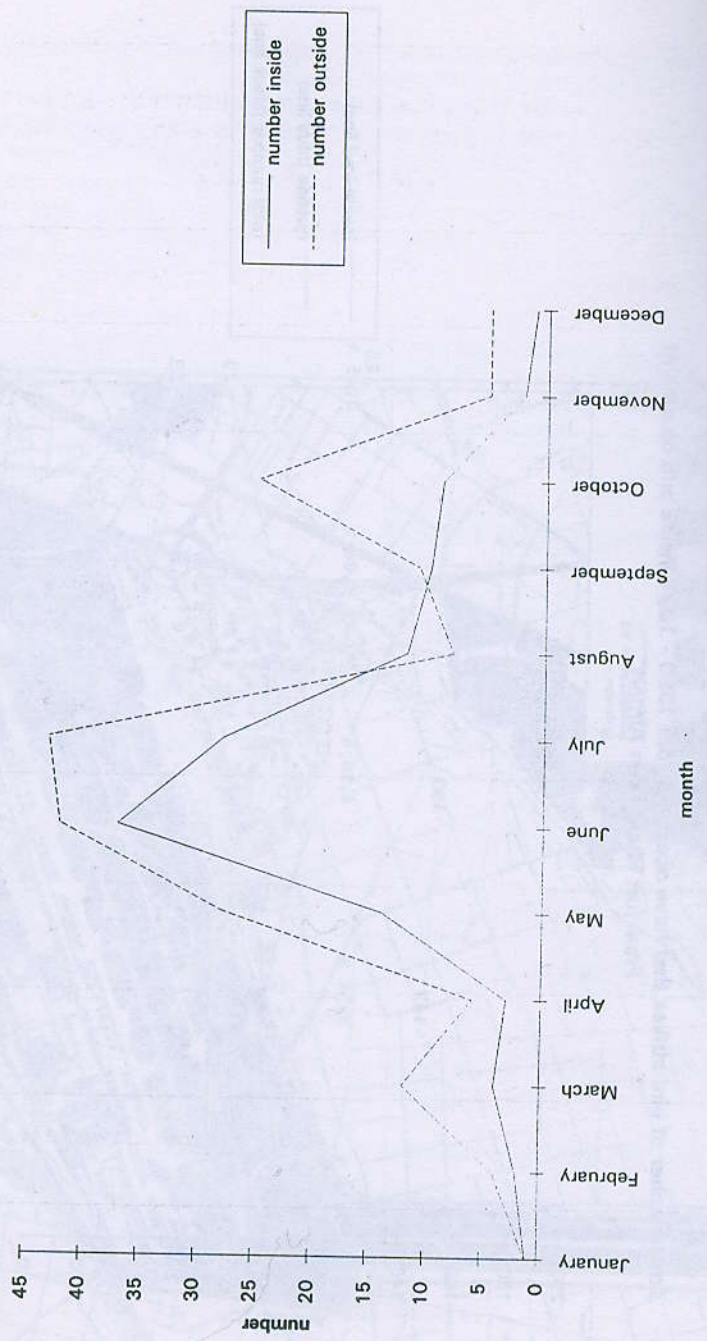
Geographical discription
of the Frankfurt Rhein-Main
Airport Area



Total number of bird strikes that have occurred from 1990 - 1994 inside and outside of Frankfurt Rhein-Main Airport



Average monthly distribution of bird strikes on Frankfurt Rhein-Main Airport from 1974 - 1994



DISCUSSION OF AERODROME PAPERS

**Bird Species involved in bird strikes
at Frankfurt Rhein-Main Airport
from 1985 - 1992**

bird species	percentage	appearance
small birds (weight up to 50 grams)	72,0	individuals or flocks from May to October
pigeon (weight up to 500 grams)	10,5	over the whole year, mainly mowing seasons
kastrel (weight up to 250 grams)	6,0	mainly in summer
carrion crow (weight up to 500 grams)	2,5	over the whole year
buzzard (weight up to 800 grams)	4,5	over the whole year, mainly in summer
starling (weight 80 - 100 grams)	3,0	over the whole year
hawk (weight up to 2000 grams)	0,5	in summer
owi (species unknown)	0,5	over the whole year
lap wing (weight up to 220 grams)	0,5	in spring-time

8 DISCUSSION OF AERODROME PAPERS

Comments on WP39 Proposal for An Association of Airfield Bird Controllers by Peter Jarman, UK

Mr Bruce Longstaff, UK, was in support of the proposal for an Association of Bird Control Operatives as the old proverb that says 'a problem shared is a problem halved'. In his experience of visiting most of the airfields in the United Kingdom, not many people on an airfield even think there is another airfield a few miles down the road, let alone to go and visit and find out how they solve problems. He endorsed the suggestion and hoped that the members of IBSC could support Peter Jarman and publicise the idea in their various countries.

Mr Tom Alge, General Electric, USA, suggested maybe dedicating half a day to bird controllers as part of the Aerodromes Working Group to get started and then branch off from there, it would be a starting point. He considered the message that the bird controllers could share with IBSC, and IBSC could share with them, could be of value.

Mr Jerry Yashon, Israel, wanted to know if anyone was aware of or had used any artificial ground covering such as astro turf in problematic areas in order to deter bird activity away from the area.

There was no response.

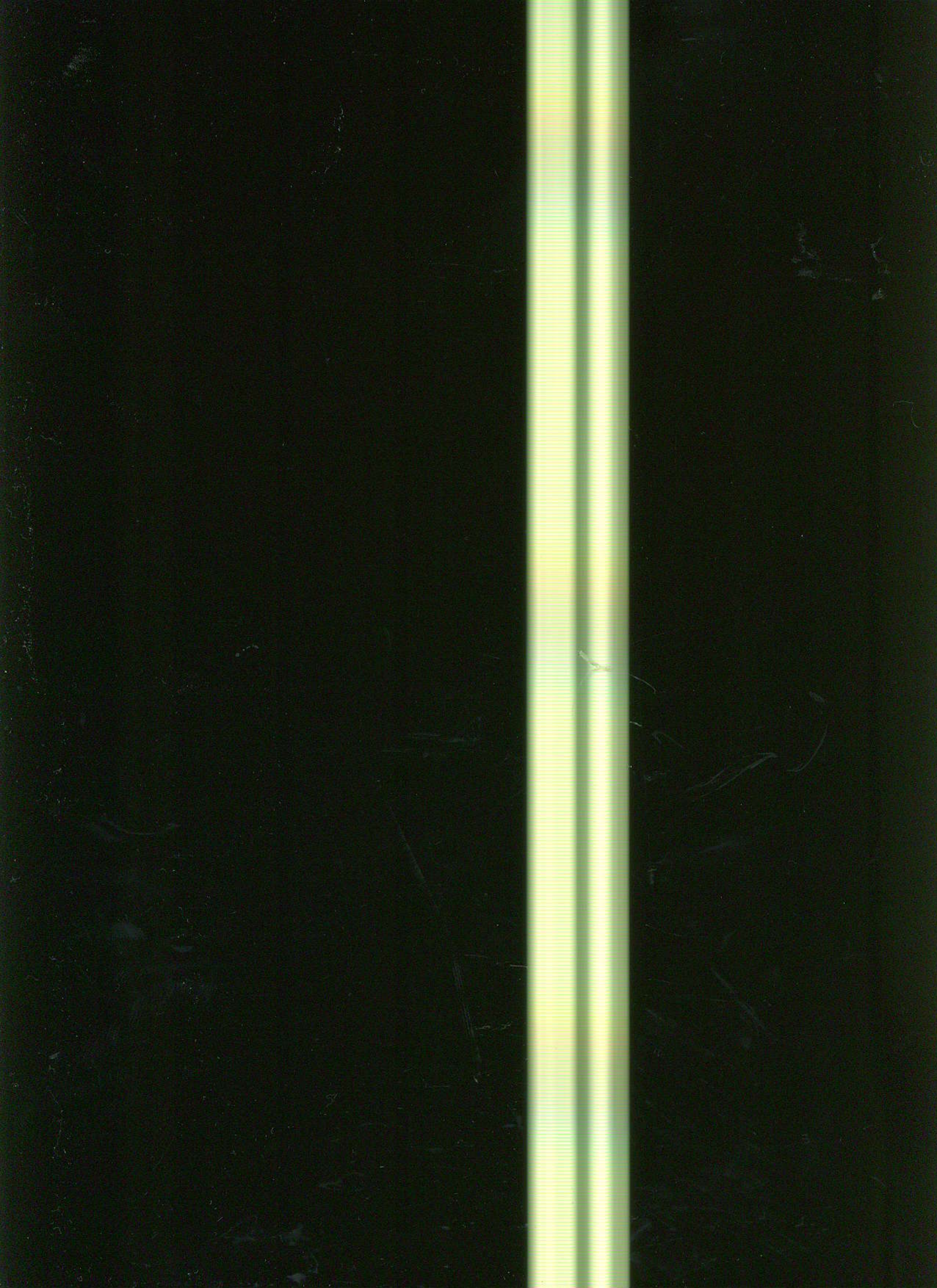
Dr John Allan, UK, The answer appears to be NO, he added that the issue had been raised while doing some work in Hong Kong, rather than growing long grass. The Hong Kong government was not impressed by the cost of astro turf.

Mr John Thorpe, UK, made an observation for people who were only at IBSC for the Aerodrome Working Group, that a number of the papers had been public relations oriented, particularly from Canada, including the idea of formation of an Association of Airfield Bird Controllers and reminded everyone that the Steering Committee have considered the need for a new Working Group called 'Legislation and Public Relations' because these are areas that IBSC now need to get involved in as it will help the cause in a lot of areas by being much more active in this area of legislation and public relations, so before the Plenary on Thursday afternoon please confirm whether in fact you feel IBSC should be going down this route.

Dr Allan commented that a number of people had been rushing backwards and forwards to Edinburgh for a public enquiry concerning a landfill site, illustrating the great importance that is attached to controlling the development of extreme bird attractants close to aerodromes and the UK are, hopefully, about to embark on some research on the matter. He invited comments on the way in which corvids, in particular, seem to be attracted to landfill sites, not necessarily to feed on the waste, this is particularly important when considering the effectiveness of nets to exclude birds from tipped waste, preliminary work suggests that many of the corvids on the landfill sites in Britain are not actually feeding on waste at all, which seems to agree with your observations.

Mr Donald Caccamise, USA, replied that the corvids in his study do in fact feed on the vegetative waste compostine but they will also spend time on the landfill itself scavenging and eating all kinds of things and also at other landfills, other than the ones he had worked at, they found in that particular part of the world often large concentrations of American crows that come into the landfills late in the day so it seems that in general several types of the sites in North Eastern United States are in fact very attractive to crows.

Dr Allan commented that it concurs almost exactly with the observations that he had, in that crows do tend to come in very large numbers immediately before dusk. A further question was put, its frequently suggested that even if birds are excluded from the bulk of a landfill they will be attracted to the general area and it will result in an increase in the overall bird population around the landfill area. Is there any evidence or any thoughts on how far out from the actual landfill itself that such an increase in bird populations might reach.



Mr Arie Dekker, The Netherlands stated there was a study on Carrion crows in southern Netherlands at an airbase near a town. About 15km on each side of the airbase there is a huge landfill and 450 Carrion crows were marked individually so they could be recognised and watched the area, at intervals, for 3 years and the main conclusions were that these big groups of corvids are not the same individuals. Crow A is seen at dump A one day and dump B the next day. It could be in a big pre-roosting flock or somewhere else but these groups are not constant so they fly around and these groups are more like 'this is the McDonalds and this is the cafe next door' so they visit randomly in the whole area so that fits in with the suggestion that it increases the whole population.

Dr W John Richardson, Canada, said that in a number of landfill studies in relation to the question about increasing or otherwise the populations by controlling the birds on the active part of the landfill they found the opposite, that when widely spaced wires were used, they are not a physical barrier but a psychological barrier, so to speak, to reduce the number of gulls on the active landfill it is also in relation to control. Observations of one kind or another show it reduced the number of gulls loafing in the area and the number of gulls soaring overhead, contrary to the suggestions that have sometimes been made that in fact the effect could be negative in those respects. Also the same thing has been seen at a landfill where gulls are prevented from going to the active area by other methods, pyrotechnics primarily.

Major Russell DeFusco, USA, was concerned about a disturbing trend throughout the USA, a great effort has been made in the last 15 years or so to enforce the FAA and the Environmental Protection Agency guidelines in terms of the distance that landfills are allowed from runways that service jet aircraft, there are a lot of municipalities that are going for waivers from these regulations and putting this to the popular vote, so there are individuals who really have no background in this, saying yes we want our trash dumped close by because it is cheaper to do that and then dealing with the problem they create after a new landfill goes in. This is cause for concern because what happens is, why create a problem and then have to deal with it, when the landfill can be put somewhere else and never have to deal with the problem. One instance in the Air Force, in Maine there was a landfill that was outside of the area of influence, according to the regulations. There were dozens of bird strikes at that particular Air National Guard base and they were on both landing and take-off, so that the municipality said it couldn't possibly be the landfill because they are taking them from both sides but when the direction that the aircraft were taking off and landing was looked at, 90% of the strikes were about 2 miles away from this particular landfill. It was closed down and it went from dozens of strikes to zero in one year. He was concerned about this trend and wondered if other countries were deciding that since scaring techniques, technology, wires etc are used to disperse birds, they can deal with it once it becomes a problem. Don't create the problem.

Mr John Seubert, USA, has had several phone calls from engineers who have been asked by a landfill operator to help them make a decision on why they should not get a waiver from the FAA when they are only 9,950ft away from an airport used by turbine aircraft. When the first statute came out in the United States on the 5,000 10,000ft parameter it was done by Tom Cage at the FAA who wanted to have some kind of a standard based on the landing and take-off profile of most aircraft. It was not the result of an ecological appraisal of the situation because the juxta position of attractants are the most important criteria that we could use. Ralph Davies from Canada has the idea that in certain situations to put something 9,000ft away from the airport depending of the juxta position of where say gulls roost or feed or drink water and it would be a perfectly good ecological reference to do so. He hadn't heard of any which are much closer. He thought there should be a competent ecological study before any decision could be made on this.

Mr Alistair Pinos, ICAO, agreed with what John Seubert had said, in Annex 14 to the ICAO Convention entitled Volume 1 Aerodrome - Design and Operations, paragraph 9.5.3 which is the result of this committee's deliberations, amongst others, its a recommendation that states that 'garbage dumps, garbage disposal dumps or any other such source attracting bird activity on or in the vicinity of an aerodrome should be eliminated or their establishment prevented unless an appropriate study indicates that they are unlikely to create conditions conducive to a bird hazard problem', there is nothing in there on a distance. Every year numerous phone calls are received on the distance for locating a dump and people are told its not a question of how far away you can locate it, its a question of doing a study to ascertain whether the dump is going to represent a danger. He recommended and supported what John Seubert had said and it is backed it up with the recommendation in ICAO Annex 14.

Dr Allan commented that regarding the Green Booklet, this is one of the areas he had been dealing with, he said that the United States, where there is almost a prohibition within a certain area for bird-attracting landfills, is very much the exception rather than the rule. Most of the countries that responded to the

questionnaire for the Green Booklet have either advisory situations or no legislation relating to the location of garbage dumps. Certainly in the UK there is a situation where anyone who applies to place a garbage dump within 8 miles of an airfield is required to consult with either the military or civil aviation authorities but there is no prohibition as such and the unfortunate situation that we are coming into now is that recommendations about the acceptance or non-acceptance of a proposal to put a landfill in close to an airfield are now increasingly being the subject of legal challenge, which is why people are rushing backwards and forwards to Edinburgh at the time of the meeting.

Mr Baron Rochard, UK, expanded on the comment, the situation in the UK is that a planning application goes to the local government planning department for the area in which the development is to take place. If it is a CAA safe-guarded aerodrome, which are the major international and regional aerodromes and any smaller aerodromes of strategic importance plus all military aerodromes through a different safe-guarding system. At each one of those, if it falls within the 8 statute mile/13km bird consultation circle, the planning department has to consult the safe-guarding authority which is either the Civil Aviation Authority or Headquarters Military Air Traffic. Neither of these organisations have any right to veto, they do not even have the right to object, they only have a right to recommend for or to recommend against or to recommend acceptance with conditions, the only powers which they have that go beyond that is if the local planning authority is to go against the advice of the aviation safe-guarding authority they must give them 3 weeks written notice that they are going to do this and the safe-guarding authority then has the right to ask for it to be called in for public enquiry to be considered by an enquiry of all interested parties held by central government. That is the full situation, it is very slightly different in Scotland.

Mr Bruce McKinnon, Transport Canada, reported that 55 airports in Canada are zoned and it would be illegal for a company to put a waste disposal site within 8km of the reference point of that airport and in their experience it has been proven that zoning an airport doesn't work and what they are trying to do is rewrite the guidelines for land use around airports and what they are trying to do now is enter into consultation with the waste disposal industry and are finding that by working with these people they have become very understanding to their needs and are also sensitive to the fact that if an aircraft should crash, they are on the hook for liability as well as the rest of us. Bird Strike Committee Canada are trying to get the waste disposal industry people involved in the Committee so that they will work with them and BSCC are getting involved now in the state selection process for a number of waste disposal facilities in Canada so that a company doesn't go through all the hoops and hurdles that they have to go through to get a piece of land on which they can develop a waste disposal site and then find out at the last minute that there is an air safety concern that they haven't been notified of. Therefore he suggested that the public relations approach can go along way in consulting with waste disposal industry people.

Dr Allan made the point that anyone considering using chemicals to control worms in that way should be careful to comply with the laws of the country in which they are doing it. It would, for example, be illegal to use Benomyl to kill worms on an airfield in the UK because it is not approved for use for that purpose. There are other chemicals that are approved for that purpose but you would actually be committing an offence were you to do so. He also asked Mr Larose when he applied these chemicals, were they applied to short grass areas and did he observe any increase in the numbers of birds feeding on those areas immediately after the application, that was something that happened when other chemicals and lumbricides were trialled in the UK a number of years ago.

Mr Mario Larose, Canada, said that application was only starting at the time of the meeting so he didn't have the information but referring to the chemical you have to understand that Benomyl is probably the lowest toxicity chemical found on the market. Also, in Canada, Benomyl is reserved as a turf management tool and has the very good secondary effect of killing earthworms. Regulations can also prevent use as earthworm control so they do turf management control in accordance with a letter sent by Agriculture Canada to all airports and aerodromes in Canada saying that even though it cannot be used for earthworm control, good turf management would have that effect.

Dr Allan commented on the working paper on grass management from Mr Dekker. He said smaller civil airfields in the UK that are effectively operating a poor grass system at the moment, not through any deliberate intention but simply because they don't bother to fertilise their grass and they cut it whenever it gets so long that it becomes inconvenient. He had looked at a number of those sites and one of the things that was of concern about them was that when this system had been in place for a long time some of the

grass became so poor that it actually became extremely short and there was the possibility that it would develop bare patches, therefore attracting birds. He asked if Mr Dekker any information on the long term effects of poor long grass?

Mr Dekker replied that there was no long term information on the two case studies when they were changed from an intensive way of using it to an extensive way. He did have information on Susteburg Airbase, which is on pure sand and had been used as a hay meadow shortly after the war, since then there had been no maintenance done whatsoever and they did not have bare soil. They have grass and herb species that invest in root systems and are very solid with no problems at all, that is on sand, there was no knowledge on heavy clay. He was quite confident that it would be all right because agriculture is not the right way to do it because agriculture requires fertilising so they think that by doing the opposite there will be no problems with birds and Susteburg Airbase has run this way since the mid 60s and has no bird problem at all, apart from migrating Swallows in the late summer but those are small birds.

Dr Allan asked about cutting the long grass, was it cut down short or to about 6 inches?

Mr Dekker replied that the mowing time is chosen very carefully. If your aim is to improve natural value you should mow it as late as possible because all the seeds are in the soil then but then there is no regrowth in the winter so from a bird strike prevention point of view it is best mown really short in August and then the grass will be high enough in the winter. He emphasised that on Susteburg Airbase some plots are only mown once every two years and it is very low and very sparse but there is no biomass production so there is nothing there for the birds.

Dr Allan asked if the sparse grass is still effective in retaining the bird repellancy.

Mr Dekker said that there were no birds apart from the swallows.

Mr Caccamise said that he reported 2 years ago at the Vienna meeting about a study he did at Atlantic City Airport of a similar system to the poor grass system that had been in place for many years. It has led to the development, on occasion, of rather severe insect outbreaks and these then were related to large numbers of gulls coming in to feed on the insects. His view, without knowing the system, was that having a poor grass system with all the plant diversity that comes along with it would lead to higher insect populations. Were there any observations to add?

Mr Dekker replied that the insect diversity is growing, the butterfly census on Twenthe Airbase records the highest number of species in the whole of The Netherlands, but that is quality rather than quantity, a lot of insects but not in weight. He thought of diverse vegetation as an ecologist should know that as diversities you probably do not get these big influxes. There was one problem with a certain kind of beetle where the females were preying upon grass roots and these beetles couldn't be removed so the whole sward was left lying loose on the soil and this attracted corvids. Nothing could be done about it, so it was reseeded and some heather seed mixed in with it and from that the heather is growing further on the airfield and it works quite well because heather doesn't attract many birds.

Mr Nigel Deacon, UK, observed that on UK civil airports, what happens when airports stop doing the bottoming out cuts when they cut the grass short in the spring and take the grass away, the first thing that seems to happen is an increase in vole populations then more raptor strikes, then there is an increase in the establishment of weeds and, therefore, more pigeon strikes and if it is continued to export nutrients, at some point there is a catastrophic failure of vegetation. The slides shown with WP33 showed the problem of large patches of bare soil, there have been beetle problems and weevils which destroyed the grass roots. Swift moths did the same thing, they stripped large areas of grassland that was already impoverished and left bare soil, weeds and severe bird problems. These problems don't occur with the standard UK long grass policy. At the RAF stations there is clean grass, any herbaceous plants are regarded as being weeds and being pests themselves because they attract birds that would not otherwise be there. Also Mr Dekker talked about 50% broad leaf weed cover, in winter they die and that weed cover leaves bare ground so you have patches of grass, patches of bare ground and birds will come in that you don't get in clean long grass so there is obviously a difference here.

Mr Dekker added that the explanation of this difference might be that in the long grass regime you do add nutrients and the biomass production might be at a higher level than the Netherlands one, please do not make the mistake of thinking that the poor grass system is a way of letting things go and see what happens,

it is definitely not, it is very carefully timed when and whether you do your mowing and we had thistle problems in some places which they were legally forced to do something about and then of course these patches will be mown. You have to be on the alert all the time.

Dr Allan was pleased to see an insurance industry representative at the meeting. For a long time it has been extremely difficult to persuade, particularly, civil aerodromes to invest in bird strike prevention and to understand that they are actually investing money to save themselves money and one of the greatest allies would be the aviation insurance industry as they can apply pressure to aerodromes in a way that others cannot. He asked Mr Robinson, obviously not expecting exact figures, but approximately to a power of 10 what would be the insurance premium for a UK airfield that is capable of taking a 747 aircraft, as a general figure? And secondly, in calculating that premium, does anyone take any account of the bird strike record of the aerodrome concerned?

Mr M Robinson, UK, for £200,000 million or £300,000 million sterling I think the premium would probably be about 60,000 to 80,000 sterling and as regards if bird strikes are taken into account, he would imagine.

Dr Allan asked that in Mr Robinson's opinion would it be worth the bird strike research and prevention community attempting to raise awareness within the aviation insurance industry or does it have such small bearing in insurance terms that IBSC would be wasting their time.

Mr Robinson said he would be quite happy for that. He had hoped the Teesside airport people would attend as they had shown interest in coming but had not turned up.

Dr Allan then thanked all participants and closed the session.

Joint Chairmen Prof Dr Bruno
Gruderer, Switzerland for Drs Luit
Buurma, Netherlands and Dr Jürgen
Becker, Germany

WORLD STRIKE COMMITTEE EUROPE 1982-1987 40
LONDON, MAY 1977, 1978

Proposed to Develop a Global Network to Predict Bird
Migrations on a Real-Time and Daily Scale by Using Radar
and Telemetry
by Dr. George S. Wainwright, Faculty of Life Sciences
Department of Zoology, 12 Nov 1977, 1978
Dr. G. S. Wainwright, JR.
Department of Zoology, University of California
1977-1978

9 REMOTE SENSING AND MILITARY LOW FLYING PAPERS

Joint Chairmen Prof Dr Bruno
Bruderer, Switzerland for Drs Luit
Buurma, Netherlands and Dr Jürgen
Becker, Germany



Proposal to Develop a Global Network to Predict Bird Movements on a Real-Time and Daily Scale by Using Radars

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Summary

Civilian air traffic as well as military flights have increased significantly during the last decades. Military aircraft now fly at low altitudes and high velocities during day and night, using fire zones in several countries. The cost of commercial and military aircraft has increased two fold during the last decades. For these reasons, the potential for damage caused by birds has increased dramatically. We propose to develop a global network of radar to predict bird movement on a real-time and daily scale through the use of a network of regional radar systems.

A network of regional radar systems should be developed in the Middle East, around the Mediterranean Sea, in Western, Northern, and Eastern Europe, in Asia, and in Africa which will provide together a global network as currently in place in the USA for weather prediction by NEXRAD WSR-88D radar. It should be proposed by BSCE to the European Market, leading insurance companies, and others to develop the system which can significantly reduce the number of air collisions in order to save lives and billions of dollars.

Keywords

Weather, Warning System, Migration, Radar, Visual, Aircraft, Airline, Civil Aviation, Military Aviation, Low level, Risk Assessment, Avoidance

