

# Wildlife & FOD Workshop

## The Current Situation

### Session #2 Presentation #2



Wildlife and Foreign Object  
Debris (FOD) Workshop,  
Cairo, Egypt, March 24-26,  
2014

**Chamsou Andjorin**  
**Aviation Safety Africa & Middle East**  
**Boeing International**

**Roger Nicholson PhD**  
**Aviation System Safety**  
**Boeing Commercial Airplanes**

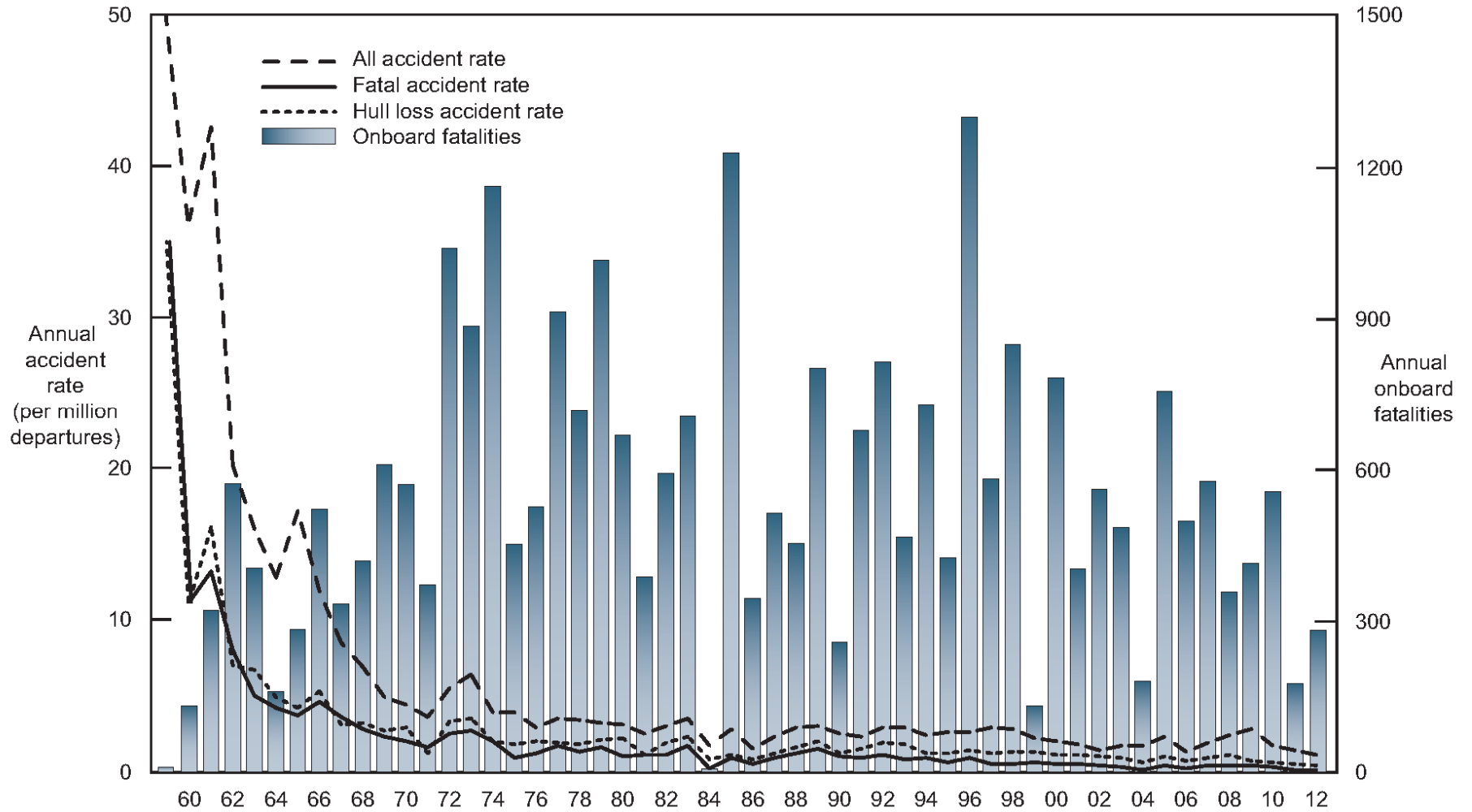
# Boeing Statistical Summary

<http://www.boeing.com/news/techissues/pdf/statsum.pdf>



# Accident Rates and Onboard Fatalities by Year

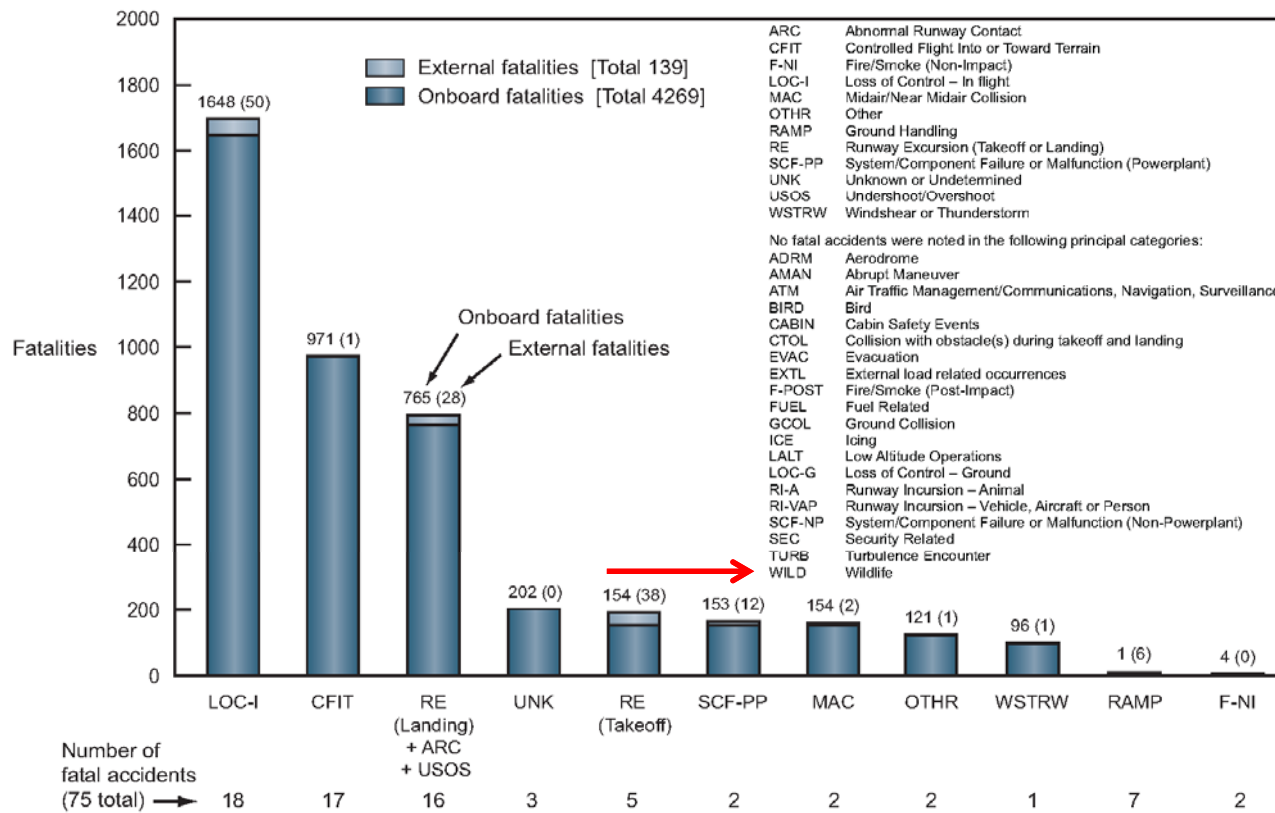
## Worldwide Commercial Jet Fleet – 1959 through 2012



Source: Boeing Statistical Summary

# No fatal wildlife accidents last 10 years

## Fatalities by CAST/ICAO Common Taxonomy Team (CICCTT) Aviation Occurrence Categories Fatal Accidents – Worldwide Commercial Jet Fleet – 2003 Through 2012



Note: Principal categories as assigned by CAST.

For a complete description of CICCTT Aviation Occurrence Categories, go to: <http://www.intlaviationstandards.org/>

Source: Boeing Statistical Summary

# Hudson River Event, January 15, 2009

Loss of Thrust in Both Engines After Encountering a Flock of Birds and Subsequent Ditching on the Hudson River  
US Airways Flight 1549  
Airbus A320-214, N106US  
Weehawken, New Jersey  
January 15, 2009

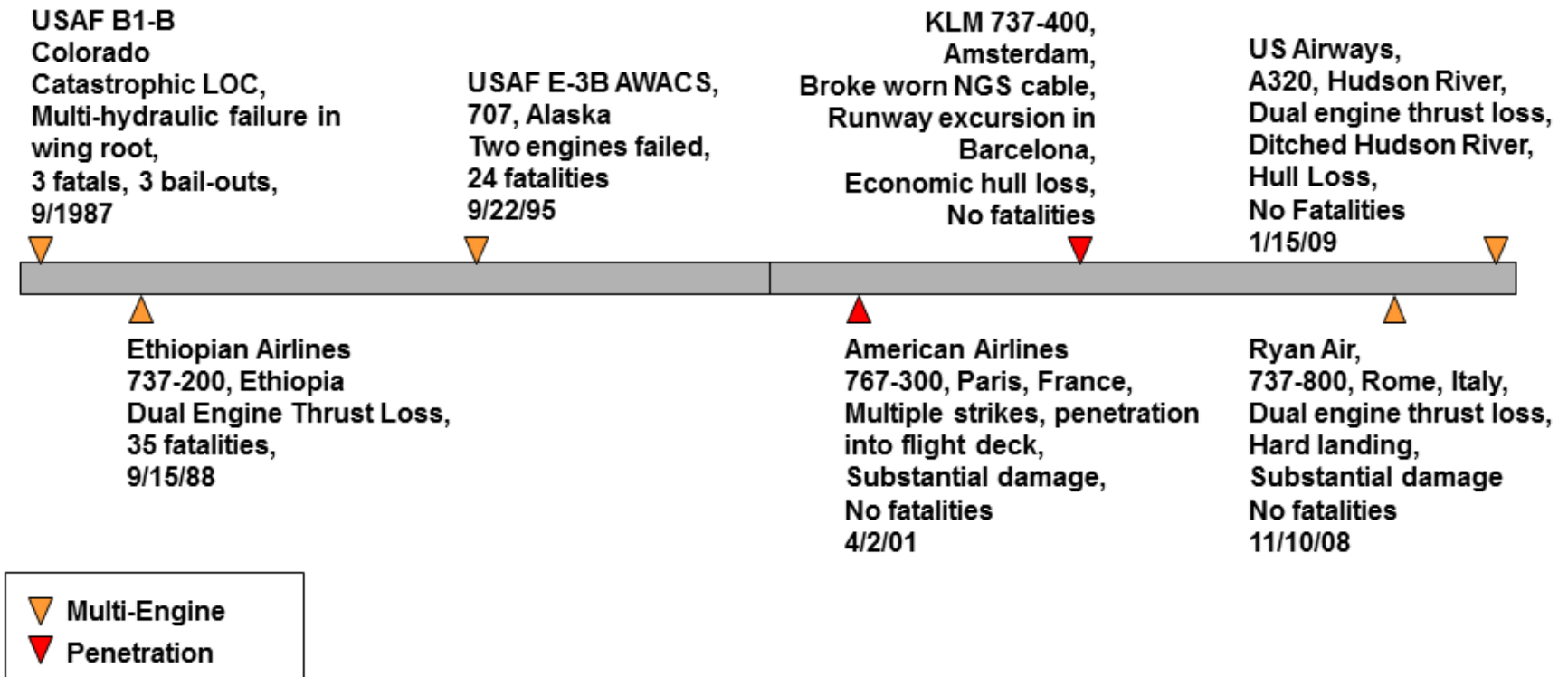


Accident Report  
NTSB/AAR-10/03  
PB2010-910403



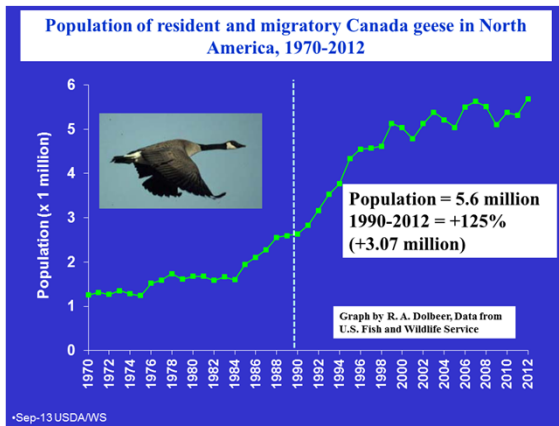
Ingestion of Canada geese into both engines at 2,800 feet 4.5 miles NNW of Lagaardia runway 22, “well outside the area expected to be covered by LGA’s WHMP” (wildlife hazard management plan).

# Selected Aviation Wildlife Incidents

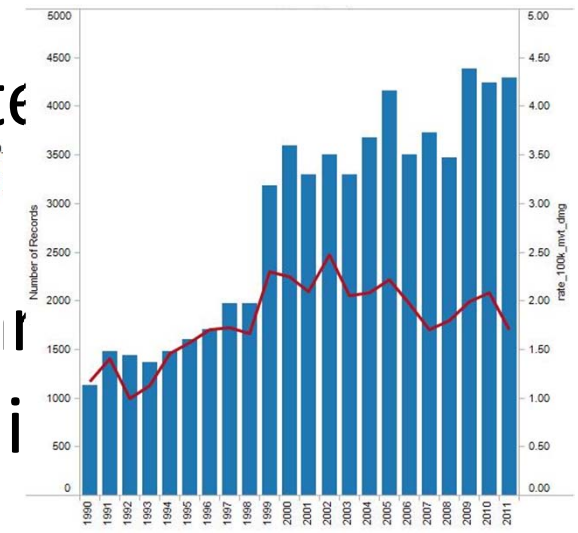
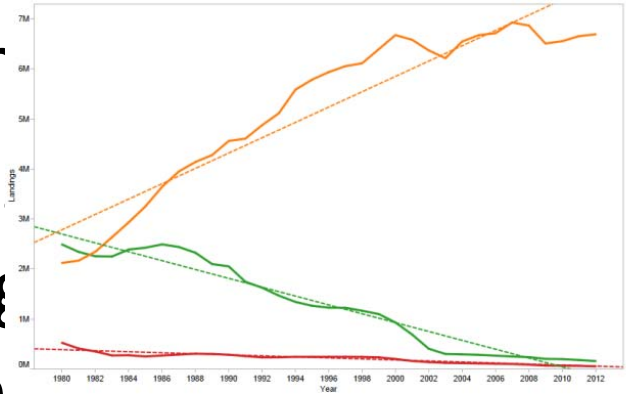


# The Aviation Wildlife Hazard is Increasing

- Increasing populations of hazardous species due to conservation & environmental initiatives



air traffic, predominate



Hazardous bird species population trend (Dolbeer, 2013)

above 500ft outside the airport



# Aviation Stakeholders and the Aviation Wildlife Hazard

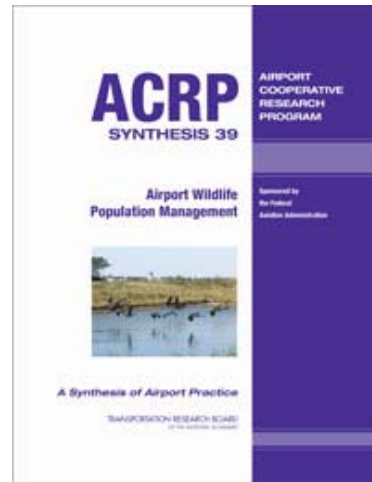
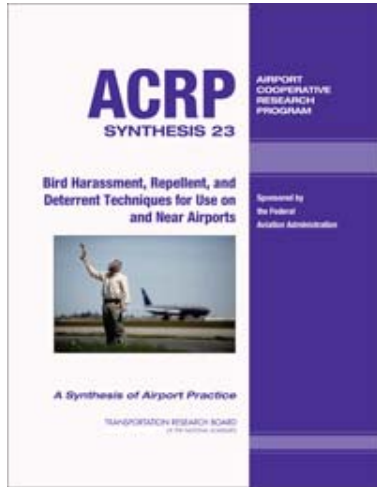
All aviation stakeholders have roles and responsibilities in addressing the aviation wildlife hazard:

- Aircraft Manufacturers: design for survivability: structures & systems; redundancy & protection; procedures & training
- Engine Manufacturers: bird strike requirements validation and verification
- Operators: Safety Management Systems, pilot

# Airport Wildlife Management

- Need “boots on the ground” - don’t rely on technology
- Trained personnel and availability of wildlife biologists
- Species identification
- Effective wildlife management: reduce attractants, knowledge of species behavior
- Use available wildlife management resources

# Wildlife Resources and Guidance



**U.S. Department of Transportation  
Federal Aviation Administration**

## Advisory Circular

Subject: **HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS**      Date: 9/29/2007      AC No: 150/200-338  
Initiated by: AAS-300      Change:

- PURPOSE.** This Advisory Circular (AC) provides guidance on certain land uses that have the potential to attract hazardous wildlife on or near public-use airports. It also discusses airport development projects (including airport construction, expansion, and renovation) affecting aircraft movement near hazardous wildlife attractants. Appendix 1 provides definitions of terms used in this AC.
- APPLICABILITY.** The Federal Aviation Administration (FAA) recommends that public-use airport operators implement the standards and practices contained in this AC. The history of Airport Operating Certificates issued under Title 14, Code of Federal Regulations (CFR), Part 139, Certification of Airports, Subpart D (Part 139), may use the standards, practices, and recommendations contained in this AC to comply with the wildlife hazard management requirements of Part 139. Airports that have received Federal grant-in-aid assistance must use these standards. The FAA also recommends the guidance in this AC for land-use planners, operators of non-certificated airports, and developers of projects, facilities, and activities on or near airports.
- CANCELLATION.** This AC cancels AC 150/5200-33A, Hazardous Wildlife Attractants on or near Airports, dated July 27, 2004.
- PRINCIPAL CHANGES.** This AC contains the following major changes, which are marked with vertical bars in the margin:
  - Technical changes to paragraph references.
  - Wording on storm water detention ponds.
  - Deleted paragraph 4.3.b, *Additional Coordination*.
- BACKGROUND.** Information about the risks posed to aircraft by certain wildlife species has increased a great deal in recent years. Improved reporting, studies, documentation, and statistics clearly show that aircraft collisions with birds and other wildlife are a serious economic and public safety problem. While many species of wildlife can pose a threat to aircraft safety, they are not equally hazardous. Table 1

**CERTALERT**

ADVISORY    CAUTIONARY    NON-DIRECTIVE

FOR INFORMATION OF ALL AIRPORTS    IF SEVERAL ARE AFFECTED, SEE LIST

DATE: September 21, 1998      No. 88-05

TO: Airport Operators,  
FAA Airport Certification Safety Inspectors

TOPIC: Grasses Attractive to Hazardous Wildlife

Recently, several reports have been received of airport owners or airport contractors planting drought-tolerant grasses on construction sites. The grasses projects with seed mats, are containing bromegrass and/or timothy are a major attractant to doves and other seed-eating birds.

Doves can be a major threat to aircraft safety. In the United States, between 1991 and 1997, doves were involved in 11% of all reported bird-aircraft strikes. 2% of the reported strikes that resulted in aircraft damage, and 1% of the reported strikes causing aircraft damage or other associated monetary losses.

Airport owners should ensure that grass species and other varieties of plants attractive to hazardous wildlife are not used on the airport. Drought-tolerant grasses or areas of seed mats should not be planted with seed mixtures containing millet or any other large-seed producing grass.

For airport projects already planted with seed mixtures containing millet or other large-seed producing grasses, it is recommended that disk plowing, or other suitable agricultural practices, be employed to prevent plant germination and seed head production.

For specific recommendations on grass management and seed selection, contact the State University Cooperative Extension Service, or the local office of the USDA Wildlife Services.

Benedict O. Casella to Manage  
Airport Safety and Compliance Branch      September 21, 1998



# The Importance of Strike Reporting and Species Identification

- Identify regional, national, local aviation wildlife hazards, and trends
- Monitor effectiveness of airport wildlife hazard management
- Provide data for airports, airlines, regulators, manufacturers, and safety bodies
- Species identification by trained personnel and laboratories

Review Strike Report for Confirmation Number 2014-2-16-211807-4-1

1. Name of Operator/Carrier Leading Edge FBO	2. Aircraft Make/Model CL60	3. Engine Make/Model
4. Aircraft Registration N604CL	5. Date of Incident 2/16/2014 mm / dd / yyyy	6. Local Time of Incident 12:22 PM Night
6A. Flight Number	6B. Wildlife/Bird Remains <input checked="" type="checkbox"/> Collected <input checked="" type="checkbox"/> Sent to Laboratory	7. Airport Name/ID (ICAO) HARRISBURG INTL - PA
10. Height (AGL) 200 ft	11. Runway Used 31	12. Phase of Flight D. Climb
14. Effect on Flight <input type="checkbox"/> None <input type="checkbox"/> Aborted Take-Off <input checked="" type="checkbox"/> Precautionary Landing <input type="checkbox"/> Engine Shutdown <input type="checkbox"/> Other (Specify)	15. Sky Condition Some Cloud	16. Precipitation <input type="checkbox"/> Fog <input type="checkbox"/> Rain <input type="checkbox"/> Snow <input checked="" type="checkbox"/> None
17. Bird/Other Wildlife Species Unknown	18. Number Seen and/or Struck Number Seen/Struck 1 <input checked="" type="checkbox"/> <input type="checkbox"/> 2 - 10 <input type="checkbox"/> <input type="checkbox"/> 11 - 100 <input type="checkbox"/> <input type="checkbox"/> more than 100 <input type="checkbox"/> <input type="checkbox"/>	19. Size of Bird(s) <input type="checkbox"/> Small <input type="checkbox"/> Medium <input type="checkbox"/> Large
20. Pilot Warned of Birds/Wildlife? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

# Detailed Strike Reports Provide Valuable Data

Form Approved OMB NO. 2120-0045  
3/31/2019

BIRD / OTHER WILDLIFE STRIKE REPORT				
U.S. Department of Transportation Federal Aviation Administration				
1. Name of Operator XXX	2. Aircraft Make/Model XXX	3. Engine Make/Model		
4. Aircraft Registration XXX	5. Date of Incident XX / XX / XX Month Day Year	6. Local Time of Incident <input type="checkbox"/> Dawn <input type="checkbox"/> Dusk <input type="checkbox"/> Night <input type="checkbox"/> AM <input type="checkbox"/> PM HR MIN		
7. Airport Name XXX	8. Runway Used	9. Location if En Route (nearest Town/Reference & State) X		
10. Height (AGL)	11. Speed (IAS)			
12. Phase of Flight <input type="checkbox"/> A. Parked <input type="checkbox"/> B. Taxi <input checked="" type="checkbox"/> C. Take-off Run <input type="checkbox"/> D. Climb <input type="checkbox"/> E. En Route <input type="checkbox"/> F. Descent <input type="checkbox"/> G. Approach <input type="checkbox"/> H. Landing Roll	13. Part(s) of Aircraft Struck or Damaged			
	A. Radome		H. Propeller	
	B. Windshield		I. Wing/Rotor	
	C. Nose		J. Fuselage	
	D. Engine No. 1		K. Landing Gear	
	E. Engine No. 2		L. Tail	
	F. Engine No. 3		M. Lights	
	G. Engine No. 4		N. Other: (Specify)	
	Struck		Struck	
	Damaged		Damaged	
14. Effect on Flight <input type="checkbox"/> None <input checked="" type="checkbox"/> Aborted Take-Off <input type="checkbox"/> Precautionary Landing <input type="checkbox"/> Engines Shut Down <input type="checkbox"/> Other: (Specify)	15. Sky Condition <input type="checkbox"/> No Cloud <input type="checkbox"/> Some Cloud <input type="checkbox"/> Overcast		16. Precipitation <input type="checkbox"/> Fog <input type="checkbox"/> Rain <input type="checkbox"/> Snow <input type="checkbox"/> None	
17. Bird/Other Wildlife Species	18. Number of birds seen and/or struck		19. Size of Bird(s)	
	Number of Birds		<input type="checkbox"/> Small <input type="checkbox"/> Medium <input type="checkbox"/> Large	
	Seen			
	Struck			
	1			
	2-10			
	11-100			
	more than 100			
20. Pilot Warned of Birds <input type="checkbox"/> Yes <input type="checkbox"/> No				
21. Remarks (Describe damage, injuries and other pertinent information) XXX				
<b>DAMAGE / COST INFORMATION</b>				
22. Aircraft time out of service: _____ hours	23. Estimated cost of repairs or replacement (U.S. \$): \$ _____	24. Estimated other Cost (U.S. \$ (e.g. loss of revenue, fuel, hotels): \$ _____		
Reported by (Optional)	Title	Date		
<p><small>Paperwork Reduction Act Statement: The information collected on this form is necessary to allow the Federal Aviation Administration to assess the magnitude and severity of the wildlife-aircraft strike problem in the U.S. The information is used in determining the best management practices for reducing the hazard to aviation safety caused by wildlife-aircraft strikes. We estimate that it will take approximately 6 minutes to complete the form. The information collected is voluntary. Please note that an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control number associated with this collection is 2120-0045. Comments concerning the accuracy of this burden and suggestions for reducing the burden should be directed to the FAA at: 800 Independence Ave SW, Washington, DC 20591. Attn: Information Collection Clearance Officer, ABA-20</small></p>				

FAA Form 5200-7 (11-97) Supersedes Previous Edition Electronic Version (Adobe) \* U.S. GPO: 1997-432-349/74201 NSN: 0052-00-651-0005

## Directions for FAA Form 5200-7 Bird/Other Wildlife Strike Report

- Name of Operator - This can be an airline (abbreviations okay - UAL, AAL, etc.), business (Coca Cola), government agency (Police Dept., FAA) or if a private pilot, his/her name.
- Aircraft Make/Model - Abbreviations are okay, but to include the model (e.g. B737-200)
- Engine Make/Model - Abbreviations are allowed (e.g., PW 4060, GECT7, LYC 580).
- Aircraft Registration - This means the N# (for USA registered aircraft).
- Date of Incident - Give the local date, not the ZULU or GMT date.
- Local Time of Incident - Check the appropriate light conditions and fill in the hour and minute local time and check AM or PM or use the 24 clock and skip AM/PM.
- Airport Name - Use the airport name or 3 letter code if a US airport. If a foreign airport, use the full name or 3 letter code and location (city/country).
- Runway used - Self explanatory.
- Location if En Route - Put the name of the nearest city and state.
- Height AGL - Put the feet above ground level at the time of the strike (if you don't know, use MSL and indicate this). For take-off run and landing roll, it must be 0.
- Speed (IAS) - Speed at which the aircraft was traveling when the strike occurred.
- Phase of Flight - Phase of flight during which the strike occurred. Take-off run and landing roll should both be 0 AGL.
- Part(s) of Aircraft Struck or Damaged - Check which parts were struck and damaged. If a part was damaged but not struck indicate this with a check on the damaged column only and indicate in comments (#21) why this happened (e.g., the landing gear might be damaged by deer strike, causing the aircraft to flip over and damage parts not struck by deer).
- Effect on Flight - You can check more than one and if you check (Other", please explain in Comments (#21).
- Sky condition - Check the one that applies.
- Precipitation - You may check more than one.
- Bird/Other Wildlife Species - Try to be accurate. If you don't know, put unknown and some description. Collect feathers or remains for identification for damaging strikes.
- Number of birds seen and/or struck - check the box in the Seen column with the correct number if you saw the birds/other wildlife before the strike and check the box in the Struck column to show how many were hit. The exact number, can be written next to the box.
- Size of Bird(s) - Check what you think is the correct size (e.g. sparrow = small, gull = medium and geese = large).
- Pilot Warned of Birds - Check the correct box (even if it was an ATIS warning or NOTAM).
- Remarks - Be as specific as you can. Include information about the extent of the damage, injuries, anything you think would be helpful to know. (e.g., number of birds ingested).
- Aircraft time out of service - Record how many hours the aircraft was out of service.
- Estimated cost of repairs or replacement - This may not be known immediately, but the data can be sent at a later date or put down a contact name and number for this data.
- Estimated other cost - Include loss of revenue, fuel, hotels, etc. (see directions for #23).
- Reported by - Although this is optional, it is helpful if questions arise about the information on the form (a phone number could also be included).
- Title - This can be Pilot, Tower, Airport Operations, Airline Operations, Flight Safety, etc.
- Date - Date the form was filled out.



# Analysis of Strike Reports guides Manufacturer Design, Pilot Procedures & Training

## Strategies for Prevention of Bird-Strike Events, Boeing AERO Magazine 2011 Qtr3



### Strategies for Prevention of Bird-Strike Events

Bird-strike events are relatively common, occur most often on the ground or at low altitude, and are usually benign. However, bird strikes can have significant economic and occasional safety consequences for flight operations. Pilots and operators should be knowledgeable about the hazard, and flight crews should use facts, data, and standard operating procedures to reduce the potential for and consequences of a bird strike.

By Roger Wainman, Ph.D., Associate Technical Fellow, Avionics System Safety, and  
William S. Reed, Safety Pilot, Boeing Flight Technical and Safety

Bird strikes are a lesser hazard to aviation than other well-known hazards such as loss of control in flight, controlled flight into terrain, and runway excursions, but they can and do present risk that needs to be addressed. The first bird strike was recorded by the Wright brothers in 1905, and the aviation wildlife hazard has been a risk to aviation ever since. The January 15, 2000, ditching of US Airways flight 1549 on the Hudson River in Westchester, New Jersey, was the dramatic result of dual engine thrust loss arising from an airborne encounter with a flock of Canada geese. Although Boeing airplanes meet and exceed the government regulations for bird

strikes, accidents and serious incidents can occur. Aviation wildlife hazards encompass birds on the ground and in flight, terrestrial animals (e.g., deer, coyotes, cattle, caribou), and even airborne animals such as fruit bats; however, this article focuses on bird strikes in particular. Operators and flight crews should be aware of the risk of bird strikes, prevention strategies, and actions to take following a bird strike. This article discusses the characteristics of bird strikes, presents practical information for flight crews, highlights the importance of reporting bird strikes, and provides resources for additional bird strike information.

**CHARACTERISTICS OF BIRD STRIKES**

According to Bird Strike Committee USA, an organization that was formed in 1991 to facilitate the exchange of information and promote the collection and analysis of accurate wildlife strike data, bird and other wildlife strikes cause more than \$550 million in damage to U.S. civil and military aviation annually. In addition, bird strikes put the lives of crew members and passengers at risk — more than 200 people have been killed worldwide as a result of wildlife strikes since 1990. The Bird Strike Committee takes a similar data-driven approach to the bird strike issue that organizations such

# Few Wildlife Strike Reports from Africa & the Middle East (ICAO 2001-2007)



International Civil Aviation Organization

**ELECTRONIC BULLETIN**  
For information only

EB 2009/37

11 December 2009

## 2001-2007 BIRD STRIKE ANALYSES (IBIS)

The analyses of bird strike reports for the years 2001 to 2007 are based on 42 508 reports, received from fifty-one States on strikes occurring in 145 States and territories as shown at Attachment A. A summary of bird strikes reported to the ICAO Bird Strike Information System (IBIS) for the years 2001 to 2007 is included at Attachment B, a chart of Significant Bird Strikes at Attachment C, IBIS World Bird Strike Statistics at Attachment D and a list of bird types at Attachment E.

Amendment 10 to Annex 14 — *Aerodromes, Volume I — Aerodrome Design and Operations*, which was adopted by the Council on 4 March 2009, became applicable on 19 November 2009. This amendment introduces new provisions, including replacing "bird strike" with "wildlife strike" to cover both strikes by birds and other animals; ongoing evaluation of the wildlife hazard on or in the vicinity of aerodromes by competent personnel; and a Recommendation on the responsibility of States to give consideration to aviation safety concerns related to land developments in the vicinity of an aerodrome that may attract wildlife.

The IBIS programme is an important element in accident prevention and is highly supported by airlines and experts working to reduce the threat of bird strikes to aircraft. It has contributed significantly to the development of international Standards and Recommended Practices (SARPs) on bird strike hazard reduction. It should be noted that with the applicability of Amendment 10 to Annex 14, Volume I, information on strikes by animals other than birds shall also be included in IBIS. Future analyses will cover both strikes by birds and other animals provided that sufficient information is available.

### Enclosures

- A — List of States and Territories for the years 2001-2007
- B — Summary of Bird Strikes reported to ICAO Bird Strike Information System (IBIS) for the years 2001-2007
- C — Chart of Significant Bird Strikes for the years 2001-2007
- D — IBIS World Bird Strike Statistics 2001-2007
- E — List of bird types for the years 2001-2007

Issued under the authority of the Secretary General

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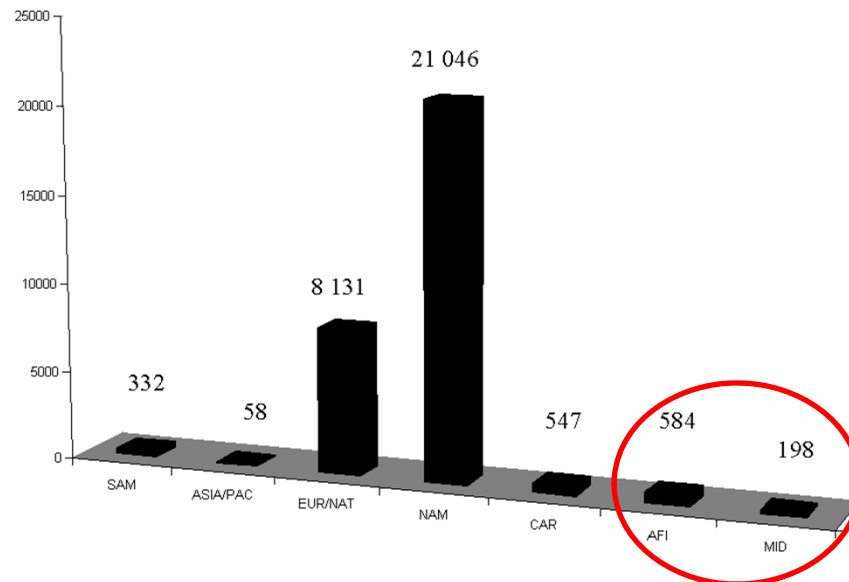
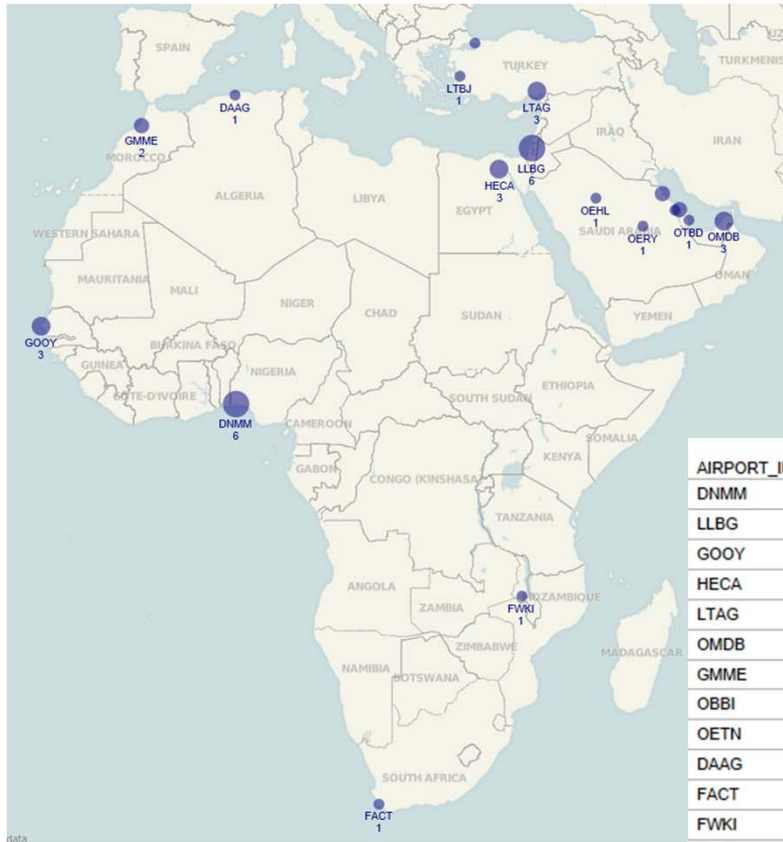


Chart 2: Strikes reported distributed by Region in which they occurred

# Africa & Mid-East strikes: FAA database 1990-2012



AIRPORT_ID	AIRPORT	municipality	iso_country	continent	iso_country_ICAO	
DNMM	MURTALA MUHAMMED	Lagos	NG	AF	WACAF	6
LLBG	BEN GURION ARPT	Tel Aviv	IL	AS	EUR/NAT (Med)	6
GOOY	DAKAY-YOFF-LEOPOLD SEDAR SENGHOR	Dakar	SN	AF	WACAF	3
HECA	CAIRO INTL	Cairo	EG	AF	MID	3
LTAG	INCIRLIK AIR BASE	Adana	TR	AS	EUR/NAT (Med)	3
OMDB	DUBAI INTL	Dubai	AE	AS	MID	3
GMME	RABAT MOROCCO	Rabat	MA	AF	EUR/NAT (Med)	2
OBBI	BAHRAIN INTL	Manama	BH	AS	MID	2
OETN	RAS TANAJIB	Null	SA	AS	MID	2
DAAG	HOUARI BOUMEDIENE	Algiers	DZ	AF	EUR/NAT (Med)	1
FACT	CAPE TOWN INTL ARPT	Cape Town	ZA	AF	ESAF	1
FWKI	KAMUZU INTL	Lilongwe	MW	AF	ESAF	1
LTBA	ATAURK INTL (TURKEY)	Istanbul	TR	EU	EUR/NAT (Med)	1
LTBJ	ADNAN MENDERES	İzmir	TR	AS	EUR/NAT (Med)	1
OEHR	DHAHRAN INTL	Null	SA	AS	MID	1
OEHL	HAIL	Null	SA	AS	MID	1
OERY	RIYADH AIR BASE	Riyadh	SA	AS	MID	1
OTBD	DOHA INTL	Doha	QA	AS	MID	1



Bird Strike Committee USA Annual Conference  
August 11-14, 2014, Atlanta, USA



## Bird Strike Committee USA Annual Conference

August 11-14, 2014, Atlanta, GA



Bird Strike Committee USA

The 2014 Bird Strike Committee – USA Annual Conference will be held 11–14 August 2014 in Atlanta, Georgia. (See [www.birdstrike.org](http://www.birdstrike.org) or [www.aaae.org](http://www.aaae.org) for details). The theme for the conference event is “Back to the Future – Learning from the Past and Looking to the Future”. We will have a series of presentations that review historical aspects of bird strike issues (“the past”), examine current issues (“the present”), and look forward to contemplate what lies ahead (“the future”). The program will

# Addressing the Regional Wildlife Hazard

- Accident rates and numbers of fatalities differ dramatically in different regions of the world
- We know how to prevent many of the types of accidents occurring today
- Efforts to improve safety have been most successful when industry and government have worked together
- Better use and coordination of industry and government resources can dramatically reduce these kinds of accidents
- Best results are attained when efforts are well-coordinated

# Summary

Airport wildlife management is effective and is reducing damaging strikes on and in the vicinity of airports. Wildlife strike reporting is crucial for tracking effectiveness and consequence.

Despite indicators of an increasing aviation wildlife hazard outside airport boundaries, there are practical limits for bird strike resistance that can be achieved by aircraft and engine manufacturers.

We should look at means to enhance inflight

.....

# Conclusion

Aircraft and birds share the sky, can we do this with enhanced safety?

Thank you.

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