EMBRY RIDDLE AERONAUTICAL UNIVERSITY

Airport Wildlife Mitigation - 'Birdstrike news you can use'

Volume 2, issue 2

Summer 2008

Special Report

Inside this issue:

Accident Report	2
Bruce Mackinnon	3
BSC Announcement	4
De Tect Merlin radar	5
ROBIN radar—Europe	7
Next wildlife training course	7
Editorial Lagniappe	8

This edition will be featuring a look at new technology emerging for use on both civil and military airports: radar. As we will see the use of small, portable radars has been successful for military forces all over the world in reducing their birdstrike and accident rate. Civil authorities are beginning to look to this technology and determine how it can be integrated into aviation safety programs. Therefore we will be profiling two different radar systems here in North America, Accipiter and De-tect, and one European version: ROBIN. We seek to explain not only 'why' it works, but 'how' it can work in context with our aviation system.

ACCIPITER® Avian Radar

Accipiter® Avian Radars, developed by Accipiter Radar Technologies Inc., a Sicom company, are presently in use at various U.S. sites to support bird aircraft strike hazard (BASH) management and natural resources management (NRM). Sites include military airfields of the U.S. Navy, Marine Corps, and Air Force, and at commercial airports such as Seattle-Tacoma International Airport, Chicago O'Hare and New York JFK through the Federal Aviation Administration (FAA)'s Center of Excellence for Airport Technology (CEAT).

The radar systems use military tracking methods that permit the simultaneous, real-time tracking of large numbers of maneuvering birds with high accuracy. They include methods and antenna subsystems that together can provide 3D target information (latitude/longitude and height) for every tracked bird and aircraft target. With integrated and continuous target information management they have the means of supporting wide-area situational awareness to address a variety of BASH and NRM remote user needs.

Matt Klope, BASH Program Manager at Naval Air Station Whidbey Island (NASWI), is using these radars to extract near-miss information for use in a facility bird strike management program. During the recording of thousands of hours of bird tracks under the Integration and Validation of Avian Radars Project, a Department of Defense, Environmental Security Technology Certification Program effort, it was discovered that the radars were capable of tracking and reporting near-miss events between birds and aircraft. Near-miss events are now being documented both in real-time and through analyses of historical radar data.

At Seattle-Tacoma International Airport, Steve Osmek, Wildlife Program Manager, is using avian radar for archiving wildlife hazard monitoring data at several of their newly created detention ponds. These areas will be compared to similar areas without ponds to make a determination of the effectiveness of their wildlife hazard mitigation techniques employed at these state of the art ponds.

Continued P. 4

Accident Report

Cessna Citation II crashes-5 dead March, 2008

According to various press reports and the NTSB, a Cessna Citation business jet, while departing Wiley Post Airport near Oklahoma City, struck a number of unidentified birds during climb out. A witness heard a series of bangs and observed the jet, plunging straight down, fly into the ground trailing smoke. All 5 persons on board were killed on impact. The NTSB investigation is continuing.

Seminole crashes enroute—2 dead October, 2007

According to the NTSB and the University of North Dakota's Dean of Aerospace, the University's twin engine trainer was enroute at night at about 4,000 feet when it struck a flock of migrating Canada geese. The airplane had multiple impact points and crashed into a swamp. Both crew members were killed. The NTSB investigation is still ongoing after 10 months.

Recent Incidents

May, 2008

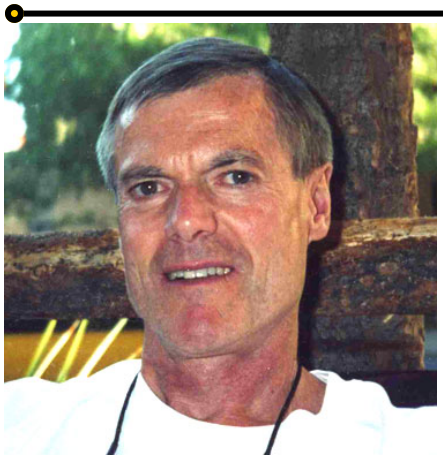
Continental Airlines - while departing Kuparuk, on Alaska's North Slope, the B737 ingested a bird on departure.

India– on the same day both **Jet Airways** and **Air Deccan** had their operations interrupted by birds strikes on their B-777 and A-320, respectively, at New Delhi and Visakhapatnam.

New York JFK– Virgin Atlantic A-340 had its windshield damaged during takeoff by a collision with a bird.

June, 2008

Seattle– Allegiant Air MD-80, during descent into Seattle, suffered damage to a wing leading edge and engine nacelle after it struck 'something' inflight.



Bruce Mackinnon

Bruce Mackinnon was the Program Manager for Wildlife Control for Transport Canada. He tragically lost his life in a light plane accident on July 6, 2008.

A memorial scholarship is being set up in his name, more details can be found at www.birdstrikecanada.com.

The following is a tribute, by his friends and co-workers, posted on the BSC-Canada website.

Bruce MacKinnon was quiet yet effective, unassuming yet determined. He was a results-oriented professional who was not content with simply seeking improvements to Canada's civil aviation system—he had to know that his efforts led to results, and that these results improved safety. In September of 1993, after 22 years with Parks Canada, Bruce became Transport Canada's Wildlife Control Specialist. From then on, he was responsible for managing the National Airport Wildlife Control Program, including the National Bird Strike database. Much of his vision has been realized in initiatives that far exceed not only the demands of his position, but also the expectations of the aviation industry. In fact, in his years at Transport Canada, Bruce's contributions to aviation safety eclipsed what many dedicated safety professionals could only hope to achieve during a full and rewarding career.

Bruce's aviation-safety legacy includes a long list of successful and, in some cases, extraordinary accomplishments that attest to his exceptional professionalism, boundless personal energy and unflagging commitment to aviation safety. He was responsible for the development and implementation of Canada's wildlife-management training program, as well as numerous bulletins and videos that have clearly advanced awareness of wildlife hazards to aviation. Bruce chaired 12 meetings of Bird Strike Committee Canada, and four meetings of the combined U.S. and Canada Bird Strike Committees. He also prepared and presented numerous technical papers to these committees, and to the International Bird Strike Committee. Bruce spent three years leading a team of industry experts, designers and writers in the creation of *Sharing the Skies—An Aviation Industry Guide to the Management of Wildlife Hazards*. The book, which exceeds 300 pages in length, was published in early 2001 and is now in its second edition. Considered by many to be the seminal treatise on wildlife management for aviation worldwide, its unique scope reflects Bruce's commitment to comprehensive and proactive system safety. Perhaps Bruce's most rewarding professional accomplishment was a proactive, performance- and safety-risk based approach to wildlife management and planning that he unveiled in 2001. A brilliant example of Bruce's ability to translate government policy and Transport Canada goals into practical results, the initiative came into force as part of the *Canadian Aviation Regulations (CARs)* in 2006. It is the first regulation of its kind in the world, enabling airport authorities to demonstrate how they are actively managing and measuring the hazardous wildlife issues that are unique to their sites.

Accipter cont'd. from P. 1

James Swift, with the Natural Resources Office at Naval Air Station Patuxent River, has been using 24/7 data collected with their eBirdRad avian radar to assist with management decisions for both the BASH program and the natural resources program. The data can be replayed and analyzed to determine when and where birds use and cross the airfield. This data is then forwarded to Air Operations and to station aviation safety officers where pilots and aircrews can make informed decisions about upcoming flights. Also, the Airfield Facilities Division and Air Traffic Control are given the information so dispersal crews know when and where to look for birds. The analysis of the eBirdRad data for bird pattern and trends assists with making habitat management decisions more quickly and more accurately.

At Marine Corps Air Station Cherry Point in North Carolina, Mike Begier, (USDA WS), at the request of the air station Natural Resources Division (NRD), is currently using avian radars for natural resources monitoring of local bird movements and also to provide information on birds relative to BASH issues.

In order to better understand the usefulness of the data collected by the radar, operations and research personnel at National Wildlife Research Center (NWRC), Ohio Field Station, are in the process of collecting a long-term dataset. One full year of data collected 24 hours a day, 7 days a week will be collected by the end of July 2008. NWRC personnel will compare the collected radar data with local bird surveys collected at the air station over the same time frame, and analyze the data in spatial and temporal contexts, creating summary statistics of radar detected bird movements. More precise knowledge of movement patterns during spring and autumn migrations in the local airspace could be used during flight planning operations to give more information that may allow for aircrews to reschedule training. This data also will be valuable, year round, especially in that it can be used to document potential BASH issues at night when traditional methods of bird detection are limited. At different times of the year various bird species utilize habitat on and adjacent to the air station. If the collected information on bird movements can be tied to a habitat attractant, then specific recommendations about habitat alteration could be considered. .

10th Annual BSCUSA-Canada Mtg.

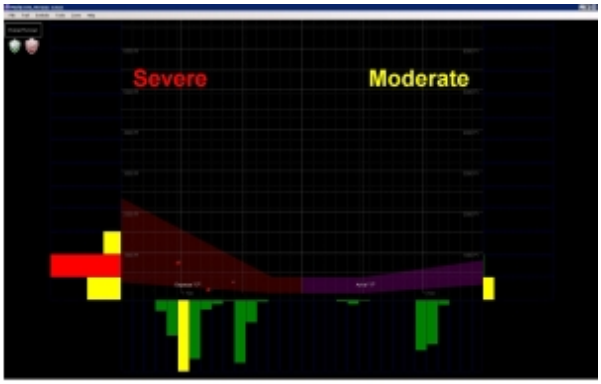
BSCUSA is sponsoring the 2008 Bird Strike Conference to be held August 19-21 in Sanford, Florida. See the BSCUSA website at www.birdstrike.org for details.

Currently the meeting hotel, the Orlando Marriott Lake Mary Hotel, is sold out. The overflow hotel is the Hampton Inn, one block away. E-Z Time transportation provides shared ride shuttle service between the Orlando Airport and the hotel, 37 miles away. Taxi fare from the airport is estimated at $135 round trip.

De Tect, Inc. Merlin Radar

For airfield detection and tracking of bird activity, DeTect developed, manufactures and supports the MERLIN Aircraft Birdstrike Avoidance Radar system that provides real-time display of bird activity on and around airports and airfields out to 8 miles and up to aircraft operational altitudes. The MERLIN avian radar system uses DeTect's proprietary radar data processing, display, distribution, and analysis software suite that was developed specifically to detect and track the unique behavioral characteristics of birds. In addition to the real-time display of bird activity, in 2007 DeTect deployed the MERLIN ATC software upgrade that automatically and continuously determines the bird-aircraft strike risk level for runway approach and departure corridors and displays the risk as color-coded LOW, MODERATE or SEVERE risk on the radar screen above each corridor with audible alerts to air traffic controllers, airfield managers and bird control teams. Currently, there are over 40 MERLIN systems in operation in the U.S., Canada, the UK, Europe, Africa and New Zealand that include 6 systems with the US Air Force and 2 system used by NASA for Space shuttle launch support.

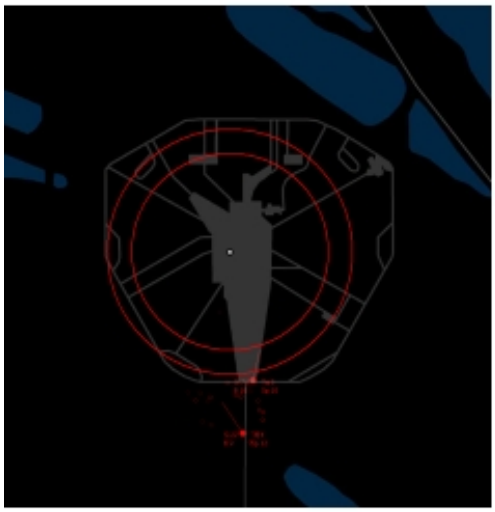
The MERLIN technology system has a well established track record for birdstrike reduction and reliability – the USAF Dare County Range reports no class A or B birdstrikes since it began using MERLIN in 2003 with an increase in available range time as a result of real time avian radar information. Additionally the system has delivered a high level of operability with an uptime exceeding 98% and maintenance costs of under $8,000.



DeTect's MERLIN ATC additionally software continuously monitors bird activity in the runway approach and departure corridors, automatically determining the current birds risk with the risk being displayed on the screen in color coded text (as LOW, MODERATE or SEVERE risk levels). Tower controllers, airfield managers and bird control staff are automatically alerted to changes in the risk condition.

Cont'd on Page 6

De Tect cont'd from P. 5



De Tect provided two expanded capability MERLIN systems to NASA that are used to provide detection and tracking of hazardous vulture activity during Space Shuttle launches. The units have provided detection and tracking for all shuttle launches since NASA's return to flight on July 4, 2006. The picture on the left illustrates two buzzard tracks approaching the shuttle launch point.

ROBIN bird control radar: Europe

The ROBIN bird radars are used in two variants. The first variant is of the ROBIN systems, which are connected to large ATC/fighter control radars, in use by the Air Forces of the Netherlands, Belgium and France.
On a large scale (10-150km) this ROBIN variant detects the birds flying through the radar beams. With signal/image processing bird tracks are made from the radar reflections of birds. The number of bird tracks per area leads to the bird density. This information of bird density is provided to all operational squadrons with a methodology named BirdTAM (comparable to NOTAM). For geographical squares the BirdTAM shows the bird density with a logarithmic scale of 1-8. On this scale, 5 and 6 represents a warning (amber) and 7 and 8 a warning (red). The BirdTAM is only used for birdstrike prevention for en route (between airport) low level flying. For a BirdTAM value 7 and 8 low level flying below a given altitude (normally 2000 or 3000ft) is not allowed. For 5 and 6 there are restrictions. The BirdTAM is not real-time information, so it has a limited value for on airport operations (take offs, landings, circuit flying).

ROBIN Lite was developed for local use on an airport. It is able to detect birds from ground level up to a few thousand feet and present the information in real-time. Both the position of birds as well as the altitude are registered, together with speed, direction, approximation of mass and species. As around the airport both the tracks of birds as well as aircraft can be predicted, birds with a potentially conflicting trajectory can be determined. How can this be used for bird strike prevention? The real-time bird information is helpful for the Bird Control Unit for improving their affectivity. As a real-time 'situational awareness' of the bird situation is presented, the BCU can more effectively deter the birds. Moreover the storing of all bird data in a database, together with datamining over a longer period, shows insight in the distribution (in space and time) of birds around the airport, preferred routes, altitudes, roosting areas etc. Consequently this information is a valuable input for habitat management.

ROBIN cont'd on Page 7

ROBIN cont'd from Page 6

A second application of ROBIN Lite is the presentation of bird danger to ATC, taking into account the bird tracks and altitude. ATC can react on it by advising a go around or delay a take off or by simply warning for the bird danger. As an ATC controller is fully occupied by his regular duties he will not use the ROBIN displays continuously and will only be warned in case of potential danger. Then only bird information of interest is displayed.

The RNLAF is using ROBIN Lite on Woensdrecht AFB, Netherlands' main military airport. The Dutch Air Force birdstrike rate has dropped by more than 50% since the use of ROBIN began.

Amsterdam's Schipol Airport will begin using ROBIN Lite in early 2009.

NEXT WILDLIFE HAZARD TRAINING SESSION

Embry-Riddle has scheduled its next Airport Wildlife Management seminar in Portland, Ore., on October 15-17, 2008.

This seminar is currently the only public training acceptable to the FAA Administrator to fulfill the FAA's training requirements of Advisory Circular 150/5200-36.

The seminar is three days in length. The first two days consist of classroom sessions led by four of the nation's top wildlife management experts. These sessions allow for plenty of interaction with the instructors, opportunities for questions and networking with fellow participants. Day three features a field trip to the host airport, during which hands-on wildlife mitigation exercises will be performed and mitigation techniques discussed.

Participants who successfully complete the seminar will receive a certificate of completion and continuing education units (CEU) from Embry-Riddle Aeronautical University.

You may register online at Embry-Riddle's website http://www.erau.edu/ec/soctapd/wildlife-dfw.html or call 866-574-9125 for more information. Hotel information will be announced shortly.

Editorial

We would like to thank the manufacturers and industry representatives from Accipiter, De Tect and ROBIN for their help in putting this edition together. They were all very forthcoming and believe in their products. The military is making good use of this technological advance, reducing strikes, saving costs and lives. The big question is: what's wrong with the civil side? Aside from some long ongoing studies there really is little effort to integrate this proven technology into civil aviation. Why?

Further the question must be asked: when it is integrated, how will it be done? With virtually no profile in the operational civil aviation arena, aviation wildlife hazard mitigation is probably two generations behind other aviation hazard mitigation such as wind shear, icing, volcanic ash, mid-air collisions, controlled flight into terrain. Who is going to lead this effort forward?

As ICAO says, aviation defenses are a three legged stool: technology, training and regulation. Without any one leg the stool can't stand. We certainly have the technology but, apart from airports, aviation wildlife training and regulation are weak or nonexistent in the civil arena. Without training and regulation here in the U.S., expect to see the 35,000 civil bird strikes a year in the U.S. increase, along with the fatal accident rate.

Paul Eschenfelder, Editor
eschenfp@erau.edu

Lagniappe— Long Range Acoustic Device (LRAD)

While not a remote sensor, the LRAD closes a gap in the aviation wildlife program, i.e., reaching those areas previously beyond the range of pyrotechnics or other harassment devices—Editor.

De Tect's LRAD is a highly directional acoustic array system that can deliver recorded distress calls and bird deterrent sirens in focused direction beam at ranges up to 1000 meters. LRAD systems can be used as a stand-alone bird deterrent device or can be directed automatically by the MERLIN system.

The LRAD-B offers capabilities not available with conventional bird control devices (e.g. gas cannons, speakers, pyrotechnics, etc.). Benefits of the LRAD-B for bird and wildlife control include:

- Extended range over conventional deterrent devices (horizontally and vertically)
- Reduced risk of habituation
- Variable sound sources
- Manual or automatic operation
- Durable, rugged MILSPEC design
- Dual purpose (supports facility security)