



# Aviation Investigation Final Report

<b>Location:</b>	Eatonton, Georgia	<b>Accident Number:</b>	ERA20LA206
<b>Date &amp; Time:</b>	June 5, 2020, 15:20 Local	<b>Registration:</b>	N135VE
<b>Aircraft:</b>	Piper PA 31T	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>	Loss of control in flight	<b>Injuries:</b>	5 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

Before the personal instrument flight rules flight began, the pilot obtained a preflight weather briefing that indicated that instrument meteorological conditions, convective activity, and moderate-to-severe icing conditions would be occurring along the route of flight. According to track data, while the pilot was navigating to avoid weather, the pilot was using the autopilot for maneuvering. After the pilot reported to air traffic control that the airplane would be turning direct to its destination, the performance analysis of track data showed that the airplane began a slight left turn with a bank angle of about 10°, which was consistent with the intended route of flight. However, the turn then reversed, and the airplane began banking to the right, reaching about 120° right wing down during the next 70 seconds and showing a slow oscillation in pitch attitude. Satellite imagery showed that the airplane was likely in instrument meteorological conditions when it began a rapid descent, and the airplane’s descent rate was about 7,000 feet per minute.

Postaccident examination of the airplane and right engine (the left engine was not recovered) revealed no evidence of any preimpact mechanical malfunctions or failures that would have precluded normal operation. The dynamics of the airplane’s movements after the right turn began indicated that the airplane likely was not being actively controlled when it diverted from the intended flightpath. The circumstances of this accident were thus consistent with the pilot’s lack of timely recognition that the autopilot was disengaged. The available evidence for this accident precluded a determination of where the pilot’s attention was directed while navigating direct to the destination. However, the turbulence would have increased the pilot’s workload, and the restricted visibility conditions would have prevented the pilot’s use of outside cues to detect deviations in the airplane’s attitude. Also, the initial roll rates might not have been sufficient to provide reliable cues to the pilot of the developing bank, and the convective conditions would likely have made it difficult for the pilot to detect and recover from the fully developed unusual attitude.

## 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 control of the airplane while maneuvering in instrument meteorological conditions, which placed the airplane in an unusual attitude from which the pilot could not recover. Contributing to the accident was the convective and turbulent weather.

### Findings

<b>Personnel issues</b>	Aircraft control - Pilot
<b>Environmental issues</b>	Convective turbulence - Effect on operation
<b>Environmental issues</b>	Thunderstorm - Effect on operation

## Factual Information

### History of Flight

<b>Enroute-cruise</b>	Turbulence encounter
<b>Enroute-cruise</b>	Loss of control in flight (Defining event)
<b>Uncontrolled descent</b>	Part(s) separation from AC

On June 5, 2020, about 1520 eastern daylight time, a Piper PA-31T, N135VE, was destroyed when it was involved in an accident near Eatonton, Georgia. The two pilots and the three passengers were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot, who owned the airplane, who was seated in the front left seat of the airplane, and the pilot rated passenger was seated in the front right seat. The pilot filed an instrument flight rules (IFR) flight plan from Williston Municipal Airport (X60), Williston, Florida, to New Castle Henry County Marlatt Field (UWL), New Castle, Indiana. The airplane departed at 1413, and one of the pilots was in contact with air traffic control (ATC) shortly afterward.

A review of ATC communications, radar data, and automatic dependent surveillance broadcast (ADS-B) data provided by the Federal Aviation Administration (FAA) revealed that the airplane flew along a northerly heading at an altitude of 26,000 ft mean sea level (msl). When the airplane was about 50 miles south of Eatonton, Georgia, one of the pilots told ATC that the airplane needed to deviate “to the right a little” to avoid weather.

At 1518:02, when the airplane passed over Eatonton, one of the pilots advised ATC that they wanted to proceed direct to their destination on a 353° heading, and ATC acknowledged. At that time, the airplane was at an altitude of about 26,450 ft msl with a groundspeed of about 262 knots. Radar data indicated that the airplane began a left turn to obtain the new heading and that, about 20 seconds later, the airplane began to turn right. At 1519:17, ATC attempted to contact the airplane. At that time, the airplane was at an altitude of about 22,000 ft msl, on a heading of 292° and at a groundspeed of 178 knots. About 2 seconds later, an unintelligible transmission on the ATC radio frequency, likely from one of the pilots of N135VE, was recorded, which was followed by the statement “made it worse.” ATC made several more attempts to contact the airplane, but no further communications from the airplane were recorded. Radar data indicated the airplane continued to turn right and then entered a rapid descent. Radar contact with the airplane was lost about 1520. At that time, the airplane’s altitude was registering as “0”, its ground track was 097°, and its groundspeed was 97 knots.

Several witnesses observed the airplane descending below the existing cloud layer, and some recorded video with their mobile phones. The videos showed the airplane descending in a flat spin-type of motion, and fire was occurring on both sides of the fuselage near both wings. The

videos also showed a trail of black smoke and parts of the airplane separating as it descended. The airplane wreckage was subsequently found in densely wooded terrain.

### Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	67, Male
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Unknown
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 3 With waivers/limitations	<b>Last FAA Medical Exam:</b>	March 19, 2020
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	2000 hours (Total, all aircraft)		

### Pilot-rated passenger Information

<b>Certificate:</b>	Student	<b>Age:</b>	41, Male
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Unknown
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 3 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	July 2, 2018
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	15 hours (Total, all aircraft)		

### Pilot

The pilot held a private pilot certificate for single and multiengine airplanes with an instrument rating. His pilot logbook was never located. The pilot's last third-class FAA medical certificate was issued in March 2020. At that time, he reported a total of 2,000 flight hours. It is unknown how many hours of actual instrument flight experience he had accrued or if he was current for operating in instrument meteorological conditions. The pilot completed an approved simulator training course for the Piper PA-31 airplane in April 2020.

### Pilot Rated Passenger

The pilot rated passenger held a student pilot certificate. Remnants of the endorsements section of his pilot logbook were found in the airplane wreckage. However, the remnants were

too severely burned to obtain logged flight data information. The pilot rated passenger's last third-class FAA medical certificate was in July 2018. At that time, he reported a total of 15 flight hours.

### Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Piper	<b>Registration:</b>	N135VE
<b>Model/Series:</b>	PA 31T Undesignat	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1975	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	31T-7520024
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	8
<b>Date/Type of Last Inspection:</b>	May 6, 2002 Continuous airworthiness	<b>Certified Max Gross Wt.:</b>	8999 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	2 Turbo prop
<b>Airframe Total Time:</b>	7749.4 Hrs as of last inspection	<b>Engine Manufacturer:</b>	Pratt & Whitney Canada
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	PT6A-135
<b>Registered Owner:</b>		<b>Rated Power:</b>	750 Horsepower
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

Each Pratt & Whitney Canada PT6A-135 turboprop engine was equipped with a five-bladed propeller. The airplane was certificated for operation by a single pilot and for flight into known or forecasted icing conditions. The airplane was equipped with pneumatic deice boots on the wing and tail leading surfaces. The airplane was also equipped with an autopilot but had no autothrottle capability.

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Instrument (IMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	3J7,688 ft msl	<b>Distance from Accident Site:</b>	19 Nautical Miles
<b>Observation Time:</b>	15:15 Local	<b>Direction from Accident Site:</b>	60°
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>		<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	6 knots /	<b>Turbulence Type Forecast/Actual:</b>	Convective / Convective
<b>Wind Direction:</b>	150°	<b>Turbulence Severity Forecast/Actual:</b>	Severe / Severe
<b>Altimeter Setting:</b>	29.97 inches Hg	<b>Temperature/Dew Point:</b>	25°C / 22°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Williston, FL (X60 )	<b>Type of Flight Plan Filed:</b>	IFR
<b>Destination:</b>	New Castle, IN (UWL )	<b>Type of Clearance:</b>	IFR
<b>Departure Time:</b>	14:13 Local	<b>Type of Airspace:</b>	Unknown

The pilot obtained a preflight weather briefing using the ForeFlight application about 1300 on the day of the accident. He also filed an IFR flight plan at the same time and estimated the flight to be about 2 hours and 36 minutes at a planned cruising altitude of 18,000 ft msl and with 5 hours and 20 minutes of fuel onboard. The pilot's preflight weather briefing included convective significant meteorological information (SIGMET) 65E and 69E, which extended over central and northern Georgia and were valid from 1255 to 1455. A convective SIGMET implies severe or extreme turbulence, severe icing, and low-level wind shear. When convective SIGMET 65 and 69E expired at 1455, the convective SIGMET 78E was issued for an area of thunderstorms with tops above 45,000 ft msl. The airplane's route of travel and the accident site were within the affected area.

The pilot's preflight weather briefing also included the following: airmen's meteorological information Sierra and Tango, which were issued for IFR conditions over northern Georgia and for turbulence, respectively; the synoptic conditions with a surface analysis chart; meteorological aerodrome reports and the terminal area forecast along the route of flight; the Graphic Forecast for Aviation surface and cloud forecast for 1100 to 1700, wind forecast, and notice to air missions for the route and selected airports. The pilot also viewed static images such as the convective outlook, surface prognostic charts, and winds aloft charts. In addition, the pilot had access to real-time radar that could be overlaid on the map page (as long as the pilot had an active connection to the internet or a compatible in-flight weather receiver).

The pilot did not obtain the National Weather Services' current or forecast icing products. A review of those icing products for 1508 depicted a high probability of encountering icing conditions over the route of flight with a high probability of encountering supercooled liquid droplet conditions about the time of the accident.

According to the Weather Surveillance Radar-1988 Doppler 3.12° base reflectivity and enhanced images that showed echoes of 10 to 25 decibels along the flight track between 1517 and 1520, the flight was in instrument meteorological conditions and echoes associated with supercooled liquid droplets and ice crystals, which indicated the potential for moderate-to-severe icing conditions. The high-resolution rapid refresh sounding at 1500 supported the development of general air mass-type thunderstorms with the potential for structural icing above the freezing level at 15,000 ft msl.

The geostationary operational environmental satellite No. 16 infrared imagery depicted an enhanced area of clouds extending east to west across Georgia and over the accident site. The cloud tops over the accident site at 1521 were at an altitude of about 32,000 ft msl. The visible imagery depicted the main core of the cloud to the southwest, where stronger updraft and downdraft would be expected with the outflow extending over the accident site.

### Wreckage and Impact Information

<b>Crew Injuries:</b>	2 Fatal	<b>Aircraft Damage:</b>	Destroyed
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### Wreckage and Impact Information

<b>Crew Injuries:</b>	2 Fatal	<b>Aircraft Damage:</b>	Destroyed
<b>Passenger Injuries:</b>	3 Fatal	<b>Aircraft Fire:</b>	Both in-flight and on-ground
<b>Ground Injuries:</b>		<b>Aircraft Explosion:</b>	In-flight
<b>Total Injuries:</b>	5 Fatal	<b>Latitude, Longitude:</b>	33.381389,-83.328887

The main wreckage of the airplane was found inverted, and fire consumed most of the fuselage. The main wreckage consisted of the cockpit, fuselage, empennage, inboard sections of both wings, and the right engine. The propeller hub remained attached to the engine. The outboard sections of both wings and the tail section had separated from the airplane and were later located within 1 mile of the where the main wreckage came to rest. The left engine and its propeller system were not located. The outboard section of the left wing was found burned and covered in soot. No other recovered parts of the airplane that had separated from the main wreckage appeared to have fire damage. The National Transportation Safety Board conducted three drone flights on separate days to help map the accident location and locate missing parts of the airplane.

The recovered airplane wreckage was taken to a hangar at a local salvage company. Examination of the cockpit and fuselage area revealed that they were crushed and mostly consumed by fire. The instrument panel, avionics, gauges, switches, and cockpit controls were



either thermally damaged or consumed by fire. Flight control continuity for the ailerons, rudder, elevators, and elevator trim could not be established due to impact and fire damage. The stability augmentation system servo actuator arm appeared intact and was observed near the lower scribe mark on the servo motor housing.

The autopilot controller was destroyed in the fire, so the system could not be tested. Both wings, their associated ailerons and flaps, and the vertical and horizontal stabilizers were heavily fragmented and damaged either from impact or fire. The wing spars, the flight control fracture surfaces, and their associated cabling and attachments points showed features consistent with an overload failure. Both wing tip fuel tanks had separated in flight and exhibited minor damage.

Postaccident examination of the airplane revealed no evidence of any preimpact mechanical malfunctions or failures that would have precluded normal operation.

The right engine was recovered with its five-bladed propeller system, airframe cowlings, and airframe exhaust ducts still attached. The engine sustained extensive impact and thermal damage. The propeller hub was attached to the propeller shaft flange, and fragments from each of the five blades remained in the hub. A total of six blades were recovered, but it could not be determined which blades were associated with the right engine.

The cowlings were removed, and a borescope was used to internally examine the engine. Damage was noted to the tips of the power turbine blades, but no evidence of rotational scoring was observed.

A portion of the engine inlet case, the oil tank, and the accessory gearbox housing were fractured and consumed by fire, exposing several accessory gearbox internal gears. The power control linkage and reversing linkage were bent and crushed. Examination of the pneumatic lines revealed that the compressor discharge air line and P3 filter were normal. The power turbine control line was bent and crushed.

The engine chip detector was removed and was absent of debris. The fuel filter was also absent of debris.

Examination of the compressor section revealed that the first-stage compressor blades were not damaged. The reduction gearbox appeared normal, and the fuel control unit and fuel pump sustained impact and fire damage.

Examination of the engine revealed no preimpact anomalies that would have precluded normal operation had its fuel source (the wing section that housed the fuel tank) not separated from the right wing in flight.

## **Medical and Pathological Information**

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The Division of Forensic Sciences, Georgia Bureau of Investigation, performed an autopsy of the pilot and the pilot rated passenger. Their cause of death was multiple blunt force injuries.

Toxicology testing performed by the Federal Aviation Administration Forensic Sciences Laboratory identified amlodipine in the pilot's liver and urine samples. Amlodipine is a blood pressure medication that is generally not considered impairing. The toxicology testing also identified glucose in the pilot rated passenger's urine sample.

As no blood was available for either pilot, carbon monoxide testing was not performed.

## Tests and Research

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An airplane performance study was conducted using ADS-B radar data and GPS position and attitude heading reference system data downloaded from the handheld Appareo Stratus 2S device that was located in the wreckage. The study determined that the 1-hour 7-minute flight was uneventful until the last 90 seconds.

The study found that, when one of the pilots reported to ATC that the airplane would be turning direct to its destination, the ADS-B data were consistent with the airplane's autopilot being engaged at this time; specifically, the recorded altitude, groundspeed, and heading were relatively constant. After the turn, the airplane dynamics appeared consistent with an open-loop situation, that is, the pilot being hands off despite the autopilot being disengaged.

Data showed the airplane banking  $10^\circ$  left during the next 20 seconds, which would be expected based on radio communications. After reaching  $10^\circ$  of left bank, the airplane began to roll back to the right as if it were returning to wings level, but the airplane instead continued to roll right to a bank angle of about  $120^\circ$  during the next 70 seconds with about a  $1^\circ$  to  $2^\circ$  per second roll rate. At the same time, the airplane entered a series of pitch oscillations for about 60 to 65 seconds. These large pitch and bank angles precluded the calculation of the airplane's speed. However, the flight dynamics were similar to the airplane's inherent phugoid and spiral modes. The last ADS-B return was recorded at 1519:07, and the last radio transmission was received 12 seconds later at 1519:19. At that time, the airplane's descent rate was about 7,000 feet per minute according to the recovered GPS data.

The airplane's maximum operating speed at 26,000 ft msl was 182 knots. The performance study concluded that the airplane did not exceed this speed during the flight until the airplane deviated from straight-and-level flight.

The airplane was operating in an area of convective activity. As such, it is possible that the turbulent weather associated with the convective activity could have precipitated or

contributed to the airplane dynamics recorded in the final 90 seconds of the flight. Although there was a high probability of moderate-to-severe icing conditions at the time of the accident, the performance dynamics observed in the final moments of the flight were not consistent with an ice encounter; that is, the airplane's speed and altitude remained constant before deviating from straight-and-level flight.

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Read, Leah		
<b>Additional Participating Persons:</b>	David Detscher; FAA/FSDO; Atlanta, GA Jonathon Hirsch; The New Piper Aircraft Company; Wichita, KS		
<b>Original Publish Date:</b>	October 5, 2022	<b>Investigation Class:</b>	3
<b>Note:</b>	The NTSB did not travel to the scene of this accident.		
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=101393">https://data.nts.gov/Docket?ProjectID=101393</a>		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).