Aviation Investigation Final Report

Location:	Osage Beach, Missouri	**Accident Number:**	CEN17FA024
Date & Time:	October 22, 2016, 13:35 Local	**Registration:**	N20087
Aircraft:	Beech C23	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The commercial pilot was flying his newly purchased airplane across the country to his home. After a flight of about 560 nautical miles that would have taken about 5 hours and consumed at least 51 gallons of the airplane's 58.8 usable gallons of fuel, an airport employee heard the pilot on the common traffic advisory frequency (CTAF) announcing his intention to land. The airplane landed but did not taxi to the ramp. The employee attempted to communicate with the pilot over the CTAF, but the pilot's transmissions were garbled. The airplane then departed on runway 4, and the employee heard no further transmissions from the pilot. No witnesses to the accident were identified. The wreckage was discovered in a heavily wooded area about 1,000 ft east of the departure end of runway 4, a location consistent with the pilot turning right during initial climb before the airplane descended and impacted terrain.

A postaccident examination of the airplane and engine did not find any anomalies that would have precluded normal operation. The wreckage distribution and impact damage indicated that the airplane collided with the trees in a nose-low attitude consistent with a loss of control. Damage to the wings precluded an accurate measurement of the fuel on-board the airplane; however, fuel was found in the carburetor bowl and fuel pump, and damage to several tree branches was consistent with the engine operating when the airplane collided with trees. The flaps were found fully extended, which is the proper setting for landing. For takeoff, the airplane's flaps should have been in the fully retracted position, and the extended flaps would have added a significant amount of drag and degraded the airplane's climb performance. It is likely that the pilot forgot to retract the flaps after landing at AIZ and attempted to take off with them extended

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's loss of control while maneuvering shortly after takeoff. Contributing to the loss of control was the pilot's attempt to climb with the flaps fully extended.

Findings

Personnel issues	Aircraft control - Pilot
Aircraft	(general) - Not attained/maintained
Aircraft	TE flap control system - Incorrect use/operation
Personnel issues	Use of equip/system - Pilot

Factual Information

History of Flight

Initial climb	Loss of control in flight (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On October 22, 2016, about 1335 central daylight time, a Beech C23 airplane, N20087, collided with trees and impacted terrain after takeoff from Lee C. Fine Memorial Airport (AIZ), Osage Beach, Missouri. The commercial pilot and the passenger were fatally injured, and the airplane was substantially damaged. The airplane was registered to and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed for the cross-country flight, which operated without a flight plan. The airplane departed from the Tucumcari Municipal Airport (TCC), Tucumcari, New Mexico, earlier on the day of the accident and was en route to an undetermined destination on the day of the accident.

According to the pilot's wife, the pilot had recently purchased the airplane in Reno, Nevada, and the pilot and their daughter were flying the airplane across the country to their home in New Britain, Pennsylvania. She had last spoken with them on October 21, the day before the accident, when the two were in Boulder City, Nevada. They then flew to and stayed the night in Tucumcari, New Mexico. On the day of the accident, the pilot planned to fly past Saint Louis, Missouri, and stop for the night east of Saint Louis. The pilot's wife did not know what airports the pilot planned to stop at for fuel en route or what airport he planned to stop at for the night.

AIZ was located 561.2 nautical miles (nm) from TCC and about 100 nm west of Saint Louis. According to an employee of the fixed base operator at AIZ, he heard the pilot report a 4-mile final for the runway. The airplane landed and stopped near the runup area of runway 4. When the pilot did not taxi to the ramp, the employee attempted to contact the pilot on the common traffic advisory frequency. The pilot's transmission was garbled, so the employee waited to see if the pilot would taxi in. However, the pilot elected to takeoff on runway 4. When the employee saw the airplane depart he returned to his duties. He did not recall the pilot making any further transmissions on the radio. The employee reported that he heard normal engine sounds when the airplane was on the ground and when the airplane took off.

There are no known witnesses to the accident. The wreckage was discovered by mountain bikers about 1,000 ft east of the departure end of runway 4 in a heavily wooded area of a state park.

Pilot Information

Certificate:	Commercial	**Age:**	56,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
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:**	November 6, 2014
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	934 hours (Total, all aircraft)		

The family reported that the pilot was very familiar with aviation. He and his wife had owned a small fleet of airplanes that they maintained and rented to other pilots. After September 11, 2001, the cost became too great, and they sold off their fleet. Recently, the pilot wanted to spend more time flying, so he researched and bought a Beech airplane. The pilot was known to fly exactly to checklist standards.

The family reported that the pilot was in good health. He used a continuous positive airway pressure (CPAP) machine but was not on any medications. On November 6, 2014, the pilot was issued a third-class Federal Aviation Administration (FAA) medical certificate with the limitation, must wear corrective lenses. On the application for that medical certificate, the pilot reported having accrued 934 hours of total time, with 3 hours in the preceding 6 months.

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N20087
Model/Series:	C23 NO SERIES	**Aircraft Category:**	Airplane
Year of Manufacture:	1978	**Amateur Built:**	
Airworthiness Certificate:	Normal; Utility	**Serial Number:**	M-2063
Landing Gear Type:	Unknown	**Seats:**	
Date/Type of Last Inspection:	March 1, 2016 Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:	64 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	9368.16 Hrs as of last inspection	**Engine Manufacturer:**	LYCOMING
ELT:	C91A installed, not activated	**Engine Model/Series:**	O-360-A4K
Registered Owner:	On file	**Rated Power:**	
Operator:	On file	**Operating Certificate(s) Held:**	None

Documents located in the airplane included a signed aircraft bill of sale for the airplane dated October

19, 2016. Entries in the airframe and engine logbooks documented an annual inspection completed on March 1, 2016, at a total tachometer/airframe time of 9,368.16 hours. On October 17, 2016, the directional gyro was replaced at an airframe time of 9,415.17 hours. At the accident site, the airplane's tachometer read 9,432.63 hours.

A review of the type certificate data sheet for the airplane revealed that the airplane's fuel capacity was 59.8 gallons of which 58.8 gallons were useable. The family provided credit card records indicating that the pilot purchased fuel at TCC. According to the family, the pilot was regularly using the card he used at TCC for travel expenses, and no other fuel charges were made to the credit card after that one. Pages in the pilot's notebook noted several airports in Oklahoma and Kansas, and FAA inspectors called these airports as well as other airports in line between TCC and AIZ and could not find an airport that sold the pilot fuel.

Airplane performance information provided by Textron Aviation indicated that, at an estimated 110 knots ground speed, the airplane would burn on average of 10.5 gallons of fuel per hour. A direct flight from TCC to AIZ of 561.2 nm in no-wind conditions would take 4 hours 50 minutes and require about 50.75 gallons of fuel. This fuel consumption calculation does not include the fuel burned on the ground at TCC and AIZ or the fuel to takeoff from TCC and climb to altitude or the fuel to takeoff from AIZ.

According to Textron Aviation, for takeoff, the airplane's flaps should be in the "UP" or fully retracted position. Textron Aviation reported that, if a takeoff were performed with the flaps fully extended, the airplane would have a significant amount of drag and difference in pitch.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KAIZ,869 ft msl	**Distance from Accident Site:**	2 Nautical Miles
Observation Time:	13:56 Local	**Direction from Accident Site:**	35°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	210°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.06 inches Hg	**Temperature/Dew Point:**	22°C / 7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	KAISER/LAKE OZARK, MO (AIZ)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	13:35 Local	**Type of Airspace:**	

No significant weather was recorded near the accident site at the time of the accident.

Airport Information

Airport:	LEE C FINE MEMORIAL AIZ	**Runway Surface Type:**	
Airport Elevation:	868 ft msl	**Runway Surface Condition:**	Dry
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	38.1025,-92.539169

The wreckage was located in a heavily wooded area. The main wreckage consisted of all major components of the airplane. The first impact point was with a 50-ft-tall tree, and the outer edge of the left wing and wingtip remained suspended in the tree. The second impact point was a ground scar that had the right wing tip located beside it. The airplane came to rest on its right side and slightly inverted. The airplane's right wing was fractured rearward and partially folded under the fuselage. The right wing spar was fractured, and the wing remained attached to the fuselage by the aileron carry through cable. The left wing was pointing upward and came to rest against a tree. The outboard left wing was partially separated outboard of the flap, and the aileron was separated. Flight control continuity was established to the left aileron, elevators, and rudder. The right aileron drive cable was fractured near the pulley under the front passenger's seat. The fractured cable was sent to the National Transportation Safety Board (NTSB) laboratory for examination. Examination of the cable's fracture surfaces found cup and cone slant fractures. No indicators of preexisting corrosion or wear were noted during the examination.

The flaps were found at 35° (fully extended), and a witness mark was found on the trailing edge of the wing, were consistent with the flaps being fully extended at impact. The emergency locator beacon was found turned off. Several ounces of fuel were found in the fuel strainer bowl; the fuel strainer screen was absent of debris. Due to the wreckage's position it could not be determine how much, if any fuel had leaked from the fuel tanks. The fuel selector was positioned to the left fuel tank. No anomalies were detected with the airframe.

At the accident scene, no less than three large branches had 45° cuts. The propeller remained attached to the engine at the propeller hub. Both blades displayed leading edge polishing and chord-wise scratches. One blade remained relatively straight while the other blade showed S-bending. The S-bent propeller blade also had a significantly larger area of polishing and chord-wise scratches.

The engine was examined by a technical representative from the engine manufacturer under the supervision of the NTSB investigator-in-charge. A bend in the propeller flange prohibited rotation, and the flange was cut to facilitate rotation. The upper spark plugs were removed and found to be in a normal condition. Engine compression and continuity were established to each cylinder, and each cylinder was subsequently inspected via borescope. Both magnetos produced spark at each terminal when rotated by hand. The oil pickup screen was absent of debris. Fuel was found in the carburetor bowl and the fuel pump. No anomalies were detected with the engine.

Medical and Pathological Information

The Boone/Callaway County Medical Examiner's office conducted an autopsy on the pilot , as authorized by the Miller County Coroner, Eldon, Missouri. The cause of death resulted from blunt force injuries. The autopsy noted hypertrophy of the left ventricle and mild atherosclerosis of the coronary arteries and aorta. However, the coronary arteries showed no thromboemboli, and the heart muscle had no evidence of a recent or past heart attack

The FAA's Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed forensic toxicology on specimens from the pilot. Testing was negative for carbon monoxide and ethanol. Cetirizine was detected in urine and blood; hydroxyzine was detected in blood; and salicylate (aspirin) was detected in urine.

Cetirizine is an over-the-counter medication used to temporarily relieve the symptoms of hay fever and allergy to other substances. Cetirizine may cause drowsiness, and the FAA recommends at least a 48-hour wait from the last dose before performing airman duties. Hydroxyzine is a prescription first-generation antihistamine frequently used to relieve itching caused by allergic skin reactions. It is also used alone or with other medications in adults and children to relieve anxiety and tension. This medication has a long half-life, and the FAA recommends 6 days after the last dose before performing airman duties. Aspirin is an over-the counter medication that reduces substances in the body that cause pain, fever, and/or inflammation.

Tests and Research

Garmin VIRB camera

The pilot's Garmin VIRB camera was located in the wreckage. The family reported that the pilot used the camera during flight. The Garmin VIRB is capable of recording still photos, videos, sound, and certain parametric data, including GPS position. The memory cards had not sustained any damage, and information was extracted normally. Information contained file system timestamps before the accident flight and timestamps around the time of the accident. Additionally, there were at least two files in the file system reporting a size of 0 bytes. When a file in the file system shows a size of 0, a corrupted file system is suspected. No data pertinent to the accident flight was recovered.

Administrative Information

Investigator In Charge (IIC):	Aguilera, Jason
Additional Participating Persons:	James Seabolt; Federal Aviation Administration; Kansas City, MO Peter Basile; Textron Aviation; Wichita, KS Troy Helgeson; Lycoming Engines; Williamsport, PA
Original Publish Date:	April 17, 2018
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=94261