



# Aviation Investigation Final Report

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<b>Location:</b>	Vienna, Illinois	<b>Accident Number:</b>	CEN17FA064
<b>Date &amp; Time:</b>	December 31, 2016, 17:45 Local	<b>Registration:</b>	N2806R
<b>Aircraft:</b>	Piper PA 28R-200	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>	VFR encounter with IMC	<b>Injuries:</b>	4 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

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## Analysis

The non-instrument rated commercial pilot departed on a cross-country flight in his high performance airplane. There was no record of the pilot receiving an official preflight weather briefing. However, the pilot may have obtained text weather information from a weather service while enroute. Images taken during the flight showed the airplane flying above an overcast cloud layer. Review of satellite imagery indicated that the overcast layer covered the area near the accident site and continued to the intended destination. Marginal visual to instrument meteorological conditions were reported near the accident site about the time of the accident. The investigation could not determine if there were breaks in the low overcast or how the pilot got below the overcast. However, a witness saw the airplane flying at a very low altitude and reported dark night conditions were present. The witness subsequently heard a loud crash, which he thought was the airplane, and called 9-1-1. The airplane was not on fire in flight and he did not see any subsequent fire or explosion. The smell of fuel was present in the area, which led emergency responders to the wreckage within a wooded area. The wreckage path through the woods was a nearly straight 150-ft descending path. Linear separations of tree branches and the S-shaped bending of a propeller blade were consistent with the engine producing power at impact. A postaccident examination of the wreckage did not reveal any preimpact anomalies that would have precluded normal operation of the airplane.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The non-instrument rated pilot's decision to descend through an overcast layer of weather during dark night conditions, which resulted in the airplane impacting trees.

## Findings

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<b>Personnel issues</b>	Decision making/judgment - Pilot
<b>Personnel issues</b>	Aircraft control - Pilot
<b>Aircraft</b>	Altitude - Not attained/maintained
<b>Environmental issues</b>	Low ceiling - Decision related to condition
<b>Environmental issues</b>	Dark - Decision related to condition
<b>Environmental issues</b>	Tree(s) - Contributed to outcome

## Factual Information

### History of Flight

<b>Prior to flight</b>	Preflight or dispatch event
<b>Enroute</b>	VFR encounter with IMC (Defining event)
<b>Enroute</b>	Controlled flight into terr/obj (CFIT)

On December 31, 2016, about 1745 central standard time, a Piper PA 28R-200 airplane, N2806R, impacted trees and terrain near Vienna, Illinois. The commercial pilot and three passengers were fatally injured. The airplane was destroyed during the impact. The airplane was registered to and operated by the pilot as a Title 14 *Code of Federal Regulations* Part 91 personal flight. Night marginal visual meteorological conditions were reported near the accident site about the time of the accident, and the flight was not operated on a flight plan. The flight originated from the Pella Municipal Airport (PEA), near Pella, Iowa, at an unknown time and was destined for Nashville, Tennessee.

A witness at PEA stated that between about 1100 and 1200 on the day of the accident, the pilot came into the shop hangar where the witness was working and asked for an air tank to fill a low tire on his airplane. The witness and the pilot "chatted." The pilot seemed to be relaxed and in a good mood even though they were talking about an "unpleasant event at work." According to the witness, the pilot did not seem to be in a hurry at all. The witness did not see anyone with the pilot in the shop hangar. The pilot did not discuss his flying plans. The weather was clear and "just a little windy" at PEA at the time. Sometime after 1200, he heard the pilot make a taxi for departure call on the common traffic advisory frequency

About 1740, a witness near the accident site saw the airplane flying "very" low and noted it was a "dark night." The engine did not "sound right" and the rpm was going "up [and] down." He did not hold an instrument rating. He subsequently heard a "loud" crash, which he thought was the airplane. According to the witness, the airplane was not on fire in flight, and he did not see any subsequent fire or explosion. The witness called 9-1-1, and a search was conducted by Johnson County Sheriff's Department personnel. The smell of fuel was present in the area identified by the witness and led the Sheriff's Department personnel to the wreckage within a wooded area.

## Pilot Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	34, Male
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 2 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	May 12, 2016
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	June 30, 2016
<b>Flight Time:</b>	(Estimated) 360.7 hours (Total, all aircraft)		

The 34-year-old pilot held a Federal Aviation Administration (FAA) commercial pilot certificate with a single engine land rating issued on June 30, 2016. He did not hold an instrument rating. The pilot held an FAA third-class medical certificate, dated May 12, 2016, with no limitations. Review of copies of the pilot's logbook showed that his last entry was dated July 24/26, 2016. The logbook showed that the pilot had accumulated 312.9 hours of total flight time, 18.9 hours of night flight time, 13.7 hours of simulated instrument flight time, and no flight time in actual instrument conditions.

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Piper	<b>Registration:</b>	N2806R
<b>Model/Series:</b>	PA 28R-200	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1969	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	28R-35293
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	June 6, 2016 Annual	<b>Certified Max Gross Wt.:</b>	2600 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	2766.3 Hrs as of last inspection	<b>Engine Manufacturer:</b>	LYCOMING
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	IO-360-C1C
<b>Registered Owner:</b>	On file	<b>Rated Power:</b>	200 Horsepower
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

N2806R, a 1969 model Piper PA 28R-200, Arrow, serial No. 28R-35293, was a single-engine, propeller-driven, retractable landing gear, semi-monocoque design, four-seat, low wing

airplane. The engine was a 200-horsepower Lycoming IO-360-C1C engine, with serial No. L-15630-51A. The propeller was a constant-speed, two-bladed, Hartzell HC-C2YK-1BF model, with serial No. CH40395B. A review of copies of excerpts from the airplane's logbooks revealed that an annual inspection was completed on June 6, 2016, at an airframe total time of 6,297.3 hours and tachometer reading of 2,766.3 hours. The logbook excerpts indicated that the most recent altimeter, static, and transponder inspections were performed on June 22, 2016, at an airframe total time of 6,302.2 hours and a tachometer reading of 2,771.2 hours.

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Instrument (IMC)	<b>Condition of Light:</b>	Night
<b>Observation Facility, Elevation:</b>	KPAH, 413 ft msl	<b>Distance from Accident Site:</b>	18 Nautical Miles
<b>Observation Time:</b>	17:53 Local	<b>Direction from Accident Site:</b>	174°
<b>Lowest Cloud Condition:</b>		<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	Overcast / 700 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	4 knots / None	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	220°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	29.9 inches Hg	<b>Temperature/Dew Point:</b>	6°C / 4°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	PELLA, IA (PEA )	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Nashville, TN	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>		<b>Type of Airspace:</b>	

A National Transportation Safety Board (NTSB) senior meteorologist collected factual weather data in reference to the accident flight, incorporated snap chat images forwarded by an FAA Inspector, and produced a Group Chairman's Factual Weather Report, which is appended to the docket material associated with this investigation.

The report, in part, indicated that a search of official weather briefing sources, such as Lockheed Martin Flight Service and Direct User Access Terminal Service was done and the accident pilot did not receive a weather briefing from either source. A search of ForeFlight weather information revealed that the accident pilot did not request a weather briefing using his ForeFlight account before the flight. However, the pilot did enter several routes during the accident flight using his ForeFlight account. Those routes and times include Harrisburg-Raleigh Airport (HSB), near Harrisburg, Illinois, to Outlaw Field Airport, near Clarksville, Tennessee, about 1652; HSB to John C Tune Airport, near Nashville, Tennessee, about 1711; and route from HSB to Barkley Regional Airport (PAH), near Paducah, Kentucky, about 1719. The pilot did not check any weather imagery using the ForeFlight account. It could not be determined whether the pilot reviewed text weather products on his ForeFlight account because ForeFlight does not log text information requests.

The surface analysis chart for 1800 depicted a cold frontal boundary just north of the accident site that

extended from southwestern Illinois northeastward into northern Ohio. A stationary front stretched southwest from southwestern Illinois into northeastern Texas. The chart depicted mostly clear skies north of the accident site and cloudy skies at the accident site and points southward. The chart showed air temperatures in the mid 30° to mid 40° F, dew point temperatures in the mid 30° to mid 40° F, temperature-dew point spreads of 3° F or less, and a south wind of 5 knots or less.

The closest weather reporting station to the accident site, Metropolis Municipal Airport (M30), near Metropolis, Illinois, was located about 11 miles south-southeast of the accident site. At 1735, the recorded weather conditions at M30 included wind calm, visibility 10 statute miles, sky condition overcast clouds at 500 ft, temperature 6° C, dew point 6° C, altimeter 29.91 inches of mercury.

At 1753, the recorded weather conditions at PAH, located about 18 nautical miles south of the accident site, included wind 220° at 4 knots, visibility 10 statute miles, sky condition overcast clouds at 700 ft, temperature 6° C, dew point 4° C, and altimeter 29.91 inches of mercury.

Instrument flight rules (IFR) refers to the general weather conditions pilots can expect at the surface and applies to the weather situations at an airport during which a pilot must use instruments to assist take off and landing. IFR conditions for fixed wing aircraft means the minimum cloud ceiling is greater than 500 ft and less than 1,000 ft and/or visibility is greater than 1 mile and less than 3 miles.

Marginal visual flight rules (MVFR), in an aviation weather product, refers to the general weather conditions pilots can expect at the surface. MVFR criteria means a ceiling between 1,000 and 3,000 ft and/or 3 to 5 miles visibility.

The observations from M30 and PAH surrounding the accident time indicated IFR ceiling conditions due to ceilings less than 1,000 ft and surface winds under 10 knots. The IFR ceiling conditions were present before the accident flight departed through the accident time.

Visible and infrared data from the Geostationary Operational Environmental Satellite No. 13 (GOES-13) indicated cloud cover to the south and east of the accident site that continued to Nashville. The difference in brightness temperatures of the cloud tops above the accident site and the surface temperatures (with clear skies) to the north and west of the frontal boundary was very small, therefore using infrared imagery, it is difficult to determine where the cloud edges were near the accident site. Based on the brightness temperatures above the accident site and the vertical temperature profile provided by the 1800 high-resolution rapid refresh sounding, the cloud-top heights over the accident site were about 5,000 ft.

Airmen's Meteorological Information (AIRMET) Tango and Sierra were valid for the accident site at the accident time. The AIRMETs were issued at 1445 and warned of low-level wind shear and IFR conditions due to low ceilings and visibility in precipitation and mist. The conditions were expected to continue past the 2100 forecast period.

Area forecast discussions at 1402 and 1744 for the location closest to the accident site discussed that MVFR to temporary IFR conditions were expected to continue into the overnight hours due to the abundant low-level moisture and inversion in place. The wind was expected to remain at or below 10 knots.

The astronomical data obtained from the United States Naval Observatory for the accident site indicated that on December 31, 2016, sunset was at 1648, the end of civil twilight was at 1717, moonrise was at 0840, and moonset was at 1921.

The phase of the Moon was Waxing Crescent with 6% of the Moon's visible disk illuminated.

### Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Destroyed
<b>Passenger Injuries:</b>	3 Fatal	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	4 Fatal	<b>Latitude, Longitude:</b>	37.354167,-88.811386

The main wreckage came to rest about 43° and 0.46 miles from the intersection of Crossroads Road and Old Metropolis Road. Broken branches, branches with linear separations, the upper portion of the rudder, a ground scar, and the engine were found in a debris path. The heading from the first tree found with broken branches to the main wreckage was 35° magnetic. The upper portion of the rudder, the ground scar, the engine, and the main wreckage were located 75 ft, 90 ft, 105 ft, and 150 ft, respectively, from this tree. The propeller hub and blades remained attached to the engine crankshaft. One propeller blade exhibited "S"-shaped bending. There was no sign of fire in the debris path or wreckage.

The stabilator remained attached to its fuselage mounts and the stabilator's travel stops did not exhibit any witness marks consistent with repeated contact. The right side of the stabilator exhibited a semicircular aft deformation in the leading edge consistent with the size of tree branches. Control continuity was established from the stabilator balance weight to the cockpit area. The stabilator trim tab remained attached to the stabilator with impact damage noted to the right outboard section. The stabilator trim rod remained attached to the trim tab as well as to the trim barrel assembly. The stabilator trim was found in a full nose-up trim setting. The stabilator trim wheel was found separated from its fuselage mount. Stabilator trim continuity was established from the separated trim wheel to the trim barrel. The vertical stabilizer remained attached to its forward fuselage mount. The rudder was separated from the vertical stabilizer. The rudder torque tube remained attached to its fuselage mount but was separated from the remainder of the rudder assembly. Control continuity was established from the separated rudder pedal assembly to the rudder torque tube. The rudder travel stops remained intact and exhibited no signs of repeated contact.

The fuselage was fragmented from the wing spar box forward to the engine. The rear bench seat remained, in part, attached to the fuselage. The left rear and right rear seat belts remained attached to their mounts and were found to be functional when field tested. No shoulder harnesses were installed in the rear seats. An after-market restraint system was installed for the front seats. The pilot lap belt and shoulder harness were located. The pilot's inboard seat belt mount was found separated from the fuselage at its fasteners. The front passenger's shoulder harness remained attached to the fuselage.

However, the lap belt portion of the front passenger's restraint assembly was separated from the fuselage and was not located within the recovered wreckage. Field tests of the pilot's lap and shoulder harness found them to be functional. The pilot and front passenger's seats were found separated from their fuselage mounts and they exhibited downward deformation.

The instrument panel was destroyed. The attitude indicator and horizontal situation indicator gyros were removed and disassembled. Disassembly revealed both gyros had witness marks consistent with a rotating gyro rubbing on its housing.

The engine control quadrant was found separated and it exhibited crush deformation. The landing gear selector was found in the "DOWN" position. The firewall and fuselage bottom skins were found separated from the remainder of the fuselage. The ruder pedal assembly was found separated from its mounts. The control yoke's "T" bar assembly was found fragmented and separated from its mounts, and the control yoke shafts were found separated from the "T" bar assembly. The fuel selector was found damaged and separated from its mounts. The fuel selector valve was noted to be in the "OFF" position.

About 78 inches of the inboard left wing remained attached to the fuselage spar box, and rearward deformation damage was noted to the leading edge of the inboard section of the wing. The left wing's fuel tank was deformed and breeched; its pickup screen was found clear of obstructions. The remainder of the separated wing was found near the main wreckage, and its aileron remained, in part, attached to the wing. The aileron balance weight was found separated and the weight was not located within the wreckage. The flap was found in the retracted position; it was fragmented and remained, in part, attached to its wing mounts. The aileron's bellcrank was separated from its mounts, and the bellcrank remained attached to the aileron via the push-pull tube. The bellcrank stops did not exhibit any signs of repeated contact. Control continuity was established from the aileron to the "T" bar chain and to an overload separation of the balance cable in the center fuselage area. The pitot head remained attached to the separated section of wing; its static hole was clear of debris. However, the pitot hole was found obstructed by a media consistent with wood.

The right wing was found separated from the fuselage at the spar box and was also separated at the manufacturer's flap and aileron splice seam. The flap remained attached to its wing and was found in the retracted position. The aileron remained attached to its mounts, and its aileron balance weight remained attached to the aileron. The right fuel tank was found deformed and breeched; its fuel tank pickup screen was found clear of obstructions. The entire length of the right wing exhibited rearward deformation. The aileron bellcrank and stops were found separated from their mounts and the stops did not exhibit any repeat contact witness marks. The aileron cables remained attached to the bellcrank but were found to be separated in overload at the wing root area. Aileron control continuity was established from the wing root to the bellcrank. The aileron push-pull tube was separated from the bellcrank. The aileron balance cable was separated about 50 inches from the cable's turnbuckle, and the cable separation exhibited a broom straw appearance. The aileron drive cable was separated about 12 inches from the cable's turnbuckle, and the cable separation exhibited a broom straw appearance. Aileron control continuity was established except where overload separations were present.

The engine accessories were all separated from the accessory gear box. All pushrods had bending deformation. The engine's sparkplugs were removed. The top sparkplugs for cylinders No. 1, No. 2, No. 4, and the bottom spark plug for cylinder No. 3 exhibited a normal condition. The remaining sparkplugs



exhibited impact damage. The engine crankshaft was rotated by rotating the propeller by hand. Drivetrain continuity was observed when the accessory gearbox gears and valve train components moved in correlation to the crankshaft movement. A borescope examination of the cylinders did not reveal any anomalies. Each cylinder produced a thumb compression as the crankshaft was rotated. Both magnetos exhibited impact damage and could not be tested. The oil pickup screen was found clear and free of debris. The fuel servo was separated from its intake and its fuel screen was clear and free of debris. The fuel flow divider was disassembled. No anomalies were observed. The internal cavity of the divider had a glossy appearance and smell consistent with aviation gasoline. The separated engine driven fuel pump was damaged and could not be tested. The electric fuel pump did not pump a fluid when electrical power was applied. Disassembly of the pump revealed its magnet had fragmented. The pump's shaft was rotated through an attached drill, and the pump pumped a fluid when the drill was activated.

The propeller hub and blades were removed from the engine and disassembled. The disassembly examination revealed that oil was present in the forward portion of the propeller dome. Both blades had their control knobs separated from their blade butts. Witness marks revealed the blades were in a cruise flight pitch range. No preimpact anomalies were observed during the disassembly examination.

## **Communications**

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According to information provided by FAA inspectors, there was no record of N2806R contacting the tower at PAH, or the tower at the Williamson County Regional Airport, near Marion, Illinois, or the air traffic control center.

## **Medical and Pathological Information**

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The Johnson County Coroner's Office performed an autopsy on the pilot and took toxicological samples. The autopsy indicated the cause of death was blunt impact trauma and the manner of death was accident.

The FAA Bioaeronautical Sciences Research Laboratory's Civil Aerospace Medical Institute performed toxicology testing on the samples taken during the pilot's autopsy and prepared a Final Forensic Toxicology Accident Report on the samples taken during the pilot's autopsy. The report was negative for all tests performed.

## **Tests and Research**

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An NTSB Recorder Laboratory Specialist examined the recovered cell phone and subsequently produced a Personal Electronic Device Factual Report, which is appended to the docket material associated with this investigation. The report, in part, stated that the phone was a Samsung S7 Edge, which was protected by a passcode that could not be determined. The phone had a cracked screen. However, it powered on normally and a partial download was accomplished. The pertinent information from the partial recovery were five photos with timestamps and geographical information.

The positions of the photos were plotted on a Google Earth overlay along with a reference line between Pella, Iowa and Nashville, Tennessee. The first photo was of the accident airplane, taken about 1141, on the ground at Pella, Iowa, from outside the airplane. The next photo was taken about 1619, at the southeastern-most location and farthest from Pella of all recovered photos; it was followed by a photo taken at 1621 and 2 photos taken at 1628, all of which were taken at locations northwest of the 1619 photo and closer to Pella. All four inflight photos showed that the airplane was flying above a cloud layer; some of the photos showed a higher layer of clouds above the airplane. The vantage point of the inflight photos was consistent with the photos being taken from the rear, left seat.

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Malinowski, Edward
<b>Additional Participating Persons:</b>	Marshall Humphries; Federal Aviation Administration; Springfield, IL Leslie A Doud; Hartzell Propeller Inc.; Piqua, OH Damian Galbraith; Piper; Vero Beach, FL Troy Helgeson; Lycoming Engines; Milliken, CO
<b>Original Publish Date:</b>	November 5, 2018
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class</a>
<b>Note:</b>	The NTSB traveled to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=94551">https://data.nts.gov/Docket?ProjectID=94551</a>

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).