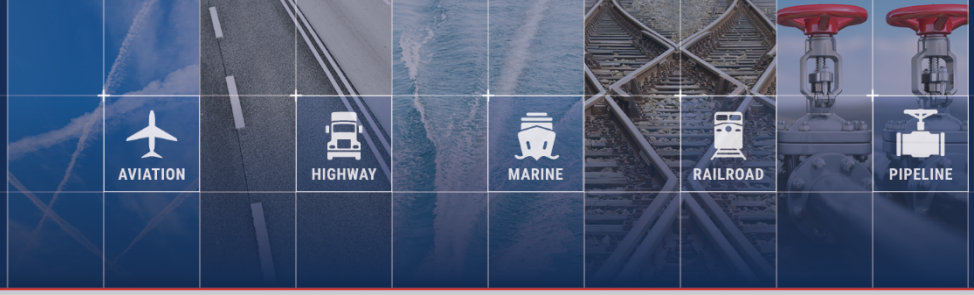

Aviation Investigation Final Report

Location:	Dawsonville, Georgia	**Accident Number:**	ERA23FA109
Date & Time:	January 12, 2023, 20:17 Local	**Registration:**	N4254T
Aircraft:	Piper PA-28-180	**Aircraft Damage:**	Destroyed
Defining Event:	VFR encounter with IMC	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The non-instrument-rated private pilot planned to complete a night, visual flight rules (VFR), cross-country flight to return to his home airport. The following day, he had an international flight that he was trying to get back for, in which he would be flying as a passenger. The pilot had questioned airport staff about the weather conditions along his route and they advised the pilot against flying and booked him a hotel to wait until the weather cleared in the morning. The pilot left the airport but returned after the fixed based operator closed; he then used the self-service fuel and departed for his home airport.

Review of automatic dependent surveillance - broadcast (ADS-B) data found that about ten minutes into the flight the flight track began turning left and right and climbing and descending. In the final two minutes of the flight, the airplane entered a series of tight turns and then a rapidly descending spiral turn. The wreckage was located near the final reported ADS-B position.

Examination of the wreckage revealed no preimpact mechanical malfunctions or failures with the airplane. The airplane impacted terrain in a near-vertical descent at a high speed. A witness reported that the airplane descended into terrain in a spinning turn and the engine noise was loud and continuous until impact.

A weather study found that precipitation, convective weather, and clouds were near the departure airport and along the airplane's flight path. The study found it likely that in the final few minutes of flight the airplane entered an area of light precipitation and clouds and likely did not climb above the cloud layer.

The pilot had not requested a weather briefing for the actual departure time, but he did request a weather briefing for the route departing a few hours earlier. Had the pilot received a weather briefing for the actual departure time, VFR flight would not have been recommended.

Based upon the flight track and meteorological and astronomical data, the pilot initiated a VFR flight into instrument meteorological and dark nighttime conditions. The accident pilot's flight into instrument meteorological conditions (IMC) likely resulted in his inability to see outside and fly by visual references to the horizon. It is likely the accident pilot was experiencing an increase in workload because of spatial disorientation and was not able to recover from the rapid descending spiral into terrain.

Review of the pilot's qualifications and experience found that he did not possess an instrument rating, which was required to fly into the conditions experienced, and he had recently received his private pilot certificate about a month and a half prior to the accident. The pilot had about 15 hours of total night experience, and he had never logged actual instrument experience in day or night conditions. This lack of total experience and qualifications to fly in night IMC likely contributed to the pilot's spatial disorientation and loss of control.

Furthermore, the pilot told the airport staff that he needed to return home the evening of the accident, because the next day he was scheduled to take an international flight to Europe. Despite leaving the airport after he had arrived for the flight and having a hotel room booked for him by the airport staff, he returned later in the evening after the staff had departed, refueled the airplane himself, and took off. The pilot's aeronautical decision making to depart was likely influenced by his stated desire to get home and make an international flight the next day. According to the FAA Airplane Flying Handbook, this type of influence on decision making can be characterized as "get-home-itis" and is a common external pressure pilots are trained to be cognizant of during preflight.

The pilot's toxicology report was positive for ethanol. Given that the ethanol was identified at a low level in muscle, but none was found in his liver tissue, most or all of the identified ethanol was likely from sources other than ingestion and did not contribute to the crash.

Probable Cause and Findings

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

The pilot's decision to initiate a visual flight rules flight into night instrument meteorological conditions, resulting in a loss of control in-flight due to spatial disorientation. Contributing to the accident was the pilot's lack of qualifications and experience in night instrument meteorological conditions.

Findings

Personnel issues	Decision making/judgment - Pilot
Environmental issues	Clouds - Decision related to condition
Environmental issues	Rain - Decision related to condition
Environmental issues	Dark - Decision related to condition
Personnel issues	Spatial disorientation - Pilot
Personnel issues	Qualification/certification - Pilot
Personnel issues	Total instrument experience - Pilot

Factual Information

History of Flight

Enroute	VFR encounter with IMC (Defining event)
Enroute	Loss of control in flight
Enroute	Collision with terr/obj (non-CFIT)

On January 12, 2023, about 2017 eastern standard time, a Piper PA-28-180, N4254T, was destroyed when it was involved in an accident near Dawsonville, Georgia. The pilot was fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

According to flight track records, on January 6, 2023, the pilot departed his home airport of Stafford Regional Airport (RMN), Stafford, Virginia, and arrived at the Concord-Padgett Regional Airport (JQF), Concord, North Carolina. On January 8, 2023, he departed JQF and arrived at the Cherokee County Regional Airport (CNI), Canton, Georgia. The purpose of the trip was work-related meetings.

According to fixed base-operator (FBO) personnel at CNI, about 1600 on the day of the accident the pilot arrived at the airport via rental car and requested that his airplane be fueled. The FBO personnel were unable to do so at that time due to heavy rain and lightning nearby.

FBO personnel reported that they had a discussion with the pilot on his plan to take off in poor weather and fly at night. The pilot stated that “after the rain passes it should be fine right?” The pilot further stated that he had an international flight scheduled to Europe the following day from the Washington, DC, area and wanted to leave as soon as possible. The staff reported that after further discussion, the pilot agreed for them to book him a hotel in the area. The staff also provided the code to the airport gate should he want to arrive in the morning before the FBO opened. The pilot subsequently left the airport in the rental car.

Fuel records showed that, later in the evening at 1954, the pilot returned to the airport after the FBO had closed and, via self-service, added 27 gallons of 100-low lead aviation fuel to his airplane.

According to Federal Aviation Administration (FAA) ADS-B flight track data, at 2005 the airplane departed runway 23 at CNI. The airplane flew on varying headings towards the east-northeast and continued to climb for about 10 minutes, reaching a peak altitude of about 7,200 ft mean sea level (msl). In the final two minutes of the flight, the airplane began to descend followed by a series of tight turns before the airplane entered a rapidly descending spiral turn. The airplane’s final position was recorded at 2017:32, about 0.15-mile south of the accident site at an altitude of about 2,000 ft msl. Figure 1 shows the final 2 minutes of the ADS-B flight track and the location of the accident site.

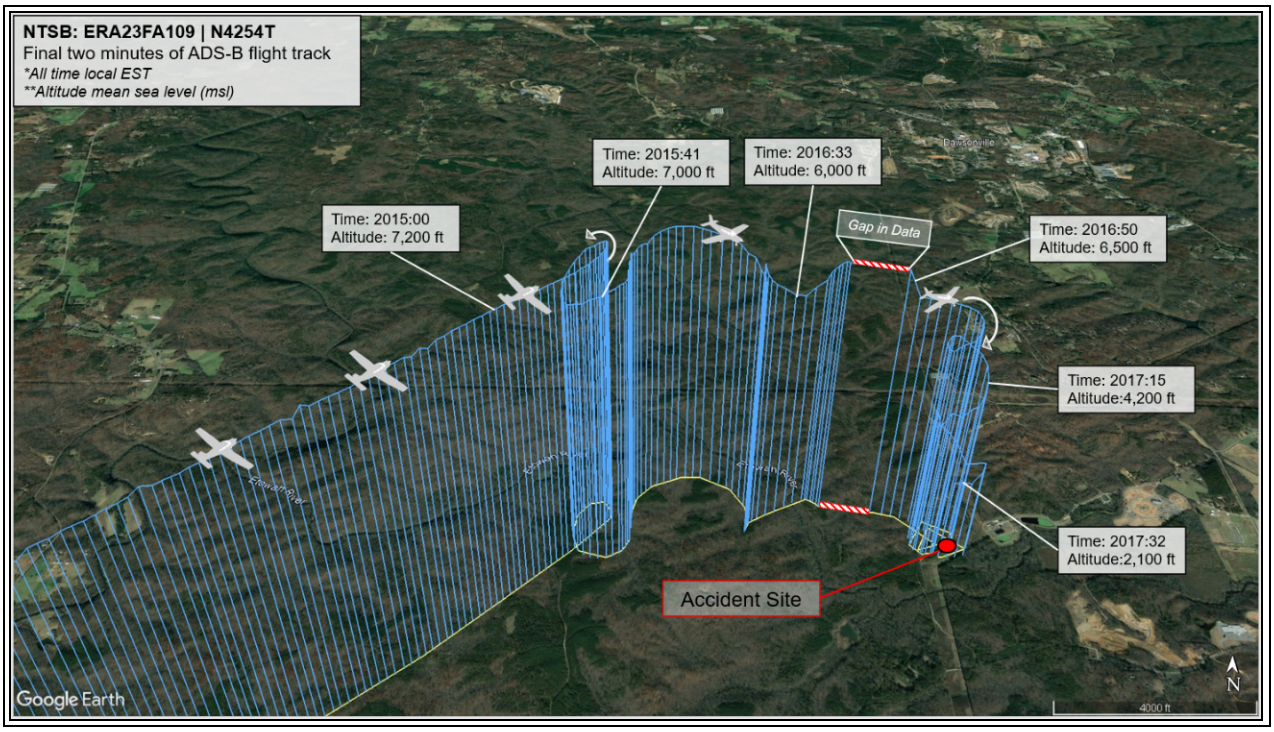

Figure 1 - Overview of the final minutes of the ADS-B flight track.

A witness who was about one mile from the accident site saw what she believed to be an airplane descending and turning/spinning towards the ground. She saw a white light and an orange light and heard a loud engine up until the moment of impact. After the sound of impact, she did not hear anything further from the airplane, nor was there an explosion or fire.

On January 13, 2023, about 0900, an FAA Alert Notice (ALNOT) for a missing aircraft was issued after family members notified the FAA of the missing airplane. The wreckage was located several hours later.

According to FAA air traffic control (ATC) records and the FAA's contract Automated Flight Service Station (AFSS) provider Leidos, there was no known communication between the pilot and ATC, nor was there a VFR flight plan on-file for the accident flight.

According to Foreflight account data, the most recent route of flight entered at 1822 was for a direct route from CNI to the pilot's home airport RMN, with an en route altitude of 7,500 ft.

Pilot Information

Certificate:	Private	**Age:**	43,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	BasicMed With waivers/limitations	**Last FAA Medical Exam:**	November 9, 2022
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	November 23, 2023
Flight Time:	(Estimated) 203 hours (Total, all aircraft), 201 hours (Total, this make and model), 103 hours (Pilot In Command, all aircraft), 10 hours (Last 30 days, all aircraft)		

According to FAA airman records, the pilot held a private pilot certificate with a rating for airplane single-engine land. He did not hold an instrument rating.

The pilot's paper logbook was recovered in the airplane at the accident site and its contents were reviewed. The pilot had logged flights from December 18, 2020, through November 22, 2022. The pilot's temporary airman certificate was located in the wreckage with a date of issue of November 23, 2022. The pilot's checkride was not logged and there were no flights logged after November 22, 2022.

The pilot had logged 171 hours, with 71 hours as pilot-in-command. Most of the the pilot's flight time was in the accident airplane. He logged a total of 3.7 simulated instrument hours and 4.4 hours at night. He had had not logged any flight time in actual instrument conditions.

Review of publicly available flight tracking websites found that several flights were logged in the accident airplane between November 22, 2022, up to the accident date. Presuming the pilot, who owned the airplane, was the pilot-in-command for those flights, the review found that about 32 hours of flight time was accumulated, with 10 hours being at night. In the 30 days before the accident, the airplane was flown about 10 hours.

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N4254T
Model/Series:	PA-28-180 NO SERIES	**Aircraft Category:**	Airplane
Year of Manufacture:	1971	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	28-7205121
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	March 19, 2022 Annual	**Certified Max Gross Wt.:**	2400 lbs
Time Since Last Inspection:	106 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	5560 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	O-360-A4A
Registered Owner:	On file	**Rated Power:**	180 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:	CNI,1221 ft msl	**Distance from Accident Site:**	14 Nautical Miles
Observation Time:	20:15 Local	**Direction from Accident Site:**	259°
Lowest Cloud Condition:		**Visibility**	1 miles
Lowest Ceiling:	Broken / 900 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	3 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	270°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.79 inches Hg	**Temperature/Dew Point:**	12°C / 11°C
Precipitation and Obscuration:	Moderate - Thunderstorm - Mist		
Departure Point:	Canton, GA (CNI)	**Type of Flight Plan Filed:**	None
Destination:	Stafford, VA (RMN)	**Type of Clearance:**	None
Departure Time:	20:05 Local	**Type of Airspace:**	Class G

According to a National Transportation Safety Board weather study, areas of precipitation, convective weather, and clouds were near the departure airport and along the pilot's route of flight and altitude flown.

The closest weather reporting location to the accident site was from the departure airport, CNI, located about 14 miles west of the accident site at an elevation of 1,219 ft. The observations issuedclosest to the time of the departure time of 2005 observed visibility 10 statute miles, scattered clouds at 700 ft above ground level (agl), scattered clouds at 7,500 ft.

At 2015, which was the observation nearest the accident time, visibility was 1 mile in mist with thunderstorm in the vicinity, ceiling broken at 900 ft and overcast at 2,600 ft agl. The remarks noted lightning in the distant northeast.

Additional weather reporting stations to the east and north of the accident site were observing similar conditions, consistent with light to moderate rain, reduced visibility, and broken and overcast cloud layers at 1,200 ft and 2,800 ft agl.

According to a High-Resolution Rapid Refresh (HRRR) numerical model data and satellite infrared images, near the final portion of the flight track cloud layers were likely present at 900 ft through 10,000 ft agl, with an additional broken layer near 22,000 ft. The freezing level was identified at 8,285 ft agl, which was above the maximum altitude the airplane reached.

According to a review of weather radar and the base reflectivity imagery, during the final portion of the flight the airplane entered areas of light intensity echoes. Figures 2 and 3 provide an overview of the echoes near the time of the accident with the airplane's ADS-B flight track overlayed into the images.

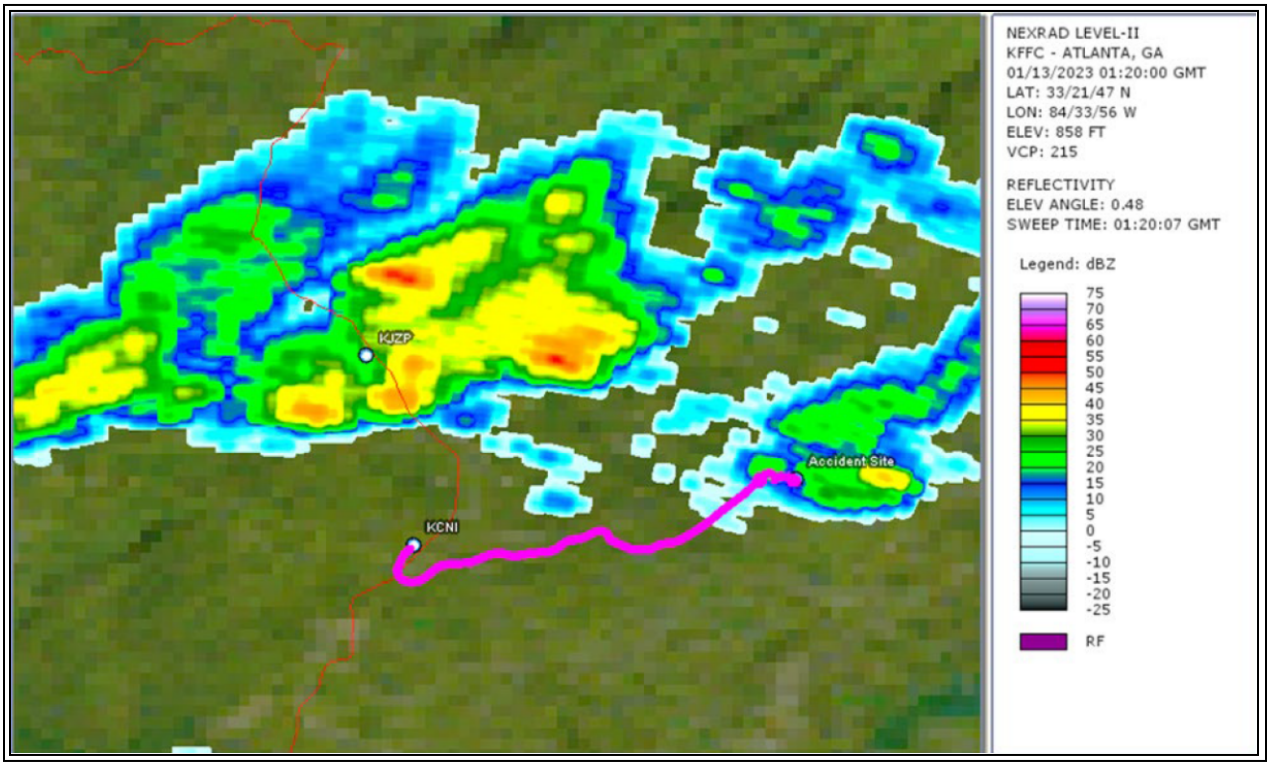

Figure 2 - Base reflectivity image for 2020 with flight track overlaid in magenta.

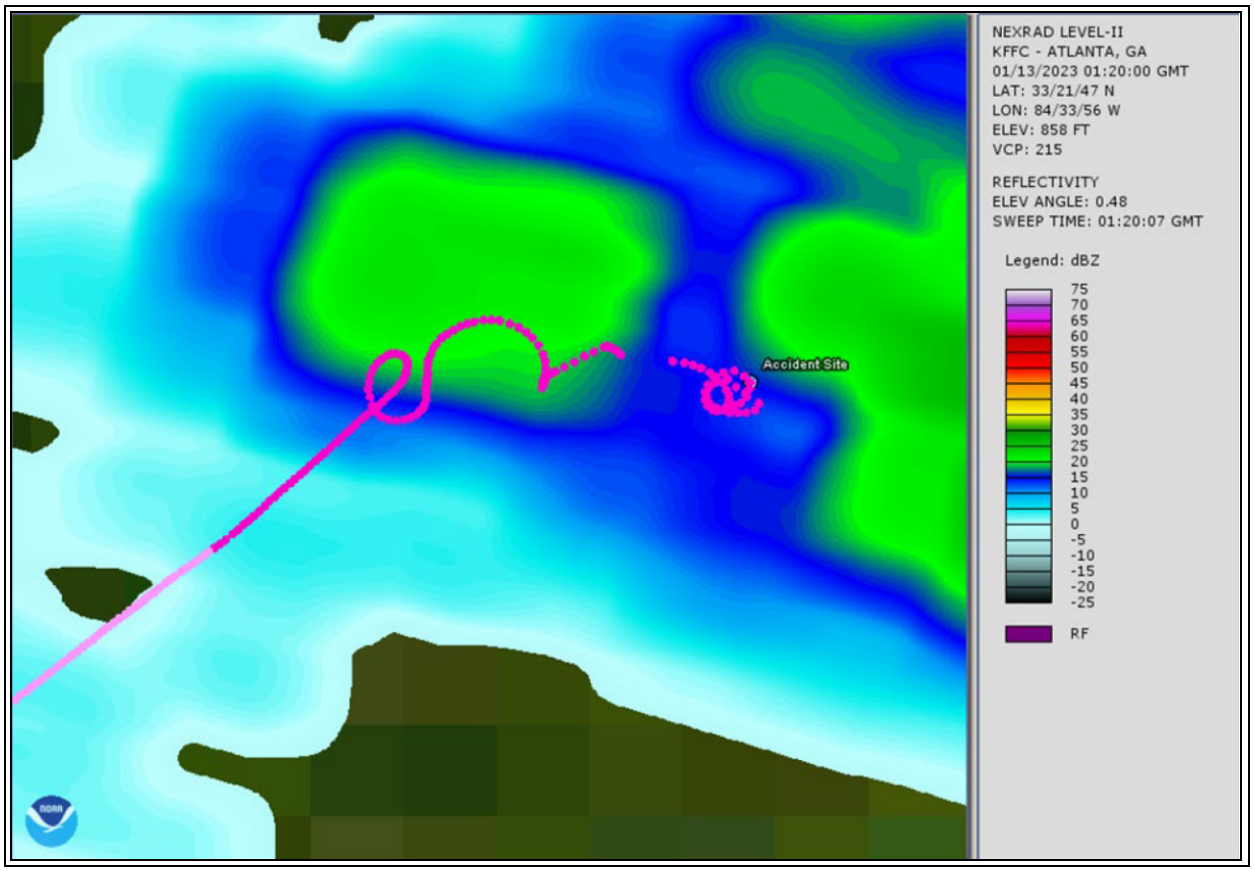

Figure 3 - Closer view of the base reflectivity image for 2020 with the flight track overlaid.

According to ForeFlight, the pilot created a route briefing for CNI to RMN with a proposed departure time of 1700. There were no subsequent route briefings located by Foreflight, nor were there any other weather briefings located for the accident flight by the FAA's contract Automated Flight Service Station (AFSS) provider, Leidos.

The route of flight weather briefing generated at 1700 did not include any inflight weather advisories (Convective SIGMETs or G-AIRMETs). Had the pilot obtained an updated briefing closer to the departure time, VFR flight would not have been recommended based on the existing observations and forecast products.

The astronomical conditions indicated that the accident occurred at nighttime with no illumination from the moon, which was expected to rise after 2309.

The witness who was about one mile from the accident site recalled that it was a dark overcast night, but it was not windy or raining at the time she observed the accident.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	34.361402,-84.136949(est)

The airplane impacted wooded terrain near the top of rising terrain at an elevation of 1,250 ft msl about 14 miles northeast of CNI. The wreckage was highly fragmented, located largely in one compact area, and the damage to trees in the vicinity were consistent with a near-vertical flight path into terrain. All major portions of the airframe were located. Flight control continuity was established from all primary flight control surfaces to the cockpit except for separations that were consistent with tensile overload.

The cockpit, switches, levers, and flight instruments were all severely damaged by impact forces. The directional gyro was disassembled and its gyro and housing exhibited rotational scoring. The signatures are consistent with normal operation of the engine-driven vacuum pump powered flight instruments.

Examination of the engine found no evidence of preimpact mechanical malfunctions or failures that would have precluded normal operation. The propeller exhibited blade polishing, chordwise scratches, and S-bending, which was consistent with the engine operating under power at the time of impact.

Medical and Pathological Information

According to the autopsy report issued by the Division of Forensic Sciences, Georgia Bureau of Investigation, State of Georgia, the cause of death was multiple blunt force injuries and the manner of death was an accident.

Toxicology testing performed by the FAA's Forensic Sciences Laboratory identified ethanol in muscle tissue at 19 (mg/dl, mg/hg). Ethanol was not detected in vitreous specimen; testing in liver tissue was inconclusive. The toxicology results were negative for drugs and glucose.

Additional Information

Spatial Disorientation

The FAA Civil Aerospace Institute's publication, "Introduction to Aviation Physiology," defines spatial disorientation as a loss of proper bearings or a state of mental confusion as to position, location, or movement relative to the position of the earth. Factors contributing to spatial disorientation include changes in acceleration, flight in instrument meteorological conditions (IMC), frequent transfer between visual meteorological conditions (VMC) and IMC, and unperceived changes in aircraft attitude.

The FAA's Airplane Flying Handbook (FAA-H-8083-3A) describes some hazards associated with flying when the ground or horizon are obscured. The handbook states, in part: The vestibular sense (motion sensing by the inner ear) in particular tends to confuse the pilot. Because of inertia, the sensory areas of the inner ear cannot detect slight changes in the attitude of the airplane, nor can they accurately sense attitude changes that occur at a uniform rate over a period of time. On the other hand, false sensations are often generated, leading the pilot to believe the attitude of the airplane has changed when in fact, it has not. These false sensations result in the pilot experiencing spatial disorientation.

The FAA’s Pilot’s Handbook of Aeronautical Knowledge provided information on how mitigate risks before and during flight.

The PAVE Checklist

Another way to mitigate risk is to perceive hazards. By incorporating the PAVE checklist into preflight planning, the pilot divides the risks of flight into four categories: Pilot-in-command (PIC), Aircraft, enVironment, and External pressures (PAVE), which form part of a pilot’s decision-making process. External pressures were further explained in the below excerpt.

> E = External Pressures
>
> External pressures are influences external to the flight that create a sense of pressure to complete a flight—often at the expense of safety. Factors that can be external pressures include the following:

- Someone waiting at the airport for the flight’s arrival
- A passenger the pilot does not want to disappoint
- The desire to demonstrate pilot qualifications

- The desire to impress someone (Probably the two most dangerous words in aviation are “Watch this!”)
- The desire to satisfy a specific personal goal (“get-home-itis,” “get-there-itis,” and “let’s-go-itis”)
- The pilot’s general goal-completion orientation

Preventing Similar Accidents

Reduced Visual References Require Vigilance (SA-020)

The Problem

About two-thirds of general aviation accidents that occur in reduced visibility weather conditions are fatal. The accidents can involve pilot spatial disorientation or controlled flight into terrain. Even in visual weather conditions, flights at night over areas with limited ground lighting (which provides few visual ground references) can be challenging.

What can you do?

- Obtain an official preflight weather briefing, and use all appropriate sources of weather information to make timely in-flight decisions. Other weather sources and in-cockpit weather equipment can supplement official information.
- Refuse to allow external pressures, such as the desire to save time or money or the fear of disappointing passengers, to influence you to attempt or continue a flight in conditions in which you are not comfortable.
- Be honest with yourself about your skill limitations. Plan ahead with cancellation or diversion alternatives. Brief passengers about the alternatives before the flight.
- Seek training to ensure that you are proficient and fully understand the features and limitations of the equipment in your aircraft, particularly how to use all features of the avionics, autopilot systems, and weather information resources.
- Don’t allow a situation to become dangerous before deciding to act. Be honest with air traffic controllers about your situation, and explain it to them if you need help.
- Remember that, when flying at night, even visual weather conditions can be challenging. Remote areas with limited ground lighting provide limited visual references cues for pilots, which can be disorienting or render rising terrain visually imperceptible. When planning a night VFR flight, use topographic references to familiarize yourself with surrounding terrain. Consider following instrument procedures if you are instrument

rated or avoiding areas with limited ground lighting (such as remote or mountainous areas) if you are not.
- Manage distractions: Many accidents result when a pilot is distracted momentarily from the primary task of flying.

See https://www.ntsb.gov/Advocacy/safety-alerts/Documents/SA-020.pdf for additional resources.

The NTSB presents this information to prevent recurrence of similar accidents. Note that this should not be considered guidance from the regulator, nor does this supersede existing FAA Regulations (FARs).

Administrative Information

Investigator In Charge (IIC):	Gerhardt, Adam
Additional Participating Persons:	Juli Hendrix; FAA/ FSDO; Atlanta, GA Jon Hirsch; Piper Aircraft; Vero Beach, FL James Childers; Lycoming Engines; WIlliamsport, PA
Original Publish Date:	May 2, 2024
Last Revision Date:	
Investigation Class:	Class 3
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=106575

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.