

National Transportation Safety Board

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**Robert L. Sumwalt, III
Board Member**

Testimony of the Honorable Robert L. Sumwalt, III
Board Member
National Transportation Safety Board
Before the
Subcommittee on Aviation
Committee on Transportation and Infrastructure
United States House of Representatives

Hearing on the US Airways Flight 1549 Accident
February 24, 2009

Good morning. With your concurrence, Mr. Chairman, I would like to give you a short summary of the Safety Board's activity to date, regarding the investigation of the accident involving US Airways flight 1549.

On January 15, 2009, at 3:27 in the afternoon, US Airways flight 1549, an Airbus A320-214, registered as N106US, experienced multiple birdstrikes following takeoff from New York's LaGuardia Airport. Birds were ingested by both engines and caused a significant loss of thrust. Due to the thrust loss, the airplane was unable to maintain level flight. The flight crew subsequently ditched the airplane in the Hudson River, adjacent to the Intrepid Sea, Air, and Space Museum, in New York City.

The 150 passengers and 5 crewmembers evacuated the aircraft and were rescued by local ferry operators and boaters in the immediate area. One flight attendant and three passengers suffered serious injuries during the touchdown. Examinations of log entries revealed that the ferry *Thomas Jefferson* arrived at the airplane 3 minutes after the ditching occurred, the ferry *Thomas Kean* arrived 2 minutes later, the ferry *Moira Smith* arrived 1 minute after the *Thomas Kean*, and the ferry *Athena* arrived 1 minute later. The logs indicate that by 4:20 p.m., all passengers and crewmembers were off the airplane.

During and following the evacuation, the aircraft drifted downriver at a speed of about 1.6 miles per hour. During the rescue operations, the airplane was lashed to tugboats and fireboats to keep it afloat. The river current drove the airplane and boats toward the Manhattan shoreline and a tug then pushed the airplane to the Battery Park shore where it was then tied to a pier near the World Financial Center in lower Manhattan, about 3.5 miles from the touchdown point. In the days following the accident, the aircraft, minus the left engine, which had been knocked off during impact with the water, was lifted onto a barge and transported to a docking location on the New Jersey side of the river. There, the wings, horizontal stabilizer, vertical stabilizer, and right engine were removed. The left engine was recovered from the river 3 days later. The engines were transported directly from the dock in New Jersey to the General Electric facility in Cincinnati, Ohio, for investigative teardown. The rest of the wreckage is in a storage yard in Kearny, New Jersey, where it will remain for further study.

Interviews with the flight crew revealed that the initial takeoff was completely normal until the first officer spotted a group of dark birds slightly to the right of the flightpath. In his statements to Safety Board investigators, the captain stated that he saw the birds an instant later and said that the flock "filled his windscreen." He indicated that he had no time to react before he felt and heard the birds colliding with the airframe. He also described a feeling of an immediate and dramatic loss of thrust at the same time. He stated that he immediately took control of the airplane from the first officer and transmitted a mayday call to the departure air traffic controller. He then described directing the first officer to begin emergency procedures for dual engine failure. Due to the low altitude and the inability to maintain level flight, the captain said he concluded that a ditching in the river was the safest alternative available. He then made a single "brace for impact" call on the public address system, and shortly thereafter touched down in the water. He said that the wings were level at impact and that the airplane stopped suddenly.

The flight recorders were recovered from the aircraft intact and in good working order. The flight data recorder, or FDR, revealed that the elapsed time from takeoff to the birdstrikes was a little over 1.5 minutes. The time from the birdstrikes to touchdown in the water was about 3.5 minutes. The birds struck the aircraft at an altitude of about 2,750 feet.

Interviews with the three flight attendants revealed that the overall evacuation was orderly. In general, they stated that they heard a thud or thuds and then the airplane became very quiet. One noticed that the airplane was descending. When they heard the captain call "brace for impact" they began to shout, "brace, brace, heads down, stay down." One forward flight attendant described the touchdown as very firm, and the aft flight attendant described the touchdown as violent. None of them realized that the airplane was in the water until they looked out the windows.

Several problems complicated the evacuation effort. Cargo compartment structure had been pushed up through the floor of the rear of the airplane that resulted in an injury to the aft flight attendant. The aft pressure bulkhead of the fuselage was also compromised and water began to enter the rear cabin area. This water caused the fuselage to float tail down, and precluded the use of the two aft slide rafts. In addition, one passenger opened one of the rear doors, and the aft flight attendant could not completely reclose the door during the evacuation.

The FDR revealed no anomalies in the operation of the two General Electric/CFM56 engines during the accident flight up until the time the birds were ingested. The engines were disassembled at the General Electric factory in Cincinnati, Ohio. Canada Goose remains, including feathers, were found in both engines. We could not determine the number of birds ingested. The U.S. Department of Agriculture and the Smithsonian Institution assisted the Safety Board in these matters. Both engines show soft body damage on compressor blades and some of the compressor blades are bent. This bending was due to bird impact or impact with the water. Two days before the accident, one engine experienced a compressor stall in flight. Subsequent maintenance

on that engine before the accident flight included the replacement of a temperature probe in accordance with approved procedures. Maintenance tests following this replacement revealed no anomalies, and investigators have found no evidence to indicate that this earlier compressor stall was related to the accident 2 days later. In addition, an examination of engine maintenance records revealed that the engines on the airplane complied with all FAA airworthiness directives and manufacturer advisory bulletins in effect at the time.

An examination of the structure of the aircraft following the accident revealed severe damage to the underside of the rear fuselage, including the aforementioned compromised aft pressure bulkhead. Further documentation and measurement of the damage will occur soon. An examination of the aircraft systems revealed no anomalies associated with the flight controls. The auxiliary power unit, located in the rear fuselage was hanging from the rear of the airplane by its generator cables. The ram air turbine was found in its extended position. The auxiliary power unit was started by the captain after the thrust loss to supply electrical and hydraulic power, and operated as anticipated. The ram air turbine, designed to deploy automatically upon loss of critical electrical and/or hydraulic components, operated as designed. An examination of the interior of the cabin revealed deployed oxygen masks over 8 rows of seats behind row 14, and windows missing or loose in 6 rows aft of row 19.

Passenger turbine-powered airliner ditchings are quite rare but not unprecedented. For instance, in 1963, a Soviet civilian Tupolev-124 airliner ditched in the Neva River near Leningrad with no injuries or fatalities. In 1970, an Overseas National Airways, Inc. (ONA) DC-9 ditched approximately 30 miles east-northeast of St. Croix, Virgin Islands, with 63 persons on board. Forty of those, including 5 crew members, survived. And in 2002, an Indonesian Boeing 737 ditched in a shallow river near Yogyakarta, Indonesia, causing 13 serious injuries and one fatality. During the Hudson River accident, 4 persons were seriously injured, and of course, no fatalities occurred.

Dual jet engine malfunctions in general and dual engine malfunctions caused by ingestion of birds in particular are extremely rare events. Multiple jet engine failures can occur because of fuel exhaustion, rain ingestion, fuel icing, volcanic ash ingestion, and bird ingestion. Most often, bird ingestion causes no loss of thrust or a partial power loss. Even in the case of US Airways flight 1549, which did lose thrust in the right engine, the left engine did not fail completely. However, the thrust available from that engine was insufficient to allow the airplane to remain airborne.

The Safety Board is currently investigating, or assisting in the investigation, of three accidents where birdstrikes may have occurred. Most recently, a Sikorsky S-76 helicopter was likely struck by a bird and crashed near Morgan City, Louisiana, on January 4, 2009. Both pilots and six of the seven passengers on board were killed in that accident, and one person was critically injured. The Board is assisting the government of Italy in its investigation of a Ryanair Limited B-737-800 that crashed near Ciampino, Italy, on November 10, 2008, with no fatalities or injuries. And last, we are investigating

the loss of a Cessna 500 Citation that struck birds near Oklahoma City, Oklahoma, on March 4, 2008, resulting in 5 fatalities.

Since 1973, the Safety Board has issued 32 recommendations to the FAA and other agencies regarding birdstrikes, bird ingestion by aircraft engines, and bird hazard mitigation. The most recent of these recommendations were issued by the Board in 1999. (See attachment.)

The Safety Board has voted to hold a public hearing on the Hudson River accident. The hearing, which will likely be held in late spring of this year, will include the following topic areas:

1. Turbine engine bird ingestion capability. The GE/CFM56 engines on the Airbus A320 airplanes were certified by the European Joint Airworthiness Authority (JAA) and, subsequently, by the U.S. Federal Aviation Administration (FAA) under a bilateral agreement. The engines were originally certified to withstand the ingestion of seven 1-1/2 pound birds directed at the core of the engine. General Electric actually tested the engine using three 2-1/2 pound birds aimed at the core, which exceeded the requirements at the time. Today's test standard for the CFM56-5 is one 2-1/2 pound bird followed by five 1-1/2 pound birds, with a maximum allowable 25% loss of thrust. The fact that the accident engines exceeded even today's standard and still failed, is of great interest and concern to the Safety Board. On November 16, 2007, the FAA amended this certification standard by raising the weight of the bird to 8 pounds for engines manufactured in the future. In its September 2006 response to the FAA notice of proposed rulemaking (NPRM) that preceded this rule change, the Safety Board commented that the FAA's proposed bird weight was too low. We did not specify a minimum weight, but we did note that the weight should be increased to represent birds as large as the Canada Goose, which can weigh up to 24 pounds, thereby representing a more realistic threat to airplanes.

2. The joint JAA/FAA certification of the Airbus A320 regarding water landings. As noted previously, during the US Airways accident sequence, cargo bay structure was forced up through the cabin floor, seriously injuring a flight attendant. According to 14 CFR Part 25.801, practical design measures must be taken to minimize the probability of this happening. Also, the aft pressure bulkhead of the airplane was breached during impact, allowing water to enter the cabin and causing a tail-low water attitude. This precluded the use of the two aft slide rafts during the evacuation of the cabin. Part 25.801 states that following a ditching, the trim of the airplane should allow passengers the opportunity to use the rafts.

3. The effectiveness of bird mitigation efforts at or near airports. According to Embry-Riddle Aeronautical University statistics, birdstrikes cost the U.S. economy over \$300 million, and have caused loss of life in the past. In 2007, a total of 7,439 birdstrikes were reported to the FAA. This number equates to 1.751 birdstrikes per 10,000 aircraft movements. Natural habitat surrounds many modern airports, and this habitat provides shelter, nesting areas, and feeding areas for wildlife that are not usually present in the

surrounding metropolitan area. Further, because bird flight typically occurs at low altitude, a majority of wildlife strikes occur within the immediate airport environment. The Board is interested in exploring the new technologies that are being developed and fielded to detect large groups of birds in these environments.

4. The current state of training at U.S. airlines regarding a ditching scenario. The highly experienced US Airways flight and cabin crews performed their duties in admirable fashion. The Board will explore the amount and type of training these personnel received and will consider what aspects of their training and experience influenced their decision-making and actions during the emergency. And, I might add that the air traffic controllers involved in the event performed their duties in an admirable manner under trying and busy conditions.

Mr. Chairman, this concludes my testimony, and I will be glad to answer questions at the appropriate time.

Recommendation Report

Friday, September 05, 2008

NOTATION:7192

Log Number 2764

Issue Date 11/19/1999

KANSAS CITY MO

3/4/1999

ON 3/4/99, AT 2200 CENTRAL STANDARD TIME, A DOUGLAS DC-9-15F, N195US, OPERATED BY USA JET AIRLINES, INC., ENCOUNTERED A FLOCK OF LARGE BIRDS WHILE ON FINAL APPROACH FOR LANDING AT KANSAS CITY INT'L. AIRPORT, KANSAS CITY, MISSOURI. DURING THE ENCOUNTER, SEVERAL BIRDS WERE INGESTED INTO BOTH ENGINES, RESULTING IN SEVERE ENGINE POWER LOSS. THE PILOT REGAINED ENOUGH POWER IN ONE ENGINE TO CONTINUE THE APPROACH AND LAND THE AIRPLANE WITHOUT FUTHER INCIDENT. THERE WERE NO INJURIES. NIGHT VISUAL METEOROLOGICAL CONDITIONS PREVAILED AT THE TIME OF THE ENCOUNTER, AND AN INSTRUMENT FLIGHT RULES (IFR) FLIGHT PLAN HAD BEEN FILED FOR THE NONSCHEDULED DOMESTIC AIR CARGO FLIGHT. THE FLIGHT WAS CONDUCTED UNDER THE PROVISIONS OF 14 CODE OF FEDERAL REGULATIONS (CFR) PART 121.

Recommendation # A-99-086

Overall Status
CAA

Priority

THE NTSB RECOMMENDS THAT THE FEDERAL AVIATION ADMINISTRATION: EVALUATE THE POTENTIAL FOR USING AVIAN HAZARD ADVISORY SYSTEM TECHNOLOGY FOR BIRD STRIKE RISK REDUCTION IN CIVIL AVIATION AND IF FOUND FEASIBLE, IMPLEMENT SUCH A SYSTEM IN HIGH-RISK AREAS, SUCH AS MAJOR HUB AIRPORTS AND ALONG MIGRATORY BIRD ROUTES, NATIONWIDE.

FAA	Closed - Acceptable Action	5/11/2000
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2/14/2000 Addressee Letter Mail Controlled 02/22/2000 3:50:06 PM MC# 2000289 THE FAA AGREES WITH THE INTENT OF THIS RECOMMENDATION AND HAS ALLOCATED RESEARCH FUNDS IN FISCAL YEAR (FY) 1999 TO BEGIN STUDYING THE USE OF AVIAN HAZARD ADVISORY SYSTEM (AHAS) TECHNOLOGY FOR THE MONITORING OF BIRD MOVEMENTS ON A NATIONAL BASIS. THE AHAS IS WELL SUITED FOR MONITORING BIRD MOVEMENTS ON A REGIONAL BASIS. HOWEVER, BECAUSE OF LIMITATIONS INHERENT IN THE AHAS, IT IS NOT SUITABLE FOR MONITORING BIRD MOVEMENTS ON OR WITHIN 5 MILES OF AN AIRPORT. TO MONITOR BIRD MOVEMENTS WITHIN 5 MILES OF AN AIRPORT, A DIFFERENT TYPE OF RADAR MUST BE USED. THE FAA IS WORKING WITH THE U.S. AIR FORCE BIRD AIRCRAFT STRIKE HAZARD TEAM AND GIO-MARINE TO STUDY THE USE OF AHAS TECHNOLOGY FOR MONITORING BIRD MOVEMENT ON A REGIONAL BASIS AND RESEARCH THE USE OF MICRO-BURST PREDICTION RADAR FOR MONITORING BIRD MOVEMENT WITHIN 5 MILES OF AN AIRPORT. THE FAA WILL CONDUCT A DETAILED REVIEW DURING FY 2000 OF ALL COMPONENTS THAT MAKE UP AHAS. THE REVIEW WILL INCLUDE: (1) ACQUISITION OF NEXRAD RADAR DATA, (2) ACQUISITION OF WEATHER DATA AND OF PREDICTED WEATHER OVER THE NEXT 24 HOURS (THIS EFFORT IS PROVIDED BY THE NATIONAL WEATHER SERVICE). THE PREDICTION USES THE MOS PROGRAM FROM NWS, (3) PROCESSING OF WEATHER DATA AGAINST KNOWN MIGRATORY BIRD "RULES", (4) DEVELOPMENT AND USE OF A NEURAL NETWORK TO PREDICT BIRD MOVEMENT AT THE NATIONAL LEVEL, AND (5) RISK ASSESSMENT FOR HIGH SPEED, LOW-LEVEL FLYING--THE FAA IS DEVELOPING RISK ASSESSMENT FACTORS FOR CIVIL AIRPORTS. BASED ON THE RESULTS OF THE DETAILED REVIEW, THE FAA WILL DETERMINE HOW AHAS CAN BE MODIFIED/ADAPTED FOR USE IN COMMERCIAL AVIATION. THE FAA WILL REVIEW OTHER TECHNOLOGIES AND RADAR SYSTEMS THAT CAN BE USED OR MODIFIED FOR USE AT THE LOCAL LEVEL. THIS WOULD PROVIDE AN AIRPORT COVERAGE FOR DETECTING WILDLIFE IN REAL TIME. TWO DIFFERENT TYPES OF RADAR THAT MAY BE ABLE TO PROVIDE THE NEEDED COVERAGE ARE THE ASR-9 OR THE AMPER RADAR (PREVIOUSLY KNOWN AS THE MICRO-BURST RADAR). A PROTOTYPE OF THE AMPER RADAR SYSTEM IS SCHEDULED TO BE INSTALLED AT PANAMA CITY IN EARLY 2000.

5/11/2000 NTSB THE SAFETY BOARD HAS REVIEWED THE FAA'S ACTIONS AND APPRECIATES THAT THE EVALUATION ADDRESSES THE POTENTIAL USE OF PREDICTION RADAR IN AREAS WHERE THE AHAS IS NOT EFFECTIVE. BECAUSE THE FAA'S EVALUATION OF AHAS FOUND THAT IT IS NOT EFFECTIVE IN HIGH-RISK AREAS AND THE FAA CONTINUES TO RESEARCH OTHER FORMS OF RADAR OF RADAR FOR THOSE AREAS, A-99-86 IS CLASSIFIED "CLOSED--ACCEPTABLE ACTION."

Recommendation Report

Friday, September 05, 2008

NOTATION:7192

Recommendation # A-99-087

**Overall Status
CAA**

Priority

THE NTSB RECOMMENDS THAT THE FEDERAL AVIATION ADMINISTRATION: IN COORDINATION WITH THE U.S. DEPT. OF AGRICULTURE, CONDUCT RESEARCH TO DETERMINE THE EFFECTIVENESS AND LIMITATIONS OF EXISTING AND POTENTIAL BIRD HAZARD REDUCTION TECHNOLOGIES.

FAA	Closed - Acceptable Action	5/11/2000
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2/14/2000 Addressee Letter Mail Controlled 02/22/2000 3:50:06 PM MC# 2000289 THE FAA AGREES WITH THIS RECOMMENDATION AND IN 1991 ENTERED INTO AN INTERAGENCY AGREEMENT WITH THE U.S. DEPT. OF AGRICULTURE'S (USDA) WILDLIFE SERVICES, NATIONAL WILDLIFE RESEARCH CENTER TO CONDUCT RESEARCH FOR REDUCING THE WILDLIFE AIRCRAFT STRIKE RATE. ON 1/25/99, A NEW 5-YEAR INTERAGENCY AGREEMENT WAS SIGNED. UNDER THE TERMS OF THE INTERAGENCY AGREEMENT, THE FOLLOWING GENERAL AREAS OF RESEARCH ARE BEING ADDRESSED: *A MANUAL ENTITLED "WILDLIFE HAZARD MANAGEMENT AT AIRPORTS" WAS DEVELOPED BY THE FAA AND THE USDA'S WILDLIFE SERVICES, NATIONAL WILDLIFE RESEARCH CENTER. THE MANUAL DISCUSSES WILDLIFE CONTROL METHODS AND WILL BE DISTRIBUTED TO ALL 14 CFR PART 139 AIRPORTS, USDA WILDLIFE SERVICES' STATE DIRECTORS, AND INDUSTRY ORGANIZATIONS. *CONDUCT HABITAT STUDIES AT VARIOUS AIRPORTS OR AT OTHER SITES THAT SIMULATE AIRPORT ENVIRONMENTS AND THAT ARE UNITED STATES. AIRPORT WILDLIFE HABITAT STUDIES HAVE BEEN CONDUCTED AT JOHN F. KENNEDY INT'L. AIRPORT, CHICAGO O'HARE INT'L. AIRPORT, AND ATLANTIC CITY INT'L. AIRPORT. CURRENTLY, STUDIES ARE BEING INITIATED AT SIX AIRPORTS IN THE NORTHWEST. THESE STUDIES PROVIDE THE SCIENTIFIC BASIS FOR AIRPORT WILDLIFE HABITAT MANAGEMENT DESIGNED TO MINIMIZE WILDLIFE ATTRACTANTS AND THE WILDLIFE STRIKE HAZARD AT AIRPORTS. LANDFILL STUDIES HAVE BEEN CONDUCTED AT VARIOUS TYPES OF LANDFILLS (MUNICIPAL SOLID WAST, CONSTRUCTION AND DEMOLITION DEBRIS, COMPOSTING REPRESENTATIVE OF THE MAJOR REGIONAL AIRPORT HABITATS IN THE FACILITIES, AND TRASH TRANSFER STATIONS). THE INFORMATION GAINED PROVIDED THE SCIENTIFIC BASIS FOR THE RECOMMENDATIONS MADE IN ADVISORY CIRCULAR 150/5200-33, WILDLIFE HAZARDS ON OR NEAR AIRPORTS. EVALUATE THE EFFICACY OF VARIOUS WILDLIFE CONTROL METHODS AND HELP DEVELOP NEW METHODS. ABOUT 30 VARIOUS TOOLS, CHEMICALS, AND TECHNIQUES HAVE BEEN EVALUATED. THIS EFFORT HAS LED TO THE ENVIRONMENTAL PROTECTION AGENCY'S REGISTRATION OF AT LEAST ONE NEW BIRD REPELLANT AND THE FEDERAL DRUG ADMINISTRATION'S APPROVAL OF ONE NEW BIRD-CAPTURING DRUG. THE FAA WILL COMPLETE THE INFORMATION GAINED FROM THE RESEARCH EFFORTS AND THE INFORMATION THAT ALREADY EXISTS IN BOTH SCIENTIFIC AND POPULAR LITERATURE INTO A CONCISE AND USEABLE DOCUMENT. OVER 120 MANUSCRIPTS HAVE BEEN PUBLISHED AND OVER 200 PRESENTATIONS HAVE BEEN MADE TO VARIOUS SPECIAL INTEREST OR USER GROUPS THAT PRESENT INFORMATION LEARNED AS A RESULT OF THE RESEARCH. * A POSTER AIMED AT INCREASING PILOT AWARENESS ABOUT WILDLIFE AIRCRAFT STRIKE HAZARDS WAS DEVELOPED AND DISTRIBUTED TO ALL CERTIFICATED AIRPORTS, ALL ATTENDEES AT THE 1997 BIRD STRIKE COMMITTEE USA MEETING, AND ALL NATIONAL BUSINESS AIRCRAFT ASSOCIATION AND AMERICAN ASSOCIATION OF AIRPORT EXECUTIVES MEMBERS. *MAINTAIN AND MANAGE THE FAA'S NATIONAL WILDLIFE STRIKE DATA BASE. THERE ARE CURRENTLY OVER 26,000 INDIVIDUAL RECORDS IN THE DATA BASE. THE DATA BASE PROVIDES ESSENTIAL BASELINE INFORMATION ON THE NATURE AND EXTENT OF THE WILDLIFE HAZARD PROBLEM. THE DATA BASE HAS BEEN USED BY NUMEROUS ORGANIZATIONS, BOTH PUBLIC AND PRIVATE, TO GAIN A BETTER UNDERSTANDING OF THE WILDLIFE AIRCRAFT STRIKE PROBLEM AND DIRECT AND FOCUS RESEARCH EFFORTS. BEGINNING IN 1995, THE FAA AND THE USDA'S WILDLIFE SERVICES PREPARED AND PUBLISHED ANNUAL REPORTS ON WILDLIFE STRIKES TO CIVIL AIRCRAFT IN THE UNITED STATES. THE FIRST REPORT COVERING 1994 WAS COMPLETED IN NOVEMBER 1995. SUBSEQUENT REPORTS COVERING THE YEARS 1993-1995, 1992-1996, 1991-1997, AND 1990-1998, WERE ISSUED IN 1996, 1997, 1998, AND 1999, RESPECTIVELY. THE FAA PLANS TO PUBLISH A DETAILED REPORT COVERING 1990-1999. SUBSEQUENT DETAILED REPORTS WILL BE PRODUCED AT 5-YEAR INTERVALS. IN THE INTERIM YEARS, ANNUAL REPORTS SUMMARIZING DATA IN TABULAR AND GRAPHIC FORM FOR ALL AVAILABLE YEARS WILL BE PRODUCED.

Recommendation Report

Friday, September 05, 2008

NOTATION:7192

5/11/2000 NTSB

THE SAFETY BOARD APPRECIATES THE FAA'S ACTIONS TO REDUCE THE BIRD STRIKE RATE OF AIRCRAFT. THESE ACTIONS, IN CONJUNCTION WITH THOSE OF THE USDA, MAY POTENTIALLY IMPROVE AVIATION SAFETY THROUGHOUT THE COUNTRY. BECAUSE THE FAA REPORTS THAT IT WILL CONTINUE TO WORK ON CURRENT AND FUTURE BIRD HAZARD REDUCTION TECHNOLOGIES AND HAS SIGNED A 5-YEAR AGREEMENT WITH THE USDA IN SUPPORT OF THAT ACTION, A-99-87 IS CLASSIFIED "CLOSED--ACCEPTABLE ACTION."

Recommendation # A-99-088

Overall Status
CUA

Priority

THE NTSB RECOMMENDS THAT THE FEDERAL AVIATION ADMINISTRATION: IN CONSULTATION WITH THE U.S. DEPT. OF AGRICULTURE, REQUIRE THAT WILDLIFE ASSESSMENTS BE CONDUCTED AT ALL 14 CODE OF FEDERAL REGULATIONS PART 139 AIRPORTS WHERE SUCH ASSESSMENTS HAVE NOT ALREADY BEEN CONDUCTED.

FAA	Closed - Unacceptable Action	5/11/2000
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2/14/2000 Addressee

Letter Mail Controlled 02/22/2000 3:50:06 PM MC# 2000289 THE FAA DOES NOT BELIEVE IT IS NECESSARY TO INITIATE ADDITIONAL REGULATIONS TO REQUIRE ALL 14 CFR PART 139 AIRPORTS TO CONDUCT WILDLIFE ASSESSMENTS. 14 CFR 139.337(A) REQUIRES THAT EACH CERTIFICATE HOLDER PROVIDE AN ECOLOGICAL STUDY WHEN ANY OF THE FOLLOWING EVENTS OCCUR ON OR NEAR AN AIRPORT: AN AIR CARRIER AIRCRAFT EXPERIENCES A MULTIPLE BIRD STRIKE OR ENGINE INGESTION, AN AIR CARRIER AIRCRAFT EXPERIENCES A DAMAGING COLLISION WITH WILDLIFE OTHER THAN BIRDS, OR WILDLIFE OF A SIZE OR IN NUMBERS CAPABLE OF CAUSING AN EVENT DESCRIBED IS OBSERVED TO HAVE ACCESS TO ANY AIRPORT FLIGHT PATTERN OR MOVEMENT AREA. TO REQUIRE ALL 14 CFR PART 139 AIRPORTS TO CONDUCT A WILDLIFE HAZARD ASSESSMENT WITHOUT ONE OF THE TRIGGER EVENTS CURRENTLY REQUIRED WOULD PLACE AN UNDUE BURDEN ON MANY AIRPORTS THAT DO NOT HAVE A HISTORY OF WILDLIFE STRIKES. THE BOARD HAS ISSUED EIGHT SAFETY RECOMMENDATIONS TO THE FAA THAT ADDRESS BIRD STRIKE HAZARDS. I BELIEVE THAT ALL OF THE ACTIONS OUTLINED IN THIS LETTER WILL ADDRESS THIS SAFETY ISSUE WITHOUT HAVING TO IMPLEMENT ADDITIONAL REGULATORY ACTIONS. I ASK THAT THE BOARD EVALUATE ALL OF THE OTHER ACTIONS OUTLINED IN THIS LETTER AS THEY RELATE TO ADDRESSING THE SAFETY CONCERN WHEN CLASSIFYING THIS SAFETY RECOMMENDATION. I CONSIDER THE FAA'S ACTION TO BE COMPLETED ON THIS RECOMMENDATION, AND I PLAN NO FURTHER ACTION.

5/11/2000 NTSB

ALTHOUGH THE SAFETY BOARD UNDERSTANDS THE POTENTIAL FISCAL BURDEN ON AIRPORTS, THE BOARD STRONGLY FEELS THAT THIS EFFORT IS NECESSARY TO ENSURE THAT ALL AIRPORTS BECOME AWARE OF THE POTENTIAL HAZARDS OF WILDLIFE STRIKES, REGARDLESS OF THEIR LOCATION. BECAUSE THE FAA STATES THAT IT DOES NOT AGREE WITH THE BOARD, AND WILL NOT REQUIRE WILDLIFE ASSESSMENTS AT ALL AIRPORTS, A-99-88 IS CLASSIFIED "CLOSED--UNACCEPTABLE ACTION."

Recommendation Report

Friday, September 05, 2008

NOTATION:7192

Recommendation # A-99-089

**Overall Status
CUA**

Priority

THE NTSB RECOMMENDS THAT THE FEDERAL AVIATION ADMINISTRATION: REQUIRE THE DEVELOPMENT OF A WILDLIFE HAZARD MANAGEMENT PROGRAM FOR ALL AIRPORTS DETERMINED TO NEED ONE AS A RESULT OF THE WILDLIFE HAZARD ASSESSMENT PROPOSED IN RECOMMENDATION A-99-88.

FAA	Closed - Unacceptable Action	5/11/2000
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2/14/2000 Addressee Letter Mail Controlled 02/22/2000 3:50:06 PM MC# 2000289 THE FAA AGREES WITH THE INTENT OF THIS RECOMMENDATION AND BELIEVES THAT EXISTING REGULATIONS SPECIFICALLY ADDRESS THIS ISSUE. 14 CFR 139.337(A) ESTABLISHES THE REQUIREMENT FOR ECOLOGICAL STUDIES. FOR THOSE CERTIFICATE HOLDERS REQUIRED TO PROVIDE WILDLIFE HAZARD ASSESSMENTS UNDER CURRENT REGULATIONS, THE FORMULATION OF A WILDLIFE HAZARD MANAGEMENT PLAN IS ADEQUATELY ADDRESSED. 14 CFR 139.337(C) REQUIRES THAT THE FAA REVIEW EVERY WILDLIFE HAZARD ASSESSMENT (ECOLOGICAL STUDY) TO DETERMINE IF A WILDLIFE HAZARD MANAGEMENT PLAN IS NEEDED. IF IT IS DETERMINED THAT A WILDLIFE HAZARD MANAGEMENT PLAN IS NEEDED, 14 CFR 139.337(D) REQUIRES THAT THE CERTIFICATE HOLDER FORMULATE AND IMPLEMENT A PLAN USING THE WILDLIFE HAZARD ASSESSMENT (ECOLOGICAL STUDY) AS A BASIS. I BELIEVE THAT ALL OF THE ACTIONS OUTLINED IN THIS LETTER WILL ADDRESS THIS SAFETY ISSUE WITHOUT HAVING TO IMPLEMENT ADDITIONAL REGULATORY ACTIONS. I ASK THAT THE BOARD EVALUATE ALL OF THE OTHER ACTIONS OUTLINED IN THIS LETTER AS THEY RELATE TO ADDRESSING THE SAFETY CONCERN WHEN CLASSIFYING THIS RECOMMENDATION. I CONSIDER THE FAA'S ACTION TO BE COMPLETED ON THIS RECOMMENDATION, AND I PLAN NO FURTHER ACTION.

5/11/2000 NTSB ALTHOUGH THE SAFETY BOARD UNDERSTANDS THE POTENTIAL FISCAL BURDEN ON AIRPORTS, THE BOARD STRONGLY FEELS THAT THIS EFFORT IS NECESSARY TO ENSURE THAT ALL AIRPORTS BECOME AWARE OF THE POTENTIAL HAZARDS OF WILDLIFE STRIKES, REGARDLESS OF THEIR LOCATION. BECAUSE SATISFACTORY COMPLETION OF A-99-89 RELIES ON ACCEPTABLE ACTION IN RESPONSE TO A-99-88, A-99-89 IS CLASSIFIED "CLOSED--UNACCEPTABLE ACTION."

Recommendation # A-99-090

**Overall Status
CAA**

Priority

THE NTSB RECOMMENDS THAT THE FEDERAL AVIATION ADMINISTRATION: ENSURE THAT THE WILDLIFE HAZARD MANAGEMENT PROGRAMS ARE INCORPORATED INTO THE AIRPORT CERTIFICATION MANUALS AND PERIODICALLY INSPECT THE PROGRAMS' PROGRESS.

FAA	Closed - Acceptable Action	5/11/2000
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2/14/2000 Addressee Letter Mail Controlled 02/22/2000 3:50:06 PM MC# 2000289 THE FAA BELIEVES THAT EXISTING REGULATIONS AND DEPARTMENTAL POLICIES MEET THE INTENT OF THIS RECOMMENDATION. 14 CFR 139.205(B)(23) REQUIRES THAT ALL CERTIFICATE HOLDERS SERVING REGULARLY SCHEDULED AIR CARRIER OPERATIONS WITH MORE THAN 30 SEATS INCORPORATE AN FAA-APPROVED WILDLIFE HAZARD MANAGEMENT PLAN INTO THEIR AIRPORT CERTIFICATION MANUAL. ON 10/4/99, THE FAA'S OFFICE OF AIRPORT SAFETY AND STANDARDS ISSUED PROGRAM AND POLICY GUIDANCE--POLICY #64, "REVIEW OF AIRPORT WILDLIFE HAZARD MANAGEMENT PLANS," TO PROVIDE GUIDANCE AND CLARIFICATION ON INTERPRETATION OF THE REGULATORY REQUIREMENTS AND PROVIDE BACKGROUND ON THE MEANING OF THE RELEVANT REGULATIONS. THE POLICY GUIDANCE ESTABLISHED PROCEDURES THAT AIRPORT CERTIFICATION SAFETY INSPECTORS MUST FOLLOW WHEN AN ACCIDENT OCCURS THAT REQUIRES AN OPERATOR OF A CERTIFICATED AIRPORT TO INITIATE A WILDLIFE HAZARD ASSESSMENT (ECOLOGICAL STUDY). THE POLICY GUIDANCE ALSO REQUIRES THAT AIRPORT CERTIFICATION SAFETY INSPECTORS, AS PART OF THE INITIAL OR PERIODIC INSPECTION, REVIEW AN AIRPORT'S WILDLIFE HAZARD MANAGEMENT PLAN TO ENSURE THAT IT MEETS ALL REQUIREMENTS OF 14 CFR 139.337(E). I HAVE ENCLOSED A COPY OF THE POLICY GUIDANCE FOR THE BOARD'S INFORMATION. I BELIEVE THAT THE FAA HAS ADDRESSED THE FULL INTENT OF THIS RECOMMENDATION, AND I CONSIDER THE FAA'S ACTION TO BE COMPLETED.

Recommendation Report

Friday, September 05, 2008

NOTATION:7192

5/11/2000 NTSB

THE SAFETY BOARD HAS REVIEWED THE CURRENT AIRPORT CERTIFICATION MANUALS AND NOTES THAT WILDLIFE HAZARD MANAGEMENT IS INCORPORATED AND THAT THERE IS A REQUIREMENT FOR SAFETY INSPECTORS TO ASSESS THE PLAN TO ENSURE THAT IT MEETS ALL REQUIREMENTS OF CURRENT FEDERAL AVIATION REGULATIONS. ON THE BASIS OF THAT REVIEW, A-99-90 IS CLASSIFIED "CLOSED--ACCEPTABLE ACTION."

Recommendation # A-99-091

Overall Status
CUA

Priority

THE NTSB RECOMMENDS THAT THE FEDERAL AVIATION ADMINISTRATION: REQUIRE ALL AIRPLANE OPERATORS TO REPORT BIRD STRIKES TO THE FEDERAL AVIATION ADMINISTRATION.

FAA	Closed - Unacceptable Action	5/11/2000
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2/14/2000 Addressee

Letter Mail Controlled 02/22/2000 3:50:06 PM MC# 2000289 THE FAA HAS DEVOTED CHAPTER 7, SECTION 4, OF THE AERONAUTICAL INFORMATION MANUAL (AIM) TO BIRD HAZARDS. THIS SECTION INCLUDES REPORTING BIRD STRIKES, REDUCING BIRD STRIKE RISKS, AND MIGRATORY BIRD ACTIVITY. IN ACCORDANCE WITH THE LONGSTANDING GUIDANCE OUTLINED IN SECTION 4 OF THE AIM, PILOTS REPORT BIRD OR OTHER WILDLIFE STRIKES USING FAA FORM 5200-7. THE DATA DERIVED FROM THESE REPORTS ARE USED TO DEVELOP STANDARDS TO COPE WITH THIS POTENTIAL HAZARD TO AIRCRAFT AND FOR DOCUMENTATION OF NECESSARY HABITAT CONTROL ON AIRPORTS. THE FAA BELIEVES THAT SUFFICIENT REPORTING PROCEDURES ARE PROVIDED TO OBTAIN ADEQUATE TREND ANALYSIS DATA FOR AREAS OF HIGH BIRD STRIKE ACTIVITY. A REGULATORY REQUIREMENT TO MANDATE THE REPORTING OF BIRD STRIKES WOULD NOT RESOLVE THE BASIC PROBLEM OF BIRD ACTIVITY AND AIRCRAFT. THE FAA BELIEVES THAT BETTER DESIGN AND PLANNING OF AIRPORT LOCATIONS AND THE ON-AIRPORT CONTROL OF BIRD HAZARDS ARE THE KEYS TO THE REDUCTION OF THE BIRD HAZARD PROBLEM. AS A PRACTICAL MATTER, THE PROPOSED REGULATION WOULD BE DIFFICULT TO ENFORCE, AND IT WOULD BE UNCLEAR WHAT SORT OF SANCTION WOULD BE APPROPRIATE IF A PILOT FAILED TO REPORT A BIRD STRIKE. ADDITIONALLY, 14 CFR PART 121 AIR CARRIERS ARE CURRENTLY REQUIRED TO REPORT THE OCCURRENCE OR FAILURE OF ANY ENGINE SHUTDOWN DURING FLIGHT BECAUSE OF FOREIGN OBJECT INGESTION, INCLUDING A BIRD STRIKE, OR ANY CRACKS OR PERMANENT DEFORMATION OF AIRCRAFT STRUCTURES. I BELIEVE THAT ALL OF THE ACTIONS OUTLINED IN THIS LETTER WILL ADDRESS THIS SAFETY ISSUE WITHOUT HAVING TO IMPLEMENT ADDITIONAL REGULATORY ACTIONS. I ASK THAT THE BOARD EVALUATE ALL OF THE OTHER ACTIONS OUTLINED IN THIS LETTER AS THEY RELATE TO ADDRESSING THE SAFETY CONCERN WHEN CLASSIFYING THIS SAFETY RECOMMENDATION. I CONSIDER THE FAA'S ACTION TO BE COMPLETED, AND I PLAN NO FURTHER ACTION.

5/11/2000 NTSB

THE SAFETY BOARD APPRECIATES THE POTENTIAL DIFFICULTY IN DEVELOPING THIS REGULATION. HOWEVER, THE IMPORTANCE OF ESTABLISHING A SOLID DATABASE OF BIRD STRIKES AND USING DATA TO DETERMINE TRENDS AND FORECAST POTENTIAL HAZARDS CANNOT BE UNDERSTATED. ALTHOUGH MANY OF THE BIRD STRIKE PREVENTION MEASURES THE FAA IS TAKING ARE PROMISING, THE BOARD IS DISAPPOINTED WITH THE FAA'S FAILURE TO ADOPT THIS MEASURE. BECAUSE THE FAA HAS STATED IT WILL NOT REQUIRE ALL PILOTS TO REPORT BIRD STRIKES, THE SAFETY BOARD CLASSIFIES A-99-91 "CLOSED--UNACCEPTABLE ACTION."

Recommendation # A-99-092

Overall Status
CAA

Priority

THE NTSB RECOMMENDS THAT THE FEDERAL AVIATION ADMINISTRATION: CONTRACT WITH AN APPROPRIATE AGENCY TO PROVIDE PROPER IDENTIFICATION OF BIRD REMAINS, ESTABLISH TIMELY PROCEDURES FOR PROPER BIRD SPECIES IDENTIFICATION, AND ENSURE THAT AIRPORT AND AIRCRAFT MAINTENANCE EMPLOYEES ARE FAMILIAR WITH THE PROCEDURES.

FAA	Closed - Acceptable Action	5/11/2000
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2/14/2000 Addressee

Letter Mail Controlled 02/22/2000 3:50:06 PM MC# 2000289 AS PART OF THE CURRENT INTERAGENCY AGREEMENT WITH THE USDA'S WILDLIFE SERVICES' NATIONAL WILDLIFE RESEARCH CENTER, A CONTRACT HAS BEEN AWARDED TO THE SMITHSONIAN INSTITUTE TO ASSIST IN THE PREPARATION AND IDENTIFICATION OF BIRD STRIKE REMAINS. THE FAA HAS PROVIDED \$90K IN FY 2000 TO FUND THIS CONTRACT. I BELIEVE THAT THE FAA HAS ADDRESSED THIS RECOMMENDATION, AND I CONSIDER THE FAA'S ACTION TO BE COMPLETED.

Recommendation Report

Friday, September 05, 2008

NOTATION:7192

5/11/2000 NTSB ON THE BASIS OF THESE ACTIONS, A-99-92 IS CLASSIFIED "CLOSED--ACCEPTABLE ACTION."

Recommendation # A-99-093

Overall Status

Priority

CAA

THE NTSB RECOMMENDS THAT THE FEDERAL AVIATION ADMINISTRATION: BEFORE ALLOWING HIGH-SPEED, LOW-LEVEL AIRPLANE OPERATIONS, EVALUATE THE POTENTIAL RISK OF INCREASED BIRD STRIKE HAZARDS TO AIR CARRIER TURBO-JET AIRPLANES.

FAA	Closed - Acceptable Action	10/31/2005
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- 2/14/2000 Addressee Letter Mail Controlled 02/22/2000 3:50:06 PM MC# 2000289 THE FAA HAS INITIATED A PROJECT TO EVALUATE DEPARTURE SPEEDS GREATER THAN 250 KNOTS IN CLASS B AIRSPACE. PHASE I INCLUDES GATHERING DATA USING BOEING 747-400 AND BOEING 727 SIMULATORS. THE RESULTS OF PHASE I WILL BE PROVIDED TO THE FAA'S AIR TRAFFIC SERVICE FOR REVIEW AND A DETERMINATION AS TO WHETHER OR NOT TO PROCEED WITH PHASE II, WHICH IS A RISK ANALYSIS TO DETERMINE IF THE INCREASED SPEED WOULD IMPACT SAFETY. IF THE PROJECT ADVANCES TO PHASE II, THE FAA WILL INCLUDE AN EVALUATION OF BIRD STRIKE HAZARDS IN ITS RISK ANALYSIS. I WILL KEEP THE BOARD INFORMED OF THE FAA'S PROGRESS ON THIS RECOMMENDATION.
- 5/11/2000 NTSB THE SAFETY BOARD CONCURS WITH THE FAA'S DECISION TO CONDUCT A RISK ANALYSIS OF HIGH-SPEED, LOW-LEVEL OPERATIONS BY COMMERCIAL CARRIERS. IF PHASE II IS INITIATED, THE BOARD WOULD APPRECIATE A COPY OF THE FORMAL RISK ASSESSMENT THAT INCLUDES THE BIRD STRIKE HAZARD EVALUATION. PENDING THAT EVALUATION, A-99-93 IS CLASSIFIED "OPEN--ACCEPTABLE RESPONSE."
- 1/11/2001 Addressee Letter Mail Controlled 01/16/2001 7:13:16 PM MC# 2010034 The Federal Aviation Administration (FAA) initiated a project at Houston Intercontinental Airport to evaluate departure speeds greater than 250 knots in Class B airspace. Phase I included gathering data using Boeing 747-400 and Boeing 727 simulators. Phase I was completed in July 2000 and the findings were presented to industry at a special meeting held on October 20, 2000. Industry was comfortable with the results of Phase I, and it was agreed to continue with Phase II, which is the risk analysis. Industry has identified some issues and concerns that need to be addressed during the risk analysis, so a test plan will be developed to address these concerns. Bird strike hazards were included as one of the concerns to be addressed in the plan. It is anticipated that the risk assessment will be completed by the end of the third quarter of fiscal year 2001. I will provide the Board with a copy of the formal risk assessment that includes bird strike evaluation as soon as it is completed.
- 3/9/2001 NTSB The FAA reports that it initiated a project at Houston Intercontinental Airport to evaluate departure speeds greater than 250 knots in Class B airspace. The FAA indicates that Phase I, which included gathering data using Boeing 747-400 and Boeing 727 simulators, was completed in July 2000, and the findings were presented to industry at an October 20, 2000, meeting. The FAA reports that industry was comfortable with the results of Phase I, and it was agreed to continue with Phase II, which is the risk analysis. The FAA states that industry identified issues and concerns that need to be addressed during the risk analysis; therefore, the FAA will develop a test plan to address these concerns, which include bird strike hazards. Pending our receipt of a copy of the formal risk assessment that includes an evaluation of the hazard of bird strikes from high-speed, low-level aviation operations, Safety Recommendation A-99-93 remains classified "Open--Acceptable Response."
- 11/12/2002 Addressee Letter Mail Controlled 11/19/2002 9:28:58 AM MC# 2020958 The Federal Aviation Administration (FAA) is completing the risk assessment resulting from the evaluation of departure speeds greater than 250 knots in Class B airspace. It is anticipated that the risk assessment will be completed in December 2002. I will provide the Board with a copy of the risk assessment as soon as it is issued. The FAA is also sponsoring an additional study entitled "Assessment of Wildlife Strike Risk to Airframes." Representatives from the University of Illinois are focusing the study on the development of a risk assessment. The risk assessment will model one bird species (Canadian Goose) and one aircraft type (Boeing 737). The focus of the study will be between 3,000 to 4,000 feet above ground level. A draft report is expected by December 2002. I will provide the Board with a copy of the formal risk assessment that includes bird strike evaluation as soon as it is completed.

Recommendation Report

Friday, September 05, 2008

NOTATION:7192

- 2/25/2003 NTSB The Board notes that the FAA is completing the risk assessment resulting from its evaluation of departure speeds greater than 250 knots in Class B airspace. We further note that the FAA is sponsoring a study titled "Assessment of Wildlife Strike Risk to Airframes" that will include the development of a risk assessment. The risk assessment will model one bird species (Canada goose) and one aircraft type (Boeing 737).
- The Safety Board appreciates receiving this update. Pending development and application of a procedure implementing (1) the risk assessment of increased bird strike hazards to airplanes with departure speeds greater than 250 knots in Class B airspace and (2) the findings of the "Assessment of Wildlife Strike Risk to Airframes" study, Safety Recommendation A-99-93 remains classified "Open--Acceptable Response."
- 5/5/2003 Addressee Letter Mail Controlled 5/13/2003 11:01:19 AM MC# 2030239 In December 2002, the Federal Aviation Administration's (FAA) Transport Airplane Directorate, in conjunction with the William J. Hughes Technical Center and the University of Illinois, completed a study of the risks of structural damage posed by wildlife/aircraft collision. The risk analysis performed provided an initial result that has fully utilized existing strike database records and specifically considers the kinetic energy of the wildlife/aircraft collision. The risk analysis determined that relatively low kinetic energy impacts have relatively high probabilities of occurring, but usually result in collisions with low hazard ratings. Further, high kinetic energy impacts have a relatively low probability of occurring, but have a higher probability of resulting in collisions with high hazard ratings. The FAA is reviewing the report and the findings.
- I will keep the Board informed of the FAA's progress on this safety recommendation.
- 7/31/2003 NTSB The Safety Board notes that the FAA completed a study of the risks of structural damage posed by wildlife/aircraft collisions, and that the risk analysis performed utilized the FAA's existing bird strike database and considered the kinetic energy of the wildlife/aircraft collision. In its November 19, 1999, letter that transmitted this recommendation to the FAA, the Safety Board concluded that because the majority of bird strikes occur at altitudes lower than 10,000 feet, increasing the exposure times of air carrier turbo-jet airplanes to that altitude range at higher speeds may markedly increase the risk of bird strikes to those airplanes. Although the Safety Board acknowledges that high-energy impacts represent a greater risk of structural damage than lower-energy impacts, the Board believes the FAA should minimize the risk of any bird strikes due to exposure time, regardless of the impact energy. The Board believes that any policy that permits an increased risk of bird strikes solely because the impacts are considered lower energy events would not be acceptable.
- The Safety Board appreciates receiving this update. Pending the development of a system that evaluates the potential risk of increased bird strike hazards, based on increased exposure times, before allowing high-speed, low-level airplane operations, Safety Recommendation A-99-93 remains classified "Open--Acceptable Response."
- 7/7/2005 Addressee Letter Mail Controlled 7/19/2005 12:36:54 PM MC# 2050334 This is in further response to Safety Recommendation A-99-93 issued by the Board on November 19, 1999, and supplements our letters dated February 14, 2000, January 11, 2001, and November 12, 2002. This safety recommendation was issued as a result of the Board's investigation of two incidents involving bird strikes. On March 4, 1999, a Douglas DC-9-15F, operated by USA Jet Airlines, he., encountered a flock of large birds while on final approach at Kansas City International Airport, Kansas City, Missouri. During the encounter, several birds were ingested into both engines, resulting in severe engine power loss. The pilot regained enough power in one engine to continue the approach and land the airplane without further incident. There were no injuries.
- On February 22, 1999, a Boeing 757, operated by Delta Air Lines, penetrated a flock of birds during takeoff from Cincinnati/Northern Kentucky International Airport, Covington, Kentucky. According to the captain, the takeoff roll was normal until reaching approximately 150 knots, at which time a flock of birds traveled from left to right in front of the airplane. The captain alerted the first officer to the hazard and asked him to attempt to climb over the flock. The first officer complied by increasing the airplane's pitch angle. However, as the main landing gear- lifted off the runway, the airplane penetrated the flock. The captain advised air traffic control of the event and was cleared to return to the airport and land. The captain observed no change in engine performance or flight characteristics during or after the event. There were no injuries, but the airplane was substantially damaged.
- A-99-03, Before allowing high-speed, low-level airplane operations, evaluate the potential risk of increased bird strike hazards to air carrier turbo-jet airplanes.
- FAA Comment. The Federal Aviation Administration is no longer considering allowing high-speed, low-level airplane operations to facilitate air traffic flow (over 250 knots, below 10,000 feet). If FAA does consider these operations in the future, it will evaluate the potential risk of increased bird strike hazards to these airplanes.

Recommendation Report

Friday, September 05, 2008

NOTATION:7192

10/31/2005 NTSB As indicated in previous correspondence, the FAA completed a study of the risks of structural damage posed by wildlife/aircraft collisions. The Safety Board notes that as a result of this study, the FAA is no longer considering allowing high-speed, low-level airplane operations to facilitate air traffic flow (over 250 knots, below 10,000 feet). If the FAA does consider these operations in the future, it will further evaluate the potential risk of increased bird strike hazards to these airplanes.

The FAA's action fully meets the intent of Safety Recommendation A-99-93; accordingly, the recommendation is classified "Closed--Acceptable Action."

Recommendation # A-99-094 Overall Status **Priority**
CAA

THE NTSB RECOMMENDS THAT THE FEDERAL AVIATION ADMINISTRATION: WITH REPRESENTATIVES FROM THE U.S. DEPT. OF AGRICULTURE, THE DEPT. OF THE INTERIOR, THE DEPT. OF DEFENSE, AND THE U.S. ARMY CORPS OF ENGINEERS, CONVENE A TASK FORCE TO ESTABLISH A PERMANENT BIRD STRIKE WORKING GROUP TO FACILITATE CONFLICT RESOLUTION AND IMPROVE COMMUNICATION BETWEEN AVIATION SAFETY AGENCIES AND WILDLIFE CONSERVATION INTERESTS.

FAA	Closed - Acceptable Action	12/4/2003
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2/14/2000 Addressee Letter Mail Controlled 02/22/2000 3:50:06 PM MC# 2000289 THE FAA AGREES WITH THE INTENT OF THIS RECOMMENDATION. IN 1997, THE FAA FORMED AN INTERDEPARTMENTAL WORKING GROUP TO DRAFT A MEMORANDUM OF UNDERSTANDING (MOU) TO ADDRESS INTERDEPARTMENTAL COOPERATION AND COMMUNICATION REGARDING WILDLIFE AIRCRAFT ISSUES. REPRESENTATIVES FROM THE DEPT. OF INTERIOR, THE DEPT. OF TRANSPORTATION'S FAA, AND THE ENVIRONMENTAL PROTECTION AGENCY WERE ON THE WORKING GROUP. THE DRAFT MOU IS IN THE FINAL DEVELOPMENT STAGE. THE FAA WILL PROPOSE THAT THE DRAFT MOU BE REVISED TO PROVIDE FOR THE ESTABLISHMENT OF A PERMANENT BIRD STRIKE WORKING GROUP TO FACILITATE CONFLICT RESOLUTION AND IMPROVE COMMUNICATION BETWEEN AVIATION SAFETY AGENCIES AND WILDLIFE CONSERVATION INTEREST GROUPS. I WILL KEEP THE BOARD INFORMED OF THE FAA'S PROGRESS ON THIS RECOMMENDATION.

5/11/2000 NTSB PENDING THE ESTABLISHMENT OF A PERMANENT BIRD STRIKE WORKING GROUP, A-99-94 IS CLASSIFIED "OPEN--ACCEPTABLE RESPONSE."

9/15/2003 Addressee Letter Mail Controlled 9/25/2003 2:04:01 PM MC# 2030496 The Federal Aviation Administration (FAA) formed an interdepartmental working group to draft a Memorandum of Agreement (MOA) to address interdepartmental cooperation and communication regarding wildlife aircraft issues. Representatives from the Department of Agriculture, the Department of Commerce, the Department of Defense, the Department of Interior, the Department of Transportation's FAA, and the Environmental Protection Agency were on the working group. The group has subsequently finalized the MOA, and a copy is enclosed for the Board's information. The MOA provides for the establishment of a permanent Bird Strike Working Group to facilitate conflict resolution and improve communication between aviation safety agencies and wildlife conservation interest groups. I believe that the FAA has satisfactorily responded to this safety recommendation, and I look forward to your response.

12/4/2003 NTSB The Safety Board notes that the FAA formed an interdepartmental working group that drafted a memorandum of agreement (MOA) to address interdepartmental cooperation and communication regarding wildlife/aircraft issues. The MOA provides for the establishment of a permanent Bird Strike Working Group to facilitate conflict resolution and improve communication between aviation safety agencies and wildlife conservation interest groups. The MOA has been signed by the Department of Agriculture, the Department of Commerce, the Department of Defense, the Department of Interior, the FAA, and the Environmental Protection Agency.

With the signing of the MOA and the formation of the permanent Bird Strike Working Group, the FAA has completed the action recommended. As discussed at the Safety With A Team meeting on October 8, 2003, Safety Recommendation A-99-94 is classified "Closed--Acceptable Action."

Recommendation Report

Friday, September 05, 2008

NOTATION:7192

Log Number 2764A

Issue Date 11/19/1999

KANSAS CITY MO

3/4/1999

ON 3/4/99, AT 2200 CENTRAL STANDARD TIME, A DOUGLAS DC-9-15F, N195US, OPERATED BY USA JET AIRLINES, INC., ENCOUNTERED A FLOCK OF LARGE BIRDS WHILE ON FINAL APPROACH FOR LANDING AT KANSAS CITY INT'L AIRPORT, KANSAS CITY, MISSOURI. DURING THE ENCOUNTER, SEVERAL BIRDS WERE INGESTED INTO BOTH ENGINES, RESULTING IN SEVERE ENGINE POWER LOSS. THE PILOT REGAINED ENOUGH POWER IN ONE ENGINE TO CONTINUE THE APPROACH AND LAND THE AIRPLANE WITHOUT FURTHER INCIDENT. THERE WERE NO INJURIES. NIGHT VISUAL METEOROLOGICAL CONDITIONS PREVAILED AT THE TIME OF THE ENCOUNTER, AND AN INSTRUMENT FLIGHT RULES (IFR) FLIGHT PLAN HAD BEEN FILED FOR THE NONSCHEDULED DOMESTIC AIR CARGO FLIGHT. THE FLIGHT WAS CONDUCTED UNDER THE PROVISIONS OF 14 CODE OF FEDERAL REGULATIONS (CFR) PART 121.

Recommendation # A-99-095

Overall Status
CAA

Priority

THE NTSB RECOMMENDS TO THE U.S. DEPT. OF AGRICULTURE: PARTICIPATE IN A TASK FORCE, TO BE CONVENED BY THE FEDERAL AVIATION ADMINISTRATION, TO ESTABLISH A PERMANENT BIRD STRIKE WORKING GROUP TO FACILITATE CONFLICT RESOLUTION AND IMPROVE COMMUNICATION BETWEEN AVIATION SAFETY AGENCIES AND WILDLIFE CONSERVATION INTERESTS.

DEPARTMENT OF AGRICULTURE

Closed - Acceptable Action

7/26/2005

1/3/2000 Addressee Letter Mail Controlled 01/10/2000 4:31:10 PM MC# 2000039 I APPRECIATE YOUR INVITATION, AND I AM PLEASED THAT USDA CAN HELP FURTHER ADDRESS THIS SERIOUS PROBLEM BY PARTICIPATING IN THE TASK FORCE. USDA IS ALSO CONCERNED ABOUT THIS ISSUE, AND OUR ANIMAL AND PLANT HEALTH INSPECTION SERVICE (APHIS) REMAINS COMMITTED TO REDUCING THE RISK POSED TO HUMANS AND AIRCRAFT CAUSED BY BIRD AND OTHER WILDLIFE STRIKES. IN THIS REGARD, APHIS PROVIDED TECHNICAL OR DIRECT WILDLIFE HAZARD CONTROL ASSISTANCE TO 363 AIRPORTS IN 47 STATES AND GUAM IN FISCAL YEAR 1999. HOWEVER, USDA REALIZES THAT FURTHER COORDINATION WITH OUR PARTNERS WILL HELP US DIRECT OUR RESOURCES MORE EFFECTIVELY AND BENEFIT OUR WORK AT U.S. AIRPORTS. ACCORDINGLY, USDA LOOKS FORWARD TO WORKING WITH FAA OFFICIALS AND THE OTHER MEMBERS OF THE TASK FORCE WHEN A BIRD STRIKE MEETING IS CONVENED. DR. RICHARD DOLBEER, WITH APHIS' WILDLIFE SERVICES PROGRAM, WILL SERVE AS USDA'S REPRESENTATIVE TO THE TASK FORCE. DR. DOLBEER'S ADDRESS IS WILDLIFE SERVICES/NATIONAL WILDLIFE RESEARCH CENTER, APHIS, USDA, C/O PLUM BROOK STATION, 6100 COLUMBUS AVENUE, SANDUSKY, OH 44870. TELEPHONE IS 419-625-0242. THANK YOU AGAIN FOR YOUR LETTER.

3/8/2000 NTSB PENDING THE INFORMATION OF THE BIRD STRIKE WORKING GROUP, A-99-95 IS CLASSIFIED "OPEN--ACCEPTABLE RESPONSE."

9/15/2003 Addressee The Federal Aviation Administration (FAA) formed an interdepartmental working group to draft a Memorandum of Agreement (MOA) to address interdepartmental cooperation and communication regarding wildlife aircraft issues. Representatives from the Department of Agriculture, the Department of Commerce, the Department of Defense, the Department of Interior, the Department of Transportation's FAA, and the Environmental Protection Agency were on the working group. The group has subsequently finalized the MOA, and a copy is enclosed for the Board's information. The MOA provides for the establishment of a permanent Bird Strike Working Group to facilitate conflict resolution and improve communication between aviation safety agencies and wildlife conservation interest groups.

7/26/2005 NTSB Through correspondence with the FAA, the Safety Board is aware of the interdepartmental working group it formed and of the memorandum of agreement (MOA) that this group drafted to address interdepartmental cooperation and communication regarding wildlife/aircraft issues. The MOA, which has been signed by the Department of Agriculture, the Department of Commerce, the Department of Defense, the Department of the Interior, the FAA, and the Environmental Protection Agency, provides for the establishment of a permanent Bird Strike Working Group to facilitate conflict resolution and improve communication between aviation safety agencies and wildlife conservation interest groups.

With the signing of the MOA and the formation of the permanent Bird Strike Working Group, the USDA has completed the action recommended. Accordingly, Safety Recommendation A-99-95 is classified "Closed--Acceptable Action."

Recommendation Report

Friday, September 05, 2008

NOTATION:7192

8/31/2005 Addressee Letter Mail Controlled 9/8/2005 12:27:19 PM MC# 2050415 (Identified as a "No Response Necessary") We are pleased that Department of Agriculture officials were active participants in the collaborative efforts convened by the Federal Aviation Administration to establish an interdepartmental bird strike working group to help facilitate communication between aviation safety agencies and natural resource conservation interests. Officials from our Animal and Plant Health Inspection Service (APHIS) played a key role in the development of the multi-agency memorandum of agreement (MOA), which established the bird strike working group. APHIS officials have now implemented the MOA and employ its principles to resolve aircraft bird strike issues at the lowest possible level with other Agency and special interest group field representatives whenever possible. Please be assured that we will continue to promote interdepartmental cooperation and partnering to effectively reduce threats to aviation caused by wildlife.

Recommendation Report

Friday, September 05, 2008

NOTATION:7192

Log Number 2764B

Issue Date 11/19/1999

KANSAS CITY MO

3/4/1999

ON 3/4/99, AT 2200 CENTRAL STANDARD TIME, A DOUGLAS DC-9-15F, N195US, OPERATED BY USA JET AIRLINES, INC., ENCOUNTERED A FLOCK OF LARGE BIRDS WHILE ON FINAL APPROACH FOR LANDING AT KANSAS CITY INT'L. AIRPORT, KANSAS CITY, MISSOURI. DURING THE ENCOUNTER, SEVERAL BIRDS WERE INGESTED INTO BOTH ENGINES, RESULTING IN SEVERE ENGINE POWER LOSS. THE PILOT REGAINED ENOUGH POWER IN ONE ENGINE TO CONTINUE THE APPROACH AND LAND THE AIRPLANE WITHOUT FURTHER INCIDENT. THERE WERE NO INJURIES. NIGHT VISUAL METEOROLOGICAL CONDITIONS PREVAILED AT THE TIME OF THE ENCOUNTER, AND AN INSTRUMENT FLIGHT RULES (IFR) FLIGHT PLAN HAD BEEN FILED FOR THE NONSCHEDULED DOMESTIC AIR CARGO FLIGHT. THE FLIGHT WAS CONDUCTED UNDER THE PROVISIONS OF 14 CODE OF FEDERAL REGULATIONS (CFR) PART 121.

Recommendation # A-99-096

Overall Status
CAA

Priority

THE NTSB RECOMMENDS THAT THE U.S. ARMY CORPS OF ENGINEERS: PARTICIPATE IN A TASK FORCE, TO BE CONVENED BY THE FEDERAL AVIATION ADMINISTRATION, TO ESTABLISH A PERMANENT BIRD STRIKE WORKING GROUP TO FACILITATE CONFLICT RESOLUTION AND IMPROVE COMMUNICATION BETWEEN AVIATION SAFETY AGENCIES AND WILDLIFE CONSERVATION INTERESTS.

U.S. ARMY CORPS OF ENGINEERS

Closed - Acceptable Action

7/26/2005

12/21/1999 Addressee ON BEHALF OF THE SECRETARY OF THE ARMY, HONORABLE LOUIS CALDERA, I AM RESPONDING TO YOUR LETTER OF 11/19/99, INVITING THE U.S. ARMY CORPS OF ENGINEERS TO PARTICIPATE ON A TASK FORCE TO ESTABLISH A PERMANENT BIRD STRIKE WORKING GROUP TO FACILITATE CONFLICT RESOLUTION AND IMPROVE COMMUNICATIONS BETWEEN AVIATION INTERESTS AND WILDLIFE CONSERVATION INTERESTS. IN RECENT YEARS THE CORPS HAS DEVELOPED AND CONSTRUCTED MANY ECOSYSTEM RESTORATION PROJECTS AND OUR EXPERIENCE COULD PROVE BENEFICIAL TO THE WORKING GROUP. I LOOK FORWARD TO PARTICIPATE ON THE BIRD STRIKE WORKING GROUP.

2/25/2000 NTSB THE SAFETY BOARD APPRECIATES YOUR EFFORTS TO IMPROVE AVIATION SAFETY THROUGH YOUR PARTICIPATION IN THIS TASK FORCE. THE FAA WILL NOTIFY ALL PARTICIPANTS WHEN THE TASK FORCE IS TO BE ASSEMBLED. PENDING THE COMPLETION OF THIS PROJECT, A-99-96 IS CLASSIFIED "OPEN--ACCEPTABLE RESPONSE."

9/15/2003 Addressee The Federal Aviation Administration (FAA) formed an interdepartmental working group to draft a Memorandum of Agreement (MOA) to address interdepartmental cooperation and communication regarding wildlife aircraft issues. Representatives from the Department of Agriculture, the Department of Commerce, the Department of Defense, the Department of Interior, the Department of Transportation's FAA, and the Environmental Protection Agency were on the working group. The group has subsequently finalized the MOA, and a copy is enclosed for the Board's information. The MOA provides for the establishment of a permanent Bird Strike Working Group to facilitate conflict resolution and improve communication between aviation safety agencies and wildlife conservation interest groups.

7/26/2005 NTSB Through correspondence with the FAA, the Safety Board is aware of the interdepartmental working group it formed and of the memorandum of agreement (MOA) that this group drafted to address interdepartmental cooperation and communication regarding wildlife/aircraft issues. The MOA, which has been signed by the Department of Agriculture, the Department of Commerce, the Department of Defense, the Department of the Interior, the FAA, and the Environmental Protection Agency, provides for the establishment of a permanent Bird Strike Working Group to facilitate conflict resolution and improve communication between aviation safety agencies and wildlife conservation interest groups.

With the signing of the MOA and the formation of the permanent Bird Strike Working Group, the U.S. Army Corps of Engineers has completed the action recommended. Accordingly, Safety Recommendation A-99-96 is classified "Closed--Acceptable Action."

Recommendation Report

Friday, September 05, 2008

NOTATION:7192

Log Number 2764C

Issue Date 11/19/1999

KANSAS CITY MO

3/4/1999

ON 3/4/99, AT 2200 CENTRAL STANDARD TIME, A DOUGLAS DC-9-15F, N195US, OPERATED BY USA JET AIRLINES, INC., ENCOUNTERED A FLOCK OF LARGE BIRDS WHILE ON FINAL APPROACH FOR LANDING AT KANSAS CITY INT'L AIRPORT, KANSAS CITY, MISSOURI. DURING THE ENCOUNTER, SEVERAL BIRDS WERE INGESTED INTO BOTH ENGINES, RESULTING IN SEVERE ENGINE POWER LOSS. THE PILOT REGAINED ENOUGH POWER IN ONE ENGINE TO CONTINUE THE APPROACH AND LAND THE AIRPLANE WITHOUT FURTHER INCIDENT. THERE WERE NO INJURIES. NIGHT VISUAL METEOROLOGICAL CONDITIONS PREVAILED AT THE TIME OF THE ENCOUNTER, AND AN INSTRUMENT FLIGHT RULES (IFR) FLIGHT PLAN HAD BEEN FILED FOR THE NONSCHEDULED DOMESTIC AIR CARGO FLIGHT. THE FLIGHT WAS CONDUCTED UNDER THE PROVISIONS OF 14 CODE OF FEDERAL REGULATIONS (CFR) PART 121.

Recommendation # A-99-097

**Overall Status
CAA**

Priority

THE NTSB RECOMMENDS THAT THE U.S. DEPT. OF DEFENSE PARTICIPATE IN A TASK FORCE, TO BE CONVENED BY THE FEDERAL AVIATION ADMINISTRATION, TO ESTABLISH A PERMANENT BIRD STRIKE WORKING GROUP TO FACILITATE CONFLICT RESOLUTION AND IMPROVE COMMUNICATION BETWEEN AVIATION SAFETY AGENCIES AND WILDLIFE CONSERVATION INTERESTS.

DOD	Closed - Acceptable Action	3/8/2000
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12/8/1999 Addressee Thank you for informing me of NTSB's recommendation for the Department of Defense (DOD) to participate in Federal Aviation Administration's (FAA) task force to establish a bird strike working group. We strongly support your interest in reducing wildlife hazards to aviation. All military services share the air, airfields and wildlife risks with commercial aviation.

As you know, personnel from the Air Force Bird/Wildlife Strike Hazard (BASH) Team have already attended two meetings to support this effort. BASH Team members held meetings on November 29-30 with representatives from the FAA. We invited their participation in our development efforts to use radar technology to provide forecasts of large bird migrations that may affect flight safety. Attendees at this meeting laid the foundation for achieving the intent of recommendation A-99-97. The next meeting of this working group is scheduled for February 16, 2000, at the FAA Technical Center to identify areas where our DOD BASH work can benefit civil aviation.

Thank you for inviting us to provide members to the task force. I've asked the Air Force Safety Center's BASH Team to provide the DOD representation. If you have any questions, please contact Maj. Peter R. Windler, BASH Team Chief at (505) 846-5679 or Eugene A. LeBoeuf at (505) 8465679.

3/8/2000 NTSB The Air Force states that its Bird/Wildlife Strike Hazard (BASH) Team has already attended two meetings to support this effort. BASH Team members held meetings on November 29 and 30 with representatives from the FAA. The Air Force also states that the BASH Team has invited the FAA to participate in its efforts to begin using radar technology to provide forecasts of large bird migrations that may affect flight safety. The Air Force reports that the working group met on February 16, 2000, at the FAA Technical Center.

The Safety Board acknowledges the outstanding effort the Air Force has made in aviation safety supporting bird strike prevention measures and encourages it to continue this effort with the FAA and other parties. Because the Air Force represents the DOD in this matter and its actions meet the intent of Safety Recommendation A-99-97, it is classified "Closed--Acceptable Action."

Recommendation Report

Friday, September 05, 2008

NOTATION:7192

Log Number 2764D

Issue Date 11/19/1999

KANSAS CITY MO

3/4/1999

ON 3/4/99, AT 2200 CENTRAL STANDARD TIME, A DOUGLAS DC-9-15F, N195US, OPERATED BY USA JET AIRLINES, INC., ENCOUNTERED A FLOCK OF LARGE BIRDS WHILE ON FINAL APPROACH FOR LANDING AT KANSAS CITY INT'L. AIRPORT, KANSAS CITY, MISSOURI. DURING THE ENCOUNTER, SEVERAL BIRDS WERE INGESTED INTO BOTH ENGINES, RESULTING IN SEVERE ENGINE POWER LOSS. THE PILOT REGAINED ENOUGH POWER IN ONE ENGINE TO CONTINUE THE APPROACH AND LAND THE AIRPLANE WITHOUT FURTHER INCIDENT. THERE WERE NO INJURIES. NIGHT VISUAL METEOROLOGICAL CONDITIONS PREVAILED AT THE TIME OF THE ENCOUNTER, AND AN INSTRUMENT FLIGHT RULES (IFR) FLIGHT PLAN HAD BEEN FILED FOR THE NONSCHEDULED DOMESTIC AIR CARGO FLIGHT. THE FLIGHT WAS CONDUCTED UNDER THE PROVISIONS OF 14 CODE OF FEDERAL REGULATIONS (CFR) PART 121.

Recommendation # A-99-098

Overall Status
CAA

Priority

THE NTSB RECOMMENDS THAT THE U.S. DEPT. OF INTERIOR: PARTICIPATE IN A TASK FORCE, TO BE CONVENED BY THE FEDERAL AVIATION ADMINISTRATION, TO ESTABLISH A PERMANENT BIRD STRIKE WORKING GROUP TO FACILITATE CONFLICT RESOLUTION AND IMPROVE COMMUNICATION BETWEEN AVIATION SAFETY AGENCIES AND WILDLIFE CONSERVATION INTERESTS.

DEPARTMENT OF THE INTERIOR

Closed - Acceptable Action

7/26/2005

3/29/2001 NTSB Although the Safety Board has heard from the organizations to whom similar recommendations were issued, Board records indicate that DOI has not responded concerning this recommendation. The other organizations have indicated their agreement to participate in the task force when formed, and the FAA has indicated that it is forming the task force. The Board would appreciate learning of any current, completed, or planned activities that DOI has taken in response to the recommendation. If there are no current or planned activities, please so inform the Board so that we may close the recommendation. A copy of the recommendation letter is enclosed for your reference.

3/4/2002 Addressee The U.S. Fish and Wildlife Service was part of the original interdisciplinary panel that reviewed aviation safety issues associated with bird strikes and suggested the idea of a bird strike working group in the spring of 1999. Most recently, we participated in an ad hoc working group organized by the Federal Aviation Administration to draft an interagency agreement on bird strikes. The Service fully intends to participate as an active member of the task force and the bird strike working group when they are formed.

5/17/2002 NTSB The Safety Board thanks the FWS for this update on actions taken in response to the recommendation. Pending completion of the interagency agreement and creation of the task force, Safety Recommendation A-99-98 is classified "Open--Acceptable Response."

9/15/2003 Addressee The Federal Aviation Administration (FAA) formed an interdepartmental working group to draft a Memorandum of Agreement (MOA) to address interdepartmental cooperation and communication regarding wildlife aircraft issues. Representatives from the Department of Agriculture, the Department of Commerce, the Department of Defense, the Department of Interior, the Department of Transportation's FAA, and the Environmental Protection Agency were on the working group. The group has subsequently finalized the MOA, and a copy is enclosed for the Board's information. The MOA provides for the establishment of a permanent Bird Strike Working Group to facilitate conflict resolution and improve communication between aviation safety agencies and wildlife conservation interest groups.

7/26/2005 NTSB Through correspondence with the FAA, the Safety Board is aware of the interdepartmental working group it formed and of the memorandum of agreement (MOA) that this group drafted to address interdepartmental cooperation and communication regarding wildlife/aircraft issues. The MOA, which has been signed by the Department of Agriculture, the Department of Commerce, the Department of Defense, the Department of the Interior, the FAA, and the Environmental Protection Agency, provides for the establishment of a permanent Bird Strike Working Group to facilitate conflict resolution and improve communication between aviation safety agencies and wildlife conservation interest groups.

With the signing of the MOA and the formation of the permanent Bird Strike Working Group, the Department of the Interior has completed the action recommended. Accordingly, Safety Recommendation A-99-98 is classified "Closed--Acceptable Action."

Recommendation Report

Friday, September 05, 2008

NOTATION:7192

Total Number of Recommendations for Recommendation Report: 13

Selection for Report:

NOTATION:7192