Wildlife Hazard Management at Aerodromes

CAP 772

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www.caa.co.uk

December 2014

Contents

Foreword

The contents of this document do not constitute a CAA requirement. It is information and guidance material to support EC Regulation 139/2014 and to conform to EASA Aerodrome Rules and Acceptable Means of Compliance.

Aerodromes subject to UK national aerodrome licencing requirements may also use this guidance material to support the applicable wildlife hazard management requirements stated in CAP 168.

The contents expand on the guidance material provided by EASA and reflect industry practices and standards supported by the International Birdstrike Committee, ACI and the ICAO Airport Services Manuals (Doc 9137).

The term *'in the vicinity'* (or surroundings) is interpreted to mean land or water within 13 km of the aerodrome reference point and to landfill and waste disposal sites as defined under relevant UK legislation. An 'appropriate authority' is deemed to be an authority that has the power to take action in a particular situation.

Acknowledgements:

The CAA contracted the Food & Environment Research Agency (now known as ‘Animal and Plant Health Agency’) to assist and provide expert advice and opinion during the formulation of this revised guidance and also during the comment response resolution phase.

The CAA also recognises the additional expert advice and material provided by:

Birdstrike Management Ltd
AWM Ltd
Avian Safe
Bird Control Group NL
DeTect
Robin Radar

The associated external consultation exercise was completed during 2014, as detailed on the CAA website

Background

Although ICAO and EASA now refer to the subject matter as '*wildlife'* (defined as animals/mammals and birds), for simplicity, consistency and to avoid confusion, throughout the majority of this document the term '*birdstrike'* is used. Where direct quotes from ICAO or EASA references are quoted, 'wildlife' may be used.

This document focuses on risks posed to aircraft by birds as they are the greatest risk from wildlife according to UK occurrence data If you have concerns regarding wildlife hazards other than birds, then you should seek specialist advice from the relevant authorities and agencies.

Certification standards for airframes and aircraft engines provide modern commercial aircraft with a measure of resistance to birdstrike damage. This is, however, proportionate to the size and type of aircraft, with light, or GA aircraft and helicopters having no birdstrike certification standards for windshields or airframes.

Aviation safety agencies and regulators worldwide have produced guidance, standards and policy documents to help aerodrome and aircraft operators in managing and mitigating birdstrike and wildlife strike risks.

Chapter 1

Standards, recommended practices and requirements

The UK, as a signatory to the Chicago Convention on International Civil Aviation, has adopted the standards and recommended practices (SARPs) specified in Annex 14 (Volume 1 Aerodrome Design and Operation), published by the International Civil Aviation Organization (ICAO). This guidance is also based on requirements and recommendations in the following documents:

- Article 10 of EC Regulation 139/20141
- EASA (ADR.OPS.B.020 Wildlife strike hazard reduction)
- Chapter 5 of CAP 168 Licensing of Aerodromes

Wildlife and conservation laws

When addressing the hazard posed by birds and wildlife, stakeholders must ensure their actions are lawful. Licences are needed for some activities to preserve air safety which would otherwise be illegal under the 1981 Wildlife and Countryside Act, and Natural England is the agency responsible for them in England. In other parts of the UK, you should make sure you and all personnel involved are familiar with equivalent local regulations and any restrictions that apply to wildlife management activities issued by the relevant licensing authorities in Northern Ireland, Scotland and Wales.

Generally, a specific species licence will be issued when:

- There is a genuine problem to resolve or need to satisfy for which a licensing purpose is applicable;
- There are no other satisfactory alternative options;
- The licensed action will contribute to resolving the problem or meeting the need;
- The action to be licensed is proportionate to the scale of the problem or need;
- The licensed action will not have an adverse effect on the favourable conservation status of any habitat type or species within its natural range.

The aerodrome accountable manager must be satisfied that any aerodrome wildlife control personnel (in house personnel or third party contracted out) act within the provisions of any relevant licence. However, it is the responsibility of individuals to ensure compliance,

[1] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2014:044:0001:0034:EN:PDF

and to be aware that failure to comply with the relevant legislation could result in fines of up to £5,000, and/or a 6 month custodial sentence. In Scotland proceedings may be taken against the airport in respect of an offence, whether or not proceedings are also taken against an individual.

Natural England and their equivalents will consider the impacts of aerodrome bird control and related activities on sites that have been designated for protecting wildlife. Sites of Special Scientific Interest (SSSI) are protected by the Wildlife and Countryside Act 1981 and the Countryside and Rights of Way Act 2000. Aerodromes which contains an SSSI or whose actions could impact on a nearby SSSI should therefore consult with the relevant agency.

Bird control and dispersal activities undertaken by the aerodrome that are not included within the existing provisions of an SSSI and which may damage an SSSI's natural features cannot be undertaken without consent from Natural England or equivalent. A significant number of SSSI's are also included in European or internationally protected designations such as Special Areas of Conservation, Special Protection Areas and Ramsar sites under the Habitat Regulations 2010 (as amended). Many of these are classified as 'Natura 2000' sites under European legislation. Aerodromes operating adjacent to or in close proximity to designated nature conservation sites should discuss their bird/wildlife control management plans with the relevant conservation agency to ensure that any activities carried out meet the requirements of the relevant environmental legislation.

The Natural England document for SSSI owners/occupiers provides useful guidance. 'Sites of Special Scientific Interest: A brief guide for land owners and occupiers (NE322)' can be found at: http://publications.naturalengland.org.uk/publication/1019788?category=20003.

Chapter 2

Wildlife hazard management plans

Principles and objectives

The reduction of birdstrike can be split into three areas:

- identify hazards
- evaluate management options
- develop strategies to manage risk.

Strategies should focus on deterring birds from flying in the same airspace as aircraft on and in the near vicinity of the aerodrome, and primary control options include:

- aerodrome habitat management
- active control procedures
- safeguarding

Each aerodrome location presents a unique habitat that influences the type and population of bird species present. It is therefore essential that the most appropriate and effective measures are identified and adapted to suit local conditions.

Wildlife hazard management plans

Wildlife hazard management plans should:

- assess the wildlife hazard on, and in the vicinity of, the aerodrome;
- establish a means and procedures to minimise the risk of collisions between wildlife and aircraft;
- notify the appropriate authority if a wildlife assessment indicates conditions in the surroundings of the aerodrome are conducive to a wildlife hazard problem[2].

As a minimum, a management plan should include details of:

- persons who are accountable for developing and implementing the risk assessment programme, overseeing the control activities, analysing data and carrying out risk assessments;

[2] EASA (ADR-OPS B.020 Wildlife Strike Hazard Reduction)

- risk assessment methodologies that are to be conducted and the risk mitigation measures that are in place;
- policies and procedures for reducing wildlife strike risks on the aerodrome including:
  - processes for effective on-aerodrome habitat management;
  - flexible use of a range of deterrent, dispersal and control measures to prevent habituation from occurring.
  - details of any relevant permissions or licences for control measures;
  - recording of control activities;
  - reporting control issues to aerodrome management and airside or flight safety committees;
  - recording and analysis of strike reports;
  - logging species, observations, intelligence and subsequent data analysis;
  - policies for bird control during hours of darkness and low visibility operations.

The management plan should be referenced or included in the aerodrome manual and made available to the CAA for audit and compliance monitoring purposes.

Measures detailed in the plan should relate to the threat posed by each identified risk, but should also include details on how measures may change due to changes in bird and wildlife activities; for example, dealing with seasonal change or following collection of wildlife data. The measures should include the wildlife control techniques described in this or other authoritative documents, at the aerodrome operator's discretion[3].

Whichever techniques or tools are used, priority should be given to reducing the presence of large and flocking birds and, where practicable, to managing other congregations of birds that present a significant threat to aircraft safety whether on or off-aerodrome.

Safeguarding Systems

Safeguarding systems need to be put in place to guard against new or increased wildlife hazards caused by developments both on and in the vicinity of an aerodrome. They should include details of activities employed by the aerodrome operator to control or influence

[3] Other useful references may include: International Birdstrike Committee, *Recommended Practices No.1 Standards for Aerodrome Bird/Wildlife Control,* Issue 1, October 2006; Airports Council International (ACI) *Aerodrome Bird Hazard Prevention and Wildlife Management Handbook*, 2nd Edition, 2013; ICAO Doc 9137 and PANS Aerodromes.

areas beyond the boundary of the airfield, in the vicinity of the aerodrome (up to 13 km and in some instances beyond, or less than 13km, as determined by risk and effectiveness of interventions), and where practicable, could include:

- establishment of a process with the local planning authorities for consultation on proposed developments that have the potential to be wildlife attractant within 13 km of the aerodrome;
- means to influence land use and development surrounding the aerodrome such that the strike risk does not increase and, where practicable, is reduced;
- means to help encourage landowners to adopt wildlife control measures and support landowners' efforts to reduce wildlife strike risks, via land use agreements and;
- procedures to conduct and record the results of off-aerodrome site monitoring visits.

Record Keeping

It is essential to record all bird and wildlife control activities undertaken both tactically and strategically and on a daily basis, and details of this should form part of the plan. This data can be used to:

- evaluate the success of risk management programmes;
- identify areas requiring attention;
- highlight key risk periods;
- provide a record of activities that were being undertaken in the event of an incident and follow-up investigation.

There is no standard list of details that must be collected, but the following are a useful guide:

- Name of the Bird Control Unit (BCU) operative on duty;
- Start time;
- Finish time;
- Time for each activity or record;
- Location of activity;
- Species details of the bird or other wildlife observed and/or dispersed;
- Numbers of each species seen, including nil returns;
- Dispersal action taken;

- Reaction of wildlife to dispersal;
- Direction of dispersal;

For airports with an aircraft movement every 15 minutes or more, the International Birdstrike Committee recommends recording any action as it is undertaken, but also that a record is added to the log *at least* every 30 minutes, even when no active control took place or observation was made[4].

Review and Evaluation

Procedures to monitor and evaluate the effectiveness of bird or wildlife control strategies might include:

- wildlife control performance monitoring, measurement and improvement systems;
- personnel training, competence assessment and appraisal.

An analysis of bird and wildlife strikes should be undertaken periodically (at least annually) and after any significant strike event has occurred as part of the risk assessment process. Recording information is essential to provide evidence that active bird control is in place in the event that an incident occurs, and equally provides an opportunity to assess and evaluate fluctuations in wildlife occurrences in different areas of the airfield.

[4] IBSC Recommendations do not constitute UK CAA policy or requirements.

Chapter 3

Roles and Responsibilities

Introduction

The roles and responsibilities of all personnel are important elements of the aerodrome operator's safety management system and contribute to the effectiveness of the wildlife/birdstrike management plan.

Where aerodrome bird control is outsourced and provided by third party management companies, there must be auditable mechanisms in place, such as a service level agreement, to ensure that only trained, assessed and competent personnel are employed.

In accordance with EASA ADR.OR.D.010, the aerodrome operator shall ensure that when contracting or purchasing any part of its activity, the contracted or purchased service or equipment or system conforms to the applicable requirements. The aerodrome operator shall ensure that the competent authority (CAA) is given access to the contracted organisation, to determine continued compliance with the applicable requirements.

Contracted organisations should have a thorough understanding of their roles and responsibilities as set out in the management plan, and be able to work effectively with other organisations as required, both on and off aerodrome, such as air traffic control and local landowners etc.

The roles and responsibilities may be adjusted to suit an aerodrome's specific hazard and control circumstances, but the following describes the type of roles and responsibilities that are typically included in wildlife hazard management plans.

Bird Control Manager / Co-ordinator

The aerodrome operator has overall accountability for wildlife hazard management at the aerodrome, but responsibility for wildlife control and the delivery and implementation of the management plan at the aerodrome is typically delegated to a coordinator, airside service delivery, or compliance manager. Their primary objectives should be to:

1. ensure that personnel understand how to assess and determine wildlife hazard and strike risks; understand the hazard management plan and have adequate resources to implement the plan;
2. manage implementation of the plan via internal audit and periodic review;
3. review statistical analysis of strike records;
4. ensure the results of strike analysis are communicated to management and stakeholders as appropriate.

5. monitor habitat changes on and in the vicinity of the aerodrome, and develop and implement appropriate management and control activities;
6. ensure adherence to habitat management, airfield grass policies and associated maintenance programmes
7. understand the implications of not managing wildlife strike hazards effectively and not following the plan and initiating any necessary changes;
8. analyse and interpret records (shift logs) of control activities, strike reports and on and off-airfield observations and intelligence;
9. understand the need for periodic surveys of bird and wildlife concentrations and movements in the local area (up to or beyond 13 km as determined by aerodrome management policies);
10. work with, for example, local landowners, farmers, gamekeepers, local nature reserve managers and racing pigeon organisations in order to influence and raise awareness of bird hazard matters;
11. consult and engage with aerodrome planning development and engineering departments regarding safeguarding proposals, and engage with planning applicants where a proposed development has potential to change risk (e.g. restoration of mineral extraction sites);
12. monitor the effectiveness of any bird and habitat management measures via quality audit or similar process;
13. identify potential wildlife strike risks through collation of local ornithological reports and survey data;
14. seek advice and assistance from outside specialists on matters requiring expertise not available at the aerodrome;
15. produce reports on specific bird hazard issues, safety briefs and issue warnings to pilots via NOTAM, ATIS or AIP as necessary;
16. ensure wildlife control record-keeping (recording observation counts, strike recording and reporting, dispersal, culling and habitat management diaries, etc) are correctly recorded in a manner that can be easily interrogated and audited;
17. ensure that all necessary training, passes, permits and licences are current;
18. ensure the supply and safe keeping of equipment, including firearms and lasers;

Aerodrome bird/wildlife control personnel

Control personnel (or Bird Control Units BCU) are responsible for the direct delivery of control duties on the aerodrome and enacting the management plan to counter any wildlife presence on the airfield that presents a potential risk to aircraft flight safety. As such, the wildlife control personnel's duties should include:

1. maintaining surveillance of wildlife activity on the aerodrome and around the aerodrome boundary;
2. implementing wildlife control measures in accordance with the plan to counter any detected wildlife strike risk;
3. providing information to air traffic control with details of potential wildlife strike risks and management activities as they occur;
4. recording and reporting all confirmed, unconfirmed, near-miss or suspected wildlife strikes;
5. advising the aerodrome certificate/licence holder and/or the accountable manager of habitat control issues on the airfield and identifying improvements to the wildlife control process, and;
6. assisting with wildlife/bird surveys and gathering and recording intelligence

Chapter 4
Risk Identification

Assessment of Wildlife Strike Risk

The aerodrome operator should develop and maintain a systematic method of obtaining information regarding hazardous wildlife species and their habitats to manage them effectively. This should include:

- assessing the hazards in the context of aircraft operations;
- analysis of strike records to identify how many of each species have been struck over specific periods of time;
- identification of species more likely to cause damage to aircraft, such as flocking birds and larger, heavier species, particularly waterfowl;
- development of a risk assessment methodology to inform the control programme in accordance with policies set out in the management plan.

Details of existing wildlife locations and wildlife movements both on and off the aerodrome should be recorded to provide a baseline and allow resources to be targeted effectively, and a risk assessment should then be carried out. The record and risk assessment should include:

- detailed information of wildlife, identifying species, size, numbers and habitats that influence wildlife population and behaviour, and likely aircraft damage in the event of a wildlife strike
- risk information that can be quantified in the short and long term, dependent upon wildlife population and seasonal changes, including an assessment of the frequency of serious multiple wildlife strikes
- the potential and continuing risks, so they can be assessed on a comparable basis
- control actions focused in a structured manner
- the determination of the acceptability of the level of risk by summing the probability and severity, based on a probability/severity matrix, such as that illustrated in Figure 1 based on published birdstrike risk assessment methodology[5]

[5] Allan, J (2006). A Hueristic Risk Assessment Technique for Birdstrike Management at Airports. Risk Analysis. Vol 26(3). pp723-729.

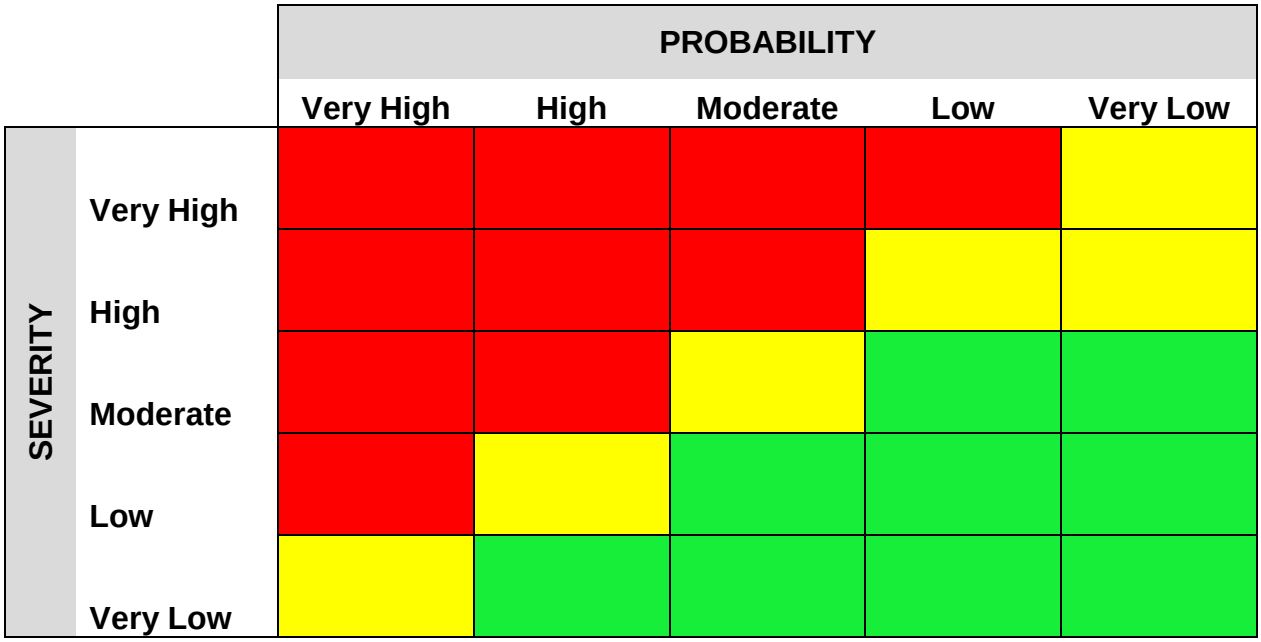
- the identification of management options for, in this example, yellow/amber and red risks;
- the development, implementation and monitoring of an action plan to eliminate, reduce or mitigate risks.

Figure 1 Example Wildlife Strike Risk Assessment Matrix

red = high risk - additional management actions should be implemented for this species as soon as possible;

yellow/amber = medium risk - current risk management strategies for this species should be reviewed and additional steps taken if appropriate;

green = low risk - no additional action above that already being implemented for this species is currently necessary



Probability of a Strike

Probability of strike risk for different species can be calculated using, ideally, data recorded from the last 5 year period to provide an annual average number of strikes for inclusion in a matrix. Accurate up to date records are invaluable. Additional to observations by aerodrome personnel, liaison with local landowners and land users such as local bird watchers and ornithological societies, nature reserve wardens, water bailiffs, gamekeepers, farmers and pigeon racers, for example, may also be useful. Specialist wildlife and birdstrike organisations can also help apply wildlife strike knowledge in the context of the location of a potential bird attractant site and the type and numbers of species found there

Using UK aerodrome data the following ratings have been calculated:

Figure 2 Probability Ratings

	Very High	High	Moderate	Low	Very Low
Number of strikes	>10	3.0 - 10	1.0 - 2.9	0.3 - 0.9	0- 0.2

Severity

Using UK wildlife strike data submitted to the CAA, severity was calculated by species, based on the percentage of strikes that caused some form of damage to an aircraft. These proportions are provided in figure 3. Examples of some severity percentages for different species are shown in figure 4.

Figure 3 Severity (Probability of damage to aircraft engines)

	Very High	High	Moderate	Low	Very Low
Number of Strikes	>20%	10 - 20%	6.0 - 9.9	2.0 - 5.9	0 - 1.9

Figure 4 Example of species and their damage probability percentages

Species	Damage Percentage
Mute swan	42.5%
Canada goose	26.7%
Herring gull	13.0%
Buzzard	11.4%
Lapwing	8.3%
Woodpigeon	6.6%
Feral pigeon	6.5%
Black-headed gull	4.6%
Kestrel	2.6%
Starling	2.6%
Swift	1.2%

Skylark	0.7%

(Source: FERA/AHVLA[6]. UK CAA birdstrike data 1991-2003)

Additional species severity ratings can be calculated using the mean weight of the species concerned x 0.014 (Allan, 2006). Strikes involving multiple birds have a far higher probability of causing damage to aircraft. Severity ratings should therefore be increased when strikes from multiple birds are being recorded. The severity rating should be upgraded to ‘very high’ when a ‘high’ severity species is recorded involving multiple birds, and 'moderate' or 'low' rated species should be upgraded after three or more strikes are recorded involving multiple birds, e.g. 'Low' to 'Moderate', 'Moderate' to 'High' etc.

Figure 5 Example of calculation for 4 Lesser Black-backed gull strikes during last five years of which three were multiples.

Strikes per year over last 5 years	0.8/year	Low
Probability of damage	11.9%	High

Low x High = Level 2 Risk. Three multiple strikes recorded in last five years raises 'High' to 'Very High' damage probability. Low x Very High = Level 3 Risk; Action plan necessary with annual review.

All species recorded within a risk assessment matrix should be updated following any strike occurrences to ensure validity. On establishing where each species lies within the matrix, the management plan can be used to target resources against the highest risk.

Off-aerodrome Wildlife Surveys (‘13 km bird circle’)

Off-aerodrome bird monitoring or control to 13 km is not stated in EASA ADR regulation and so this particular guidance may be interpreted to support an aerodrome’s own policy with regard to assessment of the wildlife hazard on, and in the surroundings of the aerodrome.

In order to provide flexibility and proportionality, aerodrome operators may determine to monitor off-aerodrome bird or wildlife activities in different ways to achieve the desired benefits. Off-aerodrome monitoring practices may be dependent and determined by the size and complexity of the aerodrome itself, the type of operating aircraft; the human resource available, the bird/wildlife hazard presented in the vicinity and results of any risk assessment (as noted in the aerodrome’s wildlife hazard management plan).

However, it is important that the aerodrome wildlife hazard management plan reflects whatever process has been decided upon and is demonstrably implemented, and explains the safety rationale where an alternative approach or deviation from 13km has been

[6] Food & Environment Research Agency/Animal Health Veterinary Laboratories Agency (now Animal Plant Health Agency)

applied. Ultimately, it is the aerodrome operator's responsibility to determine and manage the effectiveness of its off-airfield 'bird' safeguarding policies, practices and procedures.

Principally, off-aerodrome bird/wildlife surveys or assessments are carried out in order to identify:

- wildlife attractants;
- concentrations and regular movement patterns of hazardous birds at different times of the year.

Such assessments should be carried out routinely, at least seasonally, and may include the following factors:

- location - the proximity to and direction from the aerodrome;
- the site attractiveness - whether it is used as a source of food, a roost site or a breeding site;
- the species and numbers of birds/wildlife present;
- flight lines of birds to/from a site and whether flight lines are direct to the aerodrome, cross aircraft flight paths outside the aerodrome boundary, or are overhead the aerodrome are all important factors that should be considered;
- the relationship of a site to other sites that attract the same species e.g. the location of a landfill facility that attracts foraging gulls will need to be assessed in relation to local reservoirs or nesting sites that attract roosting or breeding gulls respectively;
- daily/seasonal factors - whether the site is a continuous risk (each day and throughout the day), a regular daily risk (once/twice a day), a risk related to specific daily or seasonal activities, or an annual risk;
- any control action undertaken by the site operator. Actions may range from no action to housekeeping actions only, passive and active wildlife deterrence measures, such as proofing and culling; and
- perhaps most importantly, the schedule of periodic and seasonal visits to sites should be documented so that an accurate assessment of the different risks associated with a site at different times of day or year can be evaluated.

Wildlife Attractant Habitats: On-Aerodrome

Aerodrome environments provide a wide variety of attractants and these should be identified and assessed to determine the most appropriate prevention, controls, reduction and eradication actions. The following may also apply to sites in the vicinity of the aerodrome.

Food

Food resources will vary by species but could include:

- earthworms, snails, slugs, spiders, millipedes, insects and larvae that are typically present in grassland, thatch and underlying soil;
- plant species present in the grass such as clovers, *Trifolium* spp, dandelion *Taraxacum officinale*, chickweeds *Stellaria media* and *Cerastium* spp, vetches *Vicia* spp and *Lathyrus* spp, amongst others.
- plant species that are present within water bodies;
- small mammals, such as rabbits, voles, mice and rats along with reptiles and amphibians such as newts, toads, frogs, lizards, snakes and fish and invertebrates that inhabit water bodies;
- wastes from in-flight and terminal catering areas, litterbins in car parks or on aircraft viewing terraces, etc;
- scrub, bushes, brambles, nut or berry bearing trees including, but not limited to; *Berberis* spp, barberry, holly, cotoneaster, rowan, hawthorn, wild cherry, *buddleia* etc.

Different food sources may attract different species at different times of year and should be managed accordingly.

Open Terrain

Flat, open terrain, including airfield grassland, runways, taxiways, aprons and paved surfaces, may all create secure areas for birds and some wildlife, as do buildings, lighting structures and other installations such as radar towers. Evidence in the UK suggests that cutting the airfield grass to an appropriate height is one of the most effective measures of wildlife control, often referred to as the Long Grass Policy (LGP) and used as the vernacular throughout this document.

The presence of other, less prominent features such as open drainage ditches, ponds, scrub, bushes and trees, earth banks, and waste food also provide further resources for wildlife to exploit and should be managed and secured where possible.

Car parks may also provide refuges for wildlife if they are not busy, as well as providing a food source for birds and wildlife opportunities during busy peak seasons.

Buildings and Structures

Aircraft hangars, terminal buildings, airport rescue and fire stations, old aircraft, lighting and signage structures all provide roosting sites, perching opportunities or possible nest sites. Sheltered ledges, access holes and crevices within and underneath such structures can prove ideal nesting locations for feral pigeons, stock doves, pied wagtails and starling.

Rooftops themselves, including green roofs designed as part of a SUDS7, may be attractive to gulls or wading birds such as oystercatchers, for nesting, loafing and roosting.

Rooks, carrion and hooded crows have been known to nest on aerodrome lighting gantries and they should be designed to allow nests to be removed easily.

Landscaping

Landscaping developments include grass reinstatement, tree and shrub planting and may involve the creation or enhancement of water features. Landscaping schemes have the potential to:

- create dense vegetation that may become a roost;
- provide an abundant autumn and winter food supply in the form of fruits, nuts and berries;
- create standing water or watercourses that attract gulls and waterfowl; and,
- result in areas of short grass that provide feeding opportunities for a wide range of hazardous wildlife.

Therefore, they can increase wildlife attraction, so any landscaping scheme on the aerodrome should, be avoided, and could also set a precedent for safeguarding policies concerning and off-airfield developments.

Trees provide food in the form of fruits (acorns, beech-mast etc) flowers and leaves, and are a place for birds to roost or nest. Where possible, there should not be any trees within airside areas or the airport boundary. If trees are necessary, those that offer minimal resources should be chosen and planted in such a way as to reduce their attraction to birds.

Dense vegetation, such as thorn thickets, game coverts and young un-thinned conifer screening belts, can provide nesting sites for woodpigeons, small passerines (perching birds) and magpies, as well as roosting sites for potentially large flocks of starlings.

Water

Open, standing water, such as balancing ponds, reed beds and watercourses, drainage ditches or river channels, may attract large flocking birds, including ducks, geese, swans, grebes, waders, herons, coot, moorhen and cormorant. The more open water sites there are on and around an aerodrome, the more complex and frequent the movements of waterfowl will be. There may also be more activity at night than during the day.

Wet weather can create water-logging that brings worms and other soil invertebrates to the surface, making them very accessible to foraging wildlife.

[7] Sustainable Urban Drainage Schemes

Wildlife Attractant Habitats: Off-Aerodrome

Both manmade and natural landscaping features off-aerodrome can attract wildlife onto an aerodrome. These can include:

- landfill sites
- sewage works
- building developments
- drainage schemes
- reservoirs
- gravel pits
- coastal areas
- rivers and estuaries
- woodland and agricultural land

If feeding sites are numerous and spread out (e.g. ploughed fields in autumn), bird activity can be unpredictable, with the overnight roosts being the only constant feature. Their flight lines can cross over an aerodrome or low level aircraft arrival or departure routes.

Agricultural activities in fields close to an airport, like ploughing, harrowing and cropping, which disturb the soil, together with sludge spraying, manure spreading, seed drilling, ripe crops, harvesting, and hay and silage cutting, create ideal feeding opportunities for gulls, lapwings, corvids, starling and pigeons that may then cross the airfield. Such activities will increase the resources needed for on-aerodrome wildlife control.

Awareness and understanding of wildlife concentrations and movements can improve the efficiency of wildlife control on the aerodrome. For example, if the dusk return passage of gulls over the aerodrome to a roost is understood, aerodrome wildlife control personnel may be able to warn air traffic control at the appropriate time.

The Coast

Sandy and muddy shores, especially around estuaries, have the potential to support large numbers of gulls, waders, wildfowl and fish-eating birds. Coastal aerodromes may therefore have larger numbers of bird species, whose activity patterns are complicated by tide state and affected more by the weather, which could have a significant impact on flight safety and require further specialist assessment.

Landfills for Food Wastes

Waste from household and commercial premises at open landfill sites can contain a high proportion of food waste which may support large numbers of gulls, corvids and starlings.

Similar waste at open transfer stations or composting facilities can attract similar species of birds.

Gulls congregating at landfills present the following risks:

- When not feeding, they spend most of the day on open sites within 6km of the landfill;
- They may soar up to 3000ft or more in clear weather; and
- Their flight lines between food source and roost may cross an aerodrome or its approach and departure routes.

Corvids and starlings present similar risks, but they generally travel less than gulls (max 16 km to or from a roost site).

Sewage Treatment and Disposal

Sewage treatment plants can attract large numbers of black-headed gulls, common gulls and starlings. Numbers vary depending on the type of installation and effluent release system.

Reservoirs, Lakes and Ponds

Water bodies ranging from small ponds to large manmade reservoirs can attract wildlife for food (weed, vertebrate and invertebrate species), roosting (space and security) and nesting sites (often islands or spits). Waterfowl, wading birds, fish eating birds (cormorants, herons, grebes and egrets) and gulls may congregate in large numbers.

Sand, gravel and clay pits

The large voids created by mineral workings sometimes result in ponding. This can create temporary habitats suitable for a range of waterfowl. Similarly, restoration by flooding to provide lakes or nature reserves may provide habitats around an aerodrome.

Agricultural Attractants

Growing and harvesting crops inevitably attracts wildlife at some stage. However, the attraction usually arises suddenly and persists for only a few days or weeks and the risk is mainly confined to local farms.

Livestock can also attract birds. Cattle feed, either as spillage or in store, can attract large numbers of collared doves, feral pigeons, starlings and house sparrows. Free-range pig farming can attract large numbers of gulls, corvids and pigeons, and grazing cattle, sheep and horses keep grass short and maintain suitable feeding conditions for gulls, waders, corvids and starlings. Farm buildings may be suitable for nesting species such as feral pigeons.

Chapter 5
Risk Management

Effective habitat management is the most important activity in reducing wildlife presence. Techniques should be used to remove or reduce potential habitats that attract wildlife. This then reduces reliance on reactive or 'active' control methods to prevent strikes. Where attractions are identified and modification, elimination or proofing is not possible, combinations of active control will be necessary; however, habitat control should be given priority.

Grass Management

Aerodrome grass has the potential to provide food, security and possible nesting sites for a variety of wildlife, and evidence shows that short grass may act as an attractant and therefore needs to be managed effectively or avoided. Similarly, wild flower meadows and grassland managed for silage or hay crops can attract wildlife at different times of year and therefore need to be managed effectively, and silage cutting results in a higher percentage of weed seeds and increased deterioration of the grass sward.

Long Grass Policy

Longer grass (above 300 mm) that falls over because it cannot support itself also has a greater potential to attract wildlife. Grass that is maintained at a height of 150 to 200 mm with minimal levels of weed infestation has been proven to reduce the presence of wading birds (e.g. lapwings) as well as passerines (e.g. corvids and starlings), gulls, and pigeons. It may also reduce attractiveness to rabbits because long (damp/wet) grass affects their ability to effectively regulate their body temperature. This method of grass management is often referred to as a 'long grass policy' (LGP) (Brough and Bridgeman 1980[8]) The LGP is intended to produce a healthy, erect, dense sward, which is free from broad-leaved weeds to deter most common hazardous birds found on an aerodrome.

Establishing a grass policy

All grass areas within the aerodrome boundary, including the margins adjacent to runways and taxiways, should be included within a grass policy, and maintenance should be planned according to season and grass species. It should involve the appropriate aerodrome personnel in planning, monitoring and regulating the maintenance programme to ensure the desired effectiveness.

[8] T. Brough and C. J. Bridgman (1980) An Evaluation of Long Grass as a Bird Deterrent on British Airfields *Journal of Applied Ecology,* Vol. 17, No. 2 (Aug., 1980), pp. 243-253

The maintenance programme will require ongoing monitoring activity throughout the year. The programme should take account of local climatic conditions; for example, bottoming out is suggested for the spring but can be moved should specific meteorological circumstances arise on the aerodrome.

Introducing a flexible maintenance/renovation regime requires expertise to monitor and react to grass and microclimate conditions over a short time scale, and may require maintenance operations to be carried out at short notice.

You should consider obtaining expert advice when choosing and establishing grass and setting up maintenance regimes, and ensure they understand the unique requirements for aerodromes and the need for sustained wildlife repellence rather than a rapid flush of lush grass.

Grass species

If existing grass species are unsuitable, you should consider a replacement seeding programme to upgrade the sward with more appropriate species. Specialist strains of grasses designed for airfield use, which are more likely to maintain the desired height and bird deterrent qualities throughout the year, are available. These newer varieties of grasses may also reduce topping cut operations and reduce the requirement for 'bottoming-out' operations.

Different strains of the same grass species or different grass species may be needed for different airports to achieve suitable bird deterrent qualities, and consideration should also be given to over-seeding to increase the desired grass species and reduce weed grasses.

Delayed seeding of grass produces fewer woody stems to hold the subsequent leafy growth erect throughout the winter. The ideal time for the grass growth is from mid-March. To help encourage rapid establishment and reduce the invasion of weed grass species, you should consider an application of nutrient (fertiliser) to create a suitable sward.

Some grass swards may have an effective life span and deteriorate naturally over time, becoming weaker and less able to act as a wildlife deterrent. In such circumstances, considerations should be made as to the long term benefits of re-seeding areas either as a result of engineering and associated works or as a result of the natural aging process of the grass. The replacement of old and neglected swards with modern grass species should therefore be considered, upon the advice of specialist agronomists.

Weeds

If weeds exceed 5% of the total grass area, selective herbicide spraying may be necessary because some broadleaved weeds provide a direct food source for birds by producing seeds and attracting insects that feed on their flowers. Even moderate weed infestation that does not seriously affect the grasses should not be left untreated.

Ideally, herbicide should be applied during mid-March/April to late May and again during September-October if necessary. Application times and the choice of herbicide will vary dependent on the weed species present and seasonal variation.

Nutrition

Prior to establishing a grass policy at an aerodrome, soil nutrient analyses should be taken from across the airfield to establish a baseline. These analyses should be repeated as part of a structured review of the performance of the airfield grasses and any nutrient deficiency should be made good when necessary, using organic-based fertilisers in a slow-acting granular form, rather than a high nitrogen formulation.

As part of the grass maintenance policy, a nutritional programme should be included to encourage a stiff stemmed upright sward that repels wildlife rather than on rapid soft leaf growth.

Root depth

Rooting depth of the sward should be measured to ensure that grass plants are maintaining the correct root/shoot ratio necessary to provide optimal growth. This should be monitored, and a more detailed agronomic review may be needed to determine the causes and suggest remedies if there is a failure of the root system.

Insects as an attractant

Monitoring and identifying insect and larvae populations within the soil profile should be undertaken periodically, as they are an attractant and this will help identify when insecticides need to be applied. Species should always be identified to ascertain management programmes first; however, the main pest species that require monitoring are the crane fly larvae, commonly called leatherjackets, the chafer beetle larvae and other invertebrates such as cutworms, swift moth larvae and weevils. All of these may affect the turf by eating the plant roots and cause increases in bird population by providing a high protein food source – particularly for corvid species.

Bottoming out

From mid-March to late May bird populations and activity are relatively low as hazardous species are generally involved in breeding; therefore, as soon as ground conditions permit, maintenance vehicles should be organised to cut the grass uniformly low (ideally to within 25 mm of the ground) and remove dead growth and accumulated clippings from past topping cuts, without compacting and rutting the soil. This operation is called 'bottoming-out'. Depending on the local microclimate, soil types and grass species, bottoming-out will normally be necessary every one to four years.

Typical equipment available for bottoming-out is a flail-type forage harvester that has rotating discs or drums with cutting blades and self-collecting forage wagons. The equipment should dislodge and collect the accumulated thatch for removal directly into an accompanying trailer, avoiding a separate operation to collect the loose material.

Thatch build up and prevention

This process needs to be carried out because grass trimmings (also referred to as arisings) can settle down between the stems after each cut and will result in ‘thatch’ build up. If left, thatch will block out light and air, suppress growth and weaken or even kill the grass and encourage pests and disease. Thatch can also prevent fertiliser, insecticide and herbicide from acting effectively, and may provide a suitable ‘micro-habitat’ for insects and small mammals that in turn attract birds. Ideally, thatch should not be allowed to build up to more than 25mm from the top of the soil profile.

If thatch build-up reaches 50 mm after the initial spring operation, it may be necessary to use a harrow (ploughing tool) with tines (teeth) facing down and collect trimmings before the bottoming-out operation. If the ground is uneven or unstable, a light rolling can be undertaken using a ‘Cambridge-type roller’ or similar. Regular aeration of the ground, where possible, may help reduce the long-term build-up of thatch.

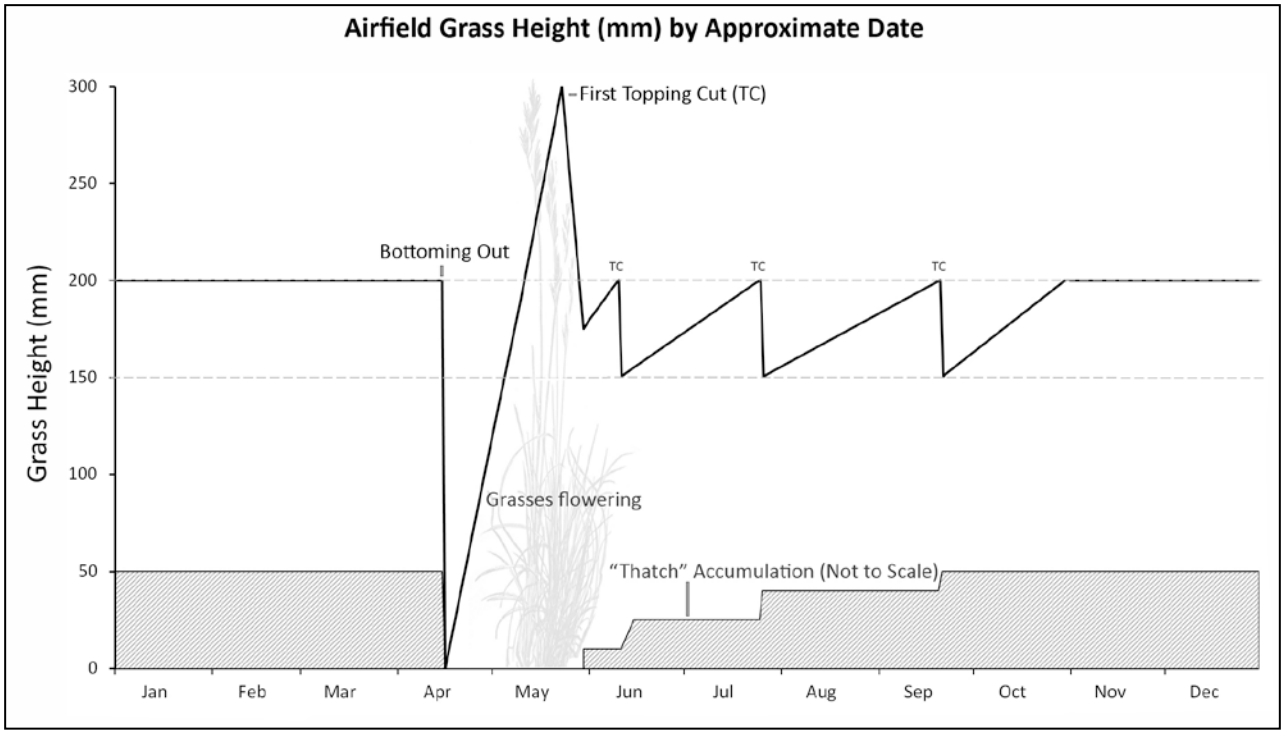


Figure 6: A traditional grass management regime

Delaying bottoming out

Bottoming-out operations may be delayed if the ground is waterlogged or is in an unstable condition. Vehicle use could result in rutting of the surface and other potential soil structural damage. In extreme situations or where climatic conditions create soil temperatures below 6°C, re-growth is very slow and has the potential to delay the effectiveness of the long grass policy. In these circumstances you should consider delaying the procedure and seek advice. This will ensure a minimum height of 150 mm is retained throughout the summer period when juvenile birds are prevalent.

If damage occurs through use of equipment on uneven ground, it is recommended that reinstatement of these areas is undertaken as soon as the temperatures exceed 6°C, otherwise it can increase the likelihood of weed infestations during the autumn and spring growing periods.

During the bottoming-out process, consider a phased replacement of the grass habitat over a three to five year period with grass species that are more suitable for providing a bird repellent sward at aerodromes.

Cutting

Following on from bottoming-out and fertilisation, the grass should be left to develop flowering stalks. The first topping cut should then be taken in late spring when the majority of the grasses will have produced their flowering stalks. It is likely that at this stage the stalk heads will have exceeded 200 mm; therefore, the first cut should be between 175 and 220 mm. Topping cuts are normally undertaken with rotary type cutting equipment of a

size to avoid excessive compaction to the soil structure. The cutting decks should be set at a cutting height of 200 mm, and this should take place on the airfield. Rutting, uneven and soft ground can result in the equipment leaving grass at a shorter height than anticipated, so this should be checked soon after starting. At no time should the grass be cut below 150 mm.

The frequency of the cutting operations will depend on the weather patterns and the existing grass sward. Where a long-term over-seeding programme has been adopted, a significant reduction in cutting frequency can be achieved. The process should be carried out often enough that the maximum length removed in one operation is no more than 50 mm to:

- avoid damage to the base of the sward
- reduce future bottoming-out operations
- ensure that vegetation such as mosses are controlled during winter, to avoid the attraction of various species of birds and make sure new grass growth in spring is not inhibited.

Cutting should take place as required to maintain this grass height throughout the growing season, which ends in late October. As the temperatures drop in autumn, no further cutting will be necessary. As winter progresses, consideration should be given to aerating the ground down to 75 mm if conditions allow, to reduce winter moss and encourage root establishment.

Potential effect of grass height on navigational and visual aids

The height of grass in certain areas on the aerodrome may affect the performance of aeronautical navigational equipment and visual aids, especially the Instrument Landing System (ILS).

In damp or wet conditions the radiated signal received by an aircraft or the signal received by the ILS field monitors may be distorted, affecting both the integrity and continuity of service of the system. The effect of grass on the ILS signal depends on the:

- type of grass (broad or narrow leaf);
- height of the grass and density of growth;
- water content within, or water from dew or rain on, the leaves; and
- height and type of aerials (transmitting and monitor).

It is not practicable to give exact grass heights that would cover all systems and environments; however, the following have been shown to be acceptable:

- **ILS glidepath**

A grass height of *up to* 100 mm is considered to be acceptable from the glidepath aerial to approximately 5 m beyond the monitors. A grass height of *up to* 200 mm is considered to be acceptable beyond this point up to the limit of the glidepath critical area.

- **ILS localiser**

  A grass height of *up to* 200 mm may be considered acceptable within the critical area.

Other heights may also be suitable; however, advice from the Air Navigation Service Provider (ANSP) must always be sought ***before*** implementation of ***any*** deviation from these grass heights.

The grass height should not obstruct the display of any aeronautical ground light, sign, marking or other type of visual aid.

Alternative grass management options

While a long grass policy is recommended, it is acknowledged that, for a variety of reasons, this may not be practicable, achievable or necessarily desirable at some aerodromes. Due to grass management regimes falling outside the scope of both EASA and CAA regulation and compliance, it is accepted that alternative methods may be used, at the discretion of the aerodrome operator. These may include other habitat or grass management policies. It is important to emphasise that use of any such alternative habitat management regimes should include evidence that they will not increase bird populations or pose an increased risk to flight safety.

Other habitat management

Plantations

Where possible, all hedges, trees, shrubs and bushes should be removed. In landside locations, the attraction provided by screening vegetation or fruit and berry bearing plants may be reduced by:

- eliminating the most attractive species
- reducing the number, distribution and proportion of the plants
- thinning densely planted areas to reduce cover
- using non-evergreen varieties and species which do not produce berries or, for some, male plants only
- keeping hedges trimmed to limit berry or nut production and roosting opportunities

The complete destruction of any plantation is the most effective and permanent means of preventing an attraction from forming. However, the attractiveness of potential sites may

be reduced by lower planting density (i.e. maximising distance between shrub or tree centres), leaving open 'rides' (open lines between trees and shrubs), and thinning out early.

Food waste

Waste food is an attractant to gulls, corvids, pigeon species and starlings in particular and should not be tolerated on an aerodrome. Where food waste could occur, all bins and skips provided should be of designs that prevent animals (such as foxes and rodents) and birds getting in; for example, with drop-down or swinging lids. They should be emptied before they overflow.

Signage should be used to ensure contractors and staff are all fully aware of the issues surrounding potential wildlife attractions.

Buildings

Dilapidated buildings should be removed, proofed or repaired to prevent roosting or nesting birds from getting access. Prevention systems, such as exclusion netting of the correct mesh size for the target species or ledge spikes, should be used to prevent any wildlife accessing these sites at any time and you should be able to demonstrate that this is being achieved.

Where wildlife is observed using lighting and signage structures, proofing should again be undertaken to prevent access where possible.

When new buildings are being designed they should:

- prevent wildlife gaining access to the interior and roof spaces
- use self-closing doors or plastic strip curtains or other mechanisms to prevent access by wildlife
- be without roof attractions[9]
- have minimal roof overhangs and be without ledges beneath overhangs or external protrusions
- allow easy access to rooftops in case it becomes necessary to take action against nesting gulls or waders that colonise large flat or shallow-pitched roofs. Gulls will also use steeply sloping roofs where the nests can be lodged behind vents, skylights, and in gullies etc.

Derelict aircraft should be removed or otherwise rendered inaccessible, as they have the potential to provide perching and nesting sites and may result in overgrown vegetation underneath.

[9] Consider implications of green, flat and shallow pitched structures

Specialist birdstrike advice should be sought before taking action against starling roosts, rookeries, breeding gulls and any wildlife inhabiting buildings to ensure success.

Water

Wherever possible, watercourses on an aerodrome should be culverted. Where culverting is not possible, effective wildlife exclusion or control systems such as netting exclosures extending to the aerodrome perimeter should be used as necessary. Netting exclosures are the most efficient approach and other control measures or habitat modification will not be needed. Channels should be free of bank side and emergent vegetation to minimise the attraction to wildlife and damage to nets.

If large permanent water areas cannot be eliminated, wildlife should be prevented from accessing sites. Where possible, water bodies should be proofed using exclusion methods such as netting or specialist floating balls. Wires suspended above the water surface could be used over larger areas where netting structures may not hold up. These require careful spacing to ensure that target species are effectively excluded.

Wet and waterlogged grass areas that attract hazardous wildlife should be drained or the site re-graded to eliminate hollows that hold standing water. If drainage cannot be achieved, active control measures will be needed to ensure that the site does not result in increased risk.

The following habitat controls may also reduce the attractiveness of water bodies to wildlife that are part of the safeguarding process:

- The water should be as deep as possible (over 4m) to minimise bottom-growing vegetation
- In order to reduce nesting opportunities, there should be no development of islands. Attached promontories or spits can be used to reduce the open expanse of waterbodies and prevent gull roosts forming.
- Banks should be as steep as possible (preferably vertical), with vegetation only deployed to prevent wildlife from walking in and out of the water.
- A vertical fence approximately 1 m high could be constructed around the water edge to prevent wildlife such as Canada geese getting access.
- On smaller lakes, wires suspended above the surface may deter wildlife that requires long take-off and landing runs (e.g. swans and geese). The wires should be made visible with tags (10 x 6 cm minimum), to increase the visibility to wildlife.
- Dense vegetation that provides nesting cover should be avoided. The water should be surrounded with long grass or a sterile substrate.
- Water should not be stocked with fish.

Landfills, sewage treatment and disposal sites

A netting exclosure is the most effective and reliable system to control birds at landfill and sewage treatment and disposal sites with open tanks. If this is necessary, an aeronautical assessment should be carried out to determine risk to the aerodrome and any agreed netting system should include an appropriate inspection and maintenance regime to ensure its reliability. Many examples of installed nets have poor maintenance regimes resulting in large rips or tears in the exclosures and a significant hazardous bird presence.

It is essential that companies who agree to implement active bird deterrence programmes at their sites meet targets agreed by the airport for bird presence and that there are auditable standards and penalties for failure[10]. Expert advice should be sought from the CAA about the options for controlling risk from landfill and sewage treatment / disposal sites.

Active risk management

While aerodrome habitat management is critical for preventing a strike risk from arising in the first place, effective control measures should be deployed to manage the residual risks and be sufficiently dynamic and resourced to respond to immediate issues and prevent risks arising in the event that habitat management is not feasible.

Due to the difficulties of detecting and monitoring dispersal of hazardous birds at night and during low visibility periods, active bird control activity should be undertaken with caution during these periods; however, the overriding principle of ensuring birds and animals are not residing on operational surfaces prior to any aircraft movement should be adhered to in all conditions, where practicable.

Any system that scares birds and prevents the operator from controlling their departure from an airfield should be avoided (‘scaring’ vs ‘control’).

Deterrence

Birds respond to a variety of stimuli that can be used to disperse them from an airfield. The objective of deterrence is not to scare randomly around an airfield but to control bird movements and disperse them effectively. This can be achieved using a variety of methods, and different species respond in different ways. The ultimate objective is to ‘educate’ hazardous bird species that the risk of remaining in the aerodrome environment outweighs the potential rewards that the airside environment may offer. Habituation is an extremely simple form of learning, in which an animal, after a period of exposure to a stimulus, stops responding.[11] Any system used should therefore only target birds when it is

[10] http://cdn.environment-agency.gov.uk/geho0409bput-e-e.pdf

[11] http://www.animalbehavioronline.com/habituation.html

necessary. Human operated (active) control is more effective than automated (static) scaring systems[12].

Distress Calls

Many birds react strongly to signals that indicate danger, distress or death. Some birds, typically social species that communicate with each other vocally (e.g. gulls, lapwings, corvids and starlings), emit piercing repeated distress calls when captured by a predator.

Different species react in different ways, but in general responsive flocks will react to a recorded distress call play-back in the field by showing alertness, lifting, taking flight and approaching the source of the call to investigate. The operator can control the behaviour of wildlife by drawing them towards a vehicle, holding them overhead, then, when the broadcast is terminated, ensuring their dispersal.

When using distress calls, the control vehicle should ideally be stationed approximately 100m upwind of the target flock, but this may require variation when considering the impact on aircraft movements. Birds will gain height and depart (gulls and lapwings), or resort to trees (corvids) or water (gulls) where they are safe. Birds should become airborne within 20 seconds and approach the speaker. Throwing a lure up (white for gulls and black for corvids), which resembles a struggling victim, can stimulate a flock to lift if necessary. You should also note that foxes may approach the sound of a distress call as they investigate a possible food opportunity.

Volume settings need to be low enough that they will not attract birds onto the aerodrome from distance. It is good practice to start the broadcast at a low volume and increase it until the target birds starts to respond if this is likely to be of concern.

The specific distress call of the target flock species should be used if possible[13]. If several species are present, play the distress call of whichever species there are more of first. Species that do not have distress calls will sometimes follow the lead of those that do.

Once airborne, you will need to keep the distress call playing to give the flock enough time to approach and investigate the source of the calls but no more than 90 seconds.

Lapwings will often take flight and fly around in wide circles at some distance (as they are seeking the safety of an open environment to avoid danger but will try to return to the airside environment) in which case it may be necessary to use pyrotechnics to ensure dispersal.

Starlings commonly fly directly away from distress calls and it may be necessary to follow them slowly to prevent them from re-alighting. Local birds, especially corvids, may start to depart immediately once the distress call has been used a few times and may eventually

[12] Cleary, E.C. & Dolbeer, R.A. (1999) Wildlife hazard management at airports, a manual for airport personnel. US Federal Aviation Administration, Washington DC.

[13] Baxter, A. T.; Bell, J. C.; Allan, J. R.; and Fairclough, J. (1999). The Interspecificity of Distress Calls. *1999 Bird Strike Committee-USA/ Canada, First Joint Annual Meeting, Vancouver, BC.* Paper 8. http://digitalcommons.unl.edu/birdstrike1999/8

habituate, so it may be necessary to reinforce non-lethal control techniques with lethal control.

Dispersal by a pyrotechnic bird scaring cartridge (BSC)

Use of a BSC is a common means of dispersing bird at aerodromes. Also commonly known as a 'shell cracker', a BSC is typically a 12 bore shotgun cartridge case with the shot replaced by a projectile containing an explosive charge and delayed fuse/light trace, so that the projectile detonates at some distance from the gun. Birds will usually fly away from the detonation so it is possible to control their direction to some degree - detonations behind birds can hasten their departure, and to either side can keep them on track and to hold a flock together. A BSC fired high in the path of an approaching flock will cause it to pause and orbit. However, birds will often avoid a significant headwind and they will eventually turn back.

Several types of BSC are available. Generally, for use on an aerodrome the BSC should:

- have a range greater than 80 m when fired at a 45° elevation (i.e. a flight time of four to five seconds before detonation) to allow firing from outside the runway strip and to provide a reasonably effective area
- have a bright tracer component that is clearly visible in sunlight throughout its flight
- detonate between maximum and ½ maximum height when fired at a 45° elevation
- produce a sharp, loud 'crack', with a bright flash

The effect of a BSC is significantly improved by using a trace, especially when trying to control their direction. The trace should be visible in sunlight throughout its flight.

Several types of signal pistol with a 12 bore liner and a few purpose-made 12 bore pistols are in use at UK aerodromes. The pistol should be fit for purpose and be pressure tested for the type of BSC used. Pistols and BSCs should be transported in appropriate carrying cases and stored in a secure and safe location when not in use. Use of BSCs and rockets may present a FOD hazard to aircraft which should be managed accordingly. Operators should also be competent in their use, comply with relevant firearm and munitions legislation, and be provided with appropriate personal protection equipment (PPE).

In many circumstances, you may not be allowed to fire a BSC beyond the aerodrome perimeter, but by firing vertically its effect can be extended outwards over a considerable distance, including locations such as the approach path.

One large flock of birds is more likely to leave the aerodrome using this method than several smaller ones. However, firing directly into a flock will probably fragment it and the individuals may not re-group, so this should be avoided unless they have ignored previous dispersal attempts. A very close detonation may be useful to disperse wildlife that re-

groups quickly, such as flocks of starlings. A BSC should not be fired immediately before or during a distress call broadcast.

Aerodrome managers should consider whether the benefits of being able to respond to dynamic situations could be hindered by the need to contact Air Traffic Control on each occasion a BSC is fired.

Manual Dispersal Techniques

Many birds are afraid of humans, especially those that are commonly shot as pests (e.g. corvids and pigeons) and traditional quarry species (wildfowl and waders), so you can try other approaches including slowly raising and lowering the outstretched arms.

Arm waving may not cause birds to move very far, but they will leave directly away from the person. This is effective against all common species, and can be used at short notice, especially where noise or pyrotechnics are unacceptable because of proximity to people or livestock, or because of fire risk.

Lures

A lure is a leather pad with an attached wing on a string. Waving it can be effective, but throwing it high into the air so that it falls to the ground with wings ‘fluttering’ will cause target flocks to fly up and directly away. This can work at ranges of several hundred metres. Birds react as if the lure is an individual 'in trouble' and may even approach to investigate and it also enhances responses to distress call broadcasts. Traditional falconer's lures, dead bird effigies, and even a tennis ball fastened in the corner of a black or white bin bag can prove useful tools.

Other Methods and Techniques

A number of other measures have been used with varying degrees of success, including:

- flags
- plastic tape that vibrates and hums in the wind
- weighted plastic balls on water
- bird scaring rockets

Birds of prey (Falconry)

Use of falcons can be suitable and effective for both civil and military aerodrome bird control and is used at some European and North American airports and airbases. Dogs such as Collies are also used at many US military bases and at some European airports.

The use of birds of prey is an additional technique that can be integrated into a bird control program at any aerodrome.

Birds of prey can undoubtedly cause changes in the behavioural patterns of some bird species that regularly frequent or habituate aerodromes and the vicinity, and when employed correctly may enhance all other techniques.

Falconry in the true sense is defined as the art of hunting wild quarry with a trained bird of prey. This procedure can be complex and time consuming and can in some instances result in a falcon being under a reduced amount of control. However, flying a falcon that has never been used to hunt is highly controllable. The bird will want to return to the falconer at all times and can therefore be brought back at a moment's notice,so it will not become a safety risk to aircraft operations.

As with dogs, falcons are a natural predator and therefore most species of bird will react quickly to their presence, and, unlike other techniques, birds will never become habituated to them. Undoubtedly, birds of prey and dogs require dedicated, experienced, trained, competent and well motivated personnel to manage them, so all the techniques used with should only be carried out by suitable persons with significant sector experience in the use of Falcons or dogs within the aviation industry.

Lasers

Trials have shown lasers to be a useful tool as part of a bird hazard management programme, particularly when attempting to disperse birds in low light or at night or from an off-airfield environment[14].

The use of lasers for bird dispersal on aerodromes has become far more widespread since early 2000. In the UK, use of lasers is subject to the requirements specified in ICAO Annex 14 Volume 1 and CAP 736 Guide for the Operation of Lasers, Searchlights and Fireworks in UK Airspace and EASA Rules concerning 'laser-free zones'. CAA approval or consent is not required to introduce and use lasers for bird control. However, you should demonstrate that the benefits outweigh the risks, typically through a safety case or risk assessment process in order to assure that flight and public safety have been considered. Risk assessments should include information on the class of laser, the safety procedures in place to prevent dazzling and an outline of the programme of work for which use of the

[14] Baxter, Andy. (2007) Laser Dispersal of Gulls From Reservoirs Near Airports. Proc. 2007 Bird Strike Committee USA/Canada, 9th Annual Meeting, Kingston, Ontario. http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1001&context=birdstrike2007

laser is intended. Figure 8[15] shows an example risk assessment. The range of portable systems developed specifically for bird control can now typically extend beyond 1.5 km. A useful safety feature you should consider is a scope or sight that can be attached to manually operated lasers, so the user always knows where the laser beam is projected because the human eye cannot accurately follow a laser beam over a large distance.

Users of lasers should be aware of the EU safety recommendations according to International Standard IEC60825 and Accessible Emission Limit (AEL) safety recommendations for Class 3B laser products. The British Standard user guide for laser safety (PD IEC TR 60825-14:2004) recommends a laser safety officer is appointed where class 3B lasers are used. All laser class 3B products should have at least the following safety requirements:

- key control
- visible of audible output indicator
- remote interlock switch

This should be stated in the manufacturer's checklist 60825-5, which forms part of the EU directive 60825.There is a risk of damage to eyesight or disorientation so it is important to consider these risks.

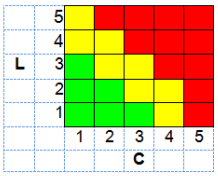
[15] Source: Southampton International Airport, United Kingdom

Figure 8 Laser Risk Assessment

Subject: Airside Bird Control Laser Usage	**Work Activity and Location: Bird control on the airfield**
Reference number:	**Dept / Section: Airside Operations**
Date completed:	
RA team members:	**Responsible Manager:**
	Review date:

Hazards Identified, Harmful Consequences, Persons at Risk	Existing Control Measures	Residual Risk			Actions Required	Target Date	Person Responsible	Predicted Residual Risk			Completion Date & Initials
		L 1-5	C 1-5	R RAG				L 1-5	C 1-5	R RAG	

lote: Residual risk:
= Likelihood ranking: 1=Improbable; 2=Unlikely; 3=Possible; 4=Likely; 5=Probable
: = Consequence severity: 1=Minor injury; 2=Moderate injury; 3=Significant injury; 4=Single fatality; 5= Multiple fatalities
: = Risk level: (R = red, A = amber G =green - see matrix opposite)



Repellents and Passive Deterrents

Repellents that can be used include sticky gels and filaments, used against roosting and nesting species on ledges and beams on buildings, and lines strung over restricted sites, such as marshy areas. Similarly, bird spikes can be effective on aerodrome signs, lights, building edges and ledges. All injurious and lethal substances are illegal for use in the UK for aviation purposes.

Lethal Control

When habitat management and active wildlife deterrence fail to reduce risk, the implementation of lethal control can reinforce the effect of non-lethal control techniques. It can also be used to reduce numbers and sick or injured birds, or to deal with an immediate problem.

It is possible for species to habituate to the use of lethal control particularly the deployment of shotguns. These have a limited range (circa 40m) beyond which some species will behave as if they are safe.

All activities involving the use of firearms should be independently certificated by the local police/licensing agency. Applications for firearms permits should be made and certified before use. Safe use, storage of guns and ammunition and record-keeping require separate and specific training by competent and qualified persons, security procedures and skills sets and are covered under separate firearms legislation.

Special legal provisions exist that licence the shooting of certain birds/wildlife on aerodromes, and are subject to specified conditions. They require an operator to be able to demonstrate that acceptable non-lethal measures have been attempted first. Stupefying or poison baiting is not licensed for use on aerodromes in the UK.

Population Control

The implementation of lethal control to reduce or eliminate the presence of hazardous wildlife on or around an airport requires a full understanding of the behaviour of the species being targeted and you should seek expert advice. Gulls in winter, for example, may have migrated to the UK from anywhere between Northern Scandinavia and Eastern Europe and move long distances between sites, so attempting to cull them is unlikely to result in a satisfactory risk reduction. Conversely, the removal of a population of feral pigeons that reside in airport buildings on the airfield may be essential before proofing and preventing further infestations in that area.

During the breeding season, the effectiveness of egg control will vary with species. Feral pigeons, if the conditions are suitable, can breed all year round and require permanent monitoring and action to have any effect. Gulls and many wading bird species will re-lay if eggs or nests are destroyed (removed, oiled or pricked) just once in a season. Successive visits are therefore necessary between April and August to ensure breeding does not occur. Alternatively, species such as Canada geese can be controlled by a single action to prevent hatching after which the adults need to moult and do not have sufficient time to breed again.

Trapping and removing wildlife from an airfield requires specialist skills and experience and the law may limit some actions, and you should consider whether it will influence on-airfield wildlife activity; for example, providing baited traps on an airfield can attract other wildlife.

In some locations, small mammals may be a particular problem. Large populations of rabbits can make it impossible to grow effective long grass and the rabbit population may need to be controlled accordingly. Lethal control may therefore be an essential requirement for the removal of species that can both influence habitat and create an attraction in their own rights. Any lethal control should ensure that all carcasses are removed from the airfield and disposed of appropriately to avoid becoming a carrion attraction themselves.

Safeguarding

Virtually all land types and land uses (including natural habitats) attract wildlife in some way. Safeguarding should therefore address developments that could become wildlife attractants with the potential to increase the wildlife strike risk at a nearby aerodrome.

ICAO recommends *that the appropriate authority shall take action to eliminate or to prevent the establishment of garbage disposal dumps or any other source which may attract wildlife to the aerodrome, or its vicinity, unless an appropriate wildlife assessment indicates that they are unlikely to create conditions conducive to a wildlife hazard problem. Where the elimination of existing sites is not possible, the appropriate authority shall ensure that any risk to aircraft posed by these sites is assessed and reduced to as low as reasonably practicable*.

Where an assessment shows that the wildlife strike risk may increase or could increase under certain conditions in the future, and the aerodrome certificate/licence holder and developer are unable to agree a solution, the aerodrome operator may object to the planning application on aviation/air safety grounds. Local knowledge of wildlife populations and activities or an appropriate similar safeguarding case to support any objection can be used and objections withdrawn when measures implemented to manage risks are deemed acceptable (to the airport operator). It may be possible to modify a development (e.g. exclusion of food wastes from a new landfill) or impose planning conditions. Where a safeguarding case is resolved through the imposition of planning conditions, it may be appropriate for the conditions (and 'wildlife control/reduction management plan') to be subject to a legal agreement between the planning authority and the developer or property owner, or its successors.

After planning permission has been granted, the aerodrome operator should regularly monitor the development for compliance with any planning conditions relevant to them that are imposed and report any alleged breach or non-compliance to the local planning authority.

Although the notification, designation, classification and listing of national, European and internationally protected sites, such as Sites of Special Scientific Interest (SSSIs), European Sites (SACs and SPAs) and Ramsar Sites, do not require planning permission, the creation of new conservation sites is usually associated with other developments that require planning permission and, as applicable, safeguarding consultation. Many nature reserves are created to protect particular flora or invertebrate communities, which do not represent an increase in wildlife strike risk; however, others, such as estuarine reserves, may be major wildlife sites. It is essential that the aerodrome operator establishes contact with agencies responsible for the management of sites, such as the RSPB, as a simple change in design may help prevent hazardous species using the new area.

Informal safeguarding agreements may exist to prevent the large-scale release of racing pigeons for the purposes of racing near aerodromes, without notifications. Releases of over 40,000 birds at a time can occur and as such represent a specific and major hazard. Releases are therefore prohibited within 13 km of 28 major aerodromes in the UK[16]. In agreement with the Royal Pigeon Racing Association (RPRA), any proposed release of racing pigeons associated with a sanctioned race, within 13 km of a licensed aerodrome should be notified to the aerodrome authority or air traffic control provider at least 14 days before. Aerodrome operators should contact the RPRA to confirm contact details to ensure this information is transmitted. In addition, the ANSP (ATC unit) should be notified by telephone at least 30 minutes before a given release time, in order to confirm the number of birds, intended destination and direction of flight. Aerodromes can then pass on information via ATIS or NOTAM, as necessary. If required, the ATC manager may request

[16] http://www.rpra.org/racing-handbook/rulebook

a delay in the release by up to 30 minutes (or longer in exceptional circumstances). Racing pigeons can travel at speeds of up to 60 mph (depending on the head or tail wind), hence an aerodrome should be able to ascertain the approximate position of flocks of birds once the release location and destination details are known. CAA recognises that for training flight pigeon releases, the issue concerning prior notification is problematic; however, the CAA continues to engage with the RPRA and other to ensure that necessity communication of releases is brought to the attention of its members and associate Homing Unions.

Chapter 6

Reporting Strike Occurrences

Changes to regulation

It is anticipated that by 2016, implementation of EC Regulation (EU) 376/2014[17] concerning the reporting, analysis and follow-up of occurrences in civil aviation will have been implemented within the UK. This Regulation updates legislation for the UK Mandatory Occurrence Reporting (MOR) Scheme and the UK Air Navigation Order (ANO) will be amended accordingly; however, CAP 382 (the MOR scheme) remains valid until further notice. The EU regulation places additional requirements on organisations, as well as 'competent authorities' and EASA, beyond what is currently contained within existing legislation for both external occurrence reporting and internal occurrence reporting systems.

Specific items within this new regulation to note include:

- A widening of scope to include ground handling organisations for mandatory reporting.
- Organisations are required to ensure that their internal safety reporting system is compatible with the European Co-ordination Centre for Accident and Incident Reporting Systems (known as 'ECCAIRS') software and the Accident/Incident Data Reporting (ADREP) taxonomy.
- Organisations are required to ensure that the preliminary results of the analysis of a mandatory occurrence report are submitted to the competent authority (CAA) within 30 days and shall report the final results of analysis within three months.

Consequently, it is anticipated that there will be significant changes to the process and procedures currently employed for the reporting of birdstrikes. This shall include: what is reportable, who is obligated to report, what constitutes a reportable occurrence and details concerning 'voluntary reports'. Further information, education and awareness will be available from by CAA during 2015. A set of FAQ's[18] is available for further information.

[17] http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32014R0376&from=EN

[18] https://www.caa.co.uk/docs/33/InformationNotice2014141.pdf

Existing Policy and Procedures as at 1 January 2015

Currently, in accordance with Article 227 of the Air Navigation Order (Mandatory Reporting of Wildlife Strikes), the commander of an aircraft **must** report to the CAA any wildlife strike occurrence while the aircraft is in flight within United Kingdom airspace.

Background

In 2004 the CAA commissioned a study looking into birdstrike reporting to assess how effective it is in the UK, and guidance and policy associated with bird strike hazard identification and risk management, information-sharing and improvements to strike reporting procedures was developed based on this.

Definitions

An industry-wide definition of what constitutes a confirmed, unconfirmed or near-miss wildlife strike occurrence has been standardised[19]: However, in due course, these definitions maybe withdrawn in lieu of EC occurrence reporting requirements and related supplementary guidance material.

Confirmed Strike

Any reported collision between a bird/wildlife and an aircraft for which evidence, in the form of a carcass, or other remains, is found on the ground; or damage and/or other evidence is found on the aircraft. Bird/wildlife remains or complete carcass found on an aerodrome where there is no other obvious cause of death should be treated as a confirmed strike and reported as such.

Often mis-categorised as a vortex strike, any bird carcass found within the vicinity of the runway where there is no other evidence of death should be recorded as a confirmed strike. Such reports should be included within a wildlife management risk assessment process.

Unconfirmed Strike

Any reported collision between a bird/wildlife and an aircraft for which no physical evidence is found (i.e. no damage to the aircraft is evident upon inspection, and no bird remains, carcass or blood smears are evident on the airframe).

Significant Event

Incidents where the presence of birds/wildlife in the air or on the ground resulted in an effect on a flight but where no physical evidence of an actual wildlife strike exists. This may include near-miss occurrences, rejected take-off and go-arounds.

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[19] Based on the best practice standards produced by the International Bird Strike Committee (IBSC) and those adopted by the International Federation of Airline Pilots Association (IFALPA).

Strike Zones are categorised as follows:

On-Aerodrome Wildlife strike

Any wildlife strike occurrence reported by the commander of an aircraft, where the aircraft is believed to be at a height of up to 1000 ft during climb out from, and/or below 200 ft during approach to the aerodrome.

Aerodrome Vicinity Wildlife strike

In the vicinity (within 13 km) of an aerodrome, any wildlife strike occurrence reported by the commander of an aircraft, where the aircraft is believed to be between 1000 ft and 1500 ft in the climb and between 1000 ft and 200 ft on approach.

En-route Wildlife strike

Any wildlife strike occurrence where an aircraft is believed to be beyond 13 km from the aerodrome radius in the climb or not below 3000 ft on approach.

Reporting

Wildlife strikes should be reported to the CAA via the Online Reporting tool[20] http://www.caa.co.uk/birdstrikereporting.

Data Management and Information Sharing

One significant aspect of the new EC reporting regulation is the provision to enable data sharing for flight safety purposes, which the CAA advocates and supports. Until such time as the regulation is implemented in the UK, the following details remain extant.

The introduction of both mandatory (in 2003) and online birdstrike reporting (in 2008) has the improved data quality and has allowed the CAA to provide more reliable data and information to stakeholders. Upon requests, the release of birdstrike data shall be considered by the CAA in accordance with Section 6, Part 2, Regulation 9, of the Civil Aviation Authority Regulations 1991. A written request is necessary and an appropriate charge *may* be levied for the provision of such data. Where the release of data and information is controlled by legislation[21] and standards, the CAA will comply with those standards and manage the release of such data accordingly. Requests for the release of wildlife strike data should be submitted on a Data Request Form, which may be obtained by emailing the CAA's Safety Investigation and Data Department at sdd@caa.co.uk or birdstrikes@caa.co.uk

The CAA also publishes on the UK CAA website certain statistics concerning birdstrike occurrences. We strongly advocate that aerodromes and their stakeholders should share information on birdstrikes. The aerodrome's bird hazard management plan should contain

[20] Subject to change in 2015-16 due to implementation of EC Reporting Regulations

[21] Section 23 CAA Act and Section 44 Freedom of Information Act

a process for this, such as via the airside or flight safety committee, or local runway safety team.

Species Identification

For the purpose of ensuring accurate reporting and to enable effective risk assessment, it is essential that accurate wildlife species information is provided when a report is submitted to the CAA. Operator's Management Plans should clearly set out procedures for obtaining species identification for this purpose. Where species identification cannot be achieved, the management plan should detail what other means and methods might be used (i.e. employing the services of third party external specialist wildlife remains identification organisations)[22]. Remains can be identified via digital photographs of whole birds, major bird parts or feathers. Details of the aircraft type, phase of flight, location, time, date and aircraft altitude may all add valuable information that may help to confirm an accurate identification.

Identifications can be achieved when even the smallest amounts of remains are left, but care needs to be taken during collection. Appropriate protective gloves should always be worn when collecting any sample and handling dead wildlife remains. These should then be double bagged and sent to an appropriate organisation together with full details.

[22] The CAA is aware of only one organisation in the UK currently providing a remains ID service.

Chapter 7

Aerodrome Ornithology

Wildlife Identification

Each wildlife species has unique features, behaviour patterns and actions. Published field guides usually include practical information on how to observe and record the various characteristics of birds that enable them to be identified.

Good field guides cover the different groups of birds in a generally accepted taxonomic sequence. Field guides that illustrate birds with photographs or paintings of birds in varied poses should be avoided, but coloured paintings with birds in similar poses, and with plumage variations for each species described or illustrated, are more useful for identification.

Important differences between species should be made clear, and the text should provide information on at least the following:

- size
- characteristic behaviour
- comparison with similar species, habitats (winter and breeding)
- movements, populations (including seasonal changes)
- food
- voice
- nesting behaviour

Wildlife Ecology

Behaviour varies with season, time of day, weather and other factors. Its way of life is based on mobility: some species migrate to exploit seasonal food abundance and to avoid harsh winters; some species commute daily between safe roosts and feeding grounds; and some take flight to avoid predators. These factors all help with identification.

Birds have sharp eyesight, communicate vocally and have good hearing over a similar range of frequencies as humans. They are unable to hear ultrasonic sound devices and most birds found on UK aerodromes have little or no sense of smell.

Birds observed in the field are almost always engaged in some activity that provides information about them. Song and call notes are often characteristic and, with experience, enable identification and even detection of unseen birds.

The following species represent the most commonly encountered birds on UK aerodromes. Their numbers will vary depending on season, time of day and location of the aerodrome and good field identification guides should provide further details.

Specific Bird Behaviour

Gulls

Common UK gulls fall into two broad groups: small (black-headed and common) and large (herring, lesser and great black-backed). Gulls feed predominantly on soil invertebrates, especially on disturbed ground, but can be found scavenging waste or hunting insects in the air.

Most often they are encountered crossing an airfield when moving between their breeding or roosting sites, and feeding sites. These can include farmland, playing fields with short grass, sewage works, and landfill sites where food wastes are tipped. They will also forage along coastlines, estuaries, river banks and in parkland where they will readily adapt to take food from people. When not feeding, flocks may spend long periods on open undisturbed sites and commonly use aerodromes for security. During the breeding season, gulls of all species may be found nesting on rooftops of buildings both on and off the aerodrome.

Gull numbers in the UK increase each winter because of migration. Numbers generally rise from July through to November and fall in March. Previously, lesser black-backed gulls would largely leave the UK in winter, returning to breed each spring. However, evidence suggests that many now remain in the UK, in large numbers, and therefore may be a birdstrike risk at any time. Ploughing fields nearby may cause short-term influxes of these species during the autumn months.

CAA data indicates that gulls are struck most frequently in July, August and September.

Lapwing and Golden Plover

Lapwings prefer open habitats with low or sparse vegetation, especially grassland. In lowland Britain, numbers are usually at a minimum during the breeding season. Flocks begin to build in June or July as local birds disperse from breeding sites and others migrate to the UK. Some aerodromes provide attractive habitats to small numbers of lapwing during the breeding season, but can attract substantial flocks of non-breeding birds towards the end of the summer. At this time, they may appear lethargic and reluctant to disperse because of moulting.

Once harvesting and ploughing are underway from August, lapwing numbers on aerodromes decline as they move to exploit these seasonal feeding opportunities. They remain relatively scarce on aerodromes until October or November when large flocks reappear. Unless hard weather settles in, numbers can remain high in winter until spring migration in February and March. However, prolonged frozen ground or snow cover prevents lapwings from feeding and they are forced to move to seek better conditions

further south or at the coast. The most effective tool for preventing lapwings residing on airfields is an effective LGP.

Golden plover are slightly smaller than the lapwing and much more difficult to detect on aerodromes because of their cryptic coloration. They are less common than lapwing but wintering flocks can be very large and dense. Golden plover frequent similar habitats to lapwings during the winter and use aerodromes in much the same way, often forming mixed flocks. Feeding birds run, pause and up-end like lapwings. Golden plover may also attempt to feed and roost on aerodromes at night. CAA data show both species have been struck far less frequently in recent years.

Other Waders

The oystercatcher is primarily a coastal species but moves inland to moors to breed and to lowland water bodies in winter to feed. On aerodromes, particularly those near the coast, they will nest on gravel islands surrounding lights and marker boards, breaking up paved surfaces, French drains and disturbed ground such as rabbit holes. 'Piping parties', vociferous display flights, and mobbing of potential nest predators make nesting oystercatchers very obvious. They will also use shingle flat roofs that provide an ideal substitute for coastal shoreline areas.

The curlew is often found on mudflats and grassland, often in large flocks in winter, mostly around the coast but inland in smaller numbers throughout lowland Britain and Ireland. The curlew nests on moors (up to 600 m above sea level) and farmland. Nesting curlews defend a large territory against other curlews and, therefore, aerodromes rarely have high densities of breeding birds. They are very obvious and present a potential wildlife strike risk when displaying or defending nests against crows and potential predators but at other times are remarkably inconspicuous. They rarely alight on paved surfaces when nesting, but wintering flocks often do.

Other waders may appear on coastal aerodromes, especially when on migration in spring and autumn or on any aerodromes where damp ground or sedge is present. A good long grass policy and active control are the best methods for preventing waders using aerodromes.

Corvids

Rooks are gregarious and feed on soil invertebrates, grain and seeds, and roots on farmland and aerodromes. They find much of their food by vigorously probing the soil. They nest colonially, forming rookeries in tall trees, where they return for security. Dawn and dusk flight lines and pre-roost assemblies may increase the risk of a wildlife strike occurring. Their foraging range is restricted to a few kilometres from the rookery when nesting. Consequently, the presence or absence of rooks on aerodromes in the breeding season depends on the size and proximity of the local rookeries. British and Irish rooks are largely sedentary but continental birds boost the UK winter population, especially in the east.

Carrion crows and hooded crows are involved in relatively few wildlife strikes despite a ubiquitous presence on aerodromes. Their presence, however, signals to other wildlife that the area is safe and may result in greater risks than initially appears. Their diet includes carrion, small mammals and birds, eggs, animals, soil invertebrates, grain and fruit and waste food. On aerodromes, carrion or dead insects around runway lights may attract them to runways. They will drop hard-shelled prey on runways and taxiways to break it open.

Although common, jackdaws are involved in very few wildlife strikes, they commonly associate with other corvids and significant numbers may nest and/or roost in hangars. Jackdaws are very gregarious, often in mixed flocks on farmland and aerodromes. Their diet is similar to that of rooks, but on grassland jackdaws feed on surface-dwelling invertebrates, rather than digging for prey. They also take small mammals, eggs, waste and chicks. They roost communally, again, often with rooks in woodland. They nest in cavities in hollow trees, buildings (including hangars), aircraft hulks, chimneys, quarries and cliffs. The jackdaw is an abundant resident, with numbers being swelled by continental birds during winter.

The most effective way of controlling corvids on aerodromes is a good LGP along with suitable habitat controls to prevent nesting opportunities, after which active control as per other species should be carried out.

Waterfowl

Waterfowl include the wildfowl (ducks, geese and swans) and also herons and cormorants etc. Some, such as geese and swans, are large birds and present a significant risk to aircraft operations. However, provided that any water habitats on aerodromes are effectively managed to exclude waterfowl, their presence is restricted to flight lines across the aerodrome, which in itself can be hazardous if not checked and understood.

The numbers of some species of geese have increased rapidly since the 1950s and flocks may occur on or near aerodromes. Canada geese are gregarious in winter, roosting on lakes and ponds, and travelling several kilometres daily to feed on farmland, parkland and short grass. Pairs are widely dispersed on islands in lakes, rivers and gravel pits in the breeding season. Canada geese tend to be site-faithful, with females tending to return to their natal areas to nest each year. Flocks of feral, non-migratory Greylag geese have also established in parts of the UK, especially southern and eastern England.

‘Wild’ geese commonly winter in Britain, notably in northern and eastern areas. These migratory Greylag and Pink-footed geese feed on farmland in large flocks, returning year on year to well-defined areas centred around roosts on lakes or estuaries. They often fly to roosts after dark and may stay airborne for extended periods if disturbed. They rarely venture onto airfields and are best dispersed using active deterrence measures if located.

Mute swans mainly frequent rivers, lakes and small ponds, although they move onto farmland to feed, especially during winter. Flights are mainly confined to movements between roosting and feeding areas. Swans may mistake runways for water bodies and

can occasionally be found in damp conditions walking around an airfield after crash landing on the runways. Birds should be dispersed by manual control efforts when aircraft movements permit, or captured (they may often be reluctant to fly off) and released some distance from the airfield.

A variety of species of duck breed and/or spend the winter in the UK. Many are relatively large, heavily built birds that tend to fly in very close formation, with the potential to cause damage to aircraft. By far the most numerous species is the mallard, frequenting rivers, lakes and small ponds, and often feeding on fields and aerodromes (in ponds, water courses or when flooded), often at night.

The grey heron can sometimes be found hunting mice and voles on aerodromes.

The cormorant nests at both coastal and inland colonies, with numbers supplemented during the winter months by continental birds. Inland, it feeds on ponds, lakes and rivers where fish are plentiful, and roosts communally on lakes, in trees and on power cables.

The most appropriate tool for preventing water birds from accessing aerodromes is to proof all water bodies.

Pigeons

In recent years, woodpigeons have been involved in a sharp increase in wildlife strikes, as the national population has undergone a major increase. Woodpigeons are most numerous on well-wooded farmland, feeding on cereals, clover, rape, peas and other crops, weeds, acorns and beech-mast. They are found at aerodromes mainly in summer, when weeds in long grass are flowering and seeding, and in late winter in search of clover leaves after acorn crops are exhausted and stubble fields gleaned bare or ploughed under. Outside the breeding season there are communal roosts in larger woods but flight lines are not well defined and temporary, reflecting changes in feeding area. They fly between the roost and feeding fields (up to around 10 km, but further in areas with less arable land) throughout the day. Feeding flocks are larger in the mornings. Later in the day, some birds return to the roost or perch in trees near the feeding fields, especially in the longer autumn and spring days.

Stock doves are often misidentified as woodpigeons or feral pigeons. Wildlife strikes involving stock doves tend to be in the early summer when they are attracted by weeds. Stock doves can occur as pairs or in small flocks, often with woodpigeons. Their food includes weed seeds, and stock doves are particularly attracted to very long grass with many wild flowers, especially vetches.

Feral pigeons are known to live on aerodromes, roosting and nesting in warehouses and hangars. In such sheltered environments, they can breed year-round. They are involved in birdstrikes all year round.

Racing pigeons may be a birdstrike risk during the racing season, generally between April and September.

The collared dove has become widespread and numerous in Britain since its arrival from the continent in the 1950s. It is common in towns, suburbs, parks, farms and granaries but less so on aerodromes.

Management of pigeon species is best achieved through an effective LGP, proofing of buildings and good 'housekeeping' (i.e. maintenance of a clean and tidy environment that reduces resource availability to hazardous species).

Starlings

Although the starling is involved in only a small percentage of wildlife strikes overall in the UK, they can form large and dense flocks during feeding bouts or prior to joining a roost around dusk. Breeding numbers have declined significantly since 1970, due probably to changes in agricultural practice. Most strikes occur during and after the breeding season when flocks of juveniles are difficult to disperse from aerodromes. Starlings are omnivorous opportunists, taking a wide range of food including worms, insects, seeds, fruit, cereals, household scraps and other waste. However, grassland is the most important feeding habitat and flocks busily probe the ground with partly open bills. They progress over the ground with a characteristic 'rolling' motion in which birds from the rear periodically take flight and move to the leading edge of the flock. Thus, they appear to be able to overcome at least in part the problem of detecting predators when foraging in aerodrome long grass. Starlings sometimes 'shadow' livestock to prey on disturbed invertebrates and flies, and also 'hawk' for flying insects when they are abundant (e.g. crane fly, ants).

Starling roosts can contain thousands of birds. Typically they roost in dense vegetation (not necessarily tall but usually difficult to penetrate) such as thorn thickets, game coverts, young un-thinned conifer plantations, reedbeds etc. Starlings may travel long distances between roost and feeding areas. They nest between April and July in holes in trees, buildings and occasionally aircraft.

The most appropriate forms of management vary from a good LGP, through proofing of nesting areas and removal of roosting habitat. Starling roosts can be dispersed by scaring action for several hours at dusk on several consecutive nights. Considerable effort and resources (and specialist advice) may be necessary to evict starlings from roosts using pyrotechnics, distress calls and lasers.

Birds of Prey

There is a common but false belief that wild birds of prey keep other species away from aerodromes and that their presence on an aerodrome may be beneficial. Birds of prey are dependent on abundant prey, and will therefore be attracted to aerodromes with abundant small mammal, bird or wildlife populations.

The kestrel is a small falcon, which hunts small mammals and large insects on farmland, aerodromes and in a variety of open habitats. Its preferred prey is especially abundant in

permanent grassland and the kestrel is, therefore, common on aerodromes and alongside motorways. It habitually hovers motionless on rapidly beating wings.

The sparrowhawk is a small short-winged hawk that hunts low over the ground, often using hedgerows or other linear obstacles as cover, to flush out small birds, which it catches with a rapid burst of speed.

The buzzard is a much larger bird of open country, but may also be seen hovering over the open grassland on aerodromes.

It has seen a national population increase and is present throughout the UK and increasingly involved in wildlife strikes. It soars on long broad wings and takes carrion, rabbits and other small ground-dwelling animals as well as feeding on grassland insects and invertebrates, which may be indicative of detrimental or poor grass and habitat management at the aerodrome.

The red kite is similar in size to the buzzard and has undergone a highly successful conservation release programme throughout the UK. As such it is now present in many areas around aerodromes and has featured in the national wildlife strike records in recent years. This is a scavenging species where good housekeeping will be essential to prevent them attempting to use aerodromes.

The peregrine falcon is a large powerful falcon that hunts birds such as feral pigeons in the air. Peregrines may be indicative management action is needed to remove their food source.

Effective aerodrome habitat management is critical for the control of birds of prey although thatch within a long grass policy may be beneficial for species such as kestrels. Active control of rabbits is essential to reduce buzzard presence while proofing of perching areas will reduce opportunities for birds to reside on airfields. Active and rigorous deterrence is necessary and removal under appropriate licence conditions may be necessary to prevent wildlife strike risks occurring.

Game Birds

Numbers of pheasants vary locally with the intensity of rearing and release by neighbouring estates. The pheasant roosts overnight in woods and thickets ('coverts') and generally walks onto fields and aerodromes to feed. It can sustain flight for only a few seconds, usually to escape danger.

The grey and red-legged partridges are both squat, ground-living birds, often found on arable land in small flocks ('coveys'). They roost on the ground and are also active at night. They are very difficult to detect and flush from aerodrome long grass. They prefer very

long grass or ruts and divots on an aerodrome. Management is difficult however advice from Natural England or other statutory bodies should be sought[23].

Swift, Swallow and Martins

Swifts, swallows and martins (house and sand) are summer visitors, which feed on flying insects. Flocks congregate where prey is concentrated by the wind, or where they arise: aphids over bean and cereal fields, midges over water, froghoppers and crane fly over grass. Large numbers of swallows and martins can sometimes sit on runways in autumn in between feeding on aerial prey over airport grass.

The swift nests in holes in buildings and only alights at the nest. Small flocks engage in screaming chases. It ascends to height to spend the night on wing. Swifts do not respond to dispersal action.

The swallow nests on ledges and beams in buildings. Flocks alight on runways and taxiways mainly in autumn. Flocks of swallows and martins feeding in flight usually resist attempts to disperse them but can sometimes be moved on when resting on the ground. The key to managing these species is a good long grass policy that includes suitable insecticide activity to prevent the presence of aerial insect emergences in the first place.

Mammals

Based on UK strike data over the past 20 years, due to the very low probability of strikes to aircraft by mammals, this guidance document does not discuss detailed information on mitigation measures involving animals. Where aerodrome operators are presented with issues concerning the control of wildlife other than birds, specialist advice should always be sought.

Red fox, deer species, sheep, hare, cat, rabbit, badger, hedgehog and bat have all been involved in wildlife strikes at airports in the UK. Some species have recorded damage (deer and fox) with others large enough to have the potential to cause damage. If they are considered to be a local hazard, foxes may be shot or trapped at any time.

The very small herbivorous mammals – the rodents, such as mice and voles – represent no direct strike hazard to aircraft but, as discussed elsewhere in this document, may attract predatory birds (and omnivorous species such as corvids) to the airfield, particularly when grassland populations of voles are high.

The rabbit constitutes a negligible strike risk to aircraft due to its small size and its behaviour. Their control is, however, recommended to prevent habitat damage or attraction to birds of prey.

[23] E.g. Natural England Technical Note 105; Game birds: managing the bird-strike risk at airports and airfields in England

A LGP may attract hares, with strikes peaking in late winter and early spring. This species typically weighs 3-4 kg but although there have been reported strikes there have been few reports of damage to aircraft in the UK.

To date, only a small number of collisions between deer and aircraft have been reported in the UK. From the reported incidents on record, the risk is higher during the hours of darkness. In the event of deer on the aerodrome it is advised that the entry route onto the airfield is identified and closed off and any scrub or tree plantations that provide cover for deer should be removed or substantially thinned out. Shooting deer must be approached with extreme caution because of the firearm and safety requirements; hence deer management experts should always be consulted when such issues arise.

Chapter 8

Personnel Training

As part of the EASA Aerodrome Operator Management System requirements, an obligation is placed on the aerodrome operator to establish and implement a training programme for personnel involved in the operation, maintenance and management of the aerodrome and for persons working unescorted on the movement area, or other areas.

In accordance with EASA Aerodrome Means of Compliance (AMC) it is necessary for aerodrome operators to ensure that personnel have demonstrated their capabilities in the performance of their assigned duties through competency or proficiency checks at adequate intervals, in order to ensure a continued competence. Attendance on a refresher training course does *not* necessarily mean competence. Training programmes should therefore be bespoked to incorporate some level of assessment and test as part of the syllabus, ideally not open-book, with a set target pass grade of at least 70%, for example.

Aerodrome Operators should ensure that only adequately qualified and experienced instructors and assessors are used for implementation of birdstrike training programmes and that they maintain appropriate qualification records to demonstrate compliance with the requirements, during audit.

Service level agreements between the aerodrome operator and any external, or third party training providers should be established that require the competency of training providers to be demonstrated and that the contents of all training programmes and syllabus are established to meet the requirements both of the aerodrome and to also satisfy any regulatory requirements.

The International Birdstrike Committee (IBSC) previously defined the standards[24] to refine future ICAO standards. Similarly, in the UK, People First have provided National Occupational Standards (NOS) for Aviation Operations on the Ground (Unit 21 – Contribute to wildlife control[25]). To meet these standards, personnel involved in wildlife management should be able to understand the objectives for wildlife management on and around aerodromes, including policy within aerodrome documentation (such as the bird hazard management or aerodrome manual), be able to identify and manage habitats, identify and manage wildlife, monitor and record activities and report on findings.

[24] http://gyroconference.event123.no/Avinor/IBSC/theibsctrainingtaskgroup.cfm

[25] Examples of requirements include;
http://www.goskills.org/webfiles/Passenger%20Transport%20NOS%202/Aviation%20Operations%20on%20the%20Ground/Unit_21_Contribute_to_wildlife_control.pdf

At the time of printing, the CAA is working in partnership in association with a number of industry stakeholders in order to explore developing a standardised training syllabus for airport operations personnel covering a wide range of airside operations subjects. As part of this work, it is envisaged that a syllabus concerning wildlife hazard management could be developed, in order to provide aerodrome operators and those employed in the provision of such services, to deliver a standardised, generic training and assessment programme and associated competency framework.

Until such time as a new standardised syllabus has been agreed, the following wildlife control initial training programme elements are suggested:

Background to Wildlife Strike Hazards

Nature and definition of wildlife strikes, nature and extent of the aviation wildlife management problem; characteristics of the aerodrome, including coastal aerodromes, inland aerodromes, grass aerodromes or tarmac aerodromes.

Roles and Responsibilities

How a wildlife control unit should be structured and who has responsibility for what roles and who the relevant people are, for example, air traffic control, air crews and external agencies.

Assessment of Risk

Understanding methods for evaluating wildlife strike risk and how this can be applied to the aerodrome environment.

Wildlife Identification

Correctly identifying aerodrome wildlife and understanding what to look out for when identifying species.

Aerodrome Ecology

Evaluating and understanding the features and factors on and around an aerodrome that attract hazardous species.

Habitat Management

An understanding of how to maintain an environment which is unattractive to birds and other wildlife.

Wildlife Ecology

An understanding of how wildlife could respond to different control methods: lively and immediate dispersal; temporary and unsettled dispersal; leaving aerodrome; removal to alternative area of aerodrome; following favoured routes of departure etc.

Passive and Active Scaring Techniques

An understanding of how to disperse birds and other wildlife and the benefits and advantages of using different active and passive management techniques on and in the

vicinity of an airfield and the applicability of techniques to different situations including health and safety aspects relating to all equipment and methods used.

Wildlife and the Law

An understanding of the law of the devolved UK, what can and cannot be done to resolve wildlife strike issues within the law including local bye-laws affecting the way operating bird scaring equipment might be utilised.

Wildlife Strike Reporting

An understanding of the requirements of reporting and what constitutes a wildlife strike. Collection, preservation and identification of strike remains.

Wildlife Recording

How to maintain a wildlife control log and what to record. Systems and procedures for reporting and analysing data.

Safeguarding

Understanding the importance of managing the off-airfield environment and monitoring the impacts of wildlife hazards in the vicinity of an aerodrome.

Refresher Training

To ensure that wildlife/bird control personnel maintain competence, Annual refresher or another system of monitoring should be implemented by the aerodrome operator.

Certification

A written certification should be provided to those who successfully pass the test(s). If a published training procedure is not provided by the trainer the certificate should attest to the fields the trainee has successfully completed.

APPENDIX A

Avian Radar

CAA is aware that the use of avian radar and is increasingly being deployed and considered by a number of major commercial air transport airports around the world.

The information provided in this appendix discusses the background, tactical use and capabilities. Aerodrome operators and other stakeholders should contact avian radar organisations in order to learn more about the capabilities and limitations in order to suit local issues, both tactical and strategic.

Background

Avian radar systems are increasingly being used around the world to monitor hazardous bird movements in relation to aircraft safety. Radar has detected birds since the beginning of its development, even if the source of the returns was not readily apparent, and opened up a new domain for the study of biology by small groups of pioneers predominantly in Europe, North America and Australia from the 1950s through to the mid-1990s. They tried to relate their findings to birdstrikes, often for the military, which led to the rise in Europe of the 'BIRDTAM' system, a Notice to Airmen message, advising of the general location of increased bird activity measured by long-range radars as a secondary function to their use for air traffic control.

In the late 1990s work by the United States Air Force led to the development of small dedicated avian radars using equipment sourced from the marine radar industry. Initially these were used to develop historical models of where and when birds hazardous to aircraft were active at bombing ranges and on airfields. These projects demonstrated that the technology was rapidly maturing whereby biological targets could be tracked and activity records stored in databases for developing historical models as well as to be used in real-time for birdstrike risk reduction. In 1997 the USAF Avian Hazard Advisory System (AHAS) was developed to use data from more than 140 long range weather radars, isolate returns from biological targets and use that information to identify areas of increased birdstrike risk, as a means to reduce the potential for loss of aircraft training on low-level routes, bombing ranges and other military training areas including the area around airfields.

More recently, dedicated avian radars have emerged which do not rely on the use of sub-optimal marine radars, but which are purpose-built for bird detection. This ensures that each part of the radar data processing chain is optimized for finding bird targets in an environment cluttered with reflections of non-bird targets such as those presented by obstacles and terrain, buildings, trees, and aircraft. Many of the new generation radars have tracking capabilities for individual birds and also species recognition capabilities.

Moreover they have added classification between small, medium and large sized birds and flocks.

Operational Use

The first dedicated avian radar system for an airfield was deployed in the UK, at RAF Kinloss, Scotland, during the winter of 2002 to manage the birdstrike risk from skeins of Canada geese that were transiting from one side of the airfield to feed on farm fields on the other side. These wintering geese were flying down the runway in order to feed around dawn each day, a movement that was visible and predictable allowing it to be monitored by human observation and allowing aircraft operations to be controlled in order to reduce the birdstrike risk. But the only thing predictable about the evening return geese movements was that it was unpredictable. The return flights of tens of thousands of geese in flocks often kilometres wide could occur any time from 1500 hrs until midnight or later, with big swings in timing occurring from night to night. Military training and operations would have been severely compromised by restrictions on flight activity lasting many hours, to cover the approximately hour-long window in which the birdstrike hazard occurred, unseen under the cover of darkness and often unheard due to aircraft engine noise.

This avian radar system was integrated into air traffic control and approach radar rooms using displays that were similar to those commonly used in Precision Approach Radars (PAR), avoiding the need to introduce unfamiliar display technology and operating procedures. These PAR-like displays showed the position of birds on one image of the display in range and elevation (side view) and on the other image in azimuth and range (top down). The two images were located one above the other so that the position of targets could easily be determined from one to the other in the exact same way that controllers were used to in managing aircraft arrivals and departures. The concept of operations was then modified to execute procedures to wave off an aircraft on arrival or delay departures if flocks were located on or near the flight corridors.

Today, commercially produced avian radars from various manufacturers in the US, Canada and Europe are in operational use by the US Air Force, NASA (for space shuttle launches from 2006 to 2011), by the US Navy and at several commercial airports in the US, Europe and Africa. The US Federal Aviation Administration (FAA) is also currently evaluating systems from various manufacturers and has published an Advisory Circular 150/5220-25.

The effectiveness of avian radar for detecting different bird species at various distances is highly dependent on the quality of the hardware and software (algorithms). To know the capabilities, and the limitations of the avian radar, it is highly recommended to perform an extensive system comparison and a thorough validation in the field. The insight in what the system can detect at which distance is fundamental to inform decision-making about birdstrike prevention based on avian radar.

Avian Radar Concept of Operations

It is important to make a distinction between the tactical operational use in real-time of bird radar compared to strategic use, non real-time, giving long-term and trend data analysis:

Tactical use of Avian Radar

- Real-time informing the bird control on the airfield with early warning detection of potential birdstrike risk to aircraft;
- Automatic activation of bird deterrent means by avian radar.

Strategic Use of Avian Radar

- Providing an insight into spatial and temporal distribution and in trends of bird migration patterns crossing in the near vicinity of the airport;
- Support of habitat management by providing insight into roosting and feeding areas and on hot spots of high bird concentration areas;
- Measurement of near-misses as precursor indicators of birdstrike;
- Providing specific and precise information of birdstrike risk to pilots as used by ATIS and NOTAM;
- Measurement of the effectiveness and durability of bird control actions providing insight in habituation of existing bird deterrents;
- Providing information supporting the optimal planning of bird control personnel.

The concept of operations for avian radar systems is crucial to their effective utilisation on an aerodrome. The RAF Kinloss experience provides a good example of how bird activity data can be successfully integrated into flight operational considerations. This exact same concept was also successfully used by NASA for 21 launches of the Space Shuttle between July 2006 and July 2011 to ensure that the shuttle's climb trajectory was clear of birds. This concern was brought to the forefront of launch safety following a vulture strike to a shuttle during a launch in July 2005. Information on the activity of large birds or large flocks of birds hazardous to flight operations can be acted upon in real time if the concept of operations is modified to use procedures similar to those utilized for missed approaches, runway incursions by vehicles or personnel or severe weather, windshear and even volcanic ash clouds.

This is not the only use for the data and output generated by avian radar systems. In the years since 2002 significant advances have been made to create concepts of operation that include using radar data to show where and when bird control personnel need to be deployed to scare away birds based on recent trends in activity or in real-time. Real-time indicators are particularly important at night when personnel cannot easily see the birds they need to remove from runways, taxiways and flight corridors.

Following the initial year of deployment, most avian radar systems installed at a new location will detect at least one bird activity pattern that was not previously known. Birdstrikes are relatively infrequent occurrences and strike statistics often don't readily identify larger night-time activity patterns that are readily apparent to radar. Radar allows the bird hazards to be mitigated before a severely damaging strike occurs. Modern aircraft are built with engines and airframes that have to withstand high levels of birdstrike damage, but this impact resistance does not include damage and aircraft loss from impacts with the largest birds and bird flocks that exist in nature. It is in the management of these rare events that real-time avian radar systems could be used to modify flight operations. A clear concept of operations needs to be established to know where and when those conditions are occurring and the procedures that will be implemented by air traffic control to deal with them. The data can also be used continuously to support bird control operations and identify bird activity patterns to improve the response times and the resulting effectiveness of bird control operations, especially at night. The establishment of long-term trends and spatial distribution of bird activity around airfields allows identification, documentation and management of birdstrike hazards that evolve and change over time as a result of the dynamic and changing nature of bird populations, migratory patterns, agriculture, land use and climatic conditions. It is impossible to manage this critical risk without data on the timing and level of the risk which only radar provides. Radar systems are the only surveillance technology currently available that provides consistent, all weather, 24/7 risk assessment of the airspace. Bird control staff as well as air traffic controllers do not have the time or capability to constantly scan the atmosphere for hazardous bird activity and are completely incapable during periods of low light conditions. Modern bird detection radars are now being deployed at airports around the world and offer a unique possibility to help monitor, detect and evaluate real-time risk at airports in the UK. Expert guidance should be sought on how bird detection radar technology could be used to help manage risk at UK aerodromes.

APPENDIX B

Wildlife strike hazard at small non-commercial or General Aviation aerodromes

Operators of General Aviation (GA) aerodromes are recommended to take practicable steps, proportionate to the identified hazard and assessed risk, to remove and or disperse birds both from:

- the aerodrome itself
- in the near vicinity beyond the airfield boundary fence where local 'safeguarding' arrangements exist and where deemed necessary

The CAA accepts that the best practice standards outlined in this document apply predominantly to aerodromes operating commercial air traffic, irrespective of aircraft movement frequency or type of aircraft involved. However it is reasonable at aerodromes not conducting commercial air traffic, such as non-public transport, VFR flights and at those aerodromes operating as flying training establishments, to be aware of the risks to flight safety posed by birds and other wildlife.

In order to meet this objective the CAA recommends an aerodrome should have in place:

- A named individual responsible for wildlife hazard management;
- A list or map of habitat types on and bordering the airfield that have the potential to attract birds;
- A record of the species and approximate numbers of birds recorded within these habitats;

To assess the risk of a bird or wildlife strike, the aerodrome should confirm hazardous birds on or in the vicinity of the runway and detail the desired options for managing and reducing any risk that is presented.

Risk Control

The aerodrome's policy and records should document and demonstrate when or whether any habitat management is undertaken to reduce the presence of birds that are considered to cause risk.

Such procedures could include cutting grass in accordance with a LGP (as described in Chapter 5, Risk Management), requesting farmers to plough fields with spilt grain in or asking gamekeepers not to rear pheasants adjacent to the airfield fence, for example.

The aerodrome's record keeping should document whether and when any active dispersal of birds is undertaken on the aerodrome. For example, this could include warning pilots of

bird issues, driving a vehicle at any birds seen on the aerodrome prior to aircraft movements or deployment of any of the more formal or typical bird dispersal methods.

Training

GA aerodromes are unlikely to have the resources to train staff in formal bird hazard control and may not perceive a need, based on records of strike incidents. However, any deterrence activities should result in a reduced risk. Familiarisation and awareness of the aerodrome and its surrounding habitat is therefore considered an essential element.

Where deemed necessary, support from a professional bird/wildlife strike prevention specialist should be sought and documentary evidence of this process, its implementation and outcomes should be recorded.