Aviation Investigation Final Report

Location:	Stuttgart, Arkansas	**Accident Number:**	CEN18FA033
Date & Time:	November 19, 2017, 18:55 Local	**Registration:**	N620PA
Aircraft:	BELL HELICOPTER TEXTRON CANADA 407	**Aircraft Damage:**	Destroyed
Defining Event:	Birdstrike	**Injuries:**	3 Fatal
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled - Air Medical (Discretionary)		

Analysis

The helicopter air ambulance flight was en route to pick up a patient when company satellite tracking was lost at an altitude about 1,250 ft mean sea level. The helicopter impacted a reservoir bank and a postimpact fire consumed a majority of the fuselage. Examination of the helicopter did not reveal any anomalies with the airframe or engine that would have precluded normal operation.

A postaccident examination of the wreckage found multiple bird remains, identified as snow geese, were located in the cockpit and embedded in the pilot's clothing and boot. Fragments of a night vision goggle (NVG) system near the pilot's position suggest that the pilot was using them for visual navigation; however, there was no moon illumination to enhance the NVG effectiveness, and it is unlikely that the pilot would have been able to visually detect the birds before impact. While the helicopter flight controls were continuous, it could not be determined if the bird strikes jammed the pilot's controls and/or incapacitated the pilot.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: An in-flight loss of control due to bird strikes.

Findings

Environmental issues	Animal(s)/bird(s) - Awareness of condition
Environmental issues	Animal(s)/bird(s) - Effect on equipment
Environmental issues	Animal(s)/bird(s) - Effect on personnel
Environmental issues	Animal(s)/bird(s) - Effect on operation

Factual Information

History of Flight

Enroute-cruise	Birdstrike (Defining event)

HISTORY OF FLIGHT
On November 19, 2017, about 1855 central standard time, a Bell 407 helicopter, N620PA, impacted terrain near Stuttgart, Arkansas. The pilot and two medical crewmembers were fatally injured, and the helicopter was destroyed. The helicopter was registered to and operated by Air Methods Corporation under the provisions of Title 14 *Code of Federal Regulations* (*CFR*) Part 135. Visual meteorological conditions prevailed for the positioning flight, which was operated on a company visual flight rules flight plan. The flight originated from Pine Bluff, Arkansas, at 1820 and was en route to pick up a patient in Helena, Arkansas.

The helicopter was transmitting its position to the company via satellite communications. At 1855:50, the helicopter transmitted that it was heading 070°, traveling 116 knots at 1,252 ft mean sea level. This was the last recorded data point. The company initiated a search when satellite tracking was lost, and the wreckage was located several hours later. There were no known witnesses to the accident.

PERSONNEL INFORMATION

The pilot was a former military helicopter pilot having flown both AH-64 and OH-58 helicopters. He had been employed as a helicopter air ambulance pilot for over 3 years. He was assigned to the Pine Bluff area on September 30, 2016.

AIRCRAFT INFORMATION

The helicopter was modified via type supplemental certificate for helicopter air ambulance operations.

METEOROLOGICAL INFORMATION

A weather study conducted for the accident area did not reveal any weather hazards around the time of the accident. Both the sun and the moon were more than 15° below the horizon, and dark night conditions existed with no illumination from the moon.

The nearest areas of cultural light were over 13 miles away.

WRECKAGE AND IMPACT INFORMATION

The helicopter was found on the bank of a reservoir on its right side on a heading about 205°. All major components of the helicopter were accounted for at the site. A postimpact fire consumed a majority of the fuselage. The flight controls were fractured and fire-damaged. The cyclic, collective, and anti-torque pedals were fractured at the cockpit floor. All control mixing lever hardware was present with safety wires in place. Fractures on the control tubes were consistent with overload. The helicopter "broom

closet" was consumed by fire. Control continuity was observed from the swashplate to the main rotor pitch change links. All main rotor blades remained attached to the main rotor hub. All blades were fractured in multiple locations; blade remnants and blade core pieces were found surrounding the accident site. The tail rotor drive shaft segments remained continuous with a small portion totally consumed by fire. The tail rotor blade rotated freely when the tail rotor drive shaft was rotated by hand. The tail rotor blades remained attached to the tail rotor yoke. Fragments of the pilot's night vision goggles were located in the area of the pilot controls. (Company policy required pilots and one crewmember to wear night vision goggles during night flights.) No preimpact anomalies were detected during postaccident examination of the helicopter airframe or engine. During the on-scene portion of the investigation, numerous geese, ducks, and cranes were observed in the reservoir and at another nearby reservoir.

Multiple bird remains were found from the cockpit area to the first bulkhead. Samples from the bird remains were sent to the Feather Identification Laboratory, Smithsonian Institution, National Museum of Natural History, Washington, DC.

MEDICAL AND PATHOLOGICAL INFORMATION

The Arkansas Crime Laboratory, Little Rock, Arkansas, conducted an autopsy on the pilot. The cause of death was multiple injuries. The autopsy noted white bird feathers embedded in the pilot's coveralls and right boot. Samples of the bird feathers were also sent to the Smithsonian for examination.

The Federal Aviation Administration (FAA) Bioaeronautical Science Research Laboratory, Oklahoma City, Oklahoma, performed toxicology testing on specimens of the pilot. Testing was negative for all tested substances.

TESTS AND RESEARCH

Feather Identification Laboratory, Smithsonian Institution

Samples submitted to the Smithsonian contained remains from snow geese, which typically have an average weight of 4.8 and 5.48 lbs for females and males, respectively. The complete report is located in the public docket for this accident.

FAA Wildlife Strike Database

A review of the FAA Wildlife Strike Database found a strike report for November 17, 2011, about 0705 central standard time; the pilot of a Cessna 210 airplane reported striking a snow goose near the area of the accident site.

United States Air Force Bird Avoidance Model

The US Air Force developed a Bird Avoidance Model (BAM) that analyzes and correlates bird habitats, migration patterns, and breeding characteristics with key environmental and man-made geospatial data. This model is used by military pilots and planners to monitor bird activity for strike mitigation purposes. Civilian pilots are not required to use the model and the investigation was unable to determine if the accident pilot was aware of the available information. At dusk, the strike probability for the accident

area was forecast to be severe, and at night, the strike probability reduced to moderate. Overlays of this information with the helicopter's flight path is included in the public docket of this report.

ADDITIONAL INFORMATION

Certification Standards

The Bell 407 is certificated under 14 *CFR* Part 27 as a normal category rotorcraft. As such, there are no bird strike safety requirements for the windshield. Transport category rotorcraft do have a requirement under 14 *CFR* 29.631 to be designed to ensure capability of continued flight and/or landing, however the design requirement assumed a single 2.2 lbs bird. The accident involved numerous birds in excess of 4 lbs each.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	46,Male
Airplane Rating(s):	None	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	4-point
Instrument Rating(s):	Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	Helicopter	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	January 31, 2017
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	4000 hours (Total, all aircraft), 214.5 hours (Total, this make and model), 2975.1 hours (Pilot In Command, all aircraft), 43.9 hours (Last 90 days, all aircraft), 14.5 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	BELL HELICOPTER TEXTRON CANADA	**Registration:**	N620PA
Model/Series:	407 NO SERIES	**Aircraft Category:**	Helicopter
Year of Manufacture:	2015	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	54610
Landing Gear Type:	N/A; High skid	**Seats:**	4
Date/Type of Last Inspection:	November 17, 2017 AAIP	**Certified Max Gross Wt.:**	5501 lbs
Time Since Last Inspection:		**Engines:**	1 Turbo shaft
Airframe Total Time:	1055 Hrs as of last inspection	**Engine Manufacturer:**	Rolls Royce
ELT:	C126 installed, not activated	**Engine Model/Series:**	250-C-47B/8
Registered Owner:	AIR METHODS CORP	**Rated Power:**	813 Horsepower
Operator:	AIR METHODS CORP	**Operating Certificate(s) Held:**	On-demand air taxi (135)
Operator Does Business As:	Air Methods	**Operator Designator Code:**	QMLA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:	SGT,223 ft msl	**Distance from Accident Site:**	19 Nautical Miles
Observation Time:	00:56 Local	**Direction from Accident Site:**	354°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	360°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.22 inches Hg	**Temperature/Dew Point:**	7°C / -2°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Pines Bluff, AR	**Type of Flight Plan Filed:**	Company VFR
Destination:	Helena, AR	**Type of Clearance:**	None
Departure Time:	18:20 Local	**Type of Airspace:**	Class E

Wreckage and Impact Information

Crew Injuries:	3 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	3 Fatal	**Latitude, Longitude:**	34.284442,-91.543891

Administrative Information

Investigator In Charge (IIC):	Aguilera, Jason
Additional Participating Persons:	David Gerlach; Federal Aviation Administration; Washington, DC Shane Benedetto ; Federal Aviation Administration; Little Rock, AR Jack Johnson; Rolls-Royce; Indianapolis, IN Mike Stacey; Air Methods; Englewood, CO Suzanne Généreux; TSB Canada; Gatineau
Original Publish Date:	November 5, 2018
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=96342