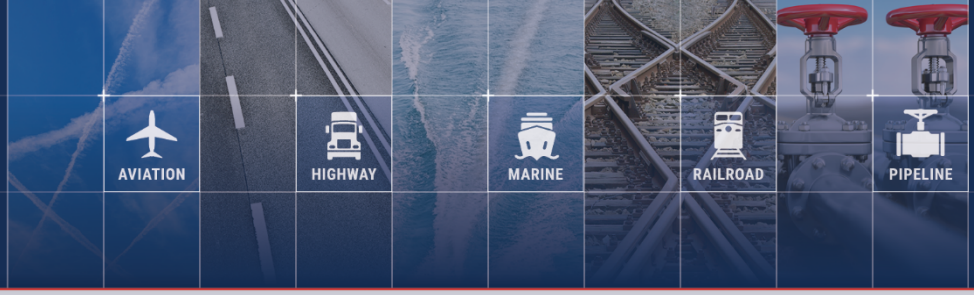

Aviation Investigation Final Report

Location:	Katy, Texas	**Accident Number:**	CEN19FA078
Date & Time:	January 31, 2019, 16:10 Local	**Registration:**	N56359
Aircraft:	Mooney M20K	**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 received a weather briefing before departing on the visual flight rules (VFR) cross-country flight, which included the presence of moderate to heavy precipitation, including some thunderstorms, near the destination airport. The pilot was advised that VFR flight was not recommended and that he should seek additional weather information as he neared his destination.

Weather observations and satellite imagery indicated that instrument meteorological conditions (IMC) prevailed in the vicinity of where the pilot began making multiple course changes and at the accident site. It is likely that the pilot encountered rain, possibly heavy rain, during the final portion of the flight. Weather observations near the destination airports, AIRMETs, and visible satellite weather images all indicated that the pilot encountered IMC en route. Examinations of the airframe and engine did not reveal any anomalies consistent with a preimpact failure or malfunction.

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 into an area of instrument meteorological conditions (IMC), which resulted in a loss of control due to spatial disorientation.

Findings

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

Factual Information

History of Flight

Enroute	VFR encounter with IMC (Defining event)
Maneuvering	Loss of control in flight

On January 31, 2019, about 1610 central standard time, a Mooney M20K airplane, N56359, was destroyed when it was involved in an accident near Katy, Texas. The private pilot was fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot's wife reported that she and the pilot departed Rohnerville Airport (FOT), Fortuna, California, the day before the accident, and stopped in Arizona to refuel. During the landing approach, they received a low battery indication. They landed uneventfully and taxied to the ramp area to refuel. When they restarted the airplane for departure, everything appeared normal, and they continued the flight to El Paso International Airport (ELP), El Paso, Texas. About 10-15 miles from ELP, the entire instrument panel went dark, and they used flashlights to see the instruments. The pilot reported to air traffic control that they had power issues. ELP air traffic cleared the runway and they landed the airplane uneventfully. They decided to stay the night in El Paso. While at dinner, they were discussing the power issue and believed it to be an alternator problem. They made the decision that she would fly home commercially because she needed to return to work and the pilot “did not want her to go down [with the pilot] if something went wrong” during the return flight from ELP to West Houston Airport (IWS), Houston, Texas. She reported she left the pilot the next morning at 0530 to make the commercial flight.

The pilot filed a VFR flight plan and took off from ELP about 1250. The flight track showed the pilot proceeded east toward IWS at a cruise altitude between 9,600 to 9,800 ft. As the flight approached IWS, the pilot descended and overflew the airport at midfield at 2,775ft. The pilot then turned southbound; paralleling the east side of the runway and climbed to 3,300ft. The pilot made descending a left turn and continued east bound, at an altitude between 2,800ft to 2,525ft. The flight track turns north with a gradual decrease in altitude before the pilot makes a descending right-hand turn into terrain (see Figure 1).

Witnesses reported they observed what they thought was a low-flying airplane traveling in a general northwest direction. One witness reported seeing the airplane “clip” the powerlines at a road intersection and saw the airplane immediately go nose up. She said she heard the engine sputter and then saw the airplane nose over into a dive. Both witnesses reported they lost sight of the airplane as it was going down. Neither witness reported hearing any loud sounds or seeing any smoke.

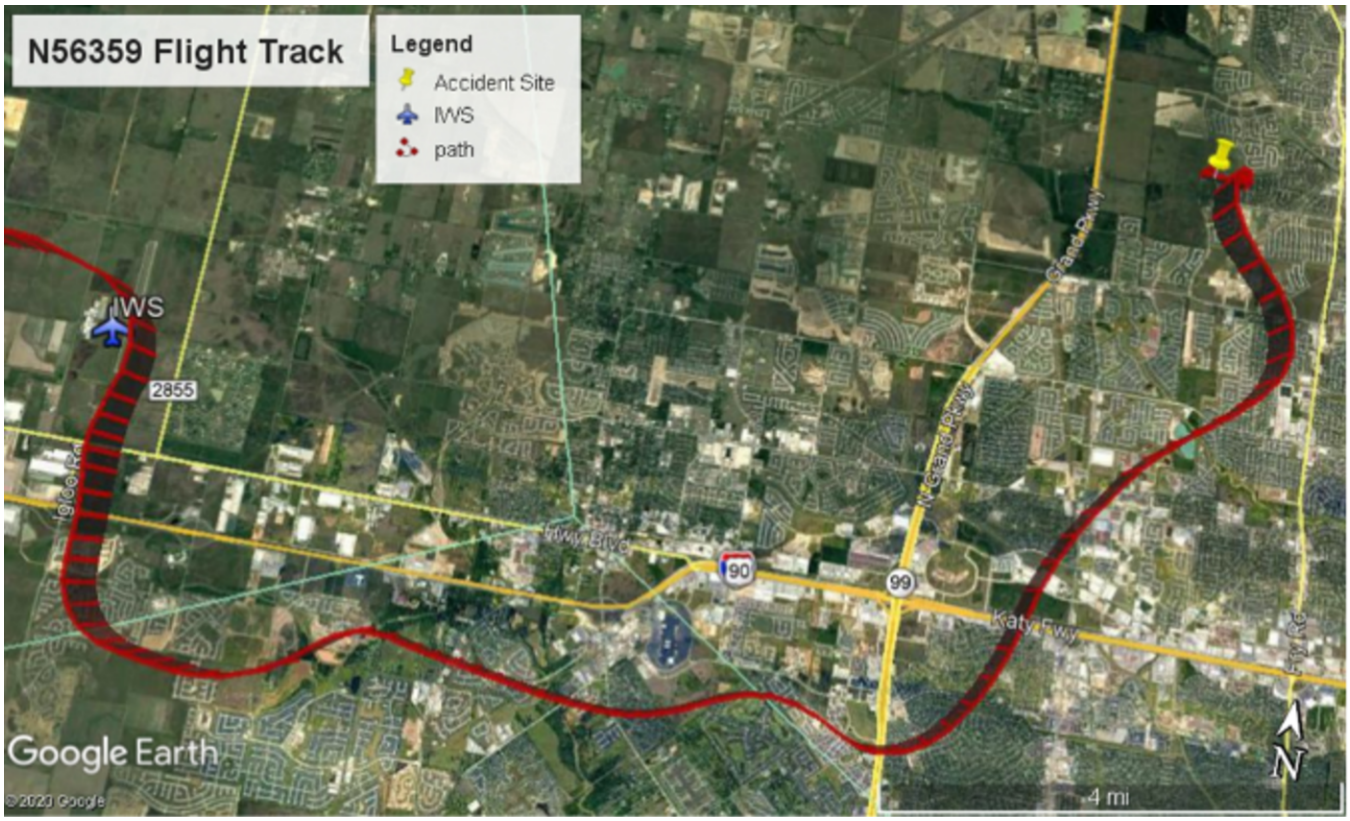

Figure 1: End Portion of Flight Track and Location of Main Wreckage

Pilot Information

Certificate:	Private	**Age:**	69,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 None	**Last FAA Medical Exam:**	October 1, 2016
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	250 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Mooney	**Registration:**	N56359
Model/Series:	M20K NO SERIES	**Aircraft Category:**	Airplane
Year of Manufacture:	1983	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	25-0745
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	July 24, 2018 Annual	**Certified Max Gross Wt.:**	2900 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	2736.1 Hrs as of last inspection	**Engine Manufacturer:**	Continental Motors
ELT:	Installed	**Engine Model/Series:**	TSIO-360-LB
Registered Owner:	On file	**Rated Power:**	210 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:	TME,166 ft msl	**Distance from Accident Site:**	9 Nautical Miles
Observation Time:	15:55 Local	**Direction from Accident Site:**	260°
Lowest Cloud Condition:		**Visibility**	4 miles
Lowest Ceiling:	Overcast / 1000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots / 13 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	120°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.1 inches Hg	**Temperature/Dew Point:**	14°C / 14°C
Precipitation and Obscuration:	Light - None - Rain		
Departure Point:	El Paso, TX (ELP)	**Type of Flight Plan Filed:**	VFR
Destination:	Houston, TX (IWS)	**Type of Clearance:**	VFR
Departure Time:	12:51 Local	**Type of Airspace:**	

The accident pilot received a weather briefing from Leidos at 1151 on the day of the accident. The briefing contained all the standard weather forecast information, including AIRMETs. The briefing indicated that the central Texas portion of the flight was “VFR not recommended,” moderate to heavy precipitation (including some thunderstorms) in east Texas, and no precipitation in the Houston area. The briefer advised the pilot to double check the

precipitation when getting closer to Houston during the course of the flight because Meteorological Aerodrome Reports (METARs) and Terminal Area Forecasts (TAFs), indicated "VFR not recommended" due to the Sugar Land Regional Airport (SGR) TAF (closest TAF to the intended destination location), and winds aloft forecast. In addition, the accident pilot received a standard Leidos text weather package and Graphical Forecasts for Aviation imagery at 1152.

There is no record of the accident pilot receiving or retrieving any other weather information during the accident flight.

Houston Executive Airport (TME), Houston, Texas, was located 9 miles west-southwest of the accident site. The 1555 observation included wind from 120° at 8 knots with gusts to 13 knots, 4 miles visibility, light rain, overcast ceiling at 1,000 ft agl, temperature of 14°C, dew point temperature of 14°C, and an altimeter setting of 30.10 inches of mercury. At 1615, TME reported wind from 120° at 8 knots, 2 1/2 miles visibility, light rain, and an overcast ceiling at 900 ft agl.

The visible imagery indicated an extensive layer of cloud cover, which was cumuliform in nature, over the accident site, with the cloud cover moving from southwest to northeast.

As the airplane approached the Houston area, it first encountered precipitation around 1550. The reflectivity bands shown in Figure 2 were moving from west to east.

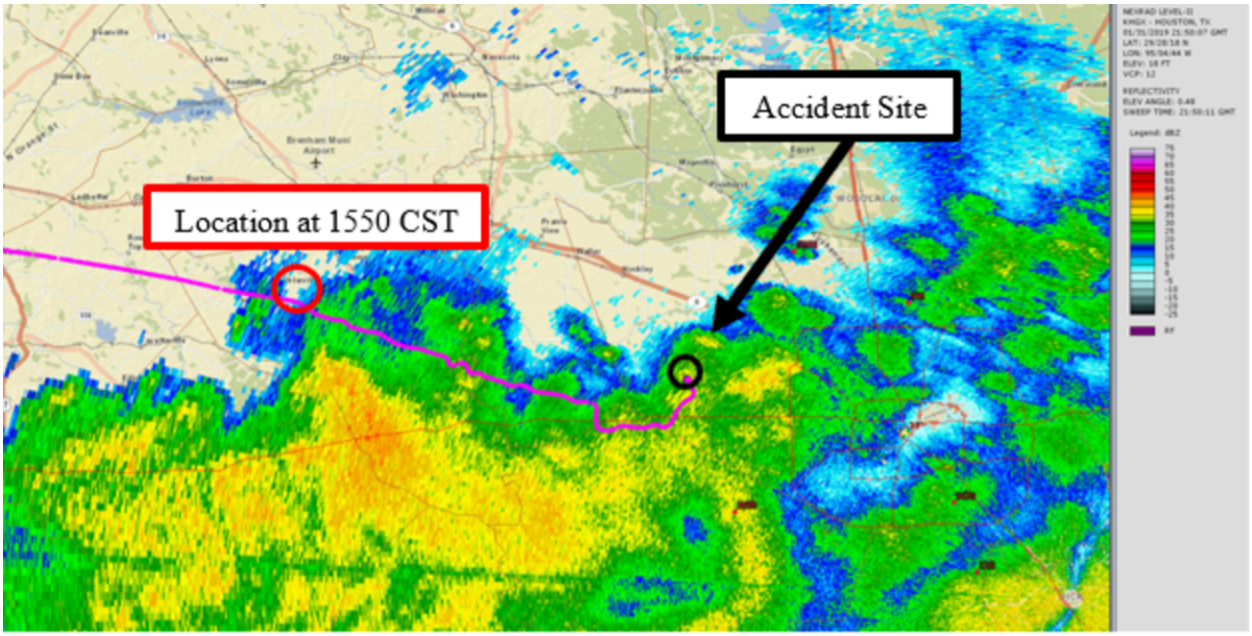

Figure 2: Reflectivity scan initiated at 1550:10 CST with the accident site marked with black circle, and the accident flight track in pink

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	29.740858,-95.830406(est)

The main wreckage came to rest in a muddy field on the west side of a residential development. The airplane impacted the ground in a near-vertical attitude. The propeller and engine were embedded about 6 ft into the ground. The airplane's wings and empennage were separated and the forward fuselage, cockpit and baggage area were highly fragmented. See Figure 3.

Figure 3: Airplane Main Wreckage

The cockpit annunciator panel was submitted to the NTSB Materials Laboratory for examination. The light bulbswere x-rayed to examine the filament in each bulb; a stretched light bulb filament indicated that the bulb was illuminated at the time of the accident. The "GEAR UNSFE" and "RIGHT FUEL LOW" had stretched filaments. The "GEAR DOWN" and

“LEFT FUEL LOW” were not stretched. The “HIGH LOW VAC,” “HIGH LOW VOLT,” and “ALT ALR” bulbs were broken or missing.

The alternator was examined at Hartzell Engine Technologies with oversight provided by the NTSB investigator-in-charge. The alternator controller functioned properly and there were no discrepancies that would have precluded normal operation of the alternator.

A postaccident examination of the airplane and engine revealed no mechanical anomalies that would have precluded normal operation.

Medical and Pathological Information

The Harris County Institute of Forensic Sciences, Houston, Texas, performed an autopsy of the pilot. The report stated that the probable cause of death was "multiple blunt force injures."

The FAA Forensic Sciences Laboratory conducted toxicological testing of specimens of the pilot. Testing was negative for volatiles and drugs.

Additional Information

Weather-Related Accidents

The FAA Risk Management Handbook, FAA-H-8083-2, states:

Weather is the largest single cause of aviation fatalities. Most of these accidents occur to a GA operator, usually flying a light single- or twin-engine aircraft, who encounters instrument meteorological conditions (IMC) while operating under VFR. Over half the pilots involved in weather accidents did not receive an official weather briefing. Once the flight is under way, the number of pilots who receive a weather update from automated flight service station (AFSS) is dismal.....

Scud running, or continued VFR flight into instrument flight rules (IFR) conditions, pushes the pilot and aircraft capabilities to the limit when the pilot tries to make visual contact with the terrain. This is one of the most dangerous things a pilot can do and illustrates how poor ADM [aeronautical decision making] links directly to a human factor that leads to an accident....

Continuing VFR into IMC often leads to spatial disorientation or collision with ground/obstacles. It is even more dangerous when the pilot is not instrument rated or current.

Spatial Disorientation

The FAA Civil Aerospace Medical Institute's publication, "Introduction to Aviation Physiology," defines spatial disorientation as a "loss of proper bearings; 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 angular acceleration, flight in IFR conditions, frequent transfer from VFR to IFR conditions, and unperceived changes in aircraft attitude. This document states, "anytime there is low or no visual cue coming from outside of the aircraft, you are a candidate for spatial disorientation."

The FAA's Airplane Flying Handbook, FAA-H-8083-3B, describes hazards associated with flying when the ground or horizon is obscured. The handbook states in part the following:

The vestibular sense (motion sensing by the inner ear) can and will confuse the pilot. Because of inertia, the sensory areas of the inner ear cannot detect slight changes in airplane attitude, 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.

Administrative Information

Investigator In Charge (IIC):	Liedler, Courtney
Additional Participating Persons:	Chris Lang; Continental Motors Inc.; Mobile, AL Ramon Reyes; FAA; Houston, TX
Original Publish Date:	June 1, 2021
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=98935