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Airport Wildlife Management Plan for Ottawa MacDonald-Cartier International Airport

***Prepared for*:**
Ottawa International Airport Authority

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Ottawa International Airport

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To be reviewed a minimum of every two (2) years

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AIRPORT WILDLIFE MANAGEMENT PLAN

1.0 Introduction

In 2006, Transport Canada introduced the addition of a *Wildlife Planning and Management Regulation to the Canadian Aviation Regulations* (CARs), *Part III, Subpart 2 – Airports*. Ottawa International Airport is subject to the regulation because it is certified by Transport Canada (TC), has more than 2800 movements per year of passenger carrying aircraft and because it lies within 15 km of a waste management facility (the City of Ottawa's Trail Road Landfill).

By December 30, 2006, the Airport Operator will be obligated to develop and maintain an Airport Wildlife Management Plan (AWMP). This document will be reviewed by the airport a minimum of every two years, as required by the CARs, to identify the need for changes, as a result updates to CARs or review of the implementation of the AWMP, and will identify the annual reporting requirements.

The purpose of the AWMP is to identify integrated management techniques that should be implemented to address the hazards and risks identified in the *Airport Wildlife Risk Assessment for Ottawa MacDonald-Cartier International Airport* (Beacon Environmental 2006). The AWMP is designed to promote aviation safety for passengers and flight crews by reducing wildlife hazards and associated risks to aircraft and to airport operations caused by wildlife activities on and in the vicinity of the airport.

1.1 Goal and Objectives

The overall goal of this Airport Wildlife Management Plan is to implement an integrated approach to wildlife management for lands on and in the vicinity of the airport. This is intended to reduce the risks to aircraft and to airport operations caused by wildlife activities and to ensure an acceptable of risk level based on current aviation standards of care and due diligence.

The objectives of the Airport Wildlife Management Plan are to:

1. Determine and implement wildlife management actions for the airport;
2. Identify required actions around the airport;
3. Establish a monitoring program for all aspects of the AWMP, including performance monitoring and annual reporting;
4. Establish communication procedures with respect to wildlife hazards;

5. Describe the training program, roles and responsibilities; and
6. Identify research needs that would assist the improvement of the Ottawa International Airport Wildlife Management Plan.

2.0 Review of Available Wildlife Management Measures

Generally, there are tools and techniques available to manage wildlife hazards associated with airports at an acceptable risk level. Approaches to minimizing the potential for serious wildlife strikes at airports have focused on five primary areas (Jackson 2001). These are:

1. Manipulating habitat and access to habitat at or near the airport ("passive");
2. Dispersing, removing or excluding wildlife from the airport ("active");
3. Influencing land use decisions around the airport that may affect hazards to aircraft;
4. Developing systems to warn of bird strike potential; and
5. Developing aircraft and engines able to withstand bird strikes.

This AWMP address wildlife management related to the first three approaches.

Critical to the success of any wildlife management program is the human factor and the development of a Safety Management Systems approach (Transport Canada 2001a). This encourages the application of the three "Cs" of leadership (adapted from Reason 1997):

- **Commitment:** wildlife management requires commitment at all levels, from Senior Management to technical field staff. The available tools must be used effectively;
- **Cognizance:** recognizing the hazards and risks and what needs to be done, when, and how, are key to successful wildlife management; and
- **Competence:** having adequately trained staff that have the ability to "out-think" the wildlife, and identify and properly apply the appropriate tools, is critical to successful wildlife management. For example, this may involve considering any consequential effects of managing one species on the abundance of another.

2.1 Outside Airport Boundaries

Most of the wildlife management activities detailed in this plan will take place within the airport limits (where most wildlife strikes occur) airside and supporting infrastructure. However, the immediate surroundings of airports are increasingly being scrutinized as critical sources for wildlife species that either visit the airport or pass through aircraft arrival-departure conflict zones.

Due to off-airport hazards, Ottawa International will make efforts to influence land use decisions beyond the airport boundary. Typical management techniques for influencing land use activities outside of the airport includes: regulation, outreach, education (i.e., through a wildlife hazard awareness program), discussion and persuasion. The following approaches should be considered to influence activities outside the airport boundaries, as appropriate.

Airport Zoning Regulations

Airport Zoning Regulations (AZRs) that are established under the Authority of the *Aeronautics Act*, Section 5.4(2) could be enacted to prohibit land use activities that have been identified as hazardous to aircraft operations. Ottawa International Airport is in the process of updating their AZRs.

Local Government Planners

Engagement in the local planning process is critical to influencing land use change around the airport. The Director of Airport Planning has an open dialogue with City of Ottawa planners, and should provide materials and copies of the AWMP to key personnel at the City. It is recommended that the Director of Airport Planning provide a presentation every two years on land use issues that affect the airport. It is important to keep this information current and to include all planning partners (i.e., in the case where the airport zone of influence straddles two jurisdictions or where there are two or more tiers of planning authority). The Airport should work with the City to have local Official Plans refer applicants in the planning process to Airport Managers for consultation when changes in land use activities are proposed within the Primary Bird Hazard Zone. Having wildlife concerns identified at the earliest possible stage will help encourage positive outcomes.

Landowners and Stakeholders

Landowners and stakeholders around the airport should be engaged in a dialogue with the airport. Local landowners and stakeholders should be identified, and a letter should be sent to them by the Airport Planner to advise of the Airport Wildlife Risk Assessment and Airport Wildlife

Management Plan and to ask for assistance in minimizing bird use on their property. The Airport Authority should consider holding an open house to discuss hazard issues, safety, potential liability, and what stakeholders can do to help and how the airport might able to assist the stakeholders. An open house in the spring of 2007 to introduce the AWMP would be useful in increasing local landowners' and stakeholders' awareness of wildlife hazards at airports.

Regulatory Agencies

Regulatory agencies may influence a variety of projects which can range from wildlife habitat creation to the design of stormwater management facilities. Without knowledge of wildlife strike issues within these agencies, proponents of land use change may find themselves pulled in two different directions. The kinds of agencies that need to be regularly updated on airport wildlife issues include federal, provincial and municipal authorities. For the Ottawa area, this would include federal agencies such as the National Capital Commission, Environment Canada – Canadian Wildlife Service and Federal Department of Fisheries and Oceans. Provincial ministries responsible for natural heritage and land and water resources include the Ministry of Natural Resources, Ministry of the Environment. The Rideau Valley Conservation Authority is also a stakeholder agency.

Non-Governmental Organizations (NGOs)

Some of the larger national or provincial NGOs may be involved in habitat creation initiatives and may be included in a stakeholder group (e.g., Ducks Unlimited Canada). Others, such as natural history groups like the Ottawa Field-Naturalists' Club, or humane societies, may become important to specific aspects of the airports wildlife control, especially lethal control, which is included as part of the AWMP. It is important to make the Risk Assessment and the AWMP available upon request in order to raise awareness of wildlife issues on the airport as well as to demonstrate the appropriateness of the management techniques employed by Ottawa International Airport.

If there is sufficient interest, a stakeholder committee, such as a "Wildlife Management Committee", could be established by the Airport Authority to foster awareness and support for management actions and sharing of effective wildlife methods. The need to establish such a committee should be determined by the airport as the elements of the AWMP are implemented over the next two years.

3.0 Determination of Wildlife Management Activities

The Airport Wildlife Risk Assessment completed in 2006 (Beacon Environmental 2006) and it presented detailed information on:

a) aircraft movement statistics, including types;

b) wildlife hazards and their habitats and movements; and

c) a risk assessment for Ottawa International Airport.

In the *Airport Wildlife Control Procedures Manual (TC 2002)*, typical management tools that can be used on and off the airport have been discussed in a general sense. In the following sections, management activities that are intended to remove or manage the hazards and mitigate risks created by those hazards identified at the airport are detailed.

This section of the plan has been broken into highly critical, moderately critical, and non-critical species as defined and discussed in the Airport Risk Assessment. The management activities and techniques that have been identified have been developed from a review of each of the problem species. This assessment has identified the following:

- what attracts hazard species into the conflict zone (whether on or off the airport);
- steps required to address both the attractants that bring wildlife into the conflict zone (e.g., short grass, perching ledges or grasshoppers as food); and
- steps required to address the presence of the species themselves (e.g., dispersal of gulls).

It is important to note that the airport's implementation of the AWMP does not mean that all activities need to be undertaken in the first instance. It is intended that this plan will provide guidance on management priorities that will result in the steady improvement in wildlife management at the airport. Progress will be made towards plan objectives, as amended from time to time, over the next two years. Initial resources will be dedicated to managing the highly critical species first. This plan will be reviewed and amended in January 2009.

3.1 Highly Critical Species

Ring-billed Gull (*Larus delawarensis)*

Airport Risk Ranking: High

Management Priority: High

Summary:

The Ring-billed Gull is the species of greatest concern at Ottawa International Airport. There is a daily presence of gulls on the runways, short grass aprons and on the abandoned runways located on the north part of the airfield. Gulls tend to congregate on the threshold of runway 14 (often the inactive runway) and on many occasions fly into the hazard cones of departures from runways 32 and 22 and arrivals on runways 14 and 04.

In addition to the Ring-billed Gulls using the airfield, there are a number of off-airport habitat hazards that are attractive to gulls. These attractants include storm water management ponds, adjacent agricultural lands, and a number of recreational facilities (i.e., soccer fields) within Elizabeth Park and Highland Golf Club. These attractants likely contribute to the north-south over-flights across the airport at 100 to 400 feet above ground level AGL.

The City of Ottawa's Trail Road Landfill is an active feeding area for thousands of gulls and it is located 15 km west of the airport, under the approach to runway 07. Gulls normally fly at low altitudes but are known to tower (upward gliding flight using air thermals) as high as 3,300 feet during period of ground warming.

The following steps should be undertaken for Ring-billed Gulls on the airport:

Active Controls

1. A zero-tolerance policy will be implemented for gulls on airport airside lands.
2. Pyrotechnics and report shells (reinforced with live shooting) will be used whenever gulls are seen during wildlife patrols. Patrols specifically for gulls should be increased when monitoring shows increased use of the airport.
3. Consideration should be given to the use of propane cannons (2) on the airfield to support the use of pyrotechnics. The cannons should be selectively shot at random

intervals throughout the day. Cannons should not take the place of active pyrotechnic management, but rather should be used as part of the integrated approach.

4. Experience has shown that gulls ***must*** be selectively shot at the airport to reinforce non–lethal deterrents, this is critical to the successful management of gulls airside. Otherwise gulls will habitauate to non-lethal deterrents.

Passive Controls

1. Grassed areas in the inactive part of the airport should not be cut during the summer growing period. These areas should only be cut during the fall to reduce the availability of weed seeds for other fall and winter bird species.
2. Grassed areas in the active part of the airport should be maintained as short grass, with short grass length increased to approximately 12 cm and cut to a minimum of approximately 9 cm.
3. For long term habitat management, abandoned runway pavement occurring along runway 04/22 and the northern section of runway 14/32 should be either removed, or allowed establish long grass cover.
5. Grass areas should be sprayed for beetle outbreaks annually. Areas selected for the application of pesticide should be those that present the highest possibility for gull-aircraft interactions. A licenced pest control company should be contacted for the application of pesticide.
6. Grass areas should be sprayed with a product such as Diazinon, for grasshopper outbreaks as required. The application of this product will require contracts with a licenced pest control specialist. Areas selected for treatment should be those with the highest potential for gull aircraft interactions (i.e. north end of runway 14/32).
7. All garbage bins on site should be wildlife proof, this means they will be covered at all times.
8. Airport policy regarding a ban on feeding of birds by staff and visitors should be posted at the terminals as well as outside of the fence where the public often watch aircraft takeoffs and departures.
9. The City of Ottawa should be notified of the need for over-wiring on all storm water management facilities in the immediate vicinity of the airport or any ponds that have the potential to attract hazardous species such as Ring-billed Gulls.
10. Wildlife patrols should be increased in April and August or when monitoring shows increased use of the airport by gulls.

The following steps will be undertaken for Ring-billed Gulls on adjacent lands:

9. A PowerPoint™ hazard awareness program for gulls should be developed and presented to the Trail Road landfill operator with a request that the landfill update their risk assessment for potential hazards and risk to aircraft operations and prepare a Gull Management Plan to address the increased gull numbers at the site. Safety and liability should be stressed. Towering behaviour should be addressed in the plan as it relates to potential interactions with departing and approaching aircraft.
10. A letter should be prepared and mailed to local farmers to encourage night ploughing.
11. If deemed necessary, for specific land uses that can be expected to attract gulls, the airport should formally request that a risk assessment for the gull problem be undertaken, citing safety concerns on all public lands. The airport should ask to be circulated on any certification process for creation or expansion of landfills in the Ottawa Region.
12. The airport has an agreement with the City to be circulated on any Official Plan amendments in the airport zoning area.
13. Ongoing monitoring of gull activity on lands directly adjacent to the airport is required using the Eagle Integrated Solutions technology. Specifically, data to confirm flightlines and potential attractants on the surrounding lands will allow the airport to confirm the effectiveness of the current management program. If specific attractants are noted, this plan should be updated to reflect new management techniques.
14. Recreational fields in the Elizabeth Park development must be managed to eliminate access to food waste and litter in the area. All waste disposal containers should be covered and signs should be posted making the public aware of the hazards associated with feeding the birds.
15. Discussion with adjacent landowners and land users should be undertaken by the airport to determine if a long grass program could be implemented, including DND lands associated with Elizabeth Park, lands of the National Research Council Facility, and the NAV Canada Control Tower Facility.

Canada Goose *(Branta canadensis)*

Airport Risk Ranking: High - Very High

Management Priority: High

Summary:

This species was ranked high priority because it is a large flocking bird that, if struck, can result in catastrophic damage. There are two distinct groups of geese populations that pose a hazard to operations at Ottawa International Airport. These are: 1) high flying flocks of migrating geese and, 2) staging spring and fall migrants and local breeding temperate geese.

While the geese do not use the airport grounds, the airport lies under a migratory flyway resulting in high flying of migratory flocks arriving in the Ottawa area during peak migratory periods (March-April and October-November). In addition, the temperate breeding geese are associated with the breeding habitat provided by the Ottawa and Rideau Rivers as well as local storm water management facilities. These birds are most active just before dawn and dusk. Their daily movements are normally at altitudes between 100 and 400 feet AGL and flightlines are between various feeding areas to the south and west of the airport and night roosting sites 10-15 km north and west of the airport on the Ottawa River.
The following steps should be undertaken:

Active Controls

1. A zero-tolerance policy will be implemented for geese on airport lands.
2. Should geese be found to occur on airport lands, they should be scared off of the site immediately using pyrotechnics
3. ***The use of lethal live shot*** should be used to reinforce active management techniques i.e. pyrotechnics.

Passive Controls

1. If possible, crop farming in the immediate vicinity of the airport should be limited to hay, alfalfa, flax, and soy, ***not*** grain crops such as wheat, corn or oats.

2. A public awareness letter and pamphlet should be prepared and distributed to surrounding farmers/landowners by mail (see Appendix A for sample letter). The letter should make landowners aware of the issue that harvested grain crop fields

are highly attractive to geese and should request ploughing immediately after harvest to cover waste/spilt grain.

3. The City of Ottawa should be notified of the need for over-wiring on all storm water management facilities in the immediate vicinity of the airport or any ponds that have the potential to attract hazardous species such as Canada Geese.
4. Discussion with the City should be initiated to determine the City's future plans regarding the control of the local and increasing urban breeding population of geese.
5. A PowerPoint™ hazard awareness program for Canada Geese should be developed and presented to the City and the National Capital Commission. Safety and liability should be stressed.
6. Ongoing monitoring of goose activity on lands directly adjacent to the airport is required.

American Crow (*Corvus brachyrhynchos)*

Airport Risk Ranking: High

Management Priority: High

Summary:

American Crows remain in the Ottawa area year-round. Detailed counts of crows in the area are not available; however, they are estimated to be in the thousands. Large night roosts develop (likely mostly primarily outside of the breeding season) and they are spread along the Rideau River, located five to seven miles north of the airport. American Crows transit daily to feeding and loafing sites throughout the urban environment in the Greater Ottawa Area. These large movements of crows at dawn and dusk can pose a high risk to aircraft operating in the Ottawa area, specifically if the roost is located on an airport flightline. Therefore the issue of crows roosting on adjacent, off-airport lands is of primary concern from a risk perspective. Anecdotal evidence from pilots indicates large crow movements along the Rideau River.

In addition to roosting crows, flights of individual or small flocks occur often over airside lands. They commonly feed along grass aprons and along runways, and can be seen perching in antennae and airfield structures. Crows frequently fly from feeding to loafing to perching sites on and off the airfield at altitudes of 100 to 400 feet AGL.

The following steps should be undertaken:

Active Controls

1. A zero-tolerance policy will be implemented for American Crows and Common Raven at the airport.
2. Should Crows or Ravens be found to occur on airport lands, they should be scared off of the site immediately using pyrotechnics
3. ***The use of lethal live shot*** should be used to reinforce active management techniques i.e. pyrotechnics.

Passive Controls

4. Fall surveys (September through November) should be undertaken to determine the exact location of the night-roosts. If the roosts occur in a location that results in morning and evening flights that could directly increase risks to aircraft, discussions must take place with the City of Ottawa to determine the feasibility of moving the roost. This will be difficult and lethal control may be necessary to move roosts.
5. Daily monitoring and documentation of the use of the airfield by the American Crow should be undertaken using the *Eagle Integrated Solutions* unit. A monthly check of lands immediately surrounding the airport will also be undertaken.
6. A public awareness letter should be prepared and distributed to the City of Ottawa by mail in order to determine if the City is monitoring crow night roosts and if there is a plan to manage crow populations in the Ottawa area (see Appendix A for sample letter).

3.2 Moderately Critical Species

Rock Pigeon (*Columba livia)*

Airport Risk Ranking: Moderate - High

Management Priority: Moderate

Summary:

This species is a hazard to aircraft operating at 50 feet AGL or lower. Rock Pigeons roost on airport structures at night; feed along the runways; and continuously fly in all directions at altitudes below 50 feet AGL. The habitat hazards include airport buildings and structures and the buildings on lands immediately adjacent to the airport including Elizabeth Park and the National Research Council buildings. In recent years, the population has varied with the control methods employed.

The following steps should be undertaken:

Active Controls

1. A lethal control program has been ongoing at the airport for a number of years to remove pigeons from the airport lands. This program should continue. A licensed pest control technician should be hired to treat areas used by pigeons with treated bait. Once the bird eats the treated corn they become ill and other members of the flock are also dispersed. However, other lethal chemicals can be considered and recommended by the licensed pest control technician.
2. Remove all nests promptly. Nests are commonly found in hangars, on ledges, under bridges and on other structures such as the First Air aircraft located on the airport.
3. Use scare tactics and pyrotechnics to disperse birds from runway areas as required, however Rock Pigeons are generally not found in runway areas.

Passive Controls

4. Limit the available nesting space by covering all holes and building crevices with screen or boards.
5. Placement of “porcupine wire” in resting/roosting locations, i.e. terminal departure bridge overpass, First Air aircraft, training aircraft.
6. Populations should be monitored for sites in the immediate vicinity of the airport, i.e. CFB/Elizabeth Park: NRC Research Facility, and if required a lethal control program for these areas should be discussed with the facility managers/landowners.

Mourning Dove (*Zenaida macroura)*

Airport Risk Ranking: Low - Moderate

Management Priority: Moderate

Summary:

The Mourning Dove is a moderate sized bird that moves individually or in small flocks. Recent field studies estimate that 20 to 30 individuals fly in the vicinity of the airport daily. The number of birds on the airport is likely to increase in the fall when field weed seeds are particularly abundant. The associated hazard lands on the airport are short and long grass field which cause the Mourning Doves to fly across the runway at any time and at altitudes below 50 feet AGL.

The following steps should be undertaken:

Active Controls

1. Use pyrotechnics to disperse Mourning Doves from the airfield.

Passive Controls

2. For grassed area in the active part of the airport, along the taxiways, runways and aprons, short grass cutting should be scheduled to remove seed heads of field weeds prior to seed development.

3. Communicate with surrounding farmers to request that stubble, waste and spilt grain not be left on the fields and controlled by ploughing of fields immediately following harvest.

European Starling (*Sturnus vulgaris)*

Airport Risk Ranking: Low – Moderate

Management Priority: Moderate

Summary:

The European Starling is a small, flocking bird with a distinctly high body mass. Because this bird often flocks in numbers of 100+, a multiple bird strike has the potential to damage a jet engine if ingested. Recent field investigations estimate that over 1,000 individual birds occur daily in the vicinity of the

airport. Their flights are in all directions and usually at altitudes very low to the ground (five to 30 feet AGL). European Starlings perch and loaf on buildings and on structures throughout the airport lands. The starlings feed on insects in the airport grasslands. Large numbers of starlings are associated with the expansive grass fields found in Elizabeth Park, the National Research Council Facility, and NAV Canada Control Tower Facility.

The following steps should be undertaken:

Active Controls

1. Use pyrotechnics to disperse flocks of starlings from the airfield.

2. Where possible remove all nests found in the airport buildings and in the training aircraft. Prevent future nesting by sealing cracks and holes and placing screen over vents and other openings.

Passive Controls

3. Discourage roosting by closing buildings/hangers and placing porcupine wire on edges, rooftops, and rafters. Netting can be placed to prevent entrance to indoor roosting areas.

4. Building and hangar doors should be kept closed at all times when not in use, especially during the spring nesting season.

5. Employ a long grass program in the inactive areas of airside lands to decrease the ability of the birds to see prey and find food. As European Starlings often feed on invertebrates, aerial spraying is effective in conjunction with long grass programs.

6. Discussion with adjacent landowners/users should be undertaken by the airport to determine if a long grass program could be implemented, including DND lands associated with Elizabeth Park, lands of the National Research Council Facility, and the NAV Canada Control Tower Facility.

3.3 Non-critical Species

The species listed below are prevalent on or in the vicinity of the Ottawa Airport but have been judged to be non-critical for management based on the risk assessment. While it is important to implement measures to manage non-critical species, it should be completed after the measures to manage high and moderate species listed above have been implemented.

American Kestrel (*Falco sparverius*) and Northern Harrier (*Circus cyaneus*)

Highest Airport Risk Ranking: Low

Management Priority: Low

Summary:

These solitary raptors feed on airport lands. Kestrels are seen conducting individual feeding flights throughout airport lands from March to October during daylight hours. Harriers are permanent residents during the summer, breeding and feeding in airport long grass fields. These species are ranked as non-critical as no significant primary or secondary damage is likely to occur due to strikes involving these species.

The following steps should be undertaken:

1. These species should be carefully monitored using the Eagle Integrated Solutions AirOps unit for changes in numbers or behaviour on the airport. This is particularly important for the Northern Harrier which breeds in the inactive grassed areas of the airport. Should numbers of summer resident birds increase significantly need for lethal removal should be considered. The use of the AirOps unit will allow the airport to monitor any increases in use by kestrels and harriers on airport lands.

2. Modify any potential perching sites on airside lands of the airport using porcupine wire and other tactile repellents. This includes airside runway lighting, navigation installations and signage.

Snow Bunting (*Plectrophenax nivalis*)

Highest Airport Risk Ranking: Low

Management Priority: Low

Summary:

The Snow Bunting is a small, flocking bird that is found at the airport between October and April. Between 1995 and 2005 there have been 12 reported strikes with Snow Buntings and no reported damage. Snow Buntings likely roost on the grass fields on the airport, and feed on seed heads in the short turf near the runways. Random low level flights of large flocks over airside lands and flocks feeding on grit (sand and small gravel) along runways and taxi ways presents the greatest hazard associated with this species.

The following steps will be undertaken:

1. This species should be carefully monitored same comment for monthly and yearly changes in numbers or behaviour during the winter period.
2. Use scare tactics and pyrotechnics to actively move large flocks of birds in the vicinity of the runway.
3. Fall grass cutting for all grassed areas should be scheduled to remove seed heads from weeds prior to the start of snow fall.

Barn Swallow (*Hirundo rustica*)

Highest Airport Risk Ranking: Low

Management Priority: Low

Summary:

This species is very small in size and mass and typically flies in feeding flocks of several to twenty birds. Barn Swallows frequent the airport between April and September for breeding and feeding. The airport population breeds in airport buildings and structures such as the Geological Service Canada Hangar and airside navigation buildings/sheds. There is estimated to be more than 100 pairs on the airport. During the breeding season there are frequent flights across the runway at altitudes between 5 and 50 feet AGL. The greatest concentration of swallows is in the vicinity of the threshold of runway 25.

The following steps will be undertaken:

1. The abundance of this species should be carefully monitored for changes in numbers or behaviour.
2. Reduce available nesting and roosting sites by modifying buildings to limit ledge space (netting/porcupine wire).
3. Hangar doors should, to the extent possible, be closed during the breeding season.
4. Conduct nest surveys of buildings and hangars and airside structures during the breeding season (May and June). Remove all nests promptly.

Groundhog (*Marmota monax*)

Highest Airport Risk Ranking: n/a

Management Priority: Low

Summary:

This species is ranked low, as there is no significant primary or secondary damage is unlikley to occur due to strikes involving this species. Extensive groundhog burrows can result in ground stability issues if they are located under active runways or taxiways. Groundhogs occur on the airport all day from April to October. The groundhog feeds and breeds on the airport in short grass fields where they enjoy a degree of protection from natural predators. The population varies from year to year and likely surpassed 20 in 2006.

The following step will be undertaken:

1. A licensed pest control company should be hired to chemically treat burrows, using 'sulphur bombs' for example, in the spring. The treatment should take place after snow melt and prior to full vegetative cover, as this will allow pest control technicians to locate all burrow entrances and effectively treat them. This will reduce the groundhog population and prevent the potential runway stability issues that could be attributed to groundhog burrows under active runways and taxiways.

3.4 General Procedures

Summary:

In addition to the species specific management techniques indicated in Sections 3.1-3.3 there are a number of active and passive management techniques that should be implemented as part of the integrated program. These actions are not species-specific and will decrease the overall attractiveness of the airport to wildlife.

The following steps will be undertaken:

Active Management

1) Wildlife patrols should be undertaken at regular intervals throughout the day light hours of airport operations to ensure that no birds or wildlife are loafing or feeding within the airport environment, including during periods of aircraft inactivity.
2) A Wildlife Officer will be on duty from one half hour prior to the first arrival/departure until dusk, seven days a week.
3) A runway check will always be completed one half hour prior to the first arrival/departure and a runway check will occur prior to the first arrival/departure in the peak afternoon period.
4) During active patrols pyrotechnics and report shells should be used whenever high or moderate risk species are seen on airside lands.
5) Wildlife patrols should inspect the fence daily, and ensure rapid repairs. Vegetation along the fence should be cut as required and the fence checked daily.

Passive Management

6) Bare un-vegetated areas will be minimized. The old runway pavement should be removed or a long grass program implemented for these areas.
7) Drainage features are not planned for the airport; however, if and when they are built they will have 4:1 side slopes, preferably with hard edges, and will be piped where feasible.
8) No cash crops should be grown on lands owned by the Airport Authority.
9) Any ponds necessary for storm water management in the designated Bird Hazard Zones, as identified in the DRAFT AZRs should be discussed with City planners and be subject to design and exclusion methods to limit their attractiveness to wildlife.
10) Any ponds outside of the designated bird hazard zones that could create a hazard to aircraft should be discussed with City planners and a request will be made for the ponds to be designed to limit the attractiveness to wildlife.
11) Local farmers should be asked to consider night-time ploughing to reduce gull use.
12) Local farmers should be asked to plough immediately after harvest to cover waste or spilt grain.
13) All garbage bins on-site and in the immediate vicinity of the airport should be wildlife proof.
14) Airport policy to ban feeding of wildlife by staff and visitors should be initiated and posted.
15) Hangars should be kept closed to the extent possible.

4.0 Firearms

The use of firearms for active wildlife control within the airport boundary is a key component of the AWMP. Firearms are heavily restricted and special permits are required. Special training is required before they are used in or around this airport.

In addition, the use of firearms in Canada (e.g., shotguns, but not typical pyrotechnic launchers) requires the possession of a Possession and Acquisition Licence (PAL). To obtain this license it is necessary for the individual license holder to undertake the Canadian Firearms Safety Course. A Federal Registration Certificate is also required for individual firearms that identifies to whom they belong. More information can be accessed at: http://www.cfc-ccaf.gc.ca/en/default.asp. These licenses are required both for the use of certain pyrotechnics and the occasional killing of individual birds or mammals with life shot. Both the primary wildlife control officer and the back-up officer should hold valid PALs.

When using firearms, empty casings shall be recovered; they can cause serious damage when ingested into turbine aircraft engines.

5.0 Required Permits

Wildlife management personnel must ensure that all appropriate permits are in place and current prior to operations commencing. The following identifies standard permits that are generally required; however, it is strongly recommended that airport management contact the local offices of the Ministry of Natural Resources, Environment Canada - Canadian Wildlife Service and Municipal Government, including the local police department, on an annual basis to determine permit requirements.

Federal Regulations

Migratory Birds – *Migratory Birds Convention Act*

Regulations under this Act protect most bird species, including gulls (but excluding, for example, crows and blackbirds) and permits are required for active scaring and killing, including as nest removal. Ottawa International Airport currently holds an active Kill/Scare Permit as issued by the Canadian Wildlife Service, 867 Lakeshore Road, P. O. Box 5050, Burlington, Ontario L7R 4A6.

The airport's current permit was issued January 1, 2006. Ottawa International Airport will submit an annual report to CWS detailing the number of birds that were killed and harassed under this permit from

January 1 to December 31, 2006. The permit will be reissued in January 2007 for a one year period after the submission of the 2006 summary report.

Provincial Regulations

Hawks, Crows and Selected Blackbirds – *Fish and Wildlife Conservation Act*

A Small Game Licence is required to hunt these species in the Province of Ontario. This is available from the Ontario Ministry of Natural Resources, Kemptville District Office. The licensed individual will also require an Outdoors Card (hunter version) and must attend a Hunter Education Course and pass the Hunting Licence Examination. More information can be accessed at:
http://www.mnr.gov.on.ca/MNR/pubs/pubmenu.html. A Small Game Licence is also required for the management of blackbirds (including starlings) and crows. It is also recommended that the Wildlife Manager be in possession of a Small Game Licence.

Local By-Laws

Discharge of Firearms

Many urban and suburban municipalities in southern Ontario, including the City of Ottawa, have discharge of firearm By-laws in place that restrict the use of firearms in certain areas or circumstances. To apply an AWMP such as this may require an application to the local Council for an exemption from a firearm use By-law, for wildlife management purposes.

Local Police Department

Information regarding local requirements for discharge of a firearm should be discussed with the local police department. Discussions with the local police will also provide an opportunity to make them aware that discharge of firearms with pyrotechnics and live shot is occurring at the airport for the implementation of the AWMP.

6.0 Monitoring

Monitoring is critically important to the management of wildlife. Monitoring provides information to assist the Wildlife Management Officer (WMO) in adjusting the program in response to shifts in hazard and risk for specific species of wildlife. It also demonstrates to regulators and others the activities conducted to minimize risks, and to maximize safety for its staff and the traveling public. Monitoring data

can be particularly important should a litigious situation arise. The following measures should be implemented by the airport to monitor wildlife activity.

6.1 Daily Wildlife Management Log

The first step in a good monitoring program is good record–keeping. The most efficient manner to collate daily wildlife logs is using software specifically designed for the task. Ottawa International Airport has purchased tablets with AIROps™ software for staff from ***Eagle Integrated Solutions*** which will be used by wildlife officers in the field to record wildlife management activities and occurrences**.** The software program has been purchased to record (for all target species listed in this report) the standard data that are suggested by Transport Canada. The airport has developed a standard monitoring template for all wildlife management activities and patrols. This information will include: date, start and finish, location, light conditions, sky conditions, precipitation, temperature, wind speed and direction, species, number seen, direction of movement, attractant, control method, number killed and results.

6.2 Monthly Summary

At the end of each month, a written summary should be provided within the Wildlife Management Log that discusses any environmental changes or unusual conditions that may have led, or might lead, to unusual wildlife hazard situations or changes in risk assessment. This summary will be produced by the airport's Eagle Integrated Solution AIROps™ monitoring unit.

The summary should also provide a brief discussion of wildlife interactions to help focus the need for future changes to the AWMP. For example, success in managing one species that leads to a sharp increase in another species should be noted, even if the evidence is largely circumstantial and anecdotal. The "best judgment" of the experienced WMO on the ground should be given careful consideration.

The monthly summary will allow the addition of any new information on policies, new laws, and changes in the status of rare species that could occur at the airport. This information can then be incorporated into training programs or management reviews.

6.3 Wildlife Strikes

The Canadian Aviation Regulations now require airport management to report all wildlife strikes that occur on the airport. Maintaining detailed accurate records of bird strikes is critical to a successful and effective wildlife management program. The Eagle Integrated Solutions unit will be used to record all strikes reported on the airport. In many cases the implementation of a management plan that adheres to

reporting all strikes results in an increase in the number of bird strikes at the airport. This is often seen by management as an indication that the management plan is not working. However, this is most often is not the case, rather, the increase reflects a more accurate picture of bird strikes that have been occurring at the airport. The recorded strikes will be reported to Transport Canada annually detailing all wildlife strikes by March 01 of the following year as per the regulatory requirement to do so. The report will be generated by the Eagle Integrated Solutions software that is used daily to monitor strikes at the airport. The use of the Eagle Integrated Solutions unit will allow the annual report to be prepared quickly and accurately at the end of the year.

Eagle's "AIROps™" product line (Airfield Inspection and Reporting) will provide the basis for the proposed solution for both the General Airfield Inspection project as well as the Bird and Wildlife project. The use of touch-screen enabled software, combined with efficient and elegant data transfer methodology back to a central database, make the process of both the inspection and the collection of the inspected data easy and reliable for the WMO. Collected data residing on the central database allows for both the review of actual inspections as well as the ability to then generate standard and customized reports such as those required by Transport Canada under the new CAR 302.304, both in tabular and graphical formats. This also allows for "closing the loop" between inspections, maintenance and management.

Any information that the Wildlife Management Officer at Ottawa International Airport has, that is outlined on the airport's site specific reporting form contained in the Eagle tablet, should be included. If strike data become increasingly reliable sources of information, they will also assist in the risk analysis procedure for this airport and future updates to this AWMP.

Wildlife strikes are now defined by Transport Canada as occurring when:

a) a pilot reports the striking of wildlife;

b) aircraft maintenance personnel identify damage to an aircraft as having been caused by a wildlife strike;

c) personnel on the ground report seeing an aircraft strike wildlife; or

d) wildlife remains are found on an airside pavement area or within 200 feet of a runway centreline, unless another cause of death is identified.

At Ottawa International Airport, regular wildlife patrols will search for and will note any dead wildlife found within 200 feet of the runway centreline. Notation will also be made of any animal remains that are considered non-strikes, prior to their removal. These strikes will be recorded by the WMO and indicated on the file as 'no aircraft reported strike'. Should subsequent data be provided by the airlines, the report will be updated to reflect the airline's data.

Ottawa International Airport has agreements with Air Canada, Westjet and Air Canada Jazz & Transport Canada to share information related to bird strikes at the airport on a regular basis. This will allow the airport to be aware of, and respond to, any concerns that the airlines may have. In addition, the airport will be able to submit a complete record of annual strikes to Transport Canada with the most accurate data available from all sources. Table 1 contains the details of these agreements and associated contact person.

Table 1. Bird Strike Information Sharing

Airline	Reporting Cycle	Contact Name	Contact Info
Air Canada	Quarterly	Alasdair Kerr- Flight Safety	905-676-7942
Westjet	Monthly	Kevin Pickett- Flight Safety	403-444-6265
Air Canada Jazz	Daily	Daryl Watkins-Flight Safety	604- 231-6532
First Air	As required	Gord Wallace- Chief Pilot	613-688-2509
Transport Canada	Quarterly	Bruce MacKinnon- Specialist	613-990-0515

In instances where pilots, airlines or NAV CANADA report strikes to the Wildlife Management Officer and no remains are found, these strikes should be recorded as incidents with 'no remains found' indicated in the species column. If, following a strike, a runway and surrounding grass area check does not reveal a carcass the information shall be recorded and 'no remains found' shall be entered in the log under the species column.

Where the identity of remains of wildlife species that have been struck is in doubt, parts will be preserved for identification by the WMO. Should the WMO be unable to identify the remains to the species level, a digital photograph will be taken for the Eagle Integrated Solutions report. No strikes will be reported in the annual report unless they are identified to species level, i.e., no entry such as "gull", "goose" or "unknown bird" strikes will be reported as it will be the airport's policy to identify **all** remains found. If no remains are found, the annual report will indicate this. Remains should be bagged in zip-lock bags (i.e., bones, fur, feathers of different types, bill and feet, but not soft tissues). Specialists may be able to identify a bird from a single small feather, so even if they look unidentifiable, remains should be recovered. In cases where there are no remains available but there is a blood smear on the aircraft, a swab can be taken and sent as DNA can also be used to identify bird remains. Specimen material can be sent by courier to: Dr. Carla J. Dove, Division of Birds, Smithsonian Institution, PO Box 37012, National Museum of Natural History, Room E 607 MRC, 116 Washington, DC 20013-7012 USA. (Email: dove.carla@nmnh.si.edu). Dr. Dove should be contacted to request DNA sample packages as well as forms for identification remains.

The WMO should also consider the collection of any strikes (even those identified) for further examination. For example, stomach contents or the age bird (adult, juvenile) could be import information for future consideration (i.e., what food source was attracting the bird to the airport?).

In addition to any studies, research, or other new information that is available, the Daily Wildlife Management Log and the Monthly Summaries should be carefully examined for information that will assist the required two-year update to this AWMP.

7.0 Roles and Responsibilities

The Director of Airside Operations will be responsible for the implementation of this AWMP. This includes the acquisition of the various permits, the provision of training and awareness programs, and the review and submission of the annual strike reports and two-year updates to this plan.

The Director of Airport Planning will be responsible for stakeholder communication as well as for the development and presentation of awareness programs. This includes consultation and discussion with City of Ottawa officials regarding proposed development within the bird hazard zones.

The Manager of Airfield Operations will be responsible for coordination, supervision and overall management of the AWMP on a long-term and daily basis at the site-specific level. This will include the nomination of the key Wildlife Management Officer, co-ordination of training, safety assurance and ensuring that the necessary equipment is available.

The Wildlife Management Officer will be responsible for:

a) Ensuring that the habitat on the airport is maintained to the standard outlined in the AWMP;

b) Establishment and maintenance of the Wildlife Management Log (e.g., including strike data, details on wildlife numbers and activity; AWMP measures undertaken, firearm use details; details on the use of lethal reinforcement and monthly summaries);

c) Set up a schedule to ensure that wildlife management coverage of the airport is in place from one-half hour before the first arrival/departure until dusk.

d) Co-ordination of the entire monitoring program;

e) Preparation of the annual strike report;

f) Ensure that airport operations are consistent with the requirements of the AWMP;

g) Ensure that the appropriate permits are current and present on-site;

h) Ensure that all communication from NAV CANADA and pilots is responded to immediately and that resolution is achieved;

i) Undertake deterrent activities;

j) Ensure all activities are undertaken following standard practices and safety protocols; and

k) Identify equipment, resource and training needs.

When the WMO is not present the nominated back-up Wildlife Management Officers will be responsible for ensuring the duties of the WMO are discharged.

NAV CANADA will be responsible for ensuring that communications from the pilots reach the on-duty WMO as soon as practicable and that issues identified by the WMO reach the pilots by way of ATIS, NOTAM or direct radio contact.

Pilots using the Ottawa International Airport are responsible for reporting any hazardous bird/wildlife activity in the vicinity of Ottawa Airport to the tower. Pilots are responsible for contacting the WMO directly should the airline or pilot have specific concerns about wildlife activity or management at the airport. A memo will be sent to all airport users providing direct contact information for the WMO.

Figure 1 presents a graphic illustrations of the key personnel required to ensure the success and implementation of this plan. The Wildlife Management Officer will be the key person for both the planning and implementation of the AWMP.

Figure 1. Wildlife Management Key Personnel

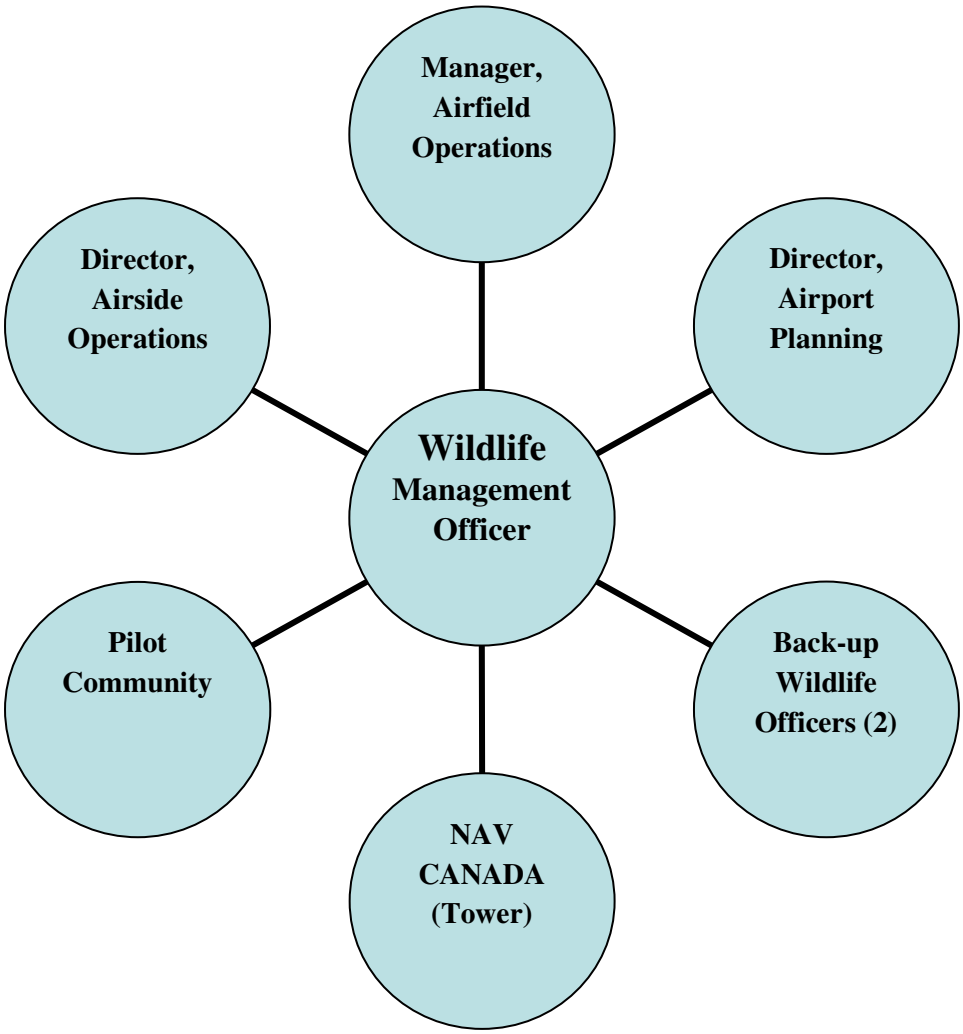

Table 2 below provides a summary of the key roles and responsibilities for implementation of the AWMP.

Table 2. Key Roles and Responsibilities for the AWMP

Name and Contact Telephone Number	Title	Key AWMP Responsibilities
	Director, Airside Operations	• Implementation of the AWMP • Acquisition of the various permits • Provision of training and awareness programs • Review and submission of the annual strike reports and two year updates
	Director, Airport Planning	• Develop and present awareness programs to local planners, and adjacent landowners • Correspond with land owners by letter and phone as required. • Monitor proposed developments within the primary and secondary bird hazard zones
	Manager, Airfield Operations	• Coordinate and supervise the overall management of the AWMP. Nomination of the key Wildlife Management Officer (WMO) • Co-ordination of training, safety assurance • Ensure that the necessary equipment is available • Preparation of the annual strike reports for Transport Canada • Attend annual Bird Strike Conferences to identify the most effective methods for bird control in the airport environment.
	Wildlife Management Officer (WMO)	• Maintenance of the Wildlife Management Log (e.g., including strike data, details on wildlife numbers and activity; AWMP measures undertaken, firearm use details; details on the use of lethal reinforcement and monthly summaries) • Set up a schedule to ensure that wildlife management coverage of the airport is in place from one-half hour before the first departure until dusk. • Co-ordination of the monitoring program • Ensure that Airport operations are consistent with the requirements of the AWMP • Ensure that the appropriate permits are current and present on-site

Name and Contact Telephone Number	Title	Key AWMP Responsibilities
		• Undertake active and lethal deterrent activities • Ensure all activities are undertaken following standard practices and safety protocols • The identification of equipment, resource and training needs • Ensuring that communication procedures are being adhered to • Determine the appropriate grass height for all areas of the airport • Determine the areas for pesticide application (if any) • Notify manager of any changes in hazardous species at the airport (trigger for an IWMP update)
	Back-up to WMO (2)	• Fill in for WMO during vacations, lunch, sick time, before and after shift etc. • To be trained in all areas that the WMO is trained and to possess all licenses and permits that that WMO does (i.e. Firearms, pyrotechnic safety, kill/scare)
	NAV CANADA (Tower)	• Notify WMO of any hazards reported by pilots as soon as practicable • Notify pilots of any concerns that the WMO has by NOTAM, ATIS or direct radio contact.
	Pilots	• Report hazardous wildlife in the vicinity of the airport to Tower. • Contact WMO directly if there are concerns about wildlife activity or wildlife management

8.0 Communications Procedures

The following communication procedures have been established for the purpose of wildlife management at this airport:

1. Information will be provided directly from the field staff on duty to Air Traffic Services (ATS) *via* radio contact;
2. ATS to provide information to WCO immediately after it is received from pilots;
3. Field staff will be responsible for ensuring that updated wildlife information is provided to ATS immediately if an urgent situation arises and on a regular basis

depending on the current conditions, or when requested by ATS. ATS will also relay any information received regarding wildlife observations to field staff in a timely manner;

4. ATS will provide information to pilots on current wildlife hazards and will ask pilots to report any wildlife observations to ATS (or UNICOM), especially those observed while taxiing;
5. Wildlife activity will be regularly updated on the Automatic Terminal Information Service (ATIS) and or UNICOM;
6. Entry in the Canada Flight Supplement (CFS) to warn pilots of hazardous wildlife. The CFS entry in Ottawa will state: 'Migratory waterfowl in the vicinity of the airport during spring (March-April) and fall (September-October) migration;
7. Ottawa International Airport will contact the major carriers at the airport (Air Canada, Westjet, Air Canada Jazz, and USAirways) and request that their monthly reports are sent to the WCO at Ottawa International Airport; and
8. Ottawa International Airport will contact Transport Canada and request to receive a quarterly report on all strikes reported to occur at Ottawa International Airport each year.

9.0 Establishment of Performance Indicators and Self-Assessment

The establishment of performance indicators is critical to help determine the need for enhancement or modification of the AWMP. It is also very necessary because actions to reduce one wildlife hazard can often result in improved conditions for some other wildlife species, for example the implementation of a long grass programs can result in the increase of mammal predators such as Red Fox (*Vulpes vulpes*) and Coyote (*Canis latrans*). When inadvertent effects such as these result in an increased exposure to other species that are hazards, this must be recognized and addressed.

The seven primary measurements of performance toward the objectives of this plan are:

1. Feedback from airport users;
2. The number of wildlife strikes;
3. Strike rate (number of strikes per 10,000 movements);
4. Damage associated with strikes;
5. Individual species' hazard assessments;

6. Risk rankings for the airport; and
7. The status of action items that have been recommended in the plan.

Strike data will be generated from the monitoring program and the annual strike report that must be filed with the Minister prior to March 01 of each following year. Both the monitoring program and the strike reports will be managed using AIROps™. Although this airport is interested in reducing the overall strike rate independent of air traffic movements, it is true that more strikes are likely when air traffic increases. Therefore, the strike rate will also be measured per 10,000 air traffic movements. A discussion of damage related to strikes will also be provided, as strikes that do not produce much or any damage may not be treated with the same level of concern as damaging strikes.

The hazard and risk assessment will be updated and compared to the previous assessments in the AWMP every two years (or earlier if there is a significant change in hazards or risk). A discussion of any changes will be provided.

Feedback from airport users should be sought and reported in time for each two-year update. This will help determine if the wildlife program is being responsive to their needs. Ottawa International Airport should adopt an 'open door' policy for discussions with airport users regarding wildlife management. A memo should be sent to all users providing contact information for the Wildlife Management Officer.

The final performance measurement will be the extent to which action items in the plan have been instigated. A list of action items is provided in Section 8.

Taken together, these seven measurements will form an effective and objective measurement of progress toward plan objectives.

9.1 Integration of AWMP to Safety Management System

Transport Canada will require the airport to operate a safety management system (SMS) - a systematic, explicit and comprehensive process for managing safety-risks that integrates operations and technical systems with financial and human resource management. An SMS is tailored to the size and complexity of an airport, and incorporates a systems approach that, as appropriate, involves its stakeholders on and off the airport.

The CARs Subpart 107.0.3 requires an SMS to include:

- A safety policy;
- A process for setting goals for the improvement of aviation safety and for measuring the attainment of those goals;

- A process for identifying hazards to aviation safety and for evaluating and managing the associated risks;
- A process for ensuring that personnel are trained and competent to perform their duties;
- A process for the internal reporting and analysing of hazards, incidents and accidents and for taking corrective actions to prevent their recurrence;
- A document containing all safety management system processes and a process for making personnel aware of their responsibilities with respect to them;
- A process for conducting periodic reviews or audits of the safety management system and reviews or audits for cause of a safety management system; and
- Any additional requirements for the safety management system that are prescribed under these regulations.

Ottawa's Wildlife Management Program was designed to be integrated with the airport's future SMS in the following ways.[1] The AWMP:

- May be employed from time-to-time to derive one of the annual safety performance targets for the airport [CAR 302.500(1)(b)(ii)].
- Specifies clear authorities, responsibilities and accountabilities for the Director, Airside Operations and wildlife management officers regarding the management of wildlife risks [CAR 302.500(3)].
- Specifies processes for the identification, management, evaluation, classification and control of wildlife related hazards and risks [CAR 302.500 (4)c].
- Includes systems for reporting and analysing wild-life-related safety issues and concerns, and for implementing remedial measures [CAR 302.500 (4)d].
- Includes procedures for the collection and analysis of data for assessing the safety performance of the wildlife management program at Ottawa airport [CAR 302.500 (4)f].

Additionally, the SMS will feature the AWMP as an important part of the airport's over-all risk management process and risk control strategies, one that consistently contributes risk-related data collected by the airport operator as part of the assessment of its safety performance [CAR 302.503(3) (g) and (i), respectively].

Communication of wildlife-related information between the airport and internal and external stakeholders will enhance the performance of the airport's SMS by involving all affected groups and organizations in the management of system safety at the airport.

[1] *Based on the provisions contained in NPA 2002-048 relative to CARs 302.500-302.506.*

10. Training Program

The Wildlife Management and Planning Regulation requires that a training program be established for the AWMP in accordance with the airport standards. An essential and required part of the regulation is to have properly trained staff to implement the plan, to reassess the risks and to provide updates to this plan every two years.

Effective wildlife management is critically dependant on staff with the tools, knowledge and motivation to complete the task at hand. A standard training program will be developed for the airport that is available to both senior management and wildlife management staff. The program will be separated into two sections allowing the field staff to participate in the entire two-day course and the management personnel to be trained in areas specific to their jobs. The program will address the following:

- Nature and extent of the wildlife management problem;
- Regulations, standards and guidance;
- Ecology and biology of key species;
- *Wildlife Control Procedures Manual* (TP 11500) and *Sharing the Skies* (TP 13549);
- Species of conservation concern;
- Liability;
- Habitat management;
- Issues outside of the airport boundary;
- Active management;
- Removal \techniques;
- Firearm safety (a pre-requisite being the Canadian Firearms Safety Course);
- Wildlife management planning;
- Development and implementation of awareness programs;
- Monitoring; and,
- Training record and schedule.

In addition to training directly associated with wildlife behaviour and the application of management techniques, it is essential that safety requirements are fully reviewed and addressed. This training should include at a minimum:

- Safe use and storage of pyrotechnics;
- Safe use, storage and maintenance of pyrotechnic launchers; and
- Identification and mandatory use of safety equipment.

Table 3 lists staff who have attended the training program, or are proposed to do so.

Table 3 Training Program

Name	Responsibility/ Title	Attended Training Program	Will Attend Training Program by
	• Director, Airside Operations		
	• Manager, Airfield Operations		
	• Tower Manager, Nav Canada		
	• Wildlife Management Officer		
	• Duty Manager		
	• Back-up WMO		
	• Back-up WMO		

While it is not required by the regulation, it is recommended that the Manager, Airfield Operations attend the annual North American Birdstrike Conference in order to keep current with methods and practices used to deter birds and wildlife from airports.

11.0 Summary of Approaches and Activities

11.1 Approach of the AWMP

The AWMP for Ottawa International Airport is a plan that is dynamic, highly integrated and comprehensive. The key elements of the plan can be summarized as follows:

- To implement an integrated approach to wildlife management for lands on and in the vicinity of the airport;
- Coordination of implementation of the AWMP though a Wildlife Management Officer;
- To manage wildlife through habitat management and active lethal and non-lethal control measures;
- To focus management efforts on those critical species identified as presenting a high risk to the safe operation of the airport;

- Maintaining a dynamic plan through the continued collection and analysis of data, monitoring, communication and training; and
- Increasing the awareness of the need for wildlife management at the airport to adjacent landowners and broader Ottawa community.

11.2 Summary of Management Activities

The AWMP integrates both passive and active management techniques to mitigate the risks of different species. For example, maintaining a long grass program in combination with the use of pyrotechnic will reduce the hazard and risk associated with several groups of species (e.g., gulls, starlings, crows). Additionally, some techniques are intended to be complementary and provide differing methods to reduce risks.

This section summarizes the recommended activities and lists the requirements to manage the program (e.g. permits, etc.).

Passive

1. Short grass length in active areas of the airport should be increased to 12 cm target height with a maximum cut to 9 cm (except where shorter grass is required for navigation aids and drainage areas).
2. Long grass areas in inactive areas of the airport should be maintained at 30 to 50 cm.
3. Bare un-vegetated areas will be minimized. The old runway pavement should be removed and a long grass program implemented for these areas.
4. Efforts will be made to cut all grass prior to seeding and in the late fall to remove high standing seed-heads before snow fall.
5. An insect (beetles and grasshoppers) management plan should be developed with the assistance of a liscenced pest control company to manage insect outbreaks on airport lands.
6. Vegetation along the fence should be cut as required and the fence checked daily.
7. Drainage features are not planned for the airport; however, if and when they are built they will have 4:1 side slopes, preferably with hard edges, and will be piped where feasible.
8. No cash crops should be grown on lands owned by the Airport Authority.
9. Any ponds necessary for storm water management in the designated Bird Hazard Zones, as identified in the DRAFT AZRs should be discussed with City planners and be subject to design and exclusion methods to limit their attractiveness to wildlife.

10. Any ponds outside of the designated bird hazard zones that could create a hazard to aircraft should be discussed with City planners and a request will be made for the ponds to be designed to limit the attractiveness to wildlife.
11. Local farmers should be asked to consider night-time ploughing to reduce gull use.
12. Local farmers should be asked to plough immediately after harvest to cover waste or spilt grain.
13. All garbage bins on-site and in the immediate vicinity of the airport should be wildlife proof.
14. Airport policy to ban feeding of wildlife by staff and visitors should be initiated and posted.
15. Breeding/roosting ledges for a number of bird species should be wired/netted to reduce nesting/roosting opportunities.
16. Hangars should be kept closed to the extent possible.
17. Entry holes for European Starlings should be identified and filled or covered.
18. Airside raptor and crow perching sites should be modified using porcupine wire and other tactile repellents. This includes airside runway lighting, navigation installations and signage.
19. Specific monitoring of numbers of the location, numbers and movements of American Crows, Ring-billed Gulls, and Canada Geese on and in the vicinity of the Airport should be conducted.
20. Specific monitoring of numbers of Northern Harrier and Snow Bunting on airside lands should be conducted.

Active

1. Wildlife patrols should be undertaken at regular intervals throughout the day light hours of airport operations to ensure that no birds or wildlife are loafing or feeding within the airport environment, including during periods of aircraft inactivity.
2. A runway check will always be completed one half hour prior to the first arrival/departure and a runway check will occur prior to the first arrival/departure in the peak afternoon period.
3. During active patrols pyrotechnics and report shells should be used whenever high or moderate risk species are seen on airside lands.
4. Propane cannons (2) should be set up on the airfield to support the use of pyrotechnics. The cannons should be selectively shot at random intervals throughout the day. Cannons should not take the place of active pyrotechnic management, but rather should be used as part of the integrated approach
5. Ring-billed Gulls and American Crows must be selectively shot at the airport to reinforce pyrotechnic deterrents. There is zero tolerance for Gulls on the airport property.

6. Canada Geese on airside lands must be shot to act as a deterrent. There is zero tolerance for Canada Geese on the airport property.
7. Barn Swallow, Rock Pigeon and European Starling nests should be searched for at appropriate times (each species twice per season minimum) and destroyed.
8. A spring baiting program should be initiated to kill nesting Rock Pigeons (if they occur).
9. A chemical control program should be undertaken to control the Groundhog population on airside lands.
10. Wildlife patrols will note any dead wildlife as strikes within 200 feet of the runway centreline.
11. Wildlife patrols should photograph any struck wildlife and if species identification is not possible specimen material should be bagged for identification by specialists.
12. Wildlife patrols should inspect the fence daily, and ensure rapid repairs.
13. Wildlife patrols should be increased in April and August or when monitoring shows increased use of the airport by gulls.
14. Wildlife patrols should be conducted of lands in the vicinity of the airport to monitor the locations, numbers and movements of Canada Geese, Gulls and Crows, including the location of, and flight lines to, fall crow roosting sites.
15. Active Groundhog burrows within the airport should be chemically treated/fumigated in the spring.

Other

1. A Daily Wildlife Management Log should be established using Eagle Integrated Solutions computer software for data storage and analysis.
2. Monthly summaries should be completed using the Eagle Integrated Solutions unit to produce a report.
3. An annual strike report must be prepared and submitted to Transport Canada by March 01 of the following year.
4. A hazard awareness program for Canada Geese should be developed using PowerPoint™ and presented to municipal staff, National Capital Commission staff the local golf course and local farmers.
5. A hazard awareness program for gulls should be developed using PowerPoint™ and shown to City staff and local landfill operators. The local landfill operators should be asked to address the gull issue through the implementation of management plans.

6. A meeting should be set up with local government to discuss the American Crow issue in the Ottawa area and to strategize management options. At this time the potential to involve the City of Gatineau in the management program can be discussed with local planners.
7. A meeting should be set up with local government to discuss the future growth of urban Canada Geese populations in the City of Ottawa and to strategize management options. At this time the potential to involve the City of Gatineau in the management program can be discussed with local planners.
8. A combined hazard awareness program will be prepared for general audience use (e.g., local government, surrounding landowners and residents).
9. The AWMP will be reviewed and updated prior to January 1, 2009.

Staffing, Equipment, Contract Requirements and Permits

1. A full-time Wildlife Management Officer is a critical requirement for the implementation of the AWMP to provide active control and coverage of the site from one half hour prior to the first morning flight until dusk, seven days a week.
2. A pest control specialist should be contracted for pigeon baiting (if nesting occurs) and to treat Groundhog burrows.
3. An insect and herbicide control specialist should be contracted for the control of airside grass insect populations and broad leaf weeds.
4. An equipment list should be prepared for the AWMP (See Table 4).
5. A Wildlife Management and Wildlife Strike software program should be purchased from Eagle Integrated Solutions in order to manage and assess all monitoring and strike data.
6. Federal firearm permits and federal kill and scare permits for migratory birds must be updated to include the additional species (kill/scare permits for gulls, geese, and nest destruction permits for Killdeer, Barn Swallows and other species as identified).
7. Provincial hunting licenses and kill permits must be updated.
8. The Canadian Wildlife Service Kill/Scare Permit will be renewed annually and a report must be submitted to CWS each January.
9. An annual review should be undertaken to identify all permit requirements of federal, provincial, and local government.

11.1 Equipment Requirements and Suppliers

The AWMP requires the use of various equipment and products. Table 4 is a checklist of required equipment and materials based on the recommendations contained in this AWCP. Other equipment requirements could be added to the table if deemed necessary as the program develops.

The supply of launchers and pyrotechnics from outside of Canada can be problematic. Currently, there is at least one reliable, full-time supplier within Canada (Margo Supplies Ltd., Box 5400, High River, Alberta, Canada T1V 1M5 or *via* the internet at www.margosupplies.com). It is still advisable to maintain a good stock of supplies in the case of supply interruption. Ordinarily, pyrotechnics will be shipped using LOOMIS and is subject to a hazardous material surcharge.

Table 4. Example Checklist of Materials required for the active AWMP

2x RG 300 Ten Shot Clip Magazine Launchers	2000x hot blanks
1x 4 cal. CAPA launcher with insert	1x mobile bird recording playback system
1x single shot hinge 12-gauge shotgun	1x vehicle mounted bird recording playback system
1x 3/16" aviation bit cleaner and oil (15 mm)	3x distress call tapes/uncleaned microchips (2 gulls, 1 starling)
1x bore scrubber launcher cleaner	4 x protective eye guards
2x nylon magazine chamber brush (15 mm)	2 x ear protection systems
2x hip holster loops	1x daily wildlife log
500x 12 gauge shotgun crackers	1x pair 8x power binoculars
500x 15 mm bangers	Permits and licences as required
500x 15 mm screamers	1x pyrotechnic cabinet
250x 15 mm flaming whistlers	1x approved ammunition cabinet
100x 12 gauge non-toxic bird shot cartridges	1x approved firearm cabinet
25x 18 mm CAPA long range exploders	Pest Control Contractor

12. Research Projects

In order for Ottawa International Airport to effectively manage birds and wildlife at, and in the immediate vicinity of the airport, there are a number of information gaps that need to be filled. These research projects need not be undertaken immediately, but as part of a long-term approach to the management of wildlife hazards at the airport. These projects could be undertaken by co-operative education students hired by the airport or as research projects for local university/college students.

Current priorities for research at this airport are:

1. Explore opportunities to test an avian radar system at Ottawa International Airport to detect off-airport bird movements. This technology has been gaining credibility in recent years, and avian radar, which is designed to locate, identify and track birds in airport environments would be well placed at this airport. Because the airport's highly critical species for management are primarily located off the airport, avian radar would assist the airport in managing these hazards and reducing the risks posed to aircraft. Appendix B provides information on the four avian radar systems that are currently in use in North America.
2. Undertake an off-airport grass study (i.e., species/variety) to determine if one species of grass is more attractive to high-priority species than another. This would involve setting up a number of test plots and monitoring the use of the plot by species. It will be important to ensure that the test site is in a location where birds/wildlife will not be attracted to high risk areas for aircraft.
3. Canada Geese numbers in urban areas are increasing throughout southern Ontario. An assessment of the numbers and movements (flight lines to and from roosts and feeding areas) of transitory migratory geese and local geese in Ottawa could provide very important information for the identification of potential hazards associated with this species.
4. Ring-billed gulls have been identified as high-risk species at the airport. Therefore studies of Ring-billed Gull movements and behaviours associated with the local landfill sites and other gull attractants in the vicinity could provide important information. In addition to the total gull number and flight lines, towering events (altitude, numbers, and frequency) should also be investigated. Determination of breeding colony sizes, summer post-breeding gull numbers within urban areas of the City Ottawa could provide important data to identify the magnitude of the problem and need for joint, multi-stakeholder efforts for gull management in the City.
5. American Crow numbers in the City of Ottawa are growing, as a result, a study to document American Crow numbers, movements and flight lines associated with roosts within the City of Ottawa would be important for the identification potential associated risk at the airport. Documentation of local areas with high concentrations of feeding birds and habitat use could provide useful information for long term management. The determination of the summer post-breeding American Crow numbers within urban areas of the City Ottawa could provide important data to identify the magnitude of the problem and need for joint, multi-stakeholder efforts for American Crow management in the City.

13. Closure

This report has been prepared for the sole use of the Ottawa International Airport Authority. Beacon Environmental and SMS Aviation Safety have prepared this document based on field data, a review of current literature, previous studies and stakeholder consultation pertaining to bird and wildlife hazards at and in the vicinity of Ottawa International Airport. All conclusions drawn and recommendations presented pertaining to wildlife hazards and risks assume that all further wildlife management actions will be undertaken in accordance with applicable laws and regulations, and in accordance with good Operational Practices normally followed by the airport. Beacon Environmental and SMS Aviation Safety accept no liability, nor responsibility, for any claims or damages, if any may result from managing wildlife hazards and risks at the airport.

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14. References

Beacon Environmental and SMS Safety Systems. 2006. Airport Wildlife Risk Assessment for Ottawa-MacDonald-Cartier International Airport. Prepared for Ottawa-MacDonald-Cartier International Airport, Ottawa.

Canada. Transport Canada. 2001a. Safety Management Systems (TP13739E). Ottawa: Transport Canada.

Canada. Transport Canada. 2002. Wildlife Control Procedures Manual (TP11500E). Ottawa: Transport Canada.

Jackson, J. A.. 2001. Understanding Bird-Strike Potential: Niche Concepts, Birds and Airports. Proceedings and Papers, Joint Meeting of the Canada/USA Bird Strike Committees, Calgary.

Appendix A

Sample Landowner/Agency Letter

<Date>

<Name>
<Address>
<Address>
<City>, <Province> <Postal Code>

Dear: <Name>

Re: Wildlife Management at Ottawa MacDonald-Cartier International Airport

Ottawa International Airport has recently undertaken an Airport Wildlife Risk Analysis and prepared a Management Plan as indicated in Section 302.304 of the Canadian Aviation Regulations (CARs). This amendment to the CARs was introduced in May 2006 and requires all certified airports that meet the criteria to undertake a wildlife risk assessment and to prepare a risk based management plan for the airport. The purpose of the risk assessment was to identify any wildlife hazards that exist on or in the vicinity of the airport, which in turn will assist in the development of the airport's wildlife management plan.

Due to the geographic location of your site, we have identified the wildlife associated with the <attractant> as a potential hazard to aviation safety operations in Ottawa. Any information or studies that you can provide on the wildlife that use the <site> would be appreciated. If there are any wildlife management or monitoring programs that are in effect at your <site>, they would be helpful in determining the hazard level and associated risks that could potentially exist. It is our request that you contact me to discuss wildlife use of your property.

Ottawa International Airport will be holding an information session on <date> for all landowners and stakeholders in the vicinity of the airport. The purpose of this session will be to provide information on wildlife hazards to aircraft and to discuss how we can work together to reduce the number of hazardous species that use <site>. The information session will take place in the <room> from <time>

Should you have any questions, please do not hesitate to contact me. Thank you for your assistance.

Yours truly,

Ms. Anne Tremblay
Director, Land Use Planning
Ottawa International Airport Authority

Appendix B

Avian Hazard Radar Systems

(Adapted from Transport Canada's AWM Bulletin Number 36- Avian Radar)

Avian Hazard Advisory System (AHAS)

AHAS was developed by the United States Air Force to provide information on real-time bird concentrations and behaviours in U.S. military training routes, military operating areas, bombing ranges, and airfields. Operational since 1998, the system updates bird-strike risk levels every 20-35 minutes and displays trend data that anticipates bird activity into the next hour.

A key significance of AHAS may be the synergy it achieves by incorporating a range of elements, namely:

- data on bird activity gathered by next-generation weather radar (NEXRAD);
- strike rates for specific bird species; and
- US Air Force Bird Avoidance Model (BAM) information.

BAM was created by the USAF in the early 1980s to help warn flight crews of bird activity. BAM uses geographic information system (GIS) technology to analyze and correlate information on bird habitats, migration, and breeding characteristics, combined with key environmental and man-made geospatial data. In effect, the system assigns each square kilometre of the U.S. a unique bird-strike risk value, and allows users to obtain bird hazard information according to location, time of year, time of day, and planned flight route.

More information on AHAS:

http://www.usahas.com

Sicom Systems Ltd.

ACCIPITER® Avian Radar

Sicom began developing Accipiter in 1994 to provide local, real-time and historical situational awareness of bird and aircraft movements for applications in civil aviation, wildlife management, and environmental assessment. Operational deployments have been undertaken by the U.S. Navy (since 2004), the United States Department of Agriculture Wildlife Services (2005),) in cooperation with the U.S. Marine Corps, and in recent tests during November 2005 at Toronto Pearson International Airport. Variants of Accipiter have also been deployed in operations involving the RCMP, DND, the New York State Police, and the U.S. Department of Homeland Security.

Accipiter's standard features usually include:

- MHT/IMM tracking for small targets;
- Fully integrated, geographical information system (GIS) that provides coordinates, speed, heading, and size parameters for up to 1,000 targets updated every 2.5 seconds;
- Continuous, 24/7 recording of GIS target data for measuring effectiveness of habitat-management and risk mitigation strategies through off -line analyses. This recording capability includes:
- Unlimited recording capacity;
- High-speed playback to visually review night-time bird activity and
- Statistical and historical overlays to interpret correlation between bird behaviour and underlying geography, and to compute and display bird counts and bird fluctuation over particular observation intervals.

Other features include:

- An SQL Radar Data Server (RDS) that organizes target data from multiple Accipiter radars in real-time. The RDS responds to user definable queries from multiple users and supports web services for real-time information retrieval, multi-sensor fusion, historical/statistical assessments, and automated bird advisories;
- Network capability to distribute target data in real-time to remote users on LANs, WANs, or public networks (such as the Internet);
- Remote control of radar hardware and software to reduce operational and lifecycle costs and provide completely unattended operation; and
- Automated alerts distributed via e-mail and/or cell phone text messaging.

For more information on Accipiter:

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Fonthill ON
Canada L0S 1E0
Tel: (905) 892-1875
tnohara@sicomsystems.com
www.sicomsystems.com

Geo-Marine Inc. (GMI)

Mobile Avian Radar System™ (MARS™)

GMI's MARS uses commercial marine-band radars and proprietary software to:

- remove background clutter;
- determine, track and classify targets; and
- automatically archive target information to a database.

The system runs 24/7, continuously recording data.

MARS features two central components: TracScan S-band (10 cm wavelength) and VerCat X-band (3 cm wavelength) radars. These units are available either individually or in a combined system.

TracScan provides horizontal surveillance of avian migratory ground track, and is capable of detecting flocks of small birds at a range of 4 nm and single birds at ranges between 1 and 2 nm (detection ranges quoted for both systems are longer for larger birds such as waterfowl). The unit has an altitude beam width of 25 degrees—12.5 degrees above and 12.5 degrees below horizontal.

Able to detect flocks of birds at an altitude of 8,000 ft, VerCat provides altitude surveillance along a bearing axis. The unit has a horizontal beam width of 20 degrees—10 degrees to either side of the scan axis. At a range of 5,000 ft, VerCat sees targets 800 ft to either side of its scan axis.

GMI's proprietary software correlates bird targets into tracks for both TracScan and VerCat. Data associated with a target track include size, speed, heading and position relative to the radar. A tracked target is counted once in data analyses regardless of track length; this results in more accurate target counts. Tracked datasets can be analyzed for spatial distribution by altitude and by heading, comparing avian activity before, during and after migratory periods.

Bird Detection System (BDS), Europe

GMI's BDS is a radar-based system designed to detect the location and flight direction of flocks of Greylag Geese and Tundra Swans within 3 nm of a Royal Air Force (RAF) air- field, and display their position with reference to aircraft in the traffic pattern

The BDS is comprised of both TracScan and VerCat radars. Detections by both radars are displayed simultaneously in the control room for real-time use by RAF air traffic controllers. The controllers use this information to advise aircrews of the presence and locations of birds, day or night, and in inclement weather. The system operates 24/7 with less than 2% downtime. Accuracy of detections is verified annually under a formal ground-truthing protocol executed at the beginning of each wintering activity season.

For more information:

http://www.geo-marine.com

Tel: (972) 423-5480

DeTect Inc.

MERLIN™ Bird Strike Avoidance Radar System

DeTect develops and commercializes radar-based bird detection technologies for both military and civil bird-aircraft strike-hazard management. A contributor to the creation of AHAS (see above), DeTect also manufactures and supports the MERLIN aircraft bird strike avoidance radar system: a production-model, real-time mobile radar designed for close-in airfield detection of hazardous bird activity.

DeTect's MERLIN system entered the market in 2003, and is currently available in three standard models.

MERLIN uses a dual marine-radar configuration to provide 2.5-dimensional (2.5-D) bird-detection capability with ranges up six nm (nautical miles) around an airport and altitudes up to 15,000 ft AGL (above ground level). The system incorporates DeTect's proprietary radar data-processing, clutter

mapping, data recording (raw and processed radar data), display, distribution and analysis software suite that was developed specifically to detect and track the unique behavioural characteristics of birds.

MERLIN enables ATC, airport operations and bird-control units to monitor high-risk zones (e.g., runway ends, corridors) even during inclement weather. The system can be controlled—and data can be viewed remotely—through an Internet interface. Audible and/or visual alerts via workstation, pager or cell-phone alerts can be delivered when elevated risk is detected. MERLIN also records bird-track data attributes—including bird size (small, medium, large, flock), speed, bearing and altitude—to a GIS-exportable database that can be used in long-term resource management and planning

DeTect will have 12 MERLIN systems in operation in the U.S. and Europe by early 2006. The company also plans to introduce a fourth MERLIN production model for forward-base military deployment in conflict zones. Long-term development activity at DeTect includes development of a lower cost, true 3-D bird detection radar system.

Additional two- to three-month trials of MERLIN are currently scheduled to begin at Dallas-Fort Worth International Airport in early 2006 and at Calgary International by June.

FAA Technical Center

Research and development on bird detection radar

In 2002 the FAA joined with the U.S. Air Force Research Laboratory to solicit bids under the Dual Use Science and Technology (DUST) program for development of airport bird detection radar. The successful bidder, WaveBand Corporation of Irvine, California, designed and constructed BIRDAR™—a millimeter-wave (MMW), 94 GHz frequency-modulated, continuous wave (FMCW) detection system.

BIRDAR's specifications include:

- a three-mile detection range;
- altitude determination up to 3,000 ft.;
- lack of interference with existing airport equipment or operations; and
- capacity for integration into existing airport GIS systems.

BIRDAR's scanning antenna achieves 0.5-degree resolution in one dimension and either 2.5 or five degrees in the orthogonal direction. The 0.5-degree beam can be electronically scanned from 30 to 360 degrees, while the five-degree beam can be scanned using a stepper motor. The antenna can be rotated by 90 degrees so that the narrow beam scans horizontally or vertically, depending on desired use.

Supported by CEAT (Centre for Excellence in Airport Technology), BIRDAR's demonstration and testing campaign had the following objectives:

- Collect sufficient radar data to enable evaluation of:
    - size/mass of bird targets,
    - distance to targets of different size/mass, and
    - capability of the radar in vertical as well as horizontal settings.
- Collect data in a form that would allow standard post processing as well as output to GIS platforms.
- Conduct demonstration and testing campaigns to collect coordinated radar and video data, supported by downrange recognition of bird targets.

An initial field campaign was completed in September 2004 at Dallas-Fort Worth (DFW) International Airport; a second campaign was completed in October 2005 at the Fermi National Accelerator Laboratory, Batavia, IL. Each field campaign involved opportunistic detection of bird movement, radar calibration and radar testing. In all cases, down-range observers provided confirmation of bird targets. Each campaign resulted in an integrated audio, video and paper record of all detections supported by calibration and testing of radar detection using defined targets. (Results of the 2004 demonstration and testing at DFW are available in a report published by the U. S. Air Force, Sensors Directorate, Rome Research Site as AFRL-SNRS- TR-2005-55. Reporting of the 2005 Fermilab demonstration and testing is currently in progress.)

General results are provided in Table 1. Detection of small, medium and large massed birds proved a success during the demonstrations. The BIRDAR prototype detected birds of different size/mass at varying ranges and operated well through both testing campaigns. Data from the radar was exported to a GIS platform to demonstrate alternate visualization schemes.

More information on BIRDAR is available through:

Federal Aviation Administration
William J. Hughes Technical Center
Atlantic City International Airport, NJ 08405
Tel: (609) 485-4000

Table 1: Demonstration and testing results for BIRDAR™

	Short Range > 500 m	**Medium Range 500 m – 1.5 km**	**Long Range > 1.5 km**
Small birds – single > 400 g	Confidence in detection	Non-detection, additional testing needed	Not Applicable
Small birds - flock	Confidence in detection	Confident in detection @ 1 - 1.2 km	Non-detection
Medium Birds 400 g – 1.5 kg	Confidence in detection	Confident up to 1.2 km	Non-detection
Large birds	Confidence in detection	Confidence in detection @ 1.5 km	Detections @ > 4 km

Appendix C

Ottawa International Airport Wildlife Management Plan Sign-Off Sheet

The following individuals have read this Plan and understand their role in the implementation of the Plan at this airport.

Signature	Responsibility/Title	Date