Aviation Investigation Final Report

Location:	Donnelly, Idaho	**Accident Number:**	WPR14FA044
Date & Time:	November 6, 2013, 09:10 Local	**Registration:**	N206KL
Aircraft:	Cessna U206F	**Aircraft Damage:**	Destroyed
Defining Event:	Controlled flight into terr/obj (CFIT)	**Injuries:**	3 Fatal
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled		

Analysis

Before departing on the cross-country flight over mountainous terrain, the accident pilot and two other pilots going to the same remote airstrip discussed the weather and checked webcams positioned throughout the passes. The accident pilot took off first and flew south before turning east to cross the mountains, while the other two pilots chose to fly north before crossing the mountains. Inflight radio communications from the accident pilot indicated that when he first turned east to cross the mountains, he encountered weather that required him to turn around and fly further south before turning east again. No further radio communications from the accident pilot were heard. The other two pilots reported encountering marginal weather with low clouds during their flights to the destination, which they completed without incident. Flight track data downloaded from the accident airplane's onboard GPS unit indicated that, during the final 40 seconds of the flight, the airplane made a left turn of about 90 degrees followed by a right turn of about 180 degrees while maintaining an altitude of about 8,150 ft. This flightpath suggests that the pilot was following the contour of the horseshoe-shaped ridgeline at that location. However, the ridgeline varied in elevation between about 8,000 and 8,200 ft, and the airplane impacted steep, heavily wooded terrain about 100 ft below the top of the ridgeline.

A postaccident examination of the airframe and engine did not reveal any anomalies that would have precluded normal operation. Due to the location of the accident site, weather reporting stations and weather products were limited. Satellite imagery did not show low-level clouds because of a mid-level cloud layer at 15,000 ft. A weather model run to simulate relative humidity over the accident site revealed that the lower altitudes above terrain likely had a much lower visibility with relative humidity greater than 98%. Thus, it is likely that the pilot was maneuvering the airplane in or near low clouds when he lost visual contact with the ground resulting in controlled flight into terrain.

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 clearance from terrain while maneuvering in likely low-ceiling and low-visibility conditions in mountainous terrain.

Findings

Aircraft	Altitude - Not attained/maintained
Personnel issues	Aircraft control - Pilot
Environmental issues	Low visibility - Effect on operation
Environmental issues	Low ceiling - Effect on operation

Factual Information

History of Flight

Maneuvering-low-alt flying	VFR encounter with IMC
Maneuvering	Controlled flight into terr/obj (CFIT) (Defining event)

On November 6, 2013 about 0910 mountain standard time, a Cessna U206F, N206KL, impacted terrain about 12 miles east of Donnelly, Idaho. The commercial pilot and two passengers were fatally injured; the airplane was destroyed. The airplane was registered to Wilderness Aircraft I LLC and operated by McCall Aviation Inc., under the provisions of 14 Code of Federal Regulations Part 135. Visual meteorological conditions prevailed for the flight, which operated on a company flight plan. The flight originated from McCall Municipal Airport (MYL), McCall, Idaho, at 0900 with a destination of Lower Loon Creek Airport (C53), Challis, Idaho.

The accident airplane was one of three airplanes taking off from MYL destined for C53. The pilot's from the other two airplanes reported that prior to the flight all three pilots checked the weather and looked at weather webcams positioned throughout the passes. They also contacted people both on the ground and flying to get their description of the weather. The accident pilot departed MYL first followed by the two other airplanes. The second and third pilots both took a route to the north that is commonly used when the weather isn't considered perfect. The accident pilot chose a different route to the south, which isn't abnormal; however, he never told anyone why he chose that particular route. At the start of the flight the three pilots were talking to each other over the radio. The accident pilot reported over the radio that the first route he attempted to take was blocked in, so he turned around and flew further south. The last radio transmission they heard from the accident pilot was that he was clear in the south fork of the Salmon River.

A portable GPS unit was removed from the wreckage and sent to the National Transportation Safety Board (NTSB) vehicle recorders laboratory for download. The GPS track showed that the airplane departed MYL to the southeast before it turned east towards the mountains. The track entered the mountains, then proceeded south temporarily along a valley before it flew west and exited mountains. The track continued south along the mountain ridgeline for a short time before it turned east and reentered the mountains. The final 40 seconds of the track showed that the airplane turned northeast temporarily before it turned southeast then southwest; this portion of the track appeared to follow the contour of a horseshoe-shaped ridgeline that varied in elevation between about 8,000 and 8,200 feet. As the airplane began to turn northeast, it was at an altitude of 8,150 feet with a groundspeed of 128 knots. As the airplane headed southeast, the groundspeed decreased from 145 knots to 71 knots and then increased to 89 knots with no noted change in altitude. After turning to the southwest, the final data point indicated the airplane was at 8,150 feet with a groundspeed of 152 knots.

Pilot Information

Certificate:	Commercial	**Age:**	66
Airplane Rating(s):	Single-engine land; 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 2 Without waivers/limitations	**Last FAA Medical Exam:**	December 18, 2012
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	July 29, 2013
Flight Time:	3841 hours (Total, all aircraft), 2158 hours (Total, this make and model), 3690 hours (Pilot In Command, all aircraft), 126 hours (Last 90 days, all aircraft), 9 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

At the time of the accident, the pilot, age 66, held a commercial pilot certificate with airplane single- and multi- engine land privileges and an instrument rating, which was issued on December 15, 2007. His most recent second class medical was issued on December 18, 2012 with no limitations or waivers noted. The pilot was hired at McCall Aviation in May 2008 and flew all seasons since then. The pilot's most recent proficiency check occurred on July 29, 2013 for single-engine airplane. As of September 13, 2013, the pilot reported to the operator that he had 3,841 hours total time, 2,158 of which were in the accident airplane make and model. This was the pilot's first flight after having a day off.

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N206KL
Model/Series:	U206F	**Aircraft Category:**	Airplane
Year of Manufacture:	1975	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	U20602655
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	October 23, 2013 Continuous airworthiness	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:	10 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	16511 Hrs at time of accident	**Engine Manufacturer:**	Continential Motors
ELT:	Installed, activated, aided in locating accident	**Engine Model/Series:**	IO 550F
Registered Owner:	WILDERNESS AIRCRAFT I LLC	**Rated Power:**	300 Horsepower
Operator:	McCall Aviation Inc.	**Operating Certificate(s) Held:**	On-demand air taxi (135)
Operator Does Business As:	McCall Air	**Operator Designator Code:**	M2LA

The accident airplane, a Cessna U206F, serial number U20602655, was manufactured in 1975 and was equipped with a Continental IO-550F engine. The airplane's most recent maintenance was completed on October 23, 2013 at a total time of 16,501.4 hours; which included the replacement of the alternator belt and the installation of bolts, springs, and washers to the left exhaust stack. On October 3, 2013, at a total time of 16,493.00 hours, the airplane was examined in accordance with its phase check maintenance schedule. On September 30, 2013, at a total time of 16,489.10 hours, a new bladder fuel tank was installed in the right wing.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	MYL,5024 ft msl	**Distance from Accident Site:**	14 Nautical Miles
Observation Time:	08:51 Local	**Direction from Accident Site:**	307°
Lowest Cloud Condition:	Few / 300 ft AGL	**Visibility**	9 miles
Lowest Ceiling:	Broken / 2500 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	30.29 inches Hg	**Temperature/Dew Point:**	-1°C / -2°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	McCall, ID (MYL)	**Type of Flight Plan Filed:**	Company VFR
Destination:	Lower Loon Cree, ID (C53)	**Type of Clearance:**	None
Departure Time:	09:00 Local	**Type of Airspace:**	

The nearest weather reporting facility, MYL, was located about 14 miles to the northwest of the accident sight. At 0851, weather was reported as calm wind, 9 statute miles of visibility, few clouds at 300 feet above ground level (agl), broken clouds at 2,500 feet agl, and overcast clouds at 3,200 feet agl. The temperature was -1 degrees C, and dewpoint was -2 degrees C, with an altimeter setting of 30.29 inches of mercury.

The other two pilots reported that the weather was not perfect. The valley where MYL is located was good and started to clear to a broken overcast. The weather along their particular route was marginal the entire way, clouds hung low in various locations; however, it became clearer as they neared C53. At no point did they have to divert from their path because of the weather.

Due to the location of the accident site, weather reporting stations and weather products are limited. Satellite imagery was unable to show low level clouds because of a mid-level cloud layer at 15,000 feet. With lack of ground instrumentation in the accident area other weather sources were unable to show cloud conditions. There were AIRMETS for IFR and MTN Obscuration, however, there are no indications that those conditions were occurring near the accident site.

A weather model and algorithm were used to simulate and approximate the weather conditions in the area of the accident site. A weather model that simulated relative humidity over the accident site was ran and revealed that the lower altitudes above terrain likely had a much lower visibility with relative

humidity greater than 98%. An algorithm that uses satellite, radar, surface, and pilot reports to calculate the probability of icing was used; the algorithm revealed "light" to "moderate" severity icing threat, with a high probability of that threat.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	2 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 Fatal	**Latitude, Longitude:**	44.745834,-115.826942

The airplane came to rest about 100 feet from the top on the western most ridgeline of a horseshoe shaped ridge. The airplane came to rest on the inside of the horseshoe, with the heading of the airplane consistent with the opening of the horseshoe. The terrain was steep, and was heavily covered with trees and about two and a half feet of snow, some of which was fresh. The first identified piece of debris was the inboard portion of the right elevator. It was found about 20 feet to the south of the main wreckage at the base of a small tree that did not appear to be topped. In between the first identified point of debris and the main wreckage were several topped trees. The airplane came to rest at the bottom of, and in between, two trees with a heading of about 299 degrees. One of those two trees sustained about 10 feet of scratching and scoring extending from the base of the tree; the airplane came to rest in a horseshoe shape around this tree. The tree severed the fuselage just aft of the cabin area; the engine, forward fuselage, cabin, and left wing came to rest on the northeast side of the tree and the aft fuselage and empennage came to rest on the northwest side of the tree.

The forward fuselage and cabin area came to rest upright, however, angled about 45 degrees onto its right side. The forward fuselage was heavily damaged. The engine was still intact and mostly buried in the snow; one of the magnetos had separated and came to rest about 3 feet in front of the engine. The cabin area sustained forward crushing, and the instrument panel was heavily damaged. The connection point for the left seat control yoke was visible and all cables were still attached. The left wing was mostly separated from its attachment points; it was twisted upside down and came to rest on top of the fuselage, extending out over the right side of the airplane. An approximate 4 foot tall section of an approximate 10-inch diameter tree was lodged in the trailing edge of the left wing. The right wing was completely separated from the wing root and the inboard portion of the wing was located at the base of the tree and main wreckage. The inboard right wing was completely covered in snow and ice; heavy organic debris was noted at the outboard fracture point. The outboard portion of the right wing was not located. The empennage sustained heavy crush damage throughout. The vertical stabilizer and rudder were accordion crushed forward. The left horizontal stabilizer was separated from the empennage and located about 10 feet to the west of the empennage.

Medical and Pathological Information

An autopsy was performed on the pilot on November 9, 2013, by the Valley County coroner's office, McCall, Idaho. The autopsy indicated the pilot's cause of death was severe blunt force trauma.

The Federal Aviation Administration (FAA) Civil Aerospace Medical Institute performed forensic toxicology on specimens from the pilot with negative results for carbon monoxide, cyanide, and tested for drugs. Ethanol was detected in various concentrations: 22 mg/dL detected in the liver, 100 mg/dL detected in muscle, 30 mg/dL detected in the heart, and 12 mg/dL detected in the lung. N-Propanol was also detected in the liver.

Additional Information

During a postaccident airframe and engine examination that included representatives from the NTSB, FAA, Textron Aviation – Cessna Aircraft company, Continental Motors, and McCall Aviation did not reveal any anomalies with the airframe or engine that would have precluded normal operations.

Airframe Examination

An airframe examination revealed that all of the airplane's components were present; with the exception of the outboard portion of the right wing, which was not found on scene. Flight control continuity was established throughout. All of the breaks in the cables were either consistent with tension overload, or cut by the recovery crew. The flap jackscrew was examined and the flaps were in the retracted position. The elevator trim position indicator was severely damaged, and the position could not be determined. The fuel selector valve was found and was positioned on the right fuel tank. The inside of the right fuel bladder was mostly clear with the exception of some small particles.

The propeller hub was fractured and separated from the propeller flange, and the blades were separated from the propeller hub. None of the blades sustained leading impact damage. One blade was bent forward about 10 degrees midspan in a small radius bend, and chordwise scoring was present on the cambered side of the blade. The outboard six inches of the second blade was twisted about 20 degrees with the leading edge being twisted aft. The third blade was bent aft about 10 degrees in a large radius bend starting 10 inches from the hub. The outboard seven inches were bent aft about 45 degrees in a small radius bend.

Engine Examination

The engine remained attached to the firewall by the fuel lines and control cables; there was no evidence of catastrophic failure. Both magnetos were separated from their attachment points. The magnetos were manually rotated and the right magneto sparked on all six magneto towers; however, the left magneto only sparked on three of the six towers. The spark plugs were removed and exhibited "normal" wear signatures when compared to the Champion Spark Plugs "Check-A-Plug" Chart AV-27. The gascolator was removed from the firewall; the screen was clear with the exception of a small amount of pinkish-gray lint. The engine driven fuel pump remained attached to the engine; once removed it rotated freely

with no anomalies or binding. The throttle body/fuel metering unit was fractured and deformed. The throttle plate was found in the full open position, and the throttle and mixture controls remained attached to their levers. The fuel inlet screen was removed and it was covered in pinkish-gray lint; light could be seen through the debris. The oil pump and oil filter were removed and disassembled; no anomalies were noted. The crankcase sustained impact-related damage and the number 5 cylinder was displaced outward from its attachment point. All cylinders were removed from the crankcase and showed no signs of distress or oil starvation to the cylinder barrels, cylinder heads, pistons, valves, valve springs, or rocker arms. The starter adapter needle bearing boss displayed a witness mark that was consistent with crankshaft gear teeth. The crankshaft was visibly distorted to the left side of the engine, which inhibited rotation of the engine. The crankshaft was removed from within the crankcase and there was no evidence of oil starvation or operational distress. The camshaft remained intact, but was bent; neither the camshaft, nor cam lifters displayed signs of corrosion, excessive wear, or rubbing.

Magneto Examination

The left magneto was taken to Aircraft Magneto Services located on Bainbridge Island, Washington for further examination. The magneto was installed onto a test bench and was operated; one out of the six terminals sparked. The magneto was removed from the test bench and disassembled; it was noted that the distributer block-rotor-screws were bent aft. It was also noted that the rotor gear was fractured in half in what appeared to be overload.

Fuel Metering Unit Examination – NTSB Materials Laboratory

The fuel metering unit was sent to the NTSB Materials laboratory for an examination of the debris found on the inlet screen. The debris was removed and collected; using a spectrometer to process infrared wavelength absorbance spectra of each sample of debris. The gray material was a strong match to dimethylsiloxane. Siloxanes (silicones) are used in lubricants, fire sleeving, and sealants. The red fiber was a strong match to cellulose, which is found in natural fibers such as wool and cotton.

Administrative Information

Investigator In Charge (IIC):	Link, Samantha
Additional Participating Persons:	Mike Misnick; Federal Aviation Administration; Boise, ID Nicole Charnon; Continental Motors Inc; Mobile, AL Steve Miller; Textron Aviation - Cessna Aircraft Company; Wichita, KS Laura Scott; McCall Aviation; McCall, ID
Original Publish Date:	December 9, 2015
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=88398