Aviation Investigation Final Report

Location:	Steamboat, Colorado	**Accident Number:**	DFW08FA153
Date & Time:	May 25, 2008, 08:30 Local	**Registration:**	N8187Q
Aircraft:	Cessna 310Q	**Aircraft Damage:**	Destroyed
Defining Event:	Controlled flight into terr/obj (CFIT)	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The commercial pilot departed on a cross-country flight over mountainous terrain in day, visual meteorological conditions. The pilot had filed a flight plan but it was never activated and an Alert Notification (ALNOT) was issued when the airplane did not reach its destination. The airplane struck trees in a shallow descent into slightly rising terrain at an elevation of 9,800 feet mean sea level, approximately 27 miles east of the departure airport. Examination of the airplane and both engines revealed no mechanical discrepancies. Postaccident toxicology testing was consistent with impairment of the pilot due to his use of marijuana within three hours of the accident. The Federal Aviation Administration was aware of multiple convictions of the pilot for alcohol-related offenses, but did not request any documentation of those convictions or additional evaluation prior to issuing the pilot a second-class medical certificate.

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 mountainous terrain in day visual conditions. Contributing to the accident was the pilot's impairment due to marijuana and inadequate medical oversight of the pilot by the Federal Aviation Administration.

Findings

Environmental issues	Mountainous/hilly terrain - Response/compensation
Personnel issues	(general) - Pilot
Personnel issues	Illicit drug - Pilot
Organizational issues	Oversight of personnel - FAA/Regulator

Factual Information

History of Flight

Enroute-cruise	Controlled flight into terr/obj (CFIT) (Defining event)

HISTORY OF FLIGHT

On May 25, 2008, approximately 0830 mountain daylight time, a Cessna 310Q, N8187Q, was destroyed when it impacted mountainous terrain in the Routt National Forrest in Steamboat Springs, Colorado. The certificated commercial pilot and the passenger were fatally injured. The airplane was registered to a private individual and operated by the pilot. A visual flight rules (VFR) flight plan was filed for the flight that originated at Yampa Valley Airport (HDN), Hayden, Colorado, about 0800, and destined for Fort Collins/Loveland Municipal Airport (FNL), Fort Collins, Colorado. Visual meteorological conditions prevailed for the personal flight conducted under 14 Code of Federal Regulations Part 91.

According to the registered owner of the airplane, the pilot departed from Durango, Colorado, earlier that morning and flew to HDN. The pilot planned to pick up his father in HDN and then fly to FNL, where they would meet up with other family members to participate in the Bolder Boulder 10k race the following day (Memorial Day). The pilot called the owner about 0730 after he landed in HDN. He said that the flight went well and the weather was "beautiful." The owner said the pilot was in good spirits and he did not mention any problems with the airplane.

The airplane was topped off with fuel (40 gallons) at Durango for a total of 163 gallons. The owner estimated that the airplane would burn about 30 to 35 gallons for the flight between Durango and Hayden would have had approximately 125 gallons on board when it departed HDN.

According to Routt County Search and Rescue personnel, the pilot contacted his sister in Fort Collins at 0758 and stated that they were just about to depart HDN and would be landing in FNL in about 50 minutes.

The pilot obtained a weather briefing and filed a VFR flight plan via the Digital Users Access Terminal (DUAT) system. The flight plan indicated a direct route between HDN and FNL using a heading of 083 degrees and an altitude of 13,500 feet mean sea level (msl). Though a flight plan was filed, the pilot never activated the flight plan. He was also not in communication with any air traffic control services prior to the accident and no radar data was available for this flight.

A digital camera was found at the accident site and the flash card was removed and downloaded. There was one photograph that was taken during the mishap flight at 0822. The

photograph appeared to be taken from the front right seat of the airplane and was of the Mount Werner ski resort in Steamboat Springs. The photo also indicated that the weather was visual meteorological conditions and that the right engine was operating at the time the photo was taken.

The airplane was reported missing by the owner when the pilot failed to call and let him know that they had arrived in FNL. The airplane was part of an Alert Notification (ALNOT), and was located by Routt County Search and Rescue personnel on May 27, 2008, on slightly rising terrain at an elevation of 9,800-feet mean sea level between Buffalo Mountain and Mount Werner, approximately 5 miles east of Steamboat Springs. The top elevation of the terrain was approximately 10,000 feet msl.

PERSONNEL INFORMATION

The pilot held a commercial pilot certificate for airplane single and multi-engine, and instrument airplane. He also held a certified flight instructor rating for airplane single and multi-engine land, and instrument airplane. His last FAA second-class medical was issued on June 29, 2007. At that time, he reported a total of 1,800 hours.

According to the pilot's fiancée, she lost the pilot's logbook shortly after the accident. However, she recalled that he had a total of 2,000 to 2,200 hours, of which 25-30 hours were in the accident airplane. She estimated the pilot's total multi-engine time at 1,100 hours. Most of this time was accrued in Cessna 404, 402 and 310 model aircraft.

The pilot had been employed as a pilot for approximately two years for a company called AeroSouth, who was a cargo feeder for DHL. He flew a Cessna 404 model airplane once a day, five times per week, from Durango, Colorado, to Albuquerque, New Mexico, then back to Durango. The round trip flight took an average of 2 hours.

METEOROLOGICAL INFORMATION

Weather reported at HDN, about 27 miles west of the accident site, at 0755, was reported as wind from 070 degrees at 9 knots, visibility 10 miles, ceiling 10,000 foot overcast, temperature 37 degrees Fahrenheit, dewpoint 32 degrees Fahrenheit, and a barometric pressure setting of 30.03 inches of Mercury.

Weather reported at the Storm Peak DRI Laboratory, located on Mount Werner, approximately 3 miles south of the accident site, at 0800, reported the wind from 206 degrees at an average speed of 13.4 knots, a maximum wind of 20.4 knots, temperature 31.9 degrees Fahrenheit, and a dewpoint of 25 degrees Fahrenheit. At 0900, the weather was reported as wind from 230 degrees at an average speed of 14.6 knots, a maximum wind of 23.4 knots, temperature 34.3 degrees Fahrenheit, and a dewpoint of 24 degrees Fahrenheit.

WRECKAGE AND IMPACT INFORMATION

An on-scene examination was conducted on May 29, 2008. The initial impact point was a stand of approximately 60-foot-tall trees. Impact marks on these trees became progressively lower and narrower on a magnetic heading of 085 degrees in the direction of the main wreckage, which consisted of the fuselage, cockpit area, both engines, both wings, right tip tank, and both propeller systems. A section of elevator was imbedded in the top of a tree near the initial impact point. Also found along the wreckage path were several pieces of angular cut wood, the tail cone, a section of the left elevator, left wing tip tank, and the horizontal stabilizer. The right side of the horizontal stabilizer exhibited a crescent shaped impact mark, consistent with the dimension of a tree trunk. Small pieces of bark were imbedded in the impact mark. The distance from the initial impact point to the main wreckage was approximately 900 feet.

Impact forces damaged the main wreckage along with the cockpit, fuselage, and inboard fuel tanks, which were consumed by post-impact fire. Both engines came to rest inverted and remained attached to their respective engine nacelles. The left propeller assembly remained attached to the engine; however, the right propeller assembly separated from the engine at the crankshaft flange and was found approximately 30-40 feet forward of the main wreckage.

The right wing fuel selector exhibited thermal damage and was found in the main (tip) tank position. The fuel bowl was empty and the fuel screen was partially melted. The left wing fuel selector was found beyond the off position. The fuel bowl had some residual fuel inside, and the fuel screen was absent of debris. The fuel selector handle inside the cockpit was destroyed by post-impact fire.

Both of the main fuel tank pumps were intact and their respective fuel screens were absent of debris. The right main fuel tank's fuel screen exhibited a small amount of melted black plastic. Both of the auxiliary fuel tanks fuel finger screens were absent of debris.

Examination of the airframe revealed that the all-major flight control surfaces were found at the accident site. Flight control continuity was established for all flight control surfaces to the cockpit area. The landing gear was retracted. The flap actuator was damaged from impact and a flap setting could not be determined; however, a review of the Routt County Search and Rescue on-scene photographs revealed the flaps appeared to be in the retracted position. The elevator trim actuator was not determined. The altimeter sustained impact damage, but the setting in the Kollsman window was 30.03 inches of Mercury.

The power quadrant sustained extensive heat damage. The throttle quadrant mounting plate was broken loose, but the position of the levers was documented as they were found in relation to each other: both throttles were found in symmetrical positions and forward of the left engine mixture control, which was positioned further aft. The right hand mixture control was forward of the left engine mixture control. The right prop lever was positioned aft of the left hand prop lever.

The right engine (m/m: IO470-VO (9B), s/n: 170624-R) came to rest inverted and partially

attached to engine firewall. The most recent logbook entry was an oil change on August 21, 2007, at a total time of 3796.9 hours and 688.8 hours since last overhaul.

The three-bladed propeller separated at the crankshaft flange and was found approximately 30-40 feet forward of the main wreckage. All three blades stayed in the hub and exhibited minimal impact damage. There was leading edge polishing on all blades, and one blade exhibited s-bending.

The engine was rotated via the vacuum pump and continuity and compression was established on all six cylinders. The fuel pump was removed, the coupling was intact, but the pump could not be rotated. The pump was retained and later sent to TCM to be examined when the engines were examined.

Fuel was present in fuel line attached to the fuel manifold. The fuel control unit (FCU) remained attached to the engine; the throttle plate was partially open, and the mixture was mid-travel. The FCU fuel screen was removed and absent of debris.

The vacuum pump was removed and the drive shaft rotated freely by hand.

The engine was examined at Teledyne Continental Motors tear down facility in Mobile, Alabama, on August 12-15, 2008, under the supervision of the Safety Board. An internal and external examination of the engine revealed that it sustained fire and impact damage. However, it was determined that the engine could be test run if the damaged components were removed and replaced. There were a number of airframe related items removed in preparation for operation on the TCM test bed.

During the internal examination, the number 2 piston skirt was found fractured and had completely separated from the piston. Numerous pieces of the piston skirt were found in the engine core and oil sump. Some of these pieces were polished and exhibited rounded fractured surfaces. The piston was removed and examined by a TCM Metallurgist on August 13, 2008. According to the TCM Materials Report factual report the skirt sustained an external impact that crushed the skirt inward, which resulted in the separation of the skirt in several sections due to overload forces. No fatigue signatures were noted. The oil scraper ring was also found fractured in several pieces and found in the oil sump. The weight of the broken sections of skirt and ring was approximately 40 grams.

Though the fractured piston could be placed back in the engine for the test run, a determination was made to have it removed and replaced with another piston to precluded further damage. The number 2 cylinder was removed from the engine and the piston was examined. An internal examination of the cylinder barrel did not reveal any scoring on the walls. The exterior of the piston did not exhibit any scoring.

A new TCM piston, part number 654832, was modified to resemble the damaged piston and was installed in cylinder number 2 for the engine test run. A new TCM piston ring, part number

648012, was also installed on the modified TCM piston. This was to determine if there was any loss of engine power or performance as a result of the observed skirt and oil scraper ring damage.

The fuel pump had been removed at the accident sight and shipped separately to TCM. Examination of the fuel pump revealed it shipped would not rotate by hand. The vanes were saturated with penetrating oil and the pump rotated. The fuel pump exhibited a fractured outlet fitting. The fitting was removed, a new one was installed, and the fuel pump was re-installed on the engine.

The engine was started and ran normally through it s full power band without interruption. No loss of engine power or performance was noted as a result of the damaged piston.

The left engine (m/m: IO470-VO (9B), s/n: 170622-R) came to rest inverted. A review of the engine logbook revealed that at the last maintenance performed on the engine included an oil change and compliance with an Airworthiness Directive (AD) on August 21,2007. At that time, the engine had accrued a total of 3,816.7 hours and 643.5 total hours since last overhaul.

The three-bladed propeller remained attached to the engine. All three blades remained in the hub, but were loose. The blades exhibited various degrees of leading edge polish. One blade-exhibited s-bending at the root of blade and twisting near the tip. The second blade was bent aft at root, and exhibited a bend at tip toward the non-cambered side of the blade. The third blade exhibited aft bending.

The propeller and the vacuum pump were removed, and the engine was manually rotated via the vacuum pump drive. Engine continuity and compression was established on each cylinder. The top spark plugs were removed and the number 1 and number 6 plugs exhibited black signatures. All of the other plugs exhibited normal operational signatures per the Champion chart.

The fuel pump was removed from the engine. The coupling was intact and moved freely when rotated.

The vacuum pump drive shaft did not rotate freely.

The engine was examined at Teledyne Continental Motors tear down facility in Mobile, Alabama, on August 12-15, 2008, under the supervision of the Safety Board. External examination of the engine revealed that the engine sustained impact damage. The number 6 cylinder sustained extensive impact damage to one of the rocker arms and the rocker cover. The damage precluded a test run of the engine and was it disassembled. No mechanical anomalies were noted with the engine or its related components.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was conducted on the pilot by the Jefferson County Coroner's Office, Golden, Colorado, on May 30, 2008. The pilot's cause of death was determined to be "...the combined impact of internal injuries, smoke inhalation, carbon monoxide toxicity, and thermal injuries secondary to an airplane crash with subsequent fire."

The FAA Toxicology Accident Research Laboratory, in Oklahoma City, Oklahoma, conducted toxicological testing. The
toxicology report noted:

>> 0.0031 (ug/ml, ug/g) TETRAHYDROCANNABINOL (MARIHUANA) detected in Blood
>> 0.095 (ug/ml, ug/g) TETRAHYDROCANNABINOL (MARIHUANA) detected in Lung
>> 0.0048 (ug/ml, ug/g) TETRAHYDROCANNABINOL CARBOXYLIC ACID (MARIHUANA) detected in Blood
>> 0.0063 (ug/ml, ug/g) TETRAHYDROCANNABINOL CARBOXYLIC ACID (MARIHUANA) detected in Lung
>> 0.2504 (ug/ml, ug/g) TETRAHYDROCANNABINOL CARBOXYLIC ACID (MARIHUANA) detected in Liver

The medical records maintained on the pilot by the FAA Aerospace Medical Certification Division were reviewed. The pilot's most recent application for 2nd Class Airman Medical Certificate noted "No" for "Do You Currently Use Any Medication." The application indicated "Yes" for "Admission to Hospital" and for "Other illness, disability, or surgery" and "No" for all other items under "Medical History," including specifically "Substance dependence or failed a drug test ever, or substance abuse or use of illegal substance in the last 2 years" and "Alcohol dependence or abuse." The application noted "Yes" to "History of any conviction(s) involving driving while intoxicated by, while impaired by, or while under the influence of alcohol or a drug..." and to "History of conviction(s) (misdemeanors of felonies)." The records documented a history of two convictions for "alcohol possession by a minor," a motorcycle accident, unconsciousness, revocation of the pilot's driver's license, a conviction for "malicious mischief," and attendance at a class for alcohol use. There was no documentation that the FAA requested or received any records regarding the circumstances of the convictions or any psychological or psychiatric records or evaluation of the pilot prior to issuing him a 2nd class medical certificate.

ADDITIONAL INFORMATION

The airplane wreckage was released to a representative of the owner's insurance company on November 25, 2008.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	26,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 None	**Last FAA Medical Exam:**	June 29, 2007
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	2100 hours (Total, all aircraft), 25 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N8187Q
Model/Series:	310Q	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	310Q0637
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	July 14, 2007 Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:	3794.7 Hrs as of last inspection	**Engine Manufacturer:**	CONT MOTOR
ELT:	Installed, not activated	**Engine Model/Series:**	I0-470
Registered Owner:	HUTTER ROBERT A	**Rated Power:**	260 Horsepower
Operator:	Levi Joseph Klapperich	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	HDN,6602 ft msl	**Distance from Accident Site:**	27 Nautical Miles
Observation Time:	07:55 Local	**Direction from Accident Site:**	270°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Overcast / 10000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	9 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	70°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.03 inches Hg	**Temperature/Dew Point:**	3°C / 0°C
Precipitation and Obscuration:			
Departure Point:	Hayden, CO (HDN)	**Type of Flight Plan Filed:**	VFR
Destination:	Fort Collins, CO (FNL)	**Type of Clearance:**	None
Departure Time:	08:00 Local	**Type of Airspace:**	Unknown

Airport Information

Airport:	None	**Runway Surface Type:**	
Airport Elevation:		**Runway Surface Condition:**	
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**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:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	40.499721,-106.706108

Administrative Information

Investigator In Charge (IIC):	Yeager, Leah
Additional Participating Persons:	Wayne Jensen; FAA/FSDO; Denver, CO Rodney Martinez; Teledyne Continental Motors; Mobile, AL Mike Koonce; Cessna Aircraft Company; Wichita, KS
Original Publish Date:	April 15, 2009
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=68100