

# **Aviation Investigation Final Report**

Location:	Ocala, Florida	Accident Number:	ERA20FA022
Date & Time:	October 31, 2019, 11:31 Local	Registration:	N959CM
Aircraft:	Beech 58	Aircraft Damage:	Destroyed
Defining Event:	Medical event	Injuries:	2 Fatal, 1 Serious
Flight Conducted Under:	Part 91: General aviation - Flight test		

### Analysis

After experiencing an issue with a fluctuating fuel transducer on the right engine, the pilot hired a mechanic, who removed the fuel flow transducers from both engines and reinstalled them on the opposite engine to determine if there was an instrument indication problem or a fuel flow sensor issue. After performing the maintenance, the pilot and mechanic performed several ground runs of the engines without incident. They then departed on a local flight. Review of air traffic control communications revealed that the pilot initially taxied to the wrong runway, and after takeoff, failed to acknowledge multiple calls from the controller, did not follow the controller's instructions, and thought that he was flying west when he was flying toward the east. About 2 minutes after takeoff, a transmission was received from the accident airplane requesting to return to the airport. The airplane impacted a four-lane divided highway and was consumed by a postcrash fire. Examination of the airplane, both engines, and their respective fuel transducers revealed no mechanical discrepancies that would have precluded normal operation.

Autopsy of the pilot revealed severe abdominal aortic atherosclerotic disease, which increased his risk for an extra-cardiovascular event such as a stroke. Toxicology testing detected the impairing medication diazepam and its metabolite at the lower end of its therapeutic range in the pilot's chest blood. Toxicology testing also revealed that the primary psychoactive compound of marijuana, THC, was detected in the pilot's blood just above the laboratory's detection limit. The THC concentration did not suggest recent use and it is unlikely that the pilot's use of marijuana contributed to the accident.

The circumstances of the accident indicate that the pilot did not perform in a manner consistent with his level of skill and experience, and it is likely that his loss of control was the result of physiological impairment; however, whether his impairment was the result of an acute medical event and/or his use of impairing medications could not be determined based on the available information.

## **Probable Cause and Findings**

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

The pilot's failure to maintain control of the airplane due to an acute medical event and/or his use of impairing medications.

Findings	
Personnel issues	(general) - Pilot
Personnel issues	Identification/recognition - Pilot
Aircraft	(general) - Not attained/maintained
Personnel issues	Aircraft control - Pilot

## **Factual Information**

History of Flight		
Initial climb	Medical event (Defining event)	
Initial climb	Loss of control in flight	
Initial climb	Aerodynamic stall/spin	

On October 31, 2019, at 1131 eastern daylight time, a Beechcraft BE-58, N959CM, was destroyed when it was involved in an accident near Ocala, Florida. The private pilot and passenger were fatally injured. An individual on the ground was seriously injured. The airplane was operated as a Title 14 *Code of Federal Regulations Part* 91 maintenance test flight.

The pilot had flown into Ocala International Airport Jim Taylor Field (OCF), Ocala, Florida, the day before the accident with a friend. According to the friend, the flight was normal, but the right engine's fuel flow meter was fluctuating between zero and high while the other engine instruments were normal. The following day, the pilot asked a mechanic to look at the fuel transducer. The mechanic removed the fuel flow transducers from both engines and reinstalled them on the opposite engine to determine if there was an instrument indication problem or an actual fuel flow sensor issue. After performing the maintenance, the pilot and mechanic performed several test runs of the engines without incident. They then conducted a flight test together.

A review of air traffic control communications provided by the Federal Aviation Administration (FAA) revealed that the pilot requested a taxi clearance at 1124 and asked if there was a block of airspace near the airport where he could conduct a maintenance test flight. The ground controller told the pilot that there were no restricted areas and he could choose where he would like to go. The pilot responded that he would conduct the test west of the airport. The ground controller cleared the pilot to taxi to runway 18; however, the pilot initially taxied to runway 26 and the ground controller twice provided the pilot directions to runway 18.

After takeoff, the pilot was cleared to make a right turn to the west, which he did not acknowledge. Several seconds later, the controller repeated the clearance, which the pilot again did not acknowledge, and the pilot turned left onto an easterly heading. On the third attempt to contact the pilot, the controller asked if he was "alright" and the pilot responded, "say again." The controller asked where the pilot was going and the pilot reported that he was going to the west; the controller stated "no, you're not, you're heading to the east sir." The controller again issued instructions to the pilot to proceed on course to the west; the pilot did not acknowledge. Seeing that the airplane was continuing to the east, the controller asked the pilot his intentions. Several seconds later, about 2 minutes after takeoff, the accident airplane transmitted, "niner charlie mike, we need to return to the field sir." This was the last communication from the airplane.

Numerous witnesses saw the airplane after it departed. Some of these witnesses said it was flying north at a low altitude before it entered a steep inverted dive. Other witnesses reported the airplane spinning to the left as it descended. One witness said that the airplane was on fire, while another witness said that the left propeller was not turning.

Data downloaded from a handheld GPS found in the wreckage revealed that, after takeoff, the airplane entered a left turn and never gained more than 418 ft in altitude. During the last minute of flight, the airplane's groundspeed varied from 95 to 107 knots before the data ended at 1131.

Video recovered from a parked car near the accident site captured the airplane rotating counterclockwise as it impacted a four-lane divided highway. The airplane's right wing struck the ground first before impacting a moving vehicle. The airplane then skidded across two lanes of traffic, struck a concrete curb, then spun 180° before coming to rest in a vacant lot. The deflection of the rudder just before ground impact was estimated to be 20°±4° to the left, in the direction of rotation. No airframe or engine fire and/or smoke was observed in the video. (see figure 1.)



Figure 1 Screen Capture of Automobile Video Showing Airplane Just Prior to Impact.

### PERSONNEL INFORMATION

The pilot held a private pilot certificate with ratings for airplane multiengine land, airplane single-engine land, airplane single-engine sea, and instrument airplane. According to the pilot's logbook, he had accumulated about 7,800 total hours of flight experience and completed a flight review on October 4,

2019. On February 19, 2019, he was issued a Federal Aviation Administration (FAA) third class medical certificate with a limitation for corrective lenses.

#### WRECKAGE AND IMPACT INFORMATION

On-scene examination revealed that the airplane traveled about 150 ft from the initial impact point. All major components of the airplane were located at the accident site and a postimpact fire consumed the fuselage. Continuity of the ailerons, elevator, and rudder was established from each of the respective control surfaces to the cockpit. The flaps and landing gear were retracted.

Located near the initial impact point was a ground scar that was consistent with an imprint of the airplane's nose, fuselage, both engines, both propellers and both wings. Three distinct slash marks, consistent with propeller contact, was observed in the asphalt near where the right engine impacted the road. Another slash mark was observed adjacent to where the left engine impacted the road.

Both wings sustained impact damage and their respective fuel tanks were breached. The fuel selector handle and the valves for each wing fuel tank were found in the "on" position.

The left engine remained attached to the airframe and sustained extensive impact and thermal damage. The crankshaft was capable of rotation; however, due to impact damage to the camshaft gear, it could not be rotated completely. Subsequent borescope examination of the engine, pistons, and cylinders revealed no anomalies. The throttle metering assembly was damaged by thermal and impact forces. Examination revealed that the throttle control arm was installed backward from the normal position; however, the throttle and metering assembly spring was intact, held tension, and operated normally. No additional anomalies were discovered on the engine or components that would preclude normal engine operation.

The three-bladed propeller assembly sustained extensive impact damage and a portion of the hub remained attached to the crankshaft. One blade remained attached to the hub, and the second and third blades had separated and were found with the wreckage. The blade that remained attached displayed chordwise scratches and curling at the tip. Of the two blades that separated, one exhibited twisting deformation, leading-edge gouges, and chordwise scratches. The other blade exhibited minor chordwise scratches near the blade tip and minor twisting deformation.

The fuel flow transducer remained attached to its installation point and displayed thermal damage. The fuel flow inlet nut was finger-tight and able to be moved by hand; however, the fuel line and nut displayed thermal damage. The transducer was removed and examined; air was blown into the inlet and it flowed through the transducer freely. Disassembly of the transducer revealed no obstructions or other anomalies.

The right engine separated from the airframe and was found just forward of the right wing. Due to impact and thermal damage, the crankshaft could not be rotated. The engine was completely disassembled, which revealed no preimpact anomalies that would have precluded normal operation.

The three-bladed propeller assembly sustained significant impact damage. One blade remained partially attached to the hub and exhibited chordwise scratches, forward deformation, and tip curling. The other

two blades had separated and were found with the wreckage. Of the two blades that separated, one had a large portion of the tip missing in addition to chordwise scratches, leading-edge gouges, twisting and S-bending deformation. The blade and a recovered portion of the blade tip displayed chordwise scratches, twisting and forward bending deformation, and leading edge gouges. The other blade was also missing a tip of the blade and exhibited chordwise scratches, leading edge gouges, and displayed twisting and S-bending deformation.

The fuel flow transducer remained attached to its installation point and remained relatively intact. The transducer was removed and examined; air was blown into the inlet and it flowed through the transducer freely. Disassembly of the transducer revealed no obstructions or other anomalies.

### MEDICAL AND PATHOLOGICAL INFORMATION

The Medical Examiner Districts 5 & 24, Leesburg, Florida, performed an autopsy on the pilot. The cause of death was multiple blunt force injuries. Severe abdominal aortic atherosclerosis was identified.

The FAA's Forensic Sciences Laboratory performed toxicology testing on the pilot's tissue and blood samples, which identified diazepam (commonly marketed as Valium) and its psychoactive metabolites nordiazepam and oxazepam in the pilot's liver and muscle tissue. The non-sedating high blood pressure medication valsartan was also detected in liver and muscle.

Toxicology testing performed for the medical examiner's office detected diazepam at 96 nanograms per milliliter (ng/mL), nordiazepam at 94 ng/mL, and delta-9- tetrahydrocannabinol (THC) at 0.69 ng/mL in the pilot's chest blood.

Diazepam is a sedating benzodiazepine available by prescription as a controlled substance and used to treat anxiety and is also useful to help treat muscle spasms, alcohol withdrawal, and seizures. It is metabolized to the active metabolites nordiazepam or temazepam. These compounds are further metabolized to the active metabolite oxazepam. Diazepam and its metabolites carry the warning that they may impair the mental and physical ability to perform hazardous tasks. The therapeutic range of diazepam and nordiazepam is 100 to 2,000 ng/mL in the blood. Diazepam has a half-life of 21 to 82 hours; nordiazepam has a half-life of 25 to 200 hours.

The marijuana plant (cannabis) contains chemicals called cannabinoids; THC is the primary psychoactive cannabinoid compound. THC's mood-altering effects include euphoria and relaxation. In addition, marijuana causes alterations in motor behavior, perception, and cognition. Significant performance impairments are usually observed for at least 1-2 hours following marijuana use, and residual effects have been reported up to 24 hours.

THC is rapidly metabolized, but the rate of metabolism is not linear and depends on the means of ingestion (smoking, oil, and edibles), potency of the product, frequency of use, and user characteristics. THC is fat soluble, so is stored in fatty tissues and can be released back into the blood long after consumption. So, while the psychoactive effects may last a few hours, THC can be detected in the blood for days or weeks. Thus, low blood level test results do not necessarily reflect recent use and cannot be used to prove that the user was under the influence of the drug at the time of testing.

### **Pilot Information**

Certificate:	Private	Age:	73,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	3-point
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3 With waivers/limitations	Last FAA Medical Exam:	February 2, 2019
Occupational Pilot:	No	Last Flight Review or Equivalent:	October 4, 2019
Flight Time:	(Estimated) 7800 hours (Total, all aircraft)		

## Passenger Information

Certificate:		Age:	50,Male
Airplane Rating(s):		Seat Occupied:	Right
Other Aircraft Rating(s):		Restraint Used:	3-point
Instrument Rating(s):		Second Pilot Present:	No
Instructor Rating(s):		Toxicology Performed:	
Medical Certification:		Last FAA Medical Exam:	
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:			

### Aircraft and Owner/Operator Information

Aircraft Make:	Beech	Registration:	N959CM
Model/Series:	58 Undesignat	Aircraft Category:	Airplane
Year of Manufacture:	1996	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	TH-1792
Landing Gear Type:	Retractable - Tricycle	Seats:	6
Date/Type of Last Inspection:	March 18, 2019 Annual	Certified Max Gross Wt.:	5500 lbs
Time Since Last Inspection:	61 Hrs	Engines:	2 Reciprocating
Airframe Total Time:	1979 Hrs as of last inspection	Engine Manufacturer:	Continental
ELT:	Installed, not activated	Engine Model/Series:	IO-550-C31B
Registered Owner:	Caribbean World Resorts Ltd	Rated Power:	300 Horsepower
Operator:	Caribbean World Resorts Ltd	Operating Certificate(s) Held:	None

### Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	OCF,89 ft msl	Distance from Accident Site:	2 Nautical Miles
Observation Time:	11:40 Local	Direction from Accident Site:	340°
Lowest Cloud Condition:	Few / 2200 ft AGL	Visibility	10 miles
Lowest Ceiling:		Visibility (RVR):	
Wind Speed/Gusts:	7 knots / None	Turbulence Type Forecast/Actual:	None / None
Wind Direction:	200°	Turbulence Severity Forecast/Actual:	N/A / N/A
Altimeter Setting:	30.05 inches Hg	Temperature/Dew Point:	29°C / 24°C
Precipitation and Obscuration:	No Obscuration; No Precipitat	tion	
Departure Point:	Ocala, FL (OCF )	Type of Flight Plan Filed:	None
Destination:	Ocala, FL (OCF )	Type of Clearance:	None
Departure Time:	11:28 Local	Type of Airspace:	Class D

### **Airport Information**

Airport:	Ocala Intl-Jim Taylor Field OCF	Runway Surface Type:	Asphalt
Airport Elevation:	89 ft msl	Runway Surface Condition:	Dry
Runway Used:	18	IFR Approach:	None
Runway Length/Width:	7467 ft / 150 ft	VFR Approach/Landing:	None

## Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	1 Fatal	Aircraft Fire:	On-ground
Ground Injuries:	1 Serious	Aircraft Explosion:	On-ground
Total Injuries:	2 Fatal, 1 Serious	Latitude, Longitude:	29.141666,-82.194168

### **Administrative Information**

Investigator In Charge (IIC):	Mccarter, Lawrence
Additional Participating Persons:	Corey Best; FAA FSDO; Orlando, FL Ricardo J Asensio; Textron; Wichita, KS Kurt Gibson; Continental Motors; Mobile, AL
Original Publish Date:	March 9, 2022
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=100509

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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.