



National Transportation Safety Board Aviation Accident Final Report

Location:	Austin, PA	Accident Number:	ERA17FA017
Date & Time:	10/16/2016, 1957 EDT	Registration:	C-GYSN
Aircraft:	PIPER PA28	Aircraft Damage:	Destroyed
Defining Event:	Abrupt maneuver	Injuries:	3 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The commercial pilot and two student pilot passengers were conducting an instrument flight rules (IFR) flight. The accident airplane was part of a group of several airplanes from the same flying club. About 2 hours 50 minutes after takeoff, the air traffic controller advised the accident pilot of areas of precipitation along the airplane's route of flight; the flight subsequently diverted west for about 6 minutes before re-establishing its northwesterly course.

Review of weather information indicated that the airplane subsequently passed through an area of light-to-heavy rain with severe turbulence, updrafts and downdrafts, and small hail; temperatures at the airplane's cruise altitude were above freezing. The airplane entered a right turn at its cruise altitude; shortly thereafter, the turn rate increased, and the airplane began to rapidly descend. Radar contact was lost, and the airplane was subsequently located in a heavily wooded area. Examination of the airplane revealed no evidence of preimpact failure or malfunction of the airframe, flight controls, or engine. The significant fragmentation of the wreckage was consistent with a high-energy impact following a loss of control.

Although components of the vacuum-operated attitude indicator and directional gyro exhibited rotational scoring, examination of the engine-driven vacuum pump could not determine whether it was operating at impact. The initial right turn, which was about standard rate, was likely the pilot's attempt to fly out of the adverse weather. The subsequent right turn, at greater than standard rate, was likely due to spatial disorientation in adverse instrument conditions and not the result of a vacuum system malfunction.

The weather encountered during the flight was forecast, but the extent to which the pilot had familiarized himself with the weather conditions before the flight could not be determined, because there was no record of the pilot receiving a weather briefing from an official, access-controlled source. Although the pilot had recently completed an instrument proficiency check (IPC), recovery from unusual attitudes was not a requirement of the IPC. None of his instrument flight experience was conducted in actual instrument conditions, and his most recent night flight experience was about 10 months before the accident.

While the pilot was expecting weather avoidance assistance from the pilot of another airplane based on their verbal agreement before departure, the two pilots did not communicate during the accident flight. Given that the accident airplane was not equipped with onboard weather information, it could not be determined why the pilot chose to deviate in the direction that he did, rather than asking the controller for more information regarding the weather or for assistance in deviating around it. If the pilot had requested assistance, the controller likely would have been able to provide him with vectors to avoid the adverse conditions.

Probable Cause and Findings

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

The pilot's loss of control while maneuvering in night instrument conditions that included light-to-heavy rain with severe turbulence, updrafts and downdrafts, and hail. Contributing to the accident was the pilot experiencing spatial disorientation, his lack of flight experience in actual instrument conditions, and his failure to request weather avoidance assistance from air traffic control.

Findings

Aircraft	Performance/control parameters - Not attained/maintained (Cause) Instrument flight capability - Not attained/maintained (Cause)
Personnel issues	Aircraft control - Pilot (Cause) Total instrument experience - Pilot (Factor) Spatial disorientation - Pilot (Factor) Lack of communication - Pilot (Factor)
Environmental issues	Convective weather - Effect on operation (Cause)

Factual Information

History of Flight

Enroute-cruise	Other weather encounter Turbulence encounter Navigation error Abrupt maneuver (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On October 16, 2016, about 1957 eastern daylight time, a Piper PA-28-161, Canadian registration C-GYSN, collided with trees and terrain near Austin, Pennsylvania. The commercial pilot and two passengers were fatally injured, and the airplane was destroyed. The airplane was owned and operated by St. Catharines Flying Club under the provisions of Title 14 Code of Federal Regulations Part 91. Night instrument meteorological conditions prevailed, and an instrument flight rules (IFR) flight plan was filed for the personal flight, which originated from Richmond International Airport (RIC), Richmond, Virginia, about 1654, and was destined for St. Catharines/Niagara District Airport (CYSN), St. Catharines, Ontario, Canada.

The accident pilot and the pilots of four other airplanes operated by the flying club flew into the United States (US) on October 12. While in the US, they visited several states, including New York, Virginia, South Carolina, and Georgia. One airplane returned to CYSN on October 15.

Earlier on the day of the accident, the accident pilot and the pilots of two of the other airplanes departed Myrtle Beach International Airport (MYR), Myrtle Beach, South Carolina, and flew to RIC. Before departing from RIC, the pilot of one of the other airplanes spoke with the accident pilot. During that conversation, the accident pilot did not express any concern for the weather. The pilots decided that the accident pilot would depart after the other pilot, and the two pilots would remain in communication about the weather via radio. If the other airplane encountered adverse conditions, the pilot would attempt to vector the accident pilot around the weather. The pilot of the other airplane reported that, during the beginning of the flight, the radio communications that he heard from the accident airplane were made by the front seat passenger, who held a student pilot certificate.

Federal Aviation Administration (FAA) air traffic control radar and voice communication information revealed that, about 1933, the accident airplane established contact with Cleveland Air Route Traffic Control Center (ZOB) at its cruise altitude of 6,000 ft; the controller provided the current altimeter setting. About 1944, while in visual meteorological conditions near the southern edge of a frontal system, the controller informed the pilot of moderate precipitation along the route of flight. The controller stated that it appeared the airplane would go "right through the middle" of two areas of precipitation; the pilot did not respond. The controller repeated the precipitation advisory and asked if the airplane would like to deviate; one of the airplane occupants responded that they would deviate 20° left of course; there were no further radio communications from the accident airplane. Radar data depicted the accident airplane

conducted a left turn to a westerly heading. About this time, the pilot of the other airplane was in visual meteorological conditions and about 21 nautical miles west-southwest of the accident airplane.

About 1946, while flying about 6,000 ft mean sea level (msl) in clouds at the southern edge of a frontal system, the rear seat passenger sent a text message to a friend that the airplane was "...stuck in freezing rain...." The flight continued west, and at 1951:02, the controller advised the accident pilot that the other flying club airplane, located about 20 miles ahead of his location at 6,000 ft msl, reported light rain and smooth ride conditions (see figure 1). About 1952, the accident airplane conducted a right standard rate turn (about 3° per second) onto a north-northwesterly heading while maintaining about 6,000 ft msl, and remained on that heading until about 1956:15.

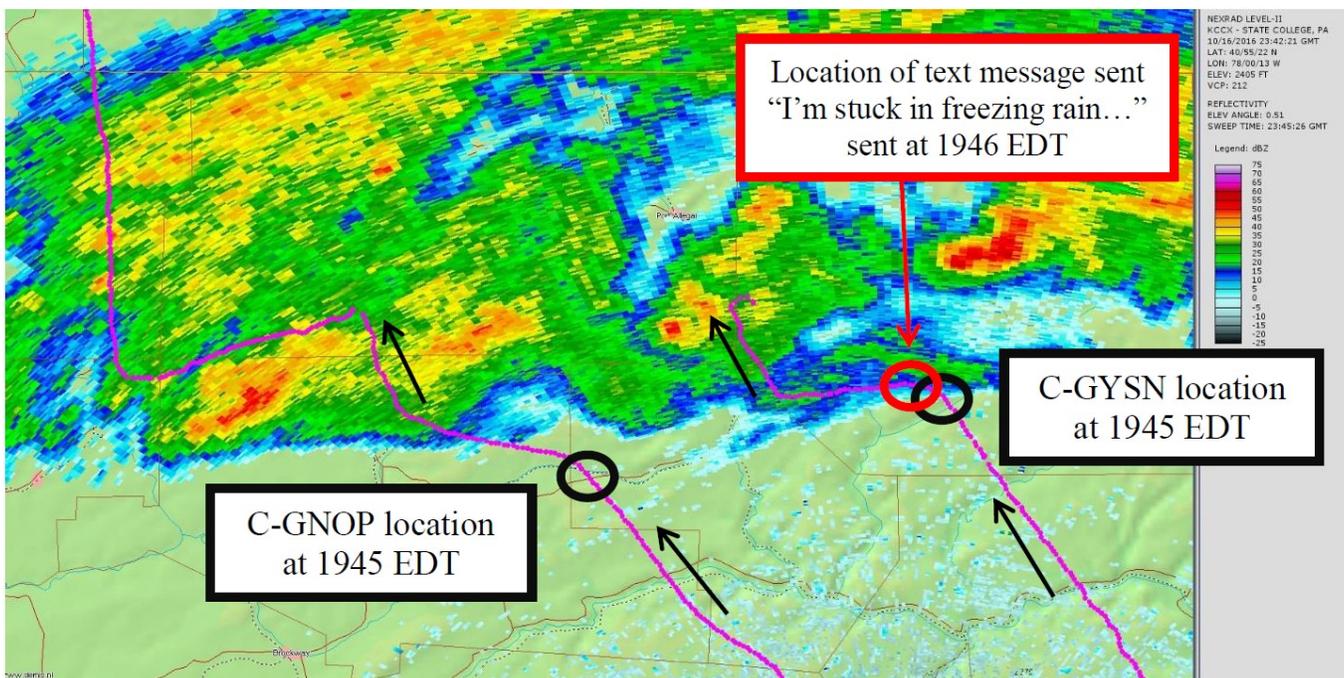


Figure 1: Locations and Flight Path of the Accident Airplane and other Flying Club Airplane (C-GNOP)

About 1956:15, the accident airplane conducted a right turn to a northeasterly direction at its cruise altitude and remained on that general heading until 1956:51, when it began another right turn. The last radar targets with recorded altitude indicated a heading change from 074° to 142°, and descent from 6,000 to 5,500 ft msl, which correlated to an average descent rate of 2,500 ft per minute, and a 5.6°-per-second rate of turn (see figure 2). The controller attempted to contact the airplane at 1957:11; there was no reply. Following the loss of radar and radio contact, air traffic control personnel alerted local authorities who initiated a search for the airplane. The wreckage was located by a Pennsylvania State Police helicopter during an aerial search the following day.

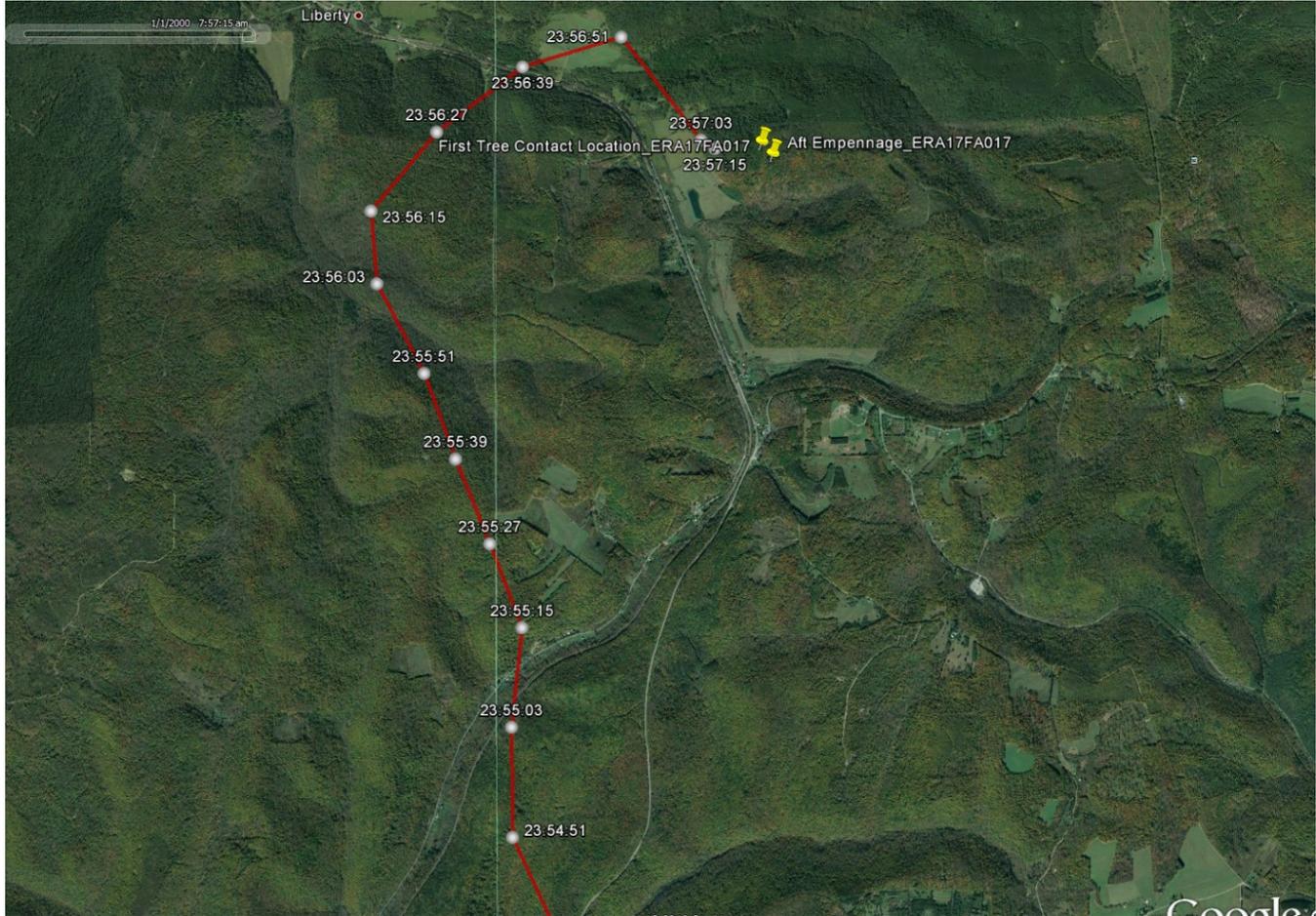


Figure 2: Radar Track Depicting the End of the Flight.

According to the pilot of the other airplane, the outside air temperature at 6,000 ft msl was between 9° and 10°C. He proceeded to the destination and landed uneventfully about 2100, about 1 hour later than planned. He stated that at no point during the flight did he communicate directly with the accident pilot, although they were on the same air traffic control frequency.

Individuals who lived in the area of the accident site reported it was raining hard about the time of the accident. One witness reported hearing an airplane descending.

PERSONNEL INFORMATION

The pilot, age 25, seated in the right seat, held a Canadian commercial pilot license with airplane single engine land, airplane multiengine land, and instrument rating group 1 (which was issued because the flight test was conducted in an other-than-center-thrust multi-engine airplane). He also held a Class 4 airplane instructor certificate with a flight test date of June 17,

2016, and an expiration date of July 1, 2017. He held a Canadian first-class medical certificate with no limitations, which was issued February 25, 2016.

He held a US FAA commercial pilot certificate with ratings for airplane single- and multiengine land, and instrument airplane, issued November 4, 2015. He held an FAA first-class medical certificate with no limitations, which was issued on October 19, 2015.

His pilot logbook contained entries between January 9, 2010 (first logged flight), and September 27, 2016, and revealed about 494 total hours of flight experience, with 301 hours as pilot-in-command (PIC). Of the 494 hours, about 77 were logged as simulated instrument time, with 3 hours simulated instrument time in the previous 90 days. His logbook did not contain any record of flight in actual instrument flight conditions. He logged about 36 hours of night flight experience, of which 27 were as PIC. His last logged night flight as PIC of a single-engine airplane was October 26, 2015, and his last logged night flight receiving dual instruction in a single-engine airplane was December 10, 2015.

According to the most senior flight instructor of the flying club, in April and May 2016, during the accident pilot's flight instructor training, the accident pilot had undergone 5 hours of instrument training. During these flights, they conducted holding procedures and instrument approaches. He reported that they practiced departure and arrival procedures during simulator sessions, and reviewed IFR knowledge during undocumented ground sessions. The accident pilot reportedly, "flew well during departure, en-route, and during approaches."

The pilot's training records indicated that he received instrument training during the month before the accident in preparation for an instrument proficiency check (IPC). The senior flight instructor reported that while the extra training wasn't a requirement, the pilot had expressed interest in obtaining additional training to "help bring him back up to standard." The pilot subsequently completed his IPC on October 11, 2016 in the accident airplane (The IPC did not require demonstration of recovery from unusual attitudes).

The left seat passenger, age 19, held a Canadian student pilot airplane permit issued May 18, 2016. According to the operator, he had accrued a total time of 56 hours in all aircraft, of which 55 were in the accident make and model airplane.

AIRCRAFT INFORMATION

The four-place, low-wing, Piper PA-28-161 airplane, serial number 28-7816311, was manufactured in 1978. It was powered by a 160-horsepower, Lycoming O-320-D3G engine and equipped with a Sensenich 74DM6-o-60, two-bladed, fixed-pitch, aluminum propeller. The airplane was exported to Canada in May 2012 and was issued a Canadian certificate of airworthiness on August 30, 2012.

The airplane was not equipped with onboard weather radar but was equipped with an electrically-operated turn coordinator. The most recent pitot/static check was performed on August 31, 2016, at an airplane total time about 11,466 hours. Review of the Aircraft Technical Log revealed that the airplane was last inspected in accordance with a 100-hour inspection on September 23, 2016 at an airplane total time about 11,519 hours. Supplemental type certificate

(STC) SA00397NY installed June 13, 2013, increased the gross weight from 2,325 to 2,440 pounds.

METEOROLOGICAL INFORMATION

The day before the accident, the accident pilot and another pilot from the group obtained weather information from a National Oceanic and Atmospheric Administration website for the accident flight, which included significant weather prognostic charts. They noted the location of a cold front and expected rain during the last portion of the flight. The freezing level was forecast to be 14,000 ft.

Earlier on the accident date while at MYR, Myrtle Beach, South Carolina, the accident pilot and the pilot of C-GNOP discussed the weather which included the locations of cold and warm fronts, making note they might need to deviate to the west to avoid the cold front.

According to personnel from Lockheed Martin, there was no record of a weather briefing associated with the airplane's call sign; further, there was no record with the Direct User Access Terminal (DUAT) vendor for flight plan or weather briefing. Additionally, there was no record of any of the airplane occupants having a subscription with ForeFlight.

According to an NTSB Weather Study, the 1953 automated surface observation at Bradford Regional Airport (BFD), Bradford, Pennsylvania, located about 21 nautical miles west-northwest of the accident site, reported wind from 310° at 4 knots, 5 miles visibility, light rain, mist, few clouds at 4,000 ft agl, a broken ceiling at 4,800 ft agl, overcast skies at 8,000 ft agl, temperature and dewpoint both 16°C, and altimeter setting 30.05 inches of mercury.

The observations from BFD about the accident time indicated marginal visual flight rules (MVFR) to IFR conditions due to low visibility, with light-to-moderate rain. These surface conditions matched the weather radar imagery and the rain shower line that the accident flight likely encountered.

A High-Resolution Rapid Refresh model sounding was created for the accident site for 2000 EDT. The sounding depicted the freezing level at 11,963 ft. The possibility of low-level wind shear was indicated by Rawinsonde Observation program between the surface and 3,000 ft, and several layers of possible light to moderate clear-air turbulence were identified between the surface and 14,000 ft.

Visible and infrared data from the Geostationary Operational Environmental Satellite number 13 (GOES-13) from 1945 and 2015 indicated cooler brightness temperatures and cloud tops (green and blue colors) located to the east of the accident site and northeastward into central New York. The clouds were moving from west to east, with most of the higher clouds east of the accident site around the accident time. Based on the brightness temperatures above the accident site and the vertical temperature profile provided by the sounding, the approximate cloud top heights over the accident site were 28,000 ft at 1945.

Interpolation of the flight path onto a weather radar summary image indicated that the accident flight entered clouds or light precipitation around 1946, and subsequently entered an area of light-to-heavy rain with severe turbulence, updrafts and downdrafts, and small hail by

1954. There were no lightning strikes near the accident site at the accident time; however, the accident flight still likely encountered instrument meteorological conditions.

There were no SIGMET advisories valid for the accident site at the accident time.

The Center Weather Service Unit (CWSU) in Cleveland (ZOB) issued a Meteorological Impact Statement (MIS) that was valid for the accident site at the accident time. No CWSU Center Weather Advisories were valid for the accident site at the accident time. The MIS issued by ZOB at 1324 was valid through 2130 and discussed, in part, MVFR conditions with isolated IFR conditions in rain showers and mist. The area of precipitation would move northwest to southeast, with ceilings below 5,000 ft msl spreading southeastward.

AIRMET advisories Tango, Zulu, and Sierra were issued at 1645 and valid at the accident time for the accident site. The AIRMETs valid at the accident flight's altitude were AIRMETs Tango and Sierra, forecasting moderate turbulence below 10,000 ft and mountain obscuration conditions due to clouds, precipitation, and mist. AIRMET Tango for moderate turbulence below 10,000 ft was in effect before the accident flight departed.

The Area Forecast, issued at 1345 and valid at the accident time, forecast scattered to broken clouds at 10,000 ft with tops at 25,000 ft. Between 1600 and 1800, the ceiling was forecast to decrease to 6,000 ft msl with scattered light rain showers and isolated light rain and thunderstorms with cumulonimbus tops to 35,000 ft.

WRECKAGE AND IMPACT INFORMATION

The airplane impacted a heavily wooded area; the first identified point of impact was a tree located about 104° and 1,400 ft from the last radar target.

The first identified airplane component was the outboard 42 inches of the right wing with a 55-inch long and full chord section of aileron that remained connected at the outboard hinge and was continuous to the skin splice. The part was located in a tree about 65-70 ft above ground level (agl); the tree was located at 41° 42.004' north latitude and 078° 10.884' west longitude, at 2,325 ft GPS elevation.

Further examination of the accident site revealed pieces of the fragmented airplane and personal effects scattered on the ground and in the trees. The wreckage path was oriented on a magnetic heading about 140°, with damage to tree heights at decreasing heights along the path. None of the observed components exhibited evidence of fire, and all of the structural fracture surfaces exhibited evidence of overload failure. The distance between the first observed tree contact and the resting position of the cockpit section was about 368 ft. The engine, which was the farthest observed piece along the wreckage path, was located about 509 ft downslope of the cockpit, about 880 ft past the first observed tree contact location.

All major components of the airplane, with the exception of the rudder balance weight, remained attached or were found along the wreckage path. Examination of the aileron, rudder, and elevator flight controls revealed no evidence of preimpact failure or malfunction. The stabilator trim tab actuator was in the full nose-down position, and the right lower stabilator stop was bent and broke during slight hand contact. No evidence of repeated contact was noted

to the stabilator, rudder, or left aileron primary control surface stops. The right aileron bellcrank was not located.

Both grips of the right seat control yoke and the left grip of the left seat control yoke were fractured, respectively. The flap selector was in the fully extended (40°) position. Examination of the slots of the flap selector revealed no evidence of impact marks. The left flap torque tube fitting assembly arm was nearly vertical, consistent with 25° extension. The flaps could not be operated because of damage to the flap torque tube and surrounding area. The carburetor heat control was in the off position, and the throttle and mixture controls were in an unknown position, but sections of fractured control cables remained attached. The airspeed indicator was separated from the instrument panel; its needle was missing, and no needle slap mark was noted. The electrically-operated turn coordinator, which was found separated from the instrument panel, did not contain the rotor, gimbal, gyro frame, or bezel.

Both wings were fragmented. Examination of the left wing revealed that the pitot mast was free of obstructions. The stall warning vane operated when tested with a volt/ohm meter. The stall warning horn was checked using a volt/ohm meter and found to be shorted due to impact damage to the horn housing. The pitot mast and associated sections of wiring were retained for further examination.

The 406-MHz emergency locator transmitter (ELT) was separated from its attach bracket and was found on the wreckage path. Examination of the ELT revealed that the switch was in the off position; the antenna connector remained attached, but the antenna cable was pulled from the connector. The FAA inspector reported that after being notified of the accident, he informed first responders to turn off the ELT. The ELT operated normally when tested.

Examination of the engine following recovery revealed that the magnetos, carburetor, engine-driven vacuum pump, ignition harness, muffler, starter, alternator, and housing portion of the engine-driven fuel pump were impact separated; the vacuum pump was recovered and retained for further examination. The accessory case, oil sump, and all cylinders remained attached to the engine. The engine mount remained attached to the separated engine at 3 places; the mount was fractured.

Further examination of the engine revealed that the crankcase was cracked from the Nos. 2 and 4 cylinders to the case half center section. The oil sump, which was impact damaged and missing the quick drain valve, did not contain any oil. The oil suction screen was examined and contained carbon and organic material. The accessory case was cracked midspan near the oil pump area. Examination of the oil pump revealed that the oil pump drive shaft could not be rotated with hand pressure; two non-ferrous slivers were noted on the oil pump gears. No evidence of hard particle passage was noted in the internal portion of the oil pump housing.

Impact damage was noted to all cylinders. Although the crankshaft could not be rotated through 360°, crankshaft continuity was noted to the accessory case. Valve train continuity was noted to the No. 2 cylinder exhaust and the No. 3 cylinder intake and exhaust valves. Impact damage to the No. 4 cylinder intake and exhaust pushrods, absence of pushrods at the No. 1 cylinder, and absence of the No. 2 cylinder intake pushrod precluded movement of the associated valve train at those cylinders. The camshaft lobes exhibited no anomalies. The No. 1 cylinder was removed; there were no broken rings and the ring gaps were not aligned. The

piston dome exhibited normal carbon deposits and color, and the heads of both valves appeared satisfactory. The cam follower for the exhaust was stuck.

Examination of one magneto revealed that the housing was fractured and the cap, rotor, coil, points, and distributor block were missing. The impulse coupling and gear remained attached. The flange was fractured by the hold down locations. Impact damage precluded rotation of the gear and rotor. Only the data plate for the other magneto was located.

Examination of the carburetor revealed that the airbox remained attached and the inlet line was separated. The airbox alternate air door was selected to primary (filtered) air, and the cable was separated from the alternate air arm.

Both propeller blades were fractured. The total length of one blade measured 21 inches from the end to the center of the hub and exhibited smooth radius aft bending and heavy, deep gouging of the leading edge. The other blade measured 31.5 inches from the end to the center of the hub, and exhibited a smooth radius forward bend, chordwise scratches, and a trailing edge gouge.

MEDICAL AND PATHOLOGICAL INFORMATION

The Erie County Coroner's Office, Erie, Pennsylvania, performed a postmortem examination of the pilot. The cause of death was reported as "catastrophic blunt force trauma." Postmortem examinations were not requested nor performed for the passengers.

The FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed forensic toxicology testing on specimens from the pilot. According to the toxicology report, no ethanol was detected in the submitted muscle specimen, while 10 mg/dL ethanol was detected in the submitted heart specimen. No drugs of abuse were detected in the submitted muscle specimen.

Toxicological testing was not performed for either of the passengers.

TESTS AND RESEARCH

The vacuum-driven attitude indicator remained partially attached to the separated instrument panel. The housing was impact damaged and the front portion of the instrument and silhouette were missing and not located. The frame was fractured in several pieces and the rotor and rotor housing were free to move within the housing. Examination of the rotor and interior portion of the rotor housing revealed slight scratches.

The engine-driven vacuum pump was examined by the NTSB Materials Laboratory, Washington, DC. According to the factual report, the inlet tube for the vacuum pump was fractured where it intersected the housing; the fracture features were rough and irregular, consistent with ductile overstress fracture. The outlet tube was intact and rotated when manipulated by hand forces; white material was observed on the threads and Fourier-transform infrared spectroscopy (FTIR) confirmed that it was consistent with Teflon tape. The pump was disassembled, revealing that the rotor was fractured into 6 relatively large pieces and many smaller pieces. The vanes were largely intact, but vanes 1 and 4 each had a small

piece fractured from the outward face of the vane at the outlet end. A piece of debris was noted on the interior of the housing near one of the air outlet holes. FTIR examination revealed a spectrum that was consistent with acrylonitrile butadiene styrene. No evidence of debris consistent with Teflon thread seal was observed inside the unit. The engine-driven vacuum pump was reassembled and the vane wear was at an acceptable level.

Examination of the wires for both pitot head heating elements (power and ground) was also performed by the NTSB Materials Laboratory. Each power wire remained connected to each heating element, but each ground wire for each heating element was separated. Although there was evidence of improper terminal crimping of the ground wires, there was no electrical arcing noted on the wires or connector.

An impact-damaged rotor housing without a rotor located among the debris was consistent with that from the vacuum-driven directional gyro. Examination of the separated rotor housing revealed rotational scoring at the air hole entrance.

ADDITIONAL INFORMATION

Operator Information

St. Catharines Flying Club, located at CYSN, was a Transport Canada certified Flight Training Unit (FTU) and offered Ab-Initio Flight Training, in which the 2 passengers were enrolled. At the time of the accident, the flying club operated six airplanes, including the accident airplane. They also operated a Cirrus II Precision Flight Controls Simulator.

In September 2013, the flying club developed a Flight Training Operations Manual (FTOM) for operation of their single engine airplanes in day or night conditions and VFR or IFR weather conditions. It indicated that the pilot-in-command was responsible for ensuring that the airplane was loaded within its weight and balance specifications. The FTOM did not specify how to maintain operational control for airplanes when away from the home base, nor did it require that a pilot have experience in actual IMC before dispatching a flight in IMC or forecast IMC conditions.

NTSB Results of Component Examinations

The SD card retained from an onboard damaged digital camera did not contain any images or video, and the recovered cellular phone, which belonged to the pilot, could not be unlocked using the family-provided passcodes. It could not be determined whether the phone contained any recent usage or images/video of the accident flight.

Spatial Disorientation

According to FAA Safety Team literature, pilots flying under both instrument and visual flight rules are subject to spatial disorientation and optical illusions that may cause a loss of aircraft control. Sight, supported by other senses, allows a pilot to maintain orientation while flying. However, when visibility is restricted (i.e., no visual reference to the horizon or surface detected) the body's supporting senses can conflict with what is seen. When this spatial

disorientation occurs, sensory conflicts and optical illusions often make it difficult for a pilot to tell which way is up.

Contributing to these phenomena are the various types of sensory stimuli: visual, vestibular (organs of equilibrium located in the inner ear), and proprioceptive (receptors located in the skin, muscles, tendons and joints). Changes in linear acceleration, angular acceleration, and gravity are detected by the vestibular system and the proprioceptive receptors, and then compared in the brain with visual information.

In a flight environment, these stimuli can vary in magnitude, direction, and frequency, resulting in a sensory mismatch that can produce illusions and lead to spatial disorientation.

Pilot Information

Certificate:	Flight Instructor; Commercial	Age:	25, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane Single-engine; Instrument Airplane	Toxicology Performed:	Yes
Medical Certification:	Class 1 Without Waivers/Limitations	Last FAA Medical Exam:	02/23/2016
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	10/11/2016
Flight Time:	494 hours (Total, all aircraft), 188 hours (Total, this make and model), 301 hours (Pilot In Command, all aircraft), 134 hours (Last 90 days, all aircraft), 22 hours (Last 30 days, all aircraft)		

Student Pilot Information

Certificate:	Student	Age:	19, Male
Airplane Rating(s):	None	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	None	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 3 Without Waivers/Limitations	Last FAA Medical Exam:	
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	56 hours (Total, all aircraft), 55 hours (Total, this make and model), 8 hours (Pilot In Command, all aircraft), 12 hours (Last 90 days, all aircraft), 5 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	PIPER	Registration:	C-GYSN
Model/Series:	PA28 161	Aircraft Category:	Airplane
Year of Manufacture:	1977	Amateur Built:	No
Airworthiness Certificate:	Normal; Utility	Serial Number:	28-7816311
Landing Gear Type:	Tricycle	Seats:	4
Date/Type of Last Inspection:	09/23/2016, 100 Hour	Certified Max Gross Wt.:	2440 lbs
Time Since Last Inspection:	37 Hours	Engines:	1 Reciprocating
Airframe Total Time:	11519 Hours as of last inspection	Engine Manufacturer:	Lycoming
ELT:	C126 installed	Engine Model/Series:	O-320-D3G
Registered Owner:	St. Catharines Flying Club	Rated Power:	160 hp
Operator:	St. Catharines Flying Club	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	Condition of Light:	Night/Dark
Observation Facility, Elevation:	BFD, 2143 ft msl	Distance from Accident Site:	21 Nautical Miles
Observation Time:	1953 EDT	Direction from Accident Site:	287°
Lowest Cloud Condition:	Few / 4000 ft agl	Visibility	5 Miles
Lowest Ceiling:	Broken / 4800 ft agl	Visibility (RVR):	
Wind Speed/Gusts:	4 knots /	Turbulence Type Forecast/Actual:	/ Convective
Wind Direction:	310°	Turbulence Severity Forecast/Actual:	/ Severe
Altimeter Setting:	30.05 inches Hg	Temperature/Dew Point:	16°C / 16°C
Precipitation and Obscuration:	Light - Rain; Moderate - Mist		
Departure Point:	Richmond, VA (RIC)	Type of Flight Plan Filed:	IFR
Destination:	St. Catherines, ON (CYSN)	Type of Clearance:	IFR
Departure Time:	1654 EDT	Type of Airspace:	

Wreckage and Impact Information

Crew Injuries:	2 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	1 Fatal	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	3 Fatal	Latitude, Longitude:	41.700000, -78.181389

Administrative Information

Investigator In Charge (IIC):	Timothy W Monville	Report Date:	07/16/2018
Additional Participating Persons:	David Shanahan; FAA/FSDO; Pittsburgh, PA Damian Galbraith; Piper Aircraft, Inc.; Vero Beach, FL Beverley Harvey; TSB of Canada; Gatineau, QC		
Publish Date:	07/16/2018		
Note:	The NTSB traveled to the scene of this accident.		
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=94224		

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](#).