Aviation Investigation Final Report

Location:	Elida, Ohio	**Accident Number:**	CEN19FA177
Date & Time:	June 20, 2019, 16:12 Local	**Registration:**	N6150X
Aircraft:	Beech A36	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of control in flight	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The noninstrument-rated private pilot and passenger departed on the cross-county flight under visual flight rules (VFR) in visual meteorological conditions and proceeded on course at an altitude of about 9,000 ft mean sea level (msl). As the flight progressed, the weather conditions deteriorated, and about halfway through the flight, the pilot appeared to deviate before resuming flight toward the destination and descended to about 2,000 ft msl over about 30 minutes. Within 20 miles of the accident site, the pilot executed multiple course changes, including two 360° turns. The airplane then entered a right turn from a southeasterly course to a southwesterly course, and about 1 minute before the accident, the airplane re-entered the right turn, which progressed into a right graveyard spiral that continued until impact.

Weather observations and satellite imagery indicated that instrument meteorological conditions (IMC) prevailed in the vicinity of where the pilot began making the multiple course changes and at the accident site. It is likely that the pilot encountered rain, and possibly heavy rain, during the final portion of the flight. There was no record of the pilot obtaining a preflight weather briefing from an official source.

Examinations of the airframe and engine did not reveal any anomalies consistent with a preimpact failure or malfunction.

Toxicology testing of the pilot revealed the presence of carboxy-delta-9-tetrahydrocannabinol (THC), an inactive metabolite of THC. The low-level presence of the inactive THC metabolite suggests that the pilot was not under the influence of THC at the time of the flight, and therefore, it is unlikely that any effects from the pilot's prior use contributed to the accident. The testing also revealed the presence of diphenhydramine; however, it did not provide a blood level. Therefore, whether the pilot might have been impaired from the diphenhydramine at the time of the accident or whether his prior use contributed to the accident could not be determined.

The restricted visibility conditions present in the area were conducive to the development of spatial disorientation, and the airplane's maneuvering and spiraling descent are consistent with the known

effects of spatial disorientation. It is likely that the pilot experienced spatial disorientation during an encounter with instrument meteorological conditions, which resulted in a loss of control.

Probable Cause and Findings

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

The noninstrument-rated pilot's decision to continue visual flight rules flight into an area of instrument meteorological conditions, which resulted in a loss of control due to spatial disorientation. Contributing was the pilot not obtaining a weather briefing prior to the flight.

Findings

Personnel issues	Spatial disorientation - Pilot
Personnel issues	Aircraft control - Pilot
Personnel issues	Decision making/judgment - Pilot
Personnel issues	Qualification/certification - Pilot
Personnel issues	Weather planning - Pilot
Environmental issues	Below VFR minima - Decision related to condition
Environmental issues	Below VFR minima - Effect on operation

Factual Information

History of Flight

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

On June 20, 2019, at 1612 eastern daylight time, a Beech A36 airplane, N6150X, was destroyed when it was involved in an accident near Elida, Ohio. The private pilot and passenger were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot departed Maquoketa Municipal Airport (OQW), Maquoketa, Iowa, about 1255 and was destined for Toledo Executive Airport (TDZ), Toledo, Ohio. Visual meteorological conditions prevailed near OQW about the time of departure and weather information indicated that the initial portion of the flight was conducted in visual meteorological conditions. However, weather conditions deteriorated as the flight progressed. Automatic Dependent Surveillance – Broadcast (ADS-B) position data indicated that the airplane climbed to an altitude of about 9,000 ft mean sea level (msl) and proceeded southeast before turning east and transitioning south of the Chicago, Illinois, metropolitan area while maintaining 9,000 ft msl. The pilot subsequently returned to a southeasterly course until nearing Logansport, Indiana, when he again took up an easterly course and transitioned south of Ft. Wayne, Indiana. During this time, the airplane began a gradual descent over the next 30 minutes eventually leveling at 2,000 ft. msl. The track data depicted multiple course changes, including two 360° turns within 20 miles of the accident site. About 1610:45, the airplane entered a right turn, changing its course from southeasterly to southwesterly over about 30 seconds. About 1611:15, the airplane entered a second right turn, which transitioned into a right descending spiral until the final data point at 1612:14. At that time, the airplane was located about 1/4 mile north-northwest of the accident site at an altitude of 2,110 ft msl, which was about 1,330 ft above ground level (agl).

At 1647, a local resident saw the wreckage in an agricultural field and contacted authorities. There were no known witnesses to the accident.

Pilot Information

Certificate:	Private	**Age:**	65,Male
Airplane Rating(s):	Single-engine land; Single-engine sea	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	BasicMed	**Last FAA Medical Exam:**	May 29, 2017
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	March 11, 2019
Flight Time:	1640 hours (Total, all aircraft)		

Federal Aviation Administration (FAA) records indicated that the pilot did not hold, nor had he ever applied for an instrument rating. His application for the addition of a seaplane rating, dated March 15, 2017, indicated a total instrument flight time of 1.0 hours. The pilot's logbook was not available during the investigation; however, a copy of the pilot's flight review endorsement was provided after the initial factual report was released.. The investigation was not able to determine if the pilot had completed any instrument training after issuance of his private pilot certificate.

The pilot did not hold a current medical certificate; however, he had applied for BasicMed. He completed the BasicMed course on May 29, 2017, and his Comprehensive Medical Examination Checklist was completed on May 15, 2017. The pilot was medically eligible to fly as long he had a valid driver's license and was in compliance with 14 *Code of Federal Regulations* Part 68, Requirements for operating small aircraft without a medical certificate.

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N6150X
Model/Series:	A36	**Aircraft Category:**	Airplane
Year of Manufacture:	1981	**Amateur Built:**	
Airworthiness Certificate:	Utility	**Serial Number:**	E-1961
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	June 14, 2019 Annual	**Certified Max Gross Wt.:**	3651 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	2801.1 Hrs as of last inspection	**Engine Manufacturer:**	Continental
ELT:	C91 installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-550-B
Registered Owner:	On file	**Rated Power:**	300 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	AOH,975 ft msl	**Distance from Accident Site:**	10 Nautical Miles
Observation Time:	15:53 Local	**Direction from Accident Site:**	145°
Lowest Cloud Condition:		**Visibility**	6 miles
Lowest Ceiling:	Overcast / 800 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	18 knots / 28 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	250°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.57 inches Hg	**Temperature/Dew Point:**	19°C / 18°C
Precipitation and Obscuration:	N/A - None - Mist		
Departure Point:	Maquoketa, IA (OQW)	**Type of Flight Plan Filed:**	None
Destination:	Toledo, OH (TDZ)	**Type of Clearance:**	None
Departure Time:	12:55 Local	**Type of Airspace:**	Class G

There was no record that the pilot obtained an official preflight weather briefing or that he had requested any weather information during the flight.

At 1555, conditions at the Putnam County Airport (OWX), Ottawa, Ohio, about 14 miles north-northeast of the accident location, included scattered clouds at 600 ft agl, broken clouds at 1,700 ft agl, and 5

miles visibility. At 1555, conditions at the Van Wert County Airport (VNW), Van Wert, Ohio, about 20 miles west of the accident site, included broken clouds at 500 ft agl, overcast clouds at 1,000 ft agl, and 2 miles visibility in rain.

Satellite imagery depicted cloudy conditions across the region. Overcast clouds prevailed near the accident site, with cloud tops above 10,000 ft msl and localized build-ups to about 30,000 ft msl. The presence of any intervening cloud layers was not known. Radar imagery depicted light to heavy precipitation across the region. The accident occurred as the airplane approached an area of moderate to heavy perception.

An AIRMET warning of instrument conditions was in effect at the time of the accident.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	40.846389,-84.158332

The accident site was located in an agricultural field. The debris field extended about 117 ft north-northeast of the main wreckage. The airplane came to rest upright on a northwest heading. The engine was separated from the airframe and located in position immediately adjacent to the fuselage. The left wing was partially separated from the fuselage, bent forward 90o, and located resting against the forward fuselage. The right wing and empennage remained attached to the fuselage. The control surfaces remained attached to the airframe.

Examination of the airframe and engine did not reveal any anomalies consistent with a preimpact failure or malfunction. A detailed summary of the accident site and the postaccident examinations is available in the public docket.

Medical and Pathological Information

An autopsy of the pilot conducted by the Lucas County Coroner's Office, Toledo, Ohio, attributed his death to multiple blunt traumatic injuries sustained in the accident. Toxicology testing was performed by the FAA Forensic Sciences Laboratory. The testing detected 2.2 (ng/mL, ng-g) carboxy-delta-9-tetrahydrocannabinol (THC) in cavity blood and 16.5 (ng/mL, ng/g) in liver tissue; diphenhydramine in muscle and liver tissue; and rosuvastatin in muscle and liver tissue. No ethanol and no carboxyhemoglobin were detected in cavity blood.

Carboxy-delta-9-THC is an inactive metabolite of THC. Although THC itself is the primary psychoactive component in marijuana and is considered to be impairing, the inactive metabolite, carboxy-delta-9-THC, is not considered to be impairing. Diphenhydramine is an antihistamine available as an over-the-counter medication commonly used to treat allergy symptoms and as a sleep aid. Due to its sedating effects, it is considered to be impairing. Rosuvastatin is a cholesterol lowering medication available by prescription and is not considered to be impairing.

Additional Information

Spatial Disorientation

The FAA Civil Aeromedical 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 VMC and IMC, and unperceived changes in aircraft attitude.

The FAA Airplane Flying Handbook 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 Pilot's Handbook of Aeronautical Knowledge provides information concerning spatial disorientation and vestibular illusions. Regarding the "graveyard spiral" illusion, it states:

A pilot in a prolonged coordinated, constant-rate turn may experience the illusion of not turning. During recovery to level flight, the pilot will then experience the sensation of turning in the opposite direction causing the disoriented pilot to return the aircraft to its original turn. Because an aircraft tends to lose altitude in turns unless the pilot compensates for the loss of lift, the pilot may notice a loss of altitude. The absence of any sensation of turning created the illusion of being in a level descent. The pilot may pull back on the control sin an attempt to climb or stop the descent. This action tightens the spiral and increase the loss of altitude; this illusion is referred to as a "graveyard spiral." This may lead to a loss of aircraft control.

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):	Sorensen, Timothy
Additional Participating Persons:	Dennis Garcia; FAA Flight Standards; Columbus, OH Ricardo Asensio; Textron Aviation; Wichita, KS Christopher Lang; Continental Aerospace Technologies; Mobile, AL
Original Publish Date:	May 19, 2020
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=99677