



Aviation Investigation Final Report

Location:	Plain City, Ohio	Accident Number:	CEN19FA100
Date & Time:	March 17, 2019, 17:45 Local	Registration:	N424TW
Aircraft:	Cessna 421	Aircraft Damage:	Destroyed
Defining Event:	Loss of control in flight	Injuries:	1 Fatal
Flight Conducted Under:	Part 91: General aviation		

Analysis

The pilot departed on a short cross-country flight in the twin-engine airplane. Instrument meteorological conditions (IMC) were present at the time. While en route at an altitude of 3,000 ft mean sea level, the pilot reported that the airplane was "picking up icing" and that he needed to "pick up speed." The controller then cleared the pilot to descend, then to climb, in order to exit the icing conditions; shortly thereafter, the controller issued a low altitude alert. The pilot indicated that he was climbing; radar and radio contact with the airplane were lost shortly thereafter. The airplane impacted a field about 7 miles short of the destination airport. Examination of the airplane was limited due to the fragmentation of the wreckage; however, no pre-impact anomalies were noted during the airframe and engine examinations. Extensive damage to the pitot static and deicing systems precluded functional testing of the two systems.

A review of data recorded from onboard avionics units indicated that, about the time the pilot reported to the controller that the airplane was accumulating ice, the airplane's indicated airspeed had begun to diverge from its ground speed as calculated by position data. However, several minutes later, the indicated airspeed was zero while the ground speed remained fairly constant. It is likely that this airspeed indication was the result of icing of the airplane's pitot probe. During the final 2 minutes of flight, the airplane was in a left turn and the pilot received several "SINK RATE" and "PULL UP PULL UP" annunciations as the airplane conducted a series of climbs and descents during which its ground speed (and likely, airspeed) reached and/or exceeded the airplane's maneuvering and maximum structural cruising speeds.

It is likely that the pilot became distracted by the erroneous airspeed indication due to icing of the pitot probe and subsequently lost control while maneuvering.

Probable Cause and Findings

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

A loss of airspeed indication due to icing of the airplane's pitot probe, and the pilot's loss of control while maneuvering.

Findings

Environmental issues	Freezing rain/sleet - Effect on equipment
Personnel issues	Aircraft control - Pilot
Aircraft	Instrument panel - Inoperative
Aircraft	Pitot/static system - Inoperative
Aircraft	Airspeed - Not attained/maintained

Factual Information

History of Flight

Enroute-cruise	Sys/Comp malf/fail (non-power)
Enroute-cruise	Loss of control in flight (Defining event)

On March 17, 2019, about 1745 eastern daylight time, a Cessna 421B airplane, N424TW, was destroyed when it was involved in an accident near Plain City, Ohio. The pilot was fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot departed on a short cross-country flight. A review of radar and radio communications information revealed that the pilot contacted air traffic control at 1717 shortly after takeoff from James M. Cox Dayton International Airport (DAY), Dayton, Ohio. At 1729, the pilot was given a frequency change. The pilot checked in on the new frequency and requested the RNAV runway 28 approach at Delaware Municipal Airport (DLZ), Delaware, Ohio, located about 55 nautical miles east-northeast of DAY. About 2 minutes later, the controller advised the pilot of weather ahead, and the pilot accepted a 15° course deviation. At 1735, the controller issued the pilot a heading of 090° and instructed him to maintain an altitude of 3,000 ft mean sea level (msl), which the pilot acknowledged. About 1 minute later, the pilot reported that the airplane was "picking up icing" and that he needed to "pick up speed." The controller issued the airplane a descent to 2,500 ft and subsequently asked if the airplane was clear of clouds; the pilot replied, "negative." About 1739, after noting that the airplane was climbing, the controller cleared the pilot to an altitude of 6,000 ft and approved deviations to the left or right as needed; the pilot acknowledged. The controller subsequently issued the pilot a low altitude alert, and the pilot advised that he was climbing. About 1740, the controller asked the pilot to report his altitude, as altitude information from the airplane was no longer being received; there were no further communications from the accident airplane.

A review of recovered data from onboard avionics indicated that, about 17 minutes after takeoff, the airplane's indicated airspeed began to decay while its groundspeed, as calculated from position information, remained steady. About 1 minute later, fuel flow increased from 38 gallons per hour (gph) to 60 gph, consistent with an increase in engine power. At this time, the indicated airspeed had decayed to about 100 knots (kts), while the groundspeed remained about 150 kts. For the final approximate 2.5 minutes of the flight, the airplane was in a left turn. The airplane entered a climb to about 3,500 ft msl, then began descending around 5,000 ft per minute. The data recorded "SINK RATE" and "PULL UP PULL UP" annunciations, and the airplane's rate of descent was arrested about 300 ft above ground level (agl). The airplane subsequently entered two additional sets of climbs and descents, receiving the same annunciations; however, the pilot did not recover from the third descent. During this time, the airplane's groundspeed, and likely airspeed, exceeded the airplane's maneuvering speed (Va) of 150 kts, and during both the first and final "SINK RATE" annunciations, the airplane's groundspeed exceeded its maximum structural cruising speed (Vno) of 200 kts.

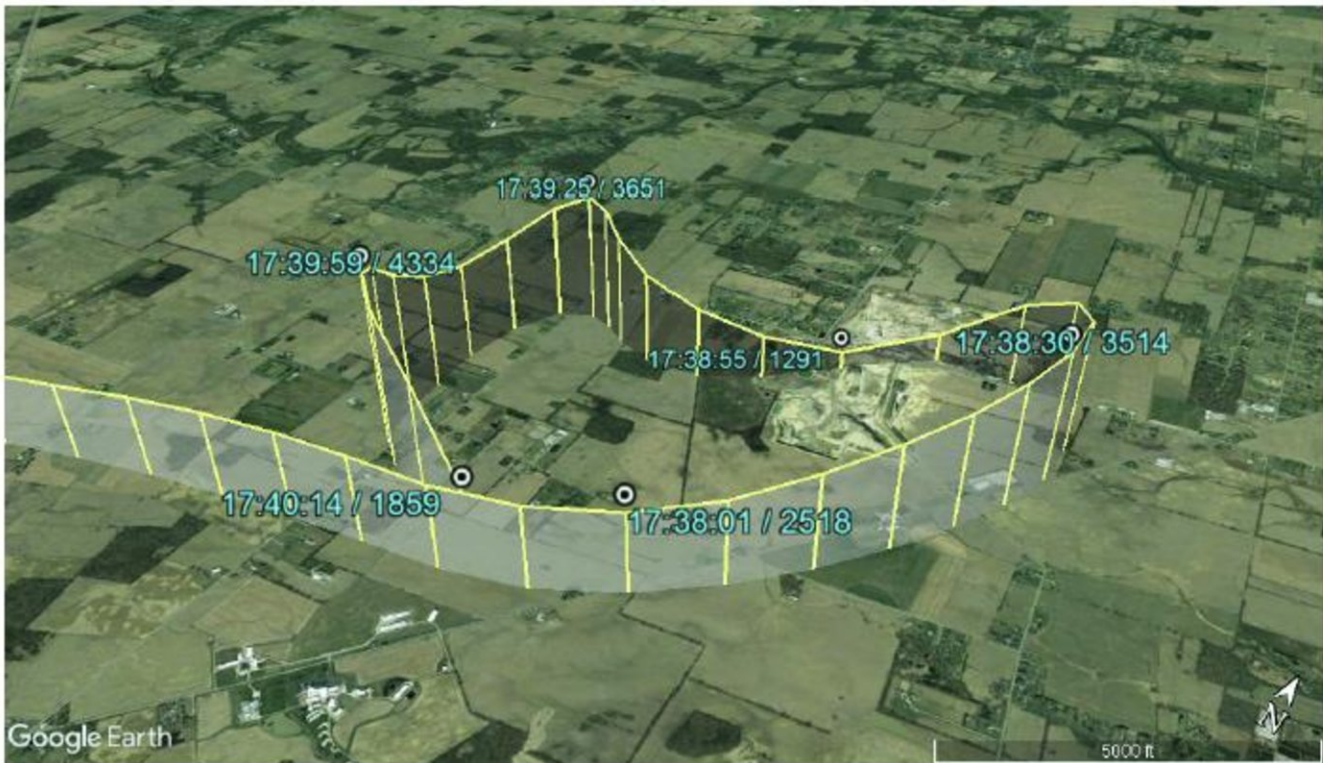


Figure 1: Airplane's Final Flight Track

Pilot Information

Certificate:	Commercial	Age:	44
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	Helicopter	Restraint Used:	Unknown
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 2 Without waivers/limitations	Last FAA Medical Exam:	August 2, 2018
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	(Estimated) 3000 hours (Total, all aircraft), 48.5 hours (Total, this make and model)		

The pilot was a former Air Force pilot and test pilot with over 3,000 hours of military flight experience.

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N424TW
Model/Series:	421 B	Aircraft Category:	Airplane
Year of Manufacture:	1974	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	421B0816
Landing Gear Type:	Retractable - Tricycle	Seats:	
Date/Type of Last Inspection:	February 15, 2019 Annual	Certified Max Gross Wt.:	7449 lbs
Time Since Last Inspection:		Engines:	2 Reciprocating
Airframe Total Time:	8339.4 Hrs as of last inspection	Engine Manufacturer:	Continental
ELT:	C91A installed, not activated	Engine Model/Series:	GTSIO-520-C
Registered Owner:		Rated Power:	340 Horsepower
Operator:		Operating Certificate(s) Held:	None

The airplane was manufactured in 1974 and was certified for flight into known icing conditions.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	Condition of Light:	Day
Observation Facility, Elevation:	KDLZ	Distance from Accident Site:	8 Nautical Miles
Observation Time:	21:35 Local	Direction from Accident Site:	35°
Lowest Cloud Condition:	Scattered / 400 ft AGL	Visibility	3 miles
Lowest Ceiling:	Overcast / 1600 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	3 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	80°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.02 inches Hg	Temperature/Dew Point:	1°C / 0°C
Precipitation and Obscuration:	Light - None - Snow		
Departure Point:	Dayton, OH (KDAY)	Type of Flight Plan Filed:	IFR
Destination:	Delaware, OH (KDLZ)	Type of Clearance:	IFR
Departure Time:	17:15 Local	Type of Airspace:	

At 1735, the automated weather observation facility located at Union County Airport (MRT), Marysville, Ohio, about 8 miles northwest of the accident site, recorded calm wind, 3 miles visibility, broken clouds at 400 ft agl, an overcast sky at 1,200 ft agl, temperature 34°F, dew point 32°F, and an altimeter setting of 30.19 inHg.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:		Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Fatal	Latitude, Longitude:	40.188331,-83.204444(est)

The airplane impacted a field about 7 miles southwest of DLZ. Ground impact scars and the wreckage were consistent with a left-wing-low attitude at the time of impact. The wreckage path was oriented on an approximate 140° heading. From the initial impact point, the airplane crossed a two-lane road before impacting two wooden utility poles. The main wreckage came to rest at the base of the second utility pole, about 395 ft from the initial impact point. The wreckage path was about 850 ft long and the airplane was highly fragmented along the wreckage path. There was no postcrash fire.

All major components of the airplane were located at the accident site; however, flight control continuity could not be confirmed due to the fragmentation of the wreckage.

The cockpit and instrument panel were extensively impact damaged. The positions of the landing gear and wing flaps could not be determined based on the positions of their cockpit controls.

Both engines had separated from the wings and were located in the wreckage path; the first engine was located near the utility poles. The engine sustained heavy impact damage and the majority of the components were separated from the engine. Due to impact damage, the crankshaft could not be rotated by hand. The camshaft, connecting rods, pistons, and valves were examined either by openings in the case or via borescope examination.

The second engine was located near the end of the wreckage path and also sustained heavy impact damage, with the majority of the components separated from the engine. The crankshaft could not be rotated by hand due to impact damage.

Each engine's fuel system, fuel manifold, fuel pump, fuel nozzles, and fuel screen were field examined and no pre-impact abnormalities were noted. The top set of spark plugs were removed from both engines and displayed normal combustion and wear signatures.

Both engines were equipped with three-bladed propellers, which had separated from their respective engines during the accident sequence. All three blades from one propeller were separated from the propeller hub; two of the blades were located in the first field, with the other blade located across the road in the second field. The blades exhibited similar signatures, including twisting and leading-edge polishing. The second propeller's three blades remained in the propeller hub and also exhibited twisting and leading-edge polishing.

Though the examinations were limited by impact damage, no pre-impact airframe, engine, or systems anomalies, were noted that would have precluded normal operation. The extensive damage to the pitot static and deicing systems precluded any functional testing.

Additional Information

An excerpt from the FAA's Instrument Flying Handbook, FAA-H-8-83-15B, Chapter 4, under "Effects of Icing on Critical Aircraft Systems" states:

In addition to the hazards of structural and induction icing, the pilot must be aware of other aircraft systems susceptible to icing. The effects of icing do not produce the performance loss of structural icing or the power loss of induction icing but can present serious problems to the instrument pilot. Examples of such systems are flight instruments, stall warning systems, and windshields.

Flight Instruments

Various aircraft instruments including the airspeed indicator, altimeter, and rate-of-climb indicator utilize pressures sensed by pitot tubes and static ports for normal operation. When covered by ice these instruments display incorrect information thereby presenting serious hazard to instrument flight.

Medical and Pathological Information

The Montgomery County Coroner's Office, Dayton, Ohio, conducted an autopsy on the pilot. The autopsy noted the cause of death was "multiple blunt force injuries."

The FAA Forensic Sciences Laboratory conducted toxicological testing. The specimens were negative for ethanol and tested-for drugs; the specimens were not tested for carbon monoxide or cyanide.

Administrative Information

Investigator In Charge (IIC):	Hatch, Craig		
Additional Participating Persons:	Paul Gillenwater; FAA FSDO; Columbus, OH Kurt Gibson; CMI; Mobile, AL Ricardo Asensio; Textron; Wichita, KS Fred Barber; Avidyne Corp; Melbourne, FL		
Original Publish Date:	December 3, 2020	Investigation Class:	2
Note:	The NTSB traveled to the scene of this accident.		
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=99120		

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](#).