Aviation Investigation Final Report

Location:	MANSFIELD, Illinois	**Accident Number:**	CEN14LA423
Date & Time:	August 12, 2014, 10:45 Local	**Registration:**	N7089J
Aircraft:	Bell 47G 5	**Aircraft Damage:**	Substantial
Defining Event:	Low altitude operation/event	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 137: Agricultural		

Analysis

The commercial pilot was conducting an agricultural application flight in the helicopter and had just completed spraying a field. A witness near the accident site reported that he saw the helicopter flying low and then pass a tree line when a wind gust lifted the helicopter up and to the left directly into power lines. Weather conditions reported at an airport in the area included wind at 16 knots gusting to 21 knots at the time of the accident.

Separated power lines were observed near the accident site, and a witness mark was melted into the leading edged of a main rotor blade, consistent with it contacting a power line. Recorded GPS data were consistent with low-altitude operations near the accident site. Based on the evidence, it is likely that, while the pilot was flying low-altitude operations in gusting wind conditions, he failed to maintain adequate clearance from power lines.

Toxicology testing detected the sedating antihistamine diphenhydramine in the pilot's urine and in his heart blood. Although some degree of impairment from diphenhydramine cannot be completely ruled out, the pilot's behavior on the day of the accident, as evidenced by GPS data that shows he flew straight lines and made good coverage of the fields during the spraying, was consistent with his level of skill and experience. Therefore, it is unlikely that the pilot's impairment from diphenhydramine contributed to the accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot's failure to maintain clearance from power lines during low-altitude flight in gusting wind conditions following his use of a sedating medication.

Findings

Personnel issues	Monitoring environment - Pilot
Aircraft	Altitude - Not attained/maintained
Environmental issues	Wire - Effect on operation
Environmental issues	Gusts - Effect on operation
Personnel issues	OTC medication - Pilot

Factual Information

History of Flight

Maneuvering-low-alt flying	Low altitude operation/event (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On August 12, 2014, about 1045 central daylight time, a Bell 47G-5 helicopter, N7089J, impacted a powerline and terrain near Mansfield, Illinois. The pilot, who was the sole occupant, sustained fatal injuries. The helicopter sustained substantial damage. The helicopter was registered to and operated by Reynolds Aerial Service LLC under the provisions of 14 Code of Federal Regulations Part 137 as an aerial application flight. Day visual flight rules conditions prevailed for the flight, which did not operate on a flight plan. The local flight originated from Mansfield, Illinois, at time unknown.

A witness, who lived near the accident site, reported that he noticed the agricultural application helicopter flying at a low altitude. He said that the helicopter cleared the tree line on the west side of his property. In his statement, he, in part, stated:

I looked up and [saw] him flying from the north east to the south west over my property and when it passed the tree line on the west side of my property the air craft was [taken] by a gust of wind which hit the right side of the air craft and jerked it up and to the left [directly] into the power lines that are south west of my house and that is when he hit the top line with the left long extension spray boom where chemicals are sprayed from and caused the air craft to flip upside down. I called 911 as I was running out.

He subsequently got in his car and drove to the field southwest of his property. He observed the helicopter was "upside down" in the bean field.

Pilot Information

Certificate:	Commercial	**Age:**	47
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Unknown
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	Unknown
Instrument Rating(s):	Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 None	**Last FAA Medical Exam:**	January 24, 2014
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 4500 hours (Total, all aircraft)		

The 47-year-old pilot held a Federal Aviation Administration (FAA) commercial pilot certificate with airplane single engine land, rotorcraft-helicopter, and instrument helicopter ratings. The pilot held an FAA second-class medical certificate, which was dated January 24, 2014. On the application for that medical certificate, he reported that he had accumulated 4,500 hours of total flight time and 100 hours in the six months prior to that medical examination. The pilot's medical application was deferred by the aviation medical examiner and was later found eligible for the medical certificate with no limitations.

Aircraft and Owner/Operator Information

Aircraft Make:	Bell	**Registration:**	N7089J
Model/Series:	47G 5	**Aircraft Category:**	Helicopter
Year of Manufacture:	1971	**Amateur Built:**	
Airworthiness Certificate:	Restricted (Special)	**Serial Number:**	25032
Landing Gear Type:	N/A; Skid	**Seats:**	2
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	2850 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	13270 Hrs	**Engine Manufacturer:**	LYCOMING
ELT:		**Engine Model/Series:**	VO-435-A1C
Registered Owner:	REYNOLDS AERIAL SERVICE LLC	**Rated Power:**	250 Horsepower
Operator:	REYNOLDS AERIAL SERVICE LLC	**Operating Certificate(s) Held:**	Agricultural aircraft (137)
Operator Does Business As:		**Operator Designator Code:**	1REG

N7089J was a Bell 47G-5 helicopter, with serial number 25032. The helicopter was manufactured in 1971 and was issued a normal category airworthiness certificate. The helicopter's type certificate data sheet indicated it seated two and had a maximum gross weight of 2,850 pounds. The helicopter was configured for agriculture and pest control and a restricted category airworthiness certificate was issued on May 17, 2012. The last helicopter annual inspection was conducted on April 2, 2014. At the time of that inspection, the helicopter had a total time of 13,270.4 hours.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KCMI,763 ft msl	**Distance from Accident Site:**	15 Nautical Miles
Observation Time:	10:53 Local	**Direction from Accident Site:**	132°
Lowest Cloud Condition:	Few / 2000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Broken / 3500 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	16 knots / 21 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	320°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.9 inches Hg	**Temperature/Dew Point:**	21°C / 15°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	MANSFIELD, IL	**Type of Flight Plan Filed:**	None
Destination:	MANSFIELD, IL	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	

At 1053, the recorded weather at the University of Illinois-Willard Airport, near Champaign/Urbana, Illinois, was: Wind 320 degrees at 16 knots gusting to 21 knots; visibility 10 statute miles; sky condition few clouds at 2,000 feet, scattered clouds at 2,800 feet, broken clouds at 3,500 feet; temperature 21 degrees C; dew point 15 degrees C; altimeter 29.91 inches of mercury.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	40.202499,-88.51139(est)

The helicopter came to rest about 1,850 feet and about 310 degrees from the intersection of County Highway 2 and County Road 3200 North. An FAA inspector examined and documented the wreckage on-scene and removed the helicopter's GPS unit. Separated powerlines were observed near the accident site. A witness mark was melted into the leading edge of a main rotor blade. One of the powerlines was stretched and the top of its powerline pole was broken. The inspector reported that the helicopter impacted the ground approximately 250 feet southwest of the separated powerlines and it came to rest on a southeast heading in a bean

field. The elevation of the terrain in the area was about 805 feet above mean sea level (MSL). The inspector subsequently shipped the GPS unit to the National Transportation Safety Board Recorder Laboratory.

Flight recorders

The accident helicopter was equipped with an AgNav Guia P152 GPS, with serial number 152110418. This GPS was a compact device, which could provide the pilot with customizable agricultural spray application data on a color, moving map. The GPS had a 6.5-inch display and was enclosed in a ruggedized housing. The moving map could display a customizable interface, which allowed the pilot to monitor application information and navigational landmarks. The device could interface with an agricultural "light bar" that provided directional guidance to the pilot as per user defined aerial application position information. The device had an obstacle warning feature, which was compatible with FAA tower obstacle data and could provide the pilot with warnings regarding incoming obstacles via messages and alarms.

Medical and Pathological Information

An autopsy was performed on the pilot by the Piatt County Coroner's Office. The autopsy listed blunt force trauma as the cause of death.

The FAA Civil Aerospace Medical Institute prepared a Final Forensic Toxicology Accident Report. The report indicated:

0.161 (ug/ml, ug/g) Diphenhydramine detected in Blood (Heart)
Diphenhydramine detected in Urine
Ibuprofen detected in Urine
Naproxen detected in Urine

The FAA Forensic Toxicology's WebDrugs website description of Diphenhydramine indicated it is a common over the counter antihistamine used in the treatment of the common cold and hay fever. Additionally, Diphenhydramine is used as a sleep aid. It is available over the counter in products such as Benadryl and Unisom. Diphenhydramine carries the following FDA warning: may impair mental and/or physical ability required for the performance of potentially hazardous tasks (e.g., driving, operating heavy machinery).

The FAA Forensic Toxicology's WebDrugs website description of Ibuprofen indicated it is a

nonnarcotic analgesic and anti-inflammatory agent. This is available in prescription, as well as nonprescription forms like Motrin.

The FAA Forensic Toxicology's WebDrugs website description of Naproxen indicated it is a nonnarcotic analgesic and anti-inflammatory agent. This is available in prescription, as well as nonprescription forms like Alleve.

Tests and Research

The accident GPS was shipped to the National Transportation Safety Board Recorder Laboratory. A vehicle recorder specialist downloaded and decoded the GPS's track log data. A portion of the data extracted from the GPS included tracklog data recorded on August 12, 2014, which showed that the GPS began logging data points near the northeast corner of a farmer's field just south of E. 3300 North Rd at approximately 1000. The data showed the helicopter flew over and in the vicinity of the farmer's field for about the next 42 minutes. The data showed that the helicopter started flying in a westerly heading at around 1041:48. At that time, the data revealed the helicopter was flying at a speed of 28.9 mph and was at a GPS altitude of 827 feet MSL. The helicopter continued on a westerly heading and flew as low as 810 feet MSL. The ending portion of the data showed the helicopter had a trend of increasing altitude. The helicopter came to rest about 2,500 feet and about 235 degrees from the last recorded track log data point. The specialist's report is appended to the docket associated with this investigation.

Administrative Information

Investigator In Charge (IIC):	Malinowski, Edward
Additional Participating Persons:	Adama Allmond; Federal Aviation Administration; Springfield, IL
Original Publish Date:	November 29, 2016
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=89862