

**TOWARDS THE MANAGEMENT OF BIRD HAZARDS
ON SOUTH AFRICAN AIRPORTS**

Albert Froneman

Airports Company South Africa
Endangered Wildlife Trust Strategic Partnership, Endangered Wildlife Trust,
Private Bag x11, Parkview 2122, South Africa
Email: albertf@iafrica.com

Abstract

Birds and aircraft have collided with serious consequences to both humans and animals almost from the beginning of aviation. The aviation industry throughout the world increasingly recognises that bird strikes have become a serious safety risk. Birds are attracted to airport grounds to feed or roost while they often also fly over the area from feeding or roosting sites.

Air traffic in South Africa is increasing and it is essential to ensure that international air safety standards are maintained at South African airports. Little has been done in the past to co-ordinate the management of bird related safety risks at South African airports. In order to improve the situation, the Airports Company South Africa (ACSA) has entered into a unique strategic partnership with the Endangered Wildlife Trust (EWT), a non-governmental organisation committed to the conservation of southern Africa's biodiversity, to establish and operate an integrated national bird control program. The aim of the project is to minimise bird strikes and other interactions between wildlife and airport facilities at ACSA airports by applying environmentally-sensitive management techniques.

Airport staff is involved in the monitoring of bird strikes and bird populations on or near airports in order to gain a better understanding of population dynamics. Emphasis is placed on proactive bird control measures involving ecological solutions such as habitat management. However, during the establishment phase of habitat alterations, more re-active bird control measures are used to scare birds away from high-risk areas on the airfield.

During its first year of operation the project has made significant progress. One hundred and forty eight bird strikes were reported from 13 airports

across the country. The data recorded have helped to narrow the problem down to specific species and to prioritise actions through analysing bird strike rates for the different airports. In addition to refining the reporting system the project currently focuses on establishing appropriate environmentally sensitive bird control measures.

Wildlife control committees have been established at ACSA airports and they form the basis of an improved bird strike reporting and bird control monitoring programme. The formation of a South African Airport Wildlife Working Group under the auspices of the partnership is envisaged to share information from a national and international level with all stakeholders.

KeyWords: South Africa; Environmental; Hazard Management; Bird Populations; Public Relations; Food Sources; Habitat modification; Long-grass.

Introduction

It is well known that airports create or modify certain habitat types which attract various species of birds, some of which prove hazardous to aircraft using the airports (ICAO 1991). The issue at hand is essentially an ecological one, namely the relationship between birds and the habitats which are available to them on or near to the airfield. Needless to say, and as with most ecological matters, the issue is a complex one. In addition, the impact of airports on bird populations may be quite significant. For example, recent research on grassland birds at some airports in the USA has indicated that airports may be acting as population “sinks” for grassland birds by serving as ecological traps for some species, thereby possibly contributing to regional declines in some species (Kershner & Bollinger, 1996).

A scan of the literature confirms that, despite all the attention, the threat that birds pose to aircraft still persists world-wide (Thorpe, 1996; Skira & Wapstra 1990; Milsom, 1990). At best, some reduction in bird strike rates has been achieved in places, but the problem has certainly not been eradicated. In fact, it has increased in places. Most notably, bird culling programmes have been shown to be relatively ineffective in the long-term (Burger, 1983). Problem species vary according to location and to prevailing conditions, and it is well known that a management action for one problem species may be successful but it may create a problem with another species. There is clearly no “magic bullet” to deal with the hazards posed to aircraft and passengers by birds.

What is clear, however, is that fundamental ecological research, based on a detailed understanding of the problem, must be conducted (ICAO 1991). This must take place on an ongoing basis since the issue of bird hazards is a persistent and ever changing one. This research must concentrate on a review of current practices and the possible implementation of new ones. It is against this backdrop that the present Airports Company South Africa (ACSA) / Endangered Wildlife Trust (EWT) partnership has been designed.

As far back as the mid-1960s, the threat posed by birds at South African airports was recognised (Siegfried 1965). In South Africa, the aviation industry experienced tremendous growth during the last few years. Associated with this increase in air traffic the potential bird strike risk also increased. Bird strikes are as common a problem in South Africa as anywhere else in the world. Analysis of the available bird strike information indicates that a significant bird strike risk exists at some South African airports. Little was, however, done in the past to manage the problem. A few independent studies were carried out but these were usually short-term assessments (Pienaar & Greyling, 1990; Anderson & Kok, 1991; Rasmussen, 1992; Grote, 1994). Such studies made some basic recommendations, but these were often only implemented for a short while.

In order to address bird hazard management on its airports, ACSA has entered into a strategic partnership with the Endangered Wildlife Trust. An initial three-year project aims to establish a basic framework for the successful implementation of a bird control master plan for each of ACSA's ten airports. Although re-active bird control measures have been and still are in use on some ACSA airports, emphasis will be placed on more pro-active environmental solutions such as habitat management.

The goal of this paper is to present the bird strike situation and bird control measures in South Africa, while drawing attention to the ACSA / EWT strategic partnership approach which serves to co-ordinate a bird control program for ACSA on a national basis.

The Airports Company South Africa / Endangered Wildlife Trust Partnership

In order to co-ordinate and facilitate the implementation of a bird control program the Airports Company South Africa entered into a strategic partnership with the Endangered Wildlife Trust at the beginning of 1999. The goal of the ACSA / EWT strategic partnership is to minimise bird strikes and other interactions between wildlife and airport facilities on ACSA airports, by applying environmentally sensitive management techniques.

In the past the implementation of bird hazard reduction programmes at South Africa's main commercial airports has occurred in a rather ad hoc and uncoordinated manner (Allan, undated). The ACSA / EWT partnership provides the first opportunity to adopt a well researched, systematic and co-ordinated approach to the issue of bird strikes and bird control in South Africa.

The arrangement between ACSA and the EWT builds on a new approach, where industry forms a partnership with a conservation organisation to assist in addressing areas of conflict between day to day operations and the environment. On a similar approach the EWT entered into a strategic partnership with the electricity supply commission (ESKOM) in South Africa during 1995, to address the issue of negative interactions between wildlife and electricity infrastructures (van Rooyen, 1996).

The ACSA / EWT partnership operates on the principles of project management with a predefined goal and a set of objectives and milestones, outlined against a time schedule and work plan leading to the ultimate goal. The project operates on a limited budget, bound to the objectives and milestones of the programme.

The following outlines the main objectives of the ACSA / EWT partnership:

Increase airport and aviation safety standards in South Africa

- Integrate bird control into daily operations at ACSA airports through dedicated staff members
- Minimise the risk of damage to aircraft landing at ACSA airports by implementation of appropriate bird control measures

Apply environmentally sensitive bird control measures in a co-ordinated manner at all ACSA airports

- Scientific research to address ecological issues and develop habitat manipulation techniques
- Test and implement both re-active and pro-active bird control measures

Implement a bird strike reporting system

- Compile and analyse existing (historic) data
- Implementation of a national bird strike reporting system involving all relevant stakeholders
- Establish a process whereby bird strike data is used to measure risks and assess the effectiveness of control measures
- Establish a bird remains identification system

Implement bird presence monitoring programmes at all ACSA airports

- Training of relevant airport staff to identify common bird species

Assess airports and their surrounding land uses

- Determine potential impacts of the airport habitat and the surrounding area on the presence and distribution of birds
- Establish an awareness campaign about the ACSA / EWT partnership**
- Increase awareness about the issue of bird strikes and the importance of detailed reporting amongst all relevant stakeholders,
- The sharing of expertise with the rest of southern Africa and the rest of the world**
- The establishment of a centre for information related to birds and other wildlife on airports in South Africa.
- Establish a network of national and international contacts relating to bird interactions on South African airports**
- Establish on airport Bird and Wildlife committees as well as a national organising committee
 - Interaction between local and international bird control programmes will ensure communication and exchanges of ideas between local and international initiatives.

During the first year of operation significant progress was made. Emphasis during this first phase was to develop a thorough understanding of the current situation with regard to bird strikes and bird control measures at ACSA airports. Simultaneously a more detailed bird strike reporting system was implemented at all ACSA airports as well as on the major domestic airlines.

The successful operation of a bird control programme does not only depend on the airport authority (ICAO, 1991). The South African aviation industry invariably has a vested interest in the issue of bird control on the major commercial airports across the country. As a result numerous other organisations also play a major role in the project. Amongst others the ACSA / EWT partnership interacts regularly with all the local commercial airlines especially South African Airways, the South African Civil Aviation Authority, Air Traffic and Navigational Systems and the South African Airline Pilots Association. Within ACSA an integrated approach to address the implementation of bird control measures is also being developed. Key issues and regulations such as the establishment of on airport bird and wildlife committees are implemented through ACSA's corporate safety section. Further operational issues and the implementation of recommendations rests with each airport individually. Interaction between Fire and Rescue Services, who are responsible for bird control and ground maintenance, is for example crucial to the success of the program. Such operational details are discussed and implemented through these on airport bird and wildlife committees, at which all relevant stakeholders meet.

Another important component of the partnership relates to an increased awareness about bird strikes and bird control, not only to the aviation community but also the general public in South Africa. To facilitate awareness

about the project and its sponsors, various articles and media releases/announcements appeared during the course of 1999. To facilitate easy information dissemination, an informal newsletter called the "Feathered Flyer" is distributed to numerous interested parties on a regular basis. An ACSA / EWT web site <http://www.ewt.org.za/acsabirds/> also provides up to date information. Posters and booklets distributed to ACSA airports, about the common bird species occurring there, serves the purpose to sensitise airport staff about bird hazards and stimulates better reporting.

The partnership is designed to focus on understanding the underlying causes of, and the taking of environmentally friendly steps to reduce, or prevent, bird strikes at ACSA airports. The information gathered will ultimately be used to introduce, or improve, bird hazard reduction programmes at other airports in South Africa and in southern and central Africa. Therefore, the main challenge for the ACSA-EWT strategic partnership, is to search for new and innovative techniques for implementation at, initially, the ACSA managed airports.

ACSA manages ten airports across South Africa of which five are located along the coast line (Figure 1). These airports are located in habitat types ranging from coastal fynbos in the Western Cape, moist coastal grasslands and wetlands along the east coast to dry semi-desert shrub-land in the northern cape.

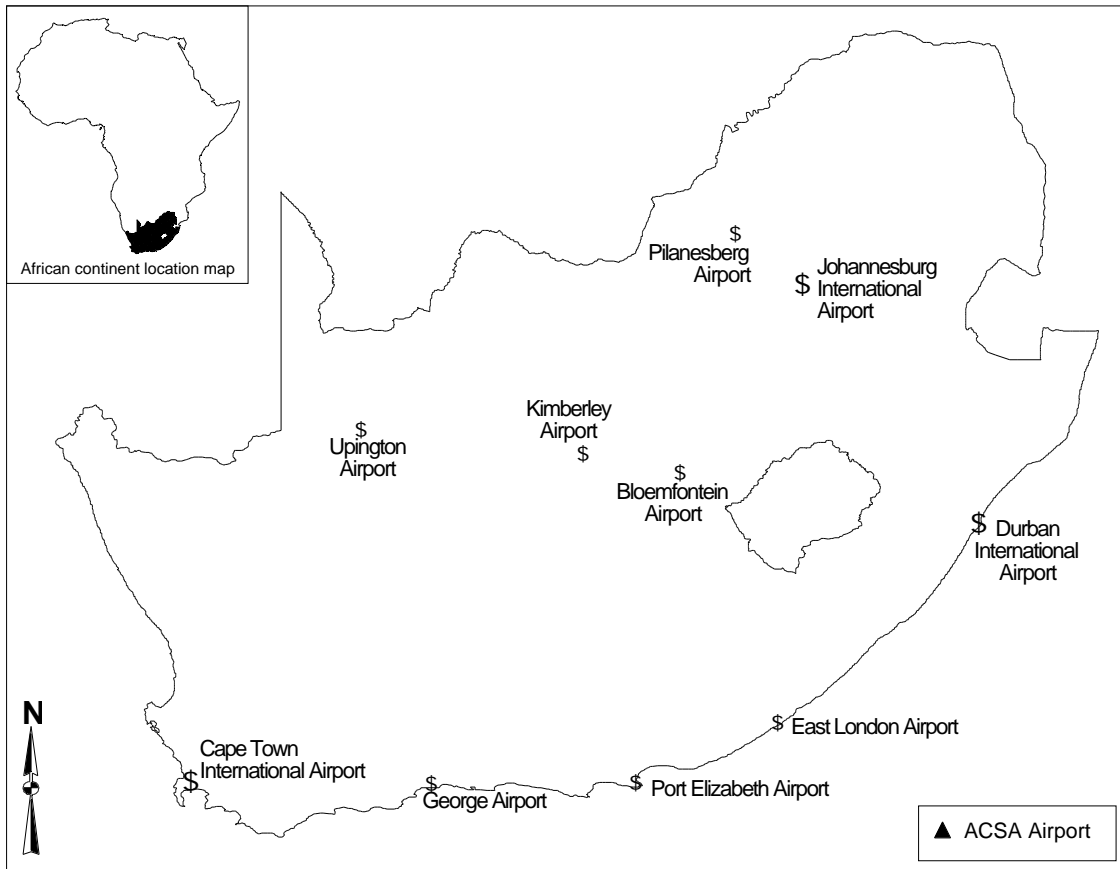
Bird strike reporting and bird presence monitoring.

A good bird control programme depends on good reporting (ICAO, 1991). The successful operation of the ACSA / EWT partnership depends largely on understanding the dynamics of bird populations occurring on the airfield and knowing which species are most often involved in bird strike incidents. A well developed national bird strike reporting system coupled by an ongoing awareness drive, will be developed to ensure that as much information as possible is captured about bird strikes. To begin to understand bird populations found on and near to the airport and to compile a species profile for the area it is essential to monitor bird presence on a regular basis.

At present the responsibility of bird control at ACSA airports rests with Fire and Rescue Services. Fire and rescue operates on a shift basis and on each shift a staff member is identified as a designated bird control officer.

To aid in the proper identification of bird species most frequently encountered on the airport bird identification posters and booklets have been produced. Bird Strike awareness posters have also been distributed to ACSA airports and the domestic airlines. The ACSA / EWT partnership interacts on a regular

basis with airport and airline staff to provide training and awareness on the issue of bird control.



A process of establishing bird control committees on all ACSA airports is currently underway. The objective of these airport bird and wildlife committees will be to identify and deliberate on bird strike and bird/wildlife control related issues and to formulate, evaluate and implement corrective and/or preventative measures to ensure and promote a safer airport environment. The committee will involve all relevant parties with a vested interest in bird control issues on the airport.

At a national level a forum known as the airport bird and wildlife committee existed under the auspices of the South African Aviation Safety Council (SAASCO). Unfortunately when SAASCO became defunct in 1998 this committee also stopped operating. The ACSA / EWT partnership has undertaken to revive such an initiative during the course of 2000.

Bird Strikes

In order to thoroughly assess the extent of the bird strike problem on an airport and in a country, a detailed bird strike reporting system needs to be in place (ICAO 1991). Bird strikes are reported to the South African Civil Aviation Authority, who collated all the information and submitted the information to International Civil Aviation Authority (ICAO). In the past the information was, however, not used to identify problem areas or to establish appropriate follow up action. Due to a lack of interest, awareness and feedback, fewer strikes were reported by airport and airline staff and little additional information about the incident was provided. Bird strike rates seem to decrease over the past few years (Figure 2) but it is suspected that this is due to a decrease and overall inaccuracy in reporting.

Part of the aim of the ACSA / EWT partnership includes the improvement and further establishment of a comprehensive bird strike reporting system for South Africa. Without the knowledge of which species are involved in strikes, an appropriate bird control program, which involves habitat management, cannot be implemented.

To standardise bird strike reporting in South Africa, a report form based on ICAO guidelines was designed and implemented at airports and on all major airlines. Much difficulty was experienced in implementing the new bird strike report form and only after a year is the frequency of reports increasing. At present a manual paper based system of reporting exists, after which the data is entered onto a database. A web based input form is envisaged for the near future.

Currently bird strikes are reported by domestic airlines, air traffic control and airport ground staff, to both the South African Civil Aviation Authority and the ACSA / EWT partnership. Information is then pooled and a final analysis done on a monthly basis to determine the number of strikes reported at each airport. This information is then conveyed back to the airport at their bird and wildlife committee meeting. Ultimately the South Africa Civil Aviation Authority should administer this reporting and analysis function.

Figure 2 provides an overview of bird strike rates for some ACSA airports over the period from 1996 to 1999. It is clear that numerous bird strikes occurred in the past but unfortunately little additional information is available about these incidents. Since the implementation of the ACSA / EWT partnership more detailed information about each incident is recorded and stored.

Tables 1, 2 and 3 provide a more detailed analysis of bird strikes, which occurred during 1999 at ACSA airports,

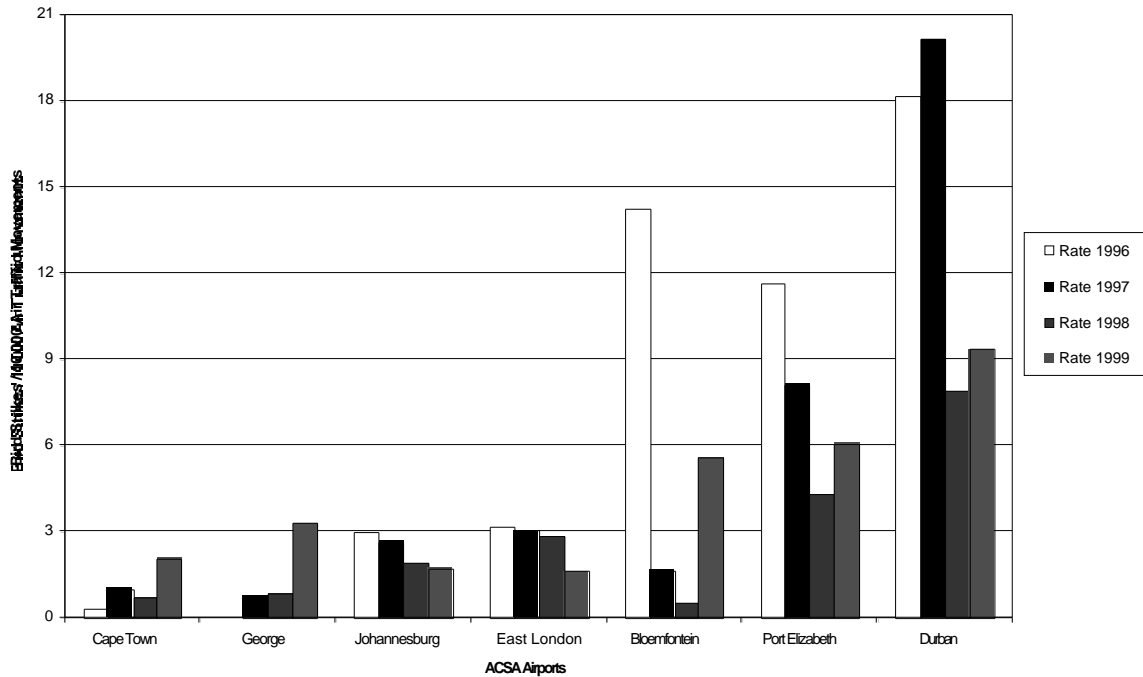


Figure 2: Bird strike rates per 10 000 air traffic movements for some ACSA airports over the period from 1996 to 1999.

Bird Presence

Effective bird control measures can only be implemented once a clear understanding exists of bird populations occurring on the airfield. In order to begin to understand population dynamics, bird presence on ACSA airfields is monitored on a daily basis.

To facilitate easy input and analysis of bird presence data, an electronic bird presence monitoring program is in operation at Johannesburg International Airport (JIA) and Durban International Airport (DIA). At present more basic bird presence reporting takes place at other ACSA airports. The electronic system, being used at JIA and DIA, consists of a custom written database application utilising an electronic grid map of the airport. Bird presence information collected during a detailed bird patrol (3 or 4 times/day) is entered into the system. Data captured includes bird species, number present, grid reference, and their behaviour. A customisable reporting facility allows the user to extract information, which can then be used to identify high density bird areas or to assess the effectiveness of control measures in use at the time. Reports generated from the data are discussed in detail at monthly bird and wildlife committee meetings. Information collected in this fashion, about the dynamics of bird populations, is proving invaluable in the development of both re-active and pro-active bird control measures.

Table 1. Monthly bird strike statistics for 1999 at ASCA airports. The bird strike rate per 10,000 air traffic movements is also displayed.

Airportname	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total/Airport	Rate
George Airport	1										1		2	328
Kimberley Airport							1		1				2	205
East London Airport			1								1	1	3	164
Cape Town International Airport				2	1	1	1	2	2				9	208
Bloemfontein Airport	1			2			1				4	5	13	555
Pot Elizabeth Airport	1	1			3	3		1	1		4	4	18	608
Johannesburg International Airport	6	1		2	1	2	1	2	2	2	7	1	27	172
Durban International Airport	10		2		4	5	3	1	5	2	6	3	41	938
Total/month	19	2	3	6	9	11	7	6	11	4	23	14	115	

Table 2. Bird strike species analysis for 1999 at ASCA airports.

Species	No
Yellowbilled Kite <i>Milvus migrans parasitus</i>	2
Blackheaded Heron <i>Ardea melanocephala</i>	2
Pigeon / Dove Family: Columbidae	3
Greyheaded Gull <i>Larus cirrocephalus</i>	3
Helmeted Guinea fowl <i>Numida meleagris</i>	3
Owl Order: Strigiformes	4
Other Raptors Order: Falconiformes	4
Spotted Dikkop <i>Burhinus capensis</i>	4
Lesser Kestrel <i>Falco naumanni</i>	4
Hadedda Ibis <i>Bostrychia hagedash</i>	10
Vanellus Plover <i>Vanellus spp.</i>	12
Swallow Family: Hirundinidae	17
Other	8
Unknown	39

Table 3. Phase of operation during which bird strikes occurred for 1999 at ASCA airports.

Phase of operation	%
En Route	0.8
Taxi	1.6
Descent	5.4
Approach	7.0
Unknown	9.3
Climb	12.4
Landing Roll	28.7

An analysis of bird strike and bird presence data led to the compilation of the following list of potentially hazardous species on South Africa's airports:

- *Vanellus* plover species frequent the short grassland habitat provided by airfields. The Blacksmith Plover (*Vanellus armatus*) prefers more moist conditions while the Crowned Plover (*Vanellus coronatus*) favours drier grassland.
- Blackheaded Herons (*Ardea melanocephala*) typically hunt large insects and rodents while walking through open grassland.
- Hadedda Ibis (*Bostrichia hagedash*) and Sacred Ibis (*Threskiornis aethiopicus*) favours short moist grassland areas in which they feed by probing for subsurface invertebrates with their long curved beaks.
- Helmeted Guinefowl (*Numida meleagris*) a chicken like terrestrial fowl occurs in loose flocks and favours the short grass adjacent to runways as feeding areas.
- Yellowbilled Kites (*Mivus migrans parasitus*) migrates from central Africa to the eastern half of Southern Africa during summer. These raptors hunt while soaring over the grassland and are often seen resting or feeding on the runways.

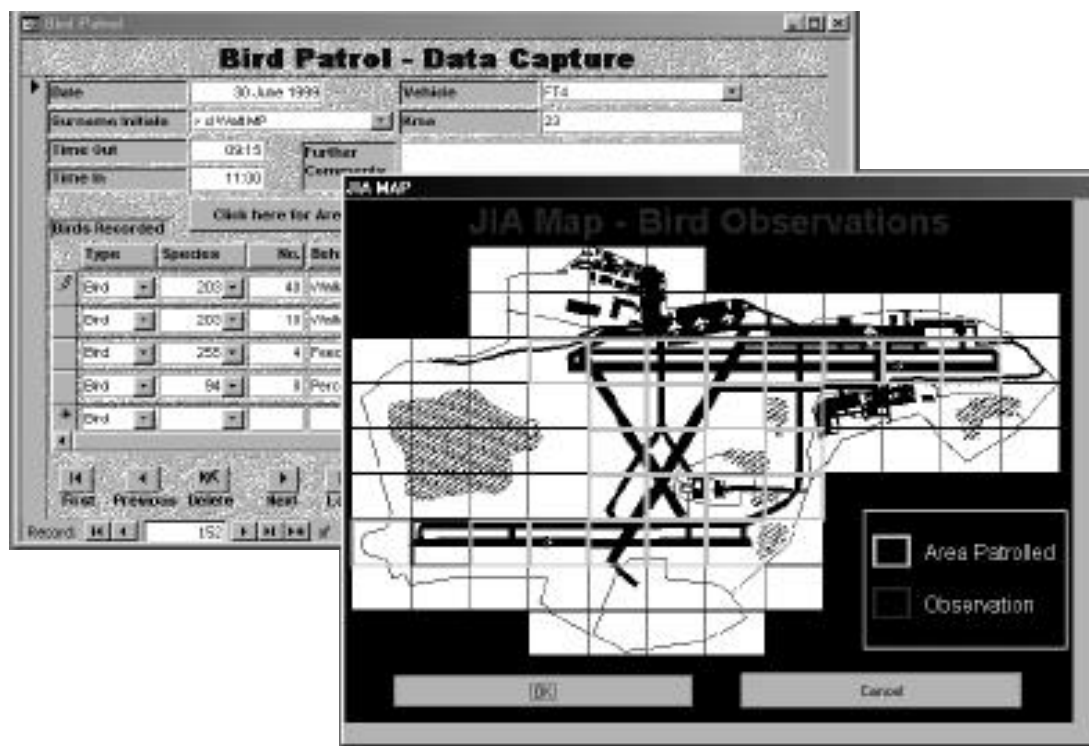


Figure 3: The data capture application designed for JIA to collect bird presence data using a grid map of the airfield.

- Greyheaded Gulls (*Larus cirrocephalus*) are only a minor problem at Johannesburg International airport when they breed on a wetland near to the airfield in winter.
- Swallows, family Hirundinidae (various species) are regularly seen in large numbers flying low over the open grassland on airfields.
- Lesser Kestrels (*Falco naumanni*) are of particular concern at Bloemfontein airport where large flocks feast on emerging termite alates during early summer.

Through a process of continuous monitoring of bird presence and bird strikes, this list of potential problem species will be refined and amended. Initial control measures being implemented on the airports will be geared against first controlling these identified problem species.

Bird Control

The study of the control of birds as hazards to the aviation industry should be viewed as a form of applied ornithology. It should draw freely on the general pool of scientific knowledge of birds – their distribution and migrations, their ecology and behaviour.

It is important to realise that an airport is an extensive area of “natural” vegetation, usually grassland, in a highly transformed urban environment. The airfield thus provides ideal habitat for numerous plant / bird and mammal species and thereby imposes a responsibility on its owners as custodians of that land to protect and conserve it. Any control program considered should, therefore, be as environmentally sensitive as possible.

Control measure should thus not involve any unnecessary destruction. Simply killing large numbers of birds, in any healthy population, is unlikely to achieve more than a temporary reduction in numbers (Wright, 1968). Habituation unfortunately also limits the usefulness of most scaring methods. Ultimately the only way to keep animals away from an area is to make the place unattractive to them. Those features, which make the habitat attractive for birds, should thus be removed. Wright already identified habitat modification as a means of bird control in 1968.

Within limits one can alter the airfield habitat by draining wet areas or allowing grass to grow longer where normally it is kept short. Such measures can be helpful in discouraging birds but a more important consideration is the availability of food. Identifying the problem bird species as well as areas that they frequent are important prerequisites.

At ACSA airports emphasis is placed on proactive bird control measures involving ecological solutions such as habitat management. Any bird remains or carcasses from infrequent culling are analysed to sample crop and stomach contents to determine what the birds were feeding on, on the airfield. Bird presence monitoring programs assist in understanding the dynamics of the bird populations which in turn assists in identifying areas, favoured by certain problem bird species. Any control measures can then be directed at known problem areas. Significant progress in this regard has been made at Durban International Airport. During the establishment phase of habitat alterations more re-active bird control measures are used to scare birds away from high-risk areas on the airfield.

Part of the environmental solution to the bird problem on ACSA's airports will include a detailed ecological assessment of the airfield, to establish its attractiveness to birds species occurring in the surrounding area and on the airport. Although environmental control could involve a costly initial investment, it offers the best hope for a long-term solution to bird problems.

Close integration exists between the ACSA / EWT partnership and the various sectors within ACSA regarding the implementation of suggested bird control methods. Both the airfield ground maintenance, planning sections and airport safety sections interact on a regular basis with the ACSA / EWT partnership to discuss bird control issues. Other stakeholders are being kept informed on the implementation of control measures.

In order to provide more detailed information about the operations of the ACSA / EWT strategic partnership the following succinct report about Durban International airport is provided.

Durban International Airport – A Case Study

An analysis of bird strike statistics will reveal that Durban International Airport (DIA) has the highest bird strike rate of all the ACSA airports. Despite concerted efforts by dedicated fire and rescue services staff to scare birds away from the airfield, they are often still present in high numbers when conditions are favourable. Since its establishment the ACSA / EWT strategic partnership has focussed a lot of attention on DIA.

The moist coastal grassland found on DIA surrounded by industrial and urban development serves as a refuge for many bird species. The airfield's location, close to the coast on a reclaimed marshland, in a subtropical climate only compounds the problem. A total of 92 species have been reported on the airfield since May 1999. The large numbers of birds present on the airfield

creates a serious bird strike risk and numerous incidents were reported over the past few years. The bird strike rate for 1999 equated to 9/10 000 aircraft movements.

Grass across the whole airfield was traditionally maintained at a height of about 150mm. The short grass created ideal feeding conditions for many species including Hadedda Ibis, Egyptian Goose (*Alopochen aegyptiacus*), Sacred Ibis and Blacksmith Plovers. At times in excess of 150 Hadedda Ibis was counted on the airfield. Following the ingestion of a Hadedda Ibis in a Boeing 737 engine during July 1999, a decision was taken to implement a taller grass height on the airfield. A limited amount of culling was also considered to initially reduce the large amount of Hadedda Ibis present on the airfield. Primarily as a result of an increase in the grass height from 150mm to 400mm, a 90% reduction in the number of Hadedda Ibis has been observed since July 1999 (Figure 4). Only about 20 Hadedda Ibis was shot during the same period. Subsequent to the implementation of the above control measures no further Hadedda Ibis were involved in bird strikes.

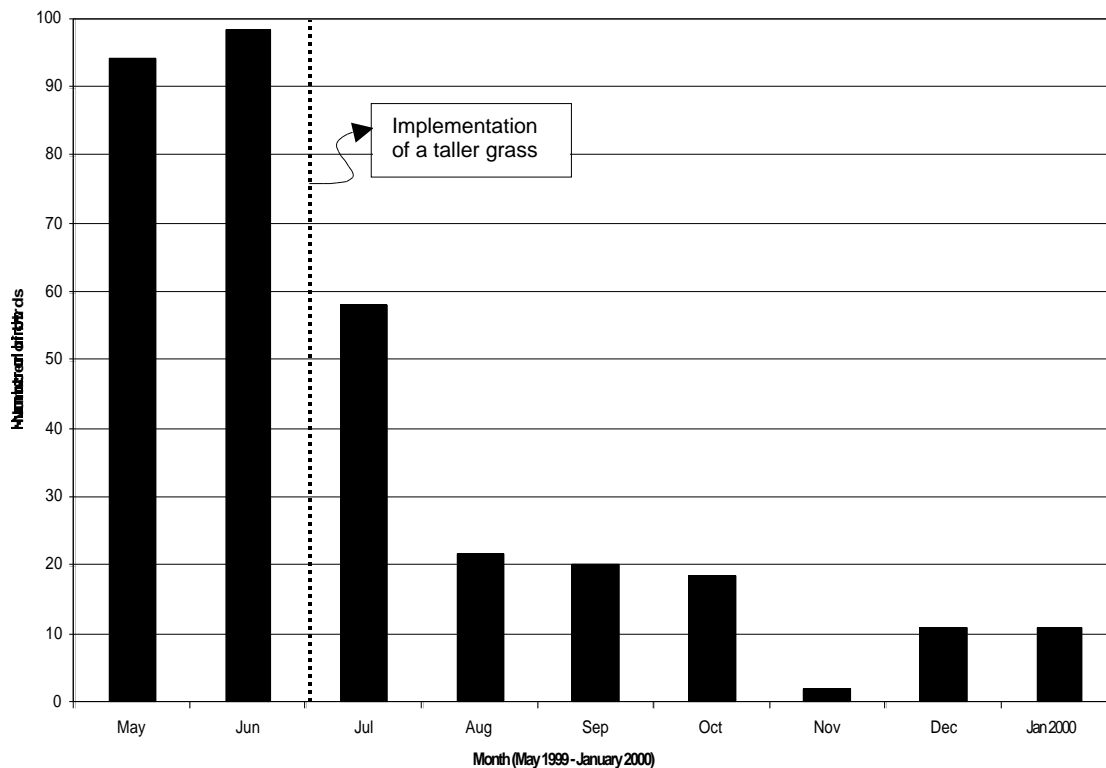


Figure 4: Average number of Hadedda Ibis recorded per bird patrol over a nine month period at DIA. Following the implementation of a taller grass height on the airfield in July 1999 a dramatic decline in average numbers can be observed.

Grass immediately adjacent to the runway and taxiways were however kept short to facilitate good visibility of runway lights and signage. Negotiations are currently underway to also increase the grass height in these areas to a height of approximately 300mm.

Apart from Hadedda Ibis various other bird species also frequent the airfield. Of note are the Blackheaded Herons, which are attracted to the area during grass cutting activities. The disturbance caused during grass cutting makes various insects more accessible to these birds. Grass cutting at night has been suggested to reduce the problem, but preliminary observations seem to indicate that the herons are also active on the airfield at night.

The Durban Natural History Museum receives all bird carcasses and bird strike remains for proper identification. Crop and stomach contents are removed for analysis to determine what the birds are feeding on at the airfield. The information and samples collected will complement research being conducted on reducing the insect population on the airfield.

To assist with bird presence monitoring the local bird club does a weekly bird count on the airfield. They have also assisted with staff training on species identification and data recording. To increase awareness among airport staff excursions were organised to the local Natural History Museum and a nearby nature reserve.

Sufficient bird presence data had been collected at DIA to act as a basis for the establishment of trial habitat management techniques. The aim of habitat management is to create a tall dense stand of vegetation on the airfield which will be unattractive to bird species which forages in short grass and also those which feeds on insects on the airfield. The approach followed involves the establishment of insect repellent grass in-between the current grass growth. It is envisaged that the establishment of these grasses on the airfield at DIA will have a positive effect on reducing insect numbers, which in turn will make the airfield less attractive for certain bird species. The University of Natal Pietermaritzburg will co-ordinate the grass planting as well as the follow-up research and monitoring.

The bird hazard at DIA is far from being solved but the ACSA / EWT partnership hopes to reduce the problem by implementing innovative proactive bird control measures through a process of habitat management.

Conclusions

The ACSA / EWT partnership heralds a new era in the relationship between two organisations. The plan is ambitious and daring, although certainly not flawless. It is however, a practical hands on attempt to address a long-standing problem between the aviation industry and the birds with whom they share the African skies!

During 1999, its first year of operation the ACSA / EWT partnership made significant progress with regard to assessing the current situation on ACSA airports regarding bird strikes and associated bird control programmes. It was clear that little is really know about the problem in South Africa and that tremendous scope exists for research and the implementation of appropriate bird control programmes on airports. Knowledge gathered during this first phase of the project will now during the second year of the project be used to further refine and streamline the process of bird strike and bird remains reporting both on airports and by airlines. The main emphasis of the second phase of the project will, however, be the implementation and evaluation of both short- and long-term bird control measures on ACSA airports. Project progress will be publicised as widely as possible to create an increased awareness about the potential risk and the cost of bird strikes to the aviation industry in South Africa.

The ACSA / EWT partnership – with its slogan “Birds and Aircraft: We Share the Air” has committed itself to over time establish a world class bird control program on South Africa’s airports. Although many challenges still lie ahead the main goal of the partnership will always aim to reduce the number of bird strikes occurring on South African airports by managing the habitat to make it less attractive for species found to create the greatest bird strike risk.

Acknowledgements

I would like to thank ACSA for taking the initiative to establish this strategic partnership with the Endangered Wildlife Trust, which involves the implementation and co-ordination of a bird control program. In addition to ACSA’s primary financial support towards this initiative sponsorship is also provided by South African Airways (SAA), AVIS Rent a Car and Tourvest.

ACSA Fire and Rescue service staff deserves a special mention as they devote many hours towards bird monitoring patrols and implementation of control measures. Special thanks to ACSA and SAA management through all sectors of their organisations for their commitment and support towards the

project and the implementation of recommendations made. A special word of thanks to Mr L Wicks from the Natal Bird Club who has spent many voluntary hours doing observations on Durban International Airport.

References

- Allan, J.R. Undated. *An assessment of the birdstrike to aircraft in South Africa and recommendations for its reduction*. Central Science Laboratory, Tangle Place, Guildford, UK. 19 pp.
- Anderson, C. & Kok, O. 1991. The crowned plover problem at airports: a simple solution. *African Wildlife* 45: 299-301.
- Burger, J. 1983. Bird control at airports. *Environ. Conserv.* 10: 115-124.
- Grote, A. 1994. Ecology of birds hazardous to aviation on Ysterplaat and Langebaanweg air force bases. Unpublished MSc.(Wildlife Management) dissertation. University of Pretoria.
- ICAO Airport Services Manual. 1991. Part 3: Bird Control and Reduction Third Edition.
- Kershner, E.L. & Bollinger, E.K. 1996. Reproductive success of grassland birds at east-central Illinois airports. *Am. Midl. Nat.* 136: 358-366.
- Milsom, T.P. 1990. Lapwings *Vanellus vanellus* on aerodromes and the birdstrike hazard. *Ibis* 132: 218-331.
- Pienaar, W.P. & Greyling, S.P. 1990. 'n Studie van die habitatvoorkeure en vliegpatrone van voels in die Jan Smutslughawe. BSc.(Hons) Natuurlewebestuur. Universiteit van Pretoria.
- Rasmussen, L.A. 1992. The habitat and daily activities of birds at Waterkloof and Swartkops airforce bases and the hazards they pose to aircraft. Bsc. (Hons) Wildlife Management. University of Pretoria.
- Siegfried, W.R. 1965. Bird hazard to aircraft. *Bokmakierie* 17: 37.
- Skira, I.J. & Wapstra, J.E. 1990. Control of silver gulls in Tasmania. *Corella* 14: 124-129.
- Thorpe, J. 1996. *The effects of birds on aircraft and some remedial measures*. 8th Annual European Aviation Seminar. Amsterdam. February 1996.
- Van Rooyen, C. 1996. *Conservation Partnerships – The Way of the Future*. In: Holt-Biddle, D. (ed). *Vision of Wildlife, Ecotourism and the Environment in Southern Africa*. Endangered Wildlife Trust, Johannesburg, South Africa. pp. 275-286.
- Wright, E.N. 1968. Modification of the Habitat as a Means of Bird Control. In: Murton, R.K. & Wright, E.N. (eds). *The problems of birds as pests*. London Academic Press. pp. 97-105.