



Aviation Investigation Final Report

Location:	Cross City, Florida	Accident Number:	ERA18FA056
Date & Time:	December 20, 2017, 19:00 Local	Registration:	N354WD
Aircraft:	Beech G35	Aircraft Damage:	Destroyed
Defining Event:	VFR encounter with IMC	Injuries:	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The commercial pilot was conducting a long cross-country flight. There was no record that he received a weather briefing from an official source, and he did not file a flight plan before departing. The pilot completed the first leg of the trip uneventfully and purchased fuel at an intermediate stop. During the second leg, about 30 minutes after takeoff and over a period of about 20 minutes, the airplane climbed from 3,400 ft mean sea level (msl) to 7,100 ft msl. It then made two left, 360° turns, followed by a rapid descent to 1,400 ft msl. During the next approximate hour, the target flew east at alternating altitudes below 2,500 ft msl, before turning south, flying s-turns and descending to 1,400 ft. The target proceeded south at 1,100 ft msl until about 10 minutes before the accident, when it flew near a cold front boundary. After that, the airplane completed numerous course deviations, including three complete left 360° and two right 360 turns; the last recorded radar return was about 0.4 mile east of the accident site at an altitude of 450 ft msl. The recorded weather near the accident site about the time of the accident included 10 miles visibility and an overcast ceiling at 600 ft. Examination of the airframe and engine did not reveal any preimpact mechanical malfunctions that would have precluded normal operation.

Although the pilot held an instrument rating, his most recent simulated instrument experience was about 11 months before the accident and his most recent actual instrument experience was more than 2 years before the accident. The dark night, restricted visibility conditions, and the pilot's extensive maneuvering in the last 10 minutes of flight, coinciding with the frontal boundary, provided conditions conducive to the development of spatial disorientation. The final path of the airplane in a direction opposite the last radar returns and the airplane's steep impact angle are consistent with the known effects of spatial disorientation and a subsequent loss of control.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's improper decision to continue visual flight rules flight into instrument meteorological conditions, which resulted in the pilot experiencing spatial disorientation and a

subsequent loss of airplane control.

Findings

Personnel issues	Decision making/judgment - Pilot
Aircraft	(general) - Not attained/maintained
Personnel issues	Aircraft control - Pilot
Personnel issues	Spatial disorientation - Pilot
Environmental issues	(general) - Decision related to condition
Environmental issues	(general) - Effect on personnel

Factual Information

History of Flight

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

On December 20, 2017, about 1900 eastern standard time (all times are EST), a Beech G35, N354WD, was destroyed when it impacted wooded terrain while maneuvering near Cross City, Florida. The commercial pilot was fatally injured. The airplane was privately owned and operated by the pilot as a Title 14 *Code of Federal Regulations* Part 91 personal flight. Night instrument meteorological conditions prevailed and no flight plan was filed for the planned flight to Melbourne International Airport (MLB), Melbourne, Florida. The flight originated from Enterprise Municipal Airport (EDN), Enterprise, Alabama, about 1715.

According to witnesses and radar data provided by the Federal Aviation Administration (FAA), earlier during the day of the accident, the pilot flew uneventfully from Guntersville Municipal Airport (8A1), Guntersville, Alabama, to EDN, where he purchased 27.7 gallons of fuel at 1705. A radar target squawking the visual flight rules transponder code of 1200 was identified at 1740 about 30 miles south of EDN and was correlated to the accident airplane. As the target proceeded over Florida in cruise flight, over a period of about 20 minutes, it climbed from 3,400 ft mean sea level (msl) to 7,100 ft msl. It then made two left, 360° turns, followed by a rapid descent to 1,400 ft msl about 1 hour prior to the accident. The target then flew east at varying altitudes below 2,500 ft msl, and then turned south toward Tallahassee, Florida, flying s-turns and descending. The target proceeded south at 1,100 ft msl until 1849, when it flew near a cold front boundary. At that time, the target completed numerous course deviations, including three complete left 360° turns and two right 360° turns; the last radar target, at 1900:03, was about 0.4 mile east of the accident site at an indicated altitude of 450 ft msl.

The pilot's family reported the airplane overdue when the pilot did not arrive at the destination, and the airplane was subsequently located in marshy wooded terrain 2 days later.

Pilot Information

Certificate:	Commercial	Age:	78, Male
Airplane Rating(s):	Single-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Lap only
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 2 With waivers/limitations	Last FAA Medical Exam:	August 6, 2015
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	4729 hours (Total, all aircraft), 999999 hours (Total, this make and model), 24 hours (Last 90 days, all aircraft), 9 hours (Last 30 days, all aircraft)		

The pilot, age 78, held a commercial pilot certificate with ratings for airplane single-engine land and instrument airplane. His most recent FAA second-class medical certificate was issued on August 6, 2015. At that time, he reported a total flight experience of 4,405 hours. The pilot applied for BasicMed privileges on September 1, 2017.

Review of the pilot's logbook revealed that the most recent entry was dated November 26, 2017. At that time, he had recorded 4,729.6 hours of flight experience. The pilot had flown 24 hours and 9 hours during the 90-day and 30-day periods preceding the accident, respectively. The most recent simulated instrument experience logged was 0.8 hour on January 25, 2017. There was no actual instrument experience logged during the 2-year period preceding the accident.

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	Registration:	N354WD
Model/Series:	G35 NO SERIES	Aircraft Category:	Airplane
Year of Manufacture:	1956	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	D-4458
Landing Gear Type:	Retractable - Tricycle	Seats:	6
Date/Type of Last Inspection:	November 1, 2017 Annual	Certified Max Gross Wt.:	2750 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	4579 Hrs as of last inspection	Engine Manufacturer:	Continental
ELT:	C91A installed, not activated	Engine Model/Series:	E225
Registered Owner:	On file	Rated Power:	225 Horsepower
Operator:	On file	Operating Certificate(s) Held:	None

The four-seat, low-wing, retractable tricycle-gear airplane, was manufactured in 1956. It was powered by a Continental E225, 225-horsepower engine, equipped with a constant-speed, two-

blade Hartzell propeller. Review of maintenance records revealed that the airplane's most recent annual inspection was completed on November 1, 2017. At that time, the airplane had accumulated 4,579 hours of operation and the engine had accrued 2,047 hours since major overhaul, with 697 hours since top overhaul.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	Condition of Light:	Night/dark
Observation Facility, Elevation:	CTY,42 ft msl	Distance from Accident Site:	11 Nautical Miles
Observation Time:	18:55 Local	Direction from Accident Site:	145°
Lowest Cloud Condition:		Visibility	10 miles
Lowest Ceiling:	Overcast / 600 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	9 knots / 15 knots	Turbulence Type Forecast/Actual:	None / None
Wind Direction:	210°	Turbulence Severity Forecast/Actual:	N/A / N/A
Altimeter Setting:	30.04 inches Hg	Temperature/Dew Point:	21°C / 21°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Enterprise, AL (EDN)	Type of Flight Plan Filed:	None
Destination:	Melbourne, FL (MLB)	Type of Clearance:	None
Departure Time:	17:15 Local	Type of Airspace:	

Cross City Airport (CTY), Cross City, Florida, was located about 11 miles southeast of the accident site. The recorded weather at CTY at 1855, included wind from 210° at 9 knots, gusting to 15 knots; 10 miles visibility; an overcast ceiling at 600 ft; temperature 21°C; dew point 21°C; and an altimeter setting of 30.05 inches of mercury (in Hg).

The southeast section of the National Weather Service Surface Analysis Chart for 1900 depicted a low-pressure system at 1010-hectopascals (hPa) on the central Alabama and Georgia border associated with a frontal wave, with a cold front extending southwest across Alabama and a stationary front extending eastward across Georgia to another low-pressure system in South Carolina at 1010-hPa. The stationary front continued eastward into the Atlantic (for more information, see Weather Study in the public docket for this accident).

There was no record of the pilot receiving an official weather briefing from flight service or the direct user access terminal system.

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:	29.777778,-83.22583

A debris path was observed beginning with freshly-cut tree branches descending on about a 45° angle and extending about 50 ft on a magnetic heading of 240° to the main wreckage. The main wreckage came to rest inverted and was oriented on about a 060° magnetic heading. The engine was in an approximate 3-ft-deep crater about halfway along the debris path. One propeller blade remained attached to the engine and one propeller blade had separated. The separated propeller blade exhibited tip curling, s-bending, leading edge gouging and chordwise scratching. The propeller blade that remained attached to the propeller hub exhibited s-bending. The vacuum pump remained attached to the engine and was removed for examination. When the vacuum pump driveshaft was rotated by hand, intake air and exhaust air were confirmed at their respective ports. The vacuum pump was then disassembled, and all the vanes were intact. Rotational scoring was noted on the vacuum pump housing.

The landing gear and flaps were retracted. The cockpit was crushed and the pilot's lap belt remained intact but was cut by rescue personnel. The fuel selector was found positioned to the left main fuel tank and the magneto switch was in the "both" position. The mixture control was in a forward position while the propeller and throttle controls were in a mid-range position. The complete attitude indicator was not recovered; however, its gyro rotor was recovered and exhibited rotational scoring. The turn and bank coordinator was recovered; it had separated from the instrument panel and its face was destroyed. When the turn and bank coordinator was disassembled, its gyro was intact and exhibited rotational scoring. The altimeter had also separated from the instrument panel and indicated 2,600 ft with a setting of 29.94 in Hg.

The air-driven heading indicator was a model DG02V-3 manufactured by Falcon Gauge Instruments/Wultrad, Inc. According to the company's website, they manufacture instruments for homebuilt and experimental aircraft. No technical standard orders (TSO) markings were observed on the unit. The unit was disassembled and rotational scoring was observed on the rotor and rotor housing.

The right wing inboard section and flap remained attached. The outboard section of right aileron separated and was located about 10 ft north of the engine. The left wing remained partially attached to the fuselage and was folded upward. The left flap and left aileron remained attached to the left wing. The right ruddervator remained attached to the right stabilator. The inboard half of the left ruddervator remained attached to the left stabilator. The outboard half of the left ruddervator separated and was located about 15 ft south of the main wreckage. Control continuity was confirmed from the right aileron and the left aileron bellcrank to the mid-cabin area. Ruddervator and ruddervator trim continuity were confirmed from the control surfaces to the control yoke in the cockpit. Measurement of the ruddervator trim actuator corresponded to a neutral setting.

The wreckage was transported to a recovery facility and the engine was examined. The rear accessories were removed for examination. Both magnetos produced spark at all leads when rotated by an electric drill. The top spark plugs were removed to facilitate a lighted borescope inspection of each cylinder. No anomalies were noted with any of the pistons or valves. When the propeller was rotated by hand, crankshaft, camshaft, and valve train continuity was confirmed and thumb compression was attained on all cylinders.

A Garmin 295, iPad Mini, and Lenovo tablet were recovered and forwarded to the National Transportation Safety Board Vehicle Recorders Laboratory, Washington, DC. Due to impact damage, data could not be recovered from any of the three devices.

Medical and Pathological Information

The State of Florida, District Eight Office of the Medical Examiner, Gainesville, Florida, performed an autopsy of the pilot. The cause of death was "injuries sustained in airplane crash."

Toxicology testing performed by the laboratory at FAA Forensic Sciences of specimens from the pilot, identified amlodipine in liver and urine and quinapril in liver and urine.

During the pilot's most recent FAA medical examination in August 2015, he reported that he was being treated for high blood pressure with amlodipine and quinapril. Both blood pressure medications are considered not to be impairing.

Administrative Information

Investigator In Charge (IIC):	Gretz, Robert
Additional Participating Persons:	Gregory Joy; FAA/FSDO; Tampa, FL Henry Soderlund; Textron Aviation; Wichita, KS Mike Council; Continental Motors; Mobile, AL
Original Publish Date:	July 8, 2019
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=96529

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](#).