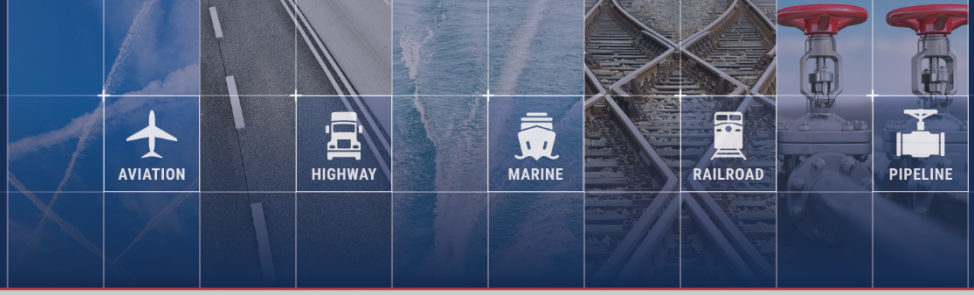

Aviation Investigation Final Report

Location:	Elizabethton, Tennessee	**Accident Number:**	ERA10FA027
Date & Time:	October 22, 2009, 13:50 Local	**Registration:**	N120MS
Aircraft:	Cessna U206G	**Aircraft Damage:**	Substantial
Defining Event:	Collision with terr/obj (non-CFIT)	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

Shortly after takeoff, on a training flight to conduct terrain following maneuvers at low altitude and maximum gross weight, the airplane collided with trees on a mountain side. The airplane impacted at 3,761 feet above mean sea level on a 6,285-foot mountain peak. Although the airplane was nearly consumed by a post-crash fire, a postaccident examination of the engine and airframe found no mechanical anomalies that would have prevented the normal operation of the airplane. There were no witnesses to the accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to remain clear of rising terrain while maneuvering at low altitude.

Findings

Personnel issues	(general) - Pilot
Personnel issues	Monitoring environment - Pilot
Environmental issues	Mountainous/hilly terrain - Contributed to outcome

Factual Information

History of Flight

Maneuvering-low-alt flying	Collision with terr/obj (non-CFIT) (Defining event)

HISTORY OF FLIGHT

On October 22, 2009, at 1350 eastern daylight time, a Cessna U206G, N120MS, registered to Focus Aviation, collided with trees while conducting terrain following maneuvers at low altitude, in the Roan Mountains, in Elizabethton, Tennessee. The two pilots on board the airplane, a certificated commercial pilot who was receiving missionary flight training, and a certificated airline transport pilot with a flight instructor certificate (CFI) were killed. The airplane was destroyed by impact forces and post crash fire. The flight was operated as an instructional flight under the provisions of 14 Code of Federal Regulations (CFR) Part 91, and a visual flight rules (VFR) flight plan was filed from Elizabethton Municipal Airport (0A9), Elizabethton, Tennessee, to Avery County/Morrison Field (7A8), Spruce Pine, North Carolina. Visual meteorological conditions prevailed at the time of the accident. The flight originated from 0A9 at 1330. There were no witnesses to the accident.

According to the airport manager, the pilots were conducting a low level (1,000 feet above ground level (AGL)) VFR flight from 0A9 to 7A8, which was about 27 nautical miles (NM) south of 0A9. The CFI was a missionary flight instructor and this was his 10th instructional flight with the commercial rated student pilot. According to the airplane's owner, the number 5 and number 6 seats were removed from the airplane and replaced with ratchet straps which secured ballast bags to simulate a fully loaded airplane. The airplane was also modified with a two axis autopilot, anti-icing system, and Flint Aero wing tip fuel tanks which increased the airplane's gross weight to 3,800 pounds. The airport manager stated that the airplane had an oil change and was topped off with 19 gallons of AVGAS in the left main fuel tank the day prior to the accident flight.

According to the student pilot's wife, "He was starting his low level and heavy airplane training... this was his first low/heavy flight." She also stated that her husband complained that the airplane was running hot and that maintenance was performed on the airplane the morning of the flight, which delayed the accident flight until the afternoon. The on-field maintenance facility was not aware of any maintenance the airplane received the morning of the flight. However, both pilots were Airframe and Power Plant (A&P) mechanics. A witness that observed what he described as a short or soft field style take-off stated, "All aspects of the departure appeared normal, and sounded normal." A local resident located near the accident site said the plane flew by at "tree top level" and it was so loud she instinctively ducked.

FAA Flight Service contacted the airport manager to notify him the airplane was overdue. The

airport manager told flight service he was already aware of the accident. The ELT did not assist with locating the wreckage. No radar data was identified that pertained to the accident.

PERSONNEL INFORMATION

The CFI, age 70, held an FAA Airline Transport Pilot certificate for airplane single and multi-engine land, issued on April 13, 1964, and a flight instructor certificate, last updated on June 11, 2009. The CFI's most recent second class medical certificate was issued on June 5, 2008; with a restriction the he must wear corrective lenses. The pilot's personal logbook was observed in the wreckage; however, it was burned and yielded little useful information. On the CFI's most recent medical certificate he reported his total civilian flight hours as 21,148.

The student pilot, age 38, held an FAA Commercial Pilot certificate, for airplane single-engine land and instrument airplane, issued on July 15, 2008, and a second class medical certificate issued September 10, 2009, with a limitation that he must wear corrective lenses. The pilot's logbook was not recovered for examination. On the pilot's most recent medical certificate he reported his total civilian flight hours as 412.

AIRCRAFT INFORMATION

The 6-seat, high-wing, fixed gear airplane, serial number (S/N) U20603668, was manufactured in 1977. It was powered by a Continental IO-520 F(21), 285-hp engine and equipped with a McCauley Model D3A4C401 aluminum, variable pitch propeller. A review of the airplane's logbook revealed that the most recent 100-hour inspection was completed on March 13, 2009, at an airframe total time of 6,327.1 hours, and an engine total time of 1,346.9 hours at the time of the inspection.

METEOROLOGICAL INFORMATION

A review of recorded data from the 0A9 automated weather observation station, at elevation 1,600 feet, revealed the following conditions at 1355: winds from 220 degrees at 5 knots, visibility 10 statute miles, cloud condition clear, temperature 20 degrees Celsius, dew point 7 degrees Celsius, and altimeter 30.09 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The aircraft contacted trees and rising terrain along a level flight path at an elevation of 3,761 feet mean sea level (MSL), and a 265 degree heading, approximately 13 nautical miles south of 0A9, at Roan High Knob Peak, which was the highest point on Roan Mountain, rising to 6,285 feet msl. The majority of the fuselage, right wing, inboard portion of the left wing, the empennage, and the tailcone were consumed by the post-crash fire.

The initial impact with tree tops was approximately 100 yards from where the main wreckage came to rest inverted. The fuselage came to rest on a 050 degree heading.

Examination of the cockpit found the instrument panel and flight controls fire damaged. The fuel selector was in the left tank position; the majority of the fuel lines were consumed by fire. The auxiliary fuel pump and fuel strainer bowl were fire damaged; the fuel strainer screen was not observed. The fuel tanks were mostly consumed by fire. One of the four fuel tank finger screens was observed and was encrusted with re-solidified aluminum. The fuel header tanks were consumed by fire. The engine-driven fuel pump screen, fuel control unit screen, and fuel distribution valve screen was free of debris. The fuselage came to rest on its left side inverted and was mostly consumed by fire.

The left wing, inboard of the main fuel tank, was partially consumed by fire. The right wing was partially consumed by fire. Airplane flight control cable continuity was confirmed between the aerodynamic surfaces and the cockpit controls through overload separations located in the wing roots. The flap actuator measurement corresponded to a flap setting of 0 degrees. The empennage was fire damaged, but the horizontal and vertical stabilizers remained attached. The elevator trim tab actuator measurement corresponded to a 15 degree tab up setting. The leading edges of the wings, horizontals, vertical and propeller were equipped with an ice protection system. The icing fluid container was located in the tailcone. Examination of the airframe did not reveal any anomalies that would have prevented normal operation.

The engine came to rest near the firewall within the cowling, but did not remain attached to the engine mounts. The engine was examined in a hangar at 0A9 on October 24, 2009. The engine was intact with all of the accessories attached. Heat discoloration and fire damage were observed in all areas of the engine. The throttle control was attached and in the 3/4 open position. The mixture control was attached and in the mid range position. The propeller governor control was attached and in the aft position.

The rocker covers and the top spark plugs were removed along with the oil pump cover. The cylinders were borescoped. Normal deposits were observed on the piston heads and the cylinder cones. All of the valves were in place. The crankshaft was rotated using the propeller, and continuity was confirmed to all of the accessories at the real of the engine and to the oil pump. Thumb compression was confirmed on all of the cylinders.

The fuel metering unit was in place and had fire damage. The throttle and mixture controls were frozen in place. The fuel screen was clean, clear, and dry of fuel.

The fuel pump was in place with heat discoloration. The drive coupling was intact and not damaged. The drive shaft was free to rotate. The fuel manifold was in place and heat discolored. The fuel nozzles were in place and not damaged. They were all clean and clear. Both of the magnetos had impact damage and were partly separated. They both sparked at all terminals when rotated by hand. The propeller governor was in place and not damaged, the drive shaft was free to rotate. Examination of the engine did not reveal any mechanical anomalies that would have prevented the normal production of power.

The propeller remained attached to the crankshaft, and the spinner was partly crushed. The blades were labeled “A,” “B,” and “C” by investigators. Blade A was wrinkled and had scaring on the cambered side. Blade B was bent 80-degrees toward the cambered side and the tip was separated. Blade C was bent 30 degrees toward the non-cambered side near the tip. Two of the propeller blades were bent opposite of each other allowing the spinner to rest against the ground. The other propeller blade came to rest vertically and was bent opposite the direction of rotation. The two blades that came to rest on the ground exhibited slight S-bending near the tips. All of the blades exhibited leading edge polishing, but no significant nicks or chord-wise scoring was observed. Several tree limbs, ranging from 1 to 4 inches in diameter, were found along the wreckage path that were cut in a manner consist with propeller contact.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the CFI, on January 19, 2010, by the East Tennessee State University, Johnson City, Tennessee. The autopsy findings included, "Multiple injuries secondary to airplane crash." Forensic toxicology was performed on specimens from the CFI by the FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma. The toxicology report indicated that there was no carbon monoxide, or cyanide, detected in blood, no ethanol detected in urine, however, ranitidine was detected in blood and urine.

An autopsy was performed on the Commercial Pilot on January 19, 2010, by the East Tennessee State University, Johnson City, Tennessee. The autopsy findings included, "Multiple injuries secondary to airplane crash." Forensic toxicology was performed on specimens from the pilot rated student by the FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma. The toxicology report indicated that there was no carbon monoxide, or cyanide, detected in blood, no ethanol detected in vitreous, and no drugs detected in urine.

Pilot Information

Certificate:	Commercial	**Age:**	38,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	September 10, 2009
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	412 hours (Total, all aircraft)		

Flight instructor Information

Certificate:	Airline transport; Commercial; Flight instructor	**Age:**	70,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	June 5, 2008
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	September 29, 2009
Flight Time:	21148 hours (Total, all aircraft), 20758 hours (Pilot In Command, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N120MS
Model/Series:	U206G	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	U20603668
Landing Gear Type:	Tricycle	**Seats:**	6
Date/Type of Last Inspection:	March 13, 2009 100 hour	**Certified Max Gross Wt.:**	3800 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	6327 Hrs as of last inspection	**Engine Manufacturer:**	CONT MOTOR
ELT:	Installed, not activated	**Engine Model/Series:**	IO 520 SERIES
Registered Owner:	On file	**Rated Power:**	285 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	0A9,1593 ft msl	**Distance from Accident Site:**	13 Nautical Miles
Observation Time:	13:15 Local	**Direction from Accident Site:**	176°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	220°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.09 inches Hg	**Temperature/Dew Point:**	20°C / 7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Elizabethton, TN (0A9)	**Type of Flight Plan Filed:**	VFR
Destination:	Spruce Pine, NC (7A8)	**Type of Clearance:**	VFR
Departure Time:	13:30 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	36.155834,-82.161941

Administrative Information

Investigator In Charge (IIC):	Wilson, Ralph
Additional Participating Persons:	Keith Stem; FAA/FSDO; Nashville, TN John Kent; Continental Motors Inc.; Mobile, AL Michael L Koonce; Cessna Aircraft Company; Wichita, KS
Original Publish Date:	December 13, 2011
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=74942