Aviation Investigation Final Report

Location:	Dayton, Wyoming	**Accident Number:**	DEN07FA140
Date & Time:	August 20, 2007, 16:30 Local	**Registration:**	N6109N
Aircraft:	Cessna 182R	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	3 Fatal
Flight Conducted Under:	Public aircraft		

Analysis

The accident airplane departed approximately 1530 for a search and rescue mission in the mountains. A witness in the area observed an airplane, matching the description of the accident airplane, flying approximately 400 to 600 feet above the ground. The burning wreckage of the accident airplane was located north of the witnesses position approximately 1800, on the east down sloping face of a vegetated canyon wall. The airplane was destroyed by fire. An examination of the airplane's systems revealed no anomalies. An AIRMET for moderate low-level turbulence was valid for the area. Winds in the area of the accident were recorded gusting to 25 miles per hour. Winds normal to the ridgeline of 20 knots or greater is conducive to leeside turbulence. Mission procedures state that the pilot should adjust the search altitude based upon the winds aloft - 10 knots of wind results in an addition of 1,000 feet to the search altitude and 20 knots of wind results in an addition of 2,000 feet to the search altitude. The pilot reported on his mission planning statement that his search altitude would be 1,000 feet.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot's inability to maintain aircraft control while maneuvering in mountainous terrain due to gusty wind conditions, and lee side turbulence. Contributing to the accident was the pilot's improper in-flight planning and decision making, and his failure to follow operational procedures regarding altitudes flown.

Findings

Occurrence #1: IN FLIGHT ENCOUNTER WITH WEATHER
Phase of Operation: MANEUVERING

Findings
1. (C) WEATHER CONDITION - HIGH WIND
2. (C) WEATHER CONDITION - TURBULENCE

Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: MANEUVERING

Findings
3. (C) AIRCRAFT CONTROL - NOT POSSIBLE - PILOT IN COMMAND

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
4. (F) IN-FLIGHT PLANNING/DECISION - IMPROPER - PILOT IN COMMAND
5. (F) PROCEDURES/DIRECTIVES - NOT FOLLOWED - PILOT IN COMMAND
6. TERRAIN CONDITION - MOUNTAINOUS/HILLY

Factual Information

HISTORY OF FLIGHT

On August 20, 2007, approximately 1630 mountain daylight time, a Cessna 182R, N6109N, operated by the Civil Air Patrol as CAPS flight 4940, was destroyed when it impacted terrain 20 miles west of Dayton, Wyoming. A post impact fire ensued. Visual meteorological conditions prevailed. The search and rescue flight was being operated under the provisions of Title 14 Code of Federal Regulations Part 91 without a flight plan. The commercial pilot, a pilot rated passenger (scanner trainee) and one observer were fatally injured. The flight departed Sheridan County Airport (SHR), Sheridan, Wyoming, approximately 1530.

According to the Civil Air Patrol (CAP) and the Sheridan County Sheriff's office, the accident airplane departed Cowley, Wyoming, at an undetermined time, in order to pick up two observers in Sheridan, for a missing hiker search and rescue mission in the Big Horn Mountains. One of the observers on the accident flight contacted the United States Forest Service approximately 1430 with regards to the temporary flight restriction (TFR 7/3431 Bone Creek Incident) over the Big Horn Mountains. The intended search area for the Civil Air Patrol mission included the perimeter of the TFR. It was determined that CAPS flight 4940 would not be a factor for the TFR. Communication frequencies and procedures were established with the US Forest Service prior to departure from SHR.

According to a US Forest Service pilot, communication with the accident airplane was established approximately 1550. The CAP airplane reported that they were "maneuvering above their search area" and they were at a higher altitude "familiarizing themselves with the terrain." The incident commander for the Garland Gulch fire (part of the Bone Creek Incident) reported observing an airplane, consistent in appearance with the accident airplane, fly "slowly" over his location in a north, northwest direction, towards the Lake and Lick Creek drainages. The witness stated that the airplane was approximately "400 to 600 [feet] above the ground. There was no apparent indication of trouble in performance of the aircraft, nor did it dip its wings or anything else remarkable." He stated that the airplane did not return to his area.

At 1756, the search and rescue teams on the ground located the missing hiker. Approximately the same time, an aerial team working on the Bone Creek Incident discovered another fire three miles north of where the hiker was located, along the Lick Creek Canyon. Several water drops were made on the fire and the wreckage of the accident airplane was discovered approximately .75 miles from the ridge of Lick Creek Canyon, on the east wall of the canyon.

PERSONNEL INFORMATION

The pilot, age 49, held a commercial pilot certificate with an airplane single engine land/sea,

multi-engine land/sea, and instrument ratings. He was issued a second class airman medical certificate on January 9, 2007. The certificate contained the limitation "must wear corrective lenses." At the time of application, the pilot reported 1,749 hours total time; 105 hours of which were logged within the previous 6 months. The pilot's personal logbook was not recovered.

According to the CAP, the pilot joined the CAP in April of 2001. His Mountain Flying Certification with the CAP was successfully completed on August 10, 2007. According to the CAP Pilot Data Summary sheet dated May 12, 2007, the pilot reported he had logged 1,803 hours total time, 1,541 of which were in single engine airplanes. The pilot reported that his last flight review was conducted on February 27, 2007. His last annual checkride and Mission Check Pilot checkride with the CAP were both conducted on May 12, 2007.

The pilot rated passenger, age 53, held a commercial pilot certificate with an airplane single engine land, rotorcraft helicopter, and instrument helicopter ratings. He was issued a second class airman medical certificate in August of 2006. The certificate contained no limitations. According to the CAP, he completed his entry level training on April 20, 2007, and was a scanner trainee.

The observer had joined the CAP in November of 2003. According to the CAP, she was trained as a mission observer, mission scanner, and skills evaluator.

AIRCRAFT INFORMATION

The accident airplane, a Cessna 182R (serial number 18267787), was manufactured in 1981. It was registered with the Federal Aviation Administration (FAA) on a standard airworthiness certificate for normal operations. The airplane was powered by a Teledyne Continental Motors O-470 U engine rated at 230 horsepower at 2,400 rpm. The engine was equipped with a two-blade, McCauley propeller.

The airplane was registered to and operated by the Civil Air Patrol, and was maintained under an annual inspection program. The maintenance records were in the airplane at the time of the accident and were destroyed. According to the Civil Air Patrol records, the last recorded maintenance performed was an oil change and filter inspection on April 13, 2007, at an aircraft total time of 3,537.9 hours. The last 100-hour/annual inspection was completed on September 14, 2006, at an aircraft total time of 3,492.6 hours.

METEOROLOGICAL INFORMATION

Aviation area forecasts were issued for Wyoming by the Aviation Weather Center, the day of the accident. The area forecast for northwestern Wyoming was as follows: sky condition, scattered at 15,000 feet; winds out of the west, gusting to 25 knots. The area forecast for northeastern Wyoming was as follows: sky condition, clear; occasional visibility 3 to 5 statute miles in smoke. The terminal forecast for Sheridan for the time period closest to the accident flight was as follows: winds 340 at 4 knots; visibility, 4 statute miles, smoke; sky condition, few

clouds at 10,000 feet, scattered at 20,000 feet.

The winds aloft forecasts were issued for the accident airplanes route of flight for Billings (BIL), Montana, (75 miles north, northwest of the accident site) and Crazy Woman (CZI), Wyoming (85 miles southeast of the accident site.) The forecast from 1100 to 1500 was as follows: BIL - 9,000 feet, 280 degrees at 29 knots, 12,000 feet, 280 degrees at 35 knots; CZI - 9,000 feet, 270 degrees at 17 knots, 12,000 feet, 280 degrees at 38 knots. The forecast from 1500 to 2400 was as follows: BIL - 9,000 feet, 280 degrees at 22 knots, 12,000 feet, 250 degrees at 22 knots; CZI - 9,000 feet, 260 degrees at 14 knots, 12,000 feet, 260 degrees at 23 knots.

Airman's Meteorological Information (AIRMET) for turbulence (TANGO) was issued for areas in Idaho, Montana, and Wyoming, including the accident airplane's route of flight. AIRMET TANGO covered an area from 50 nautical miles (nm) north, northwest of Williston, North Dakota, to 50 nm west, southwest of Rapid City, South Dakota, to 50 nm east, northeast of Salt Lake City, Utah, to Jackson, Wyoming, to 40 nm south of Cranbrook, Canada. The AIRMET stated to expect moderate turbulence below 14,000 feet. There were no AIRMETS for icing, instrument flight rules, or mountain obscuration for the accident airplane's route of flight.

The spot forecast for the Garland Gulch Fire, issued by the National Weather Service in Billings, Montana, forecasted winds west, to northwest at 10 to 15 mph, with gusts to 25 mph for the slopes and valleys. Ridgetop winds were forecast to be out of the west at 25 to 40 miles per hour.

The closest official aviation weather observation station was Sheridan County Airport (SHR), Sheridan, Wyoming, located 35 nm east of the accident site. The elevation of the weather observation station was 4,021 feet mean sea level (msl). The routine aviation weather report (METAR) for SHR, issued at 1553, reported, winds, calm; visibility, 3 statute miles, haze; temperature 23 degrees Celsius (C); dewpoint, 03 degrees C; altimeter, 29.94 inches.

Two fire weather observation stations were located within 10 miles of the accident site. The Boyd Ridge (BYDW4) station was located 5 miles northwest of the accident site, at an elevation of 7,740 feet msl. The observation for BYDW4, recorded at 1655, reported winds from the north, northwest at 9 miles per hour (mph) with gusts to 21 mph. The Burgess (BUJW4) station was located 8 nautical miles southeast of the accident site at an elevation of 7,743 feet msl. The observation for BUJW4, recorded at 1649, reported winds from the west, southwest at 12 mph with gusts to 25 mph. Visibility was not reported at either station.

The pilot of the aircraft that located the initial fire noted that there were "high winds and surface friction causing turbulence." There was no record of the pilot obtaining a weather briefing from the FAA Flight Service Station or the Direct User Access Terminal System (DUATS).

WRECKAGE AND IMPACT INFORMATION

The National Transportation Safety Board investigator-in-charge (IIC) arrived on scene approximately 1000 on August 23, 2007. The accident site was located on the east side of a vegetated canyon wall. A global positioning system receiver reported the coordinates of the main wreckage as 44 degrees 51 minutes 37.2 seconds north latitude, and 107 degrees 40 minutes 17.6 seconds west longitude. The accident site was at an elevation of 7,650 feet msl and the airplane impacted on a magnetic heading of 010 degrees.

The tops of several pine trees were broken in the direction of the main wreckage. An airplane antenna and paint chips were located directly below these trees. A debris field extended from the initial impact point, north, approximately 50 feet, to the right wing and a large burn area. The wing exhibited aft accordion crushing, torn metal, and was charred, melted, and partially consumed by fire. The right aileron and flap were consumed by fire. Aileron cable continuity was confirmed from the aileron bell crank, inboard to the wing root. The cable end failure was consistent with tension overload.

The debris field and burn area continued in a northeast direction, in down-sloping terrain. The propeller assembly separated from the engine and was located approximately 50 feet north of the right wing. The propeller blades were arbitrarily labeled "A" and "B" for identification purposes only. Blade "A" was bowed forward approximately 60 degrees and exhibited leading edge scratches and chord wise scratches. Blade "B" was bowed aft approximately 45 degrees and exhibited leading edge knicks, and chord wise scratches. The throttle control separated from the fuselage and was partially melted. It was secured in a position 1.5 inches aft of a full forward position.

The main wreckage, to include portions of the empennage, fuselage, and left wing, came to rest inverted, approximately 140 feet from the initial impact point. The wreckage exhibited extensive crushing and torn metal due to impact damage. The wreckage was charred, melted, and consumed by fire. The instrument panel was destroyed, and various instruments scattered downhill from the main wreckage. The vertical speed indicator (VSI) indicated a rate of descent of 1,900 feet per minute. The bottom portion of the directional gyro gave an indication of 190 degrees.

Rudder cable control continuity was established from the rudder pedals aft, to the "tail cone" area. Control cable continuity for the left aileron was established from the aileron bell crank, inboard, to the wing root. Elevator control continuity was established from the elevator bell cranks, forward, to the "tail cone" area. Signatures consistent with tension overload were observed in all of the cables. The trim tab actuator for the elevator was measured at 1 inch. According to Cessna, this is consistent with 10 degrees tab down. The flap jackscrew exposed 5.8 inches of threads. According to Cessna, this is consistent with 40 degrees of flaps.

The engine separated from the airplane and came to rest approximately 100 feet downhill (east) of the main wreckage. It exhibited no apparent fire damage. The vacuum pump, alternator, and left magneto separated from the engine and were not located. The top bank of

spark plugs were removed and the engine was partially rotated by the crankshaft propeller flange. Movement of all six pistons was noted. The right magneto was removed and rotated by hand. Spark was observed on all six leads. Due to impact damage, tactile compression could not be confirmed.

MEDICAL AND PATHOLOGICAL INFORMATION

The autopsy was performed by the office of Forensic Medicine and Pathology, PLLC, Billings, Montana, on August 21, 2007, as authorized by the Sheridan County Coroner's office. The autopsy revealed the cause of death as "blunt traumatic injuries."

During the autopsy, specimens were collected for toxicological testing to be performed by the FAA's Civil Aerospace Medical Institute, Oklahoma City, Oklahoma (CAMI Reference #200700197001). Tests for carbon monoxide, and cyanide were not performed. Tests for ethanol were negative. Ibuprofen was detected in the urine.

ADDITIONAL INFORMATION

According to the CAP policies and procedures, the pilot will obtain a weather briefing from an FAA weather briefer. They will share the contents of the weather briefing with their crew. While operating the aircraft in mountainous terrain, the pilot should adjust the search altitude, based upon the winds aloft. For 10 knots of wind, the pilot shall add 1,000 feet to the search altitude - 20 knots of wind results in an addition of 2,000 feet added to the search altitude.

The CAP Mountain Furry - Mountain Search Pilot Course Guide states that more "than 30 knots of wind at the operating altitude usually denotes that the flight should be delayed or postponed until more favorable conditions prevail." The text continues to state that "mission search pilots may fly as close as 500 to 1,000 feet from mountain ridges and terrain (providing the wind allows this operation)."

According to the CAP Mission Flight Plan/Briefing Form, the mission was going to use multiple search patterns at a search altitude of 1,000 feet above ground level and a search airspeed of 100 knots. They were searching the northern half of grid 518 on the Billings Sectional Chart. Hazards to this particular flight were noted as winds, smoke, and firefighting.

Parties to the investigation included the Civil Air Patrol, Cessna Aircraft Company, Teledyne Continental Motors, the United Stated Air Force, and the FAA as represented through the Casper, Flight Standards Field Office. The wreckage was released to a representative of the Civil Air Patrol on December 7, 2007.

Pilot Information

Certificate:	Commercial	**Age:**	59,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land; Multi-engine sea	**Seat Occupied:**	Unknown
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	January 1, 2007
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	February 1, 2007
Flight Time:	1749 hours (Total, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N6109N
Model/Series:	182R	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	18267787
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	September 1, 2006 Annual	**Certified Max Gross Wt.:**	2550 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	3492.6 Hrs as of last inspection	**Engine Manufacturer:**	Continental
ELT:	Installed, not activated	**Engine Model/Series:**	O-470 U
Registered Owner:	Civil Air Patrol	**Rated Power:**	230 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KSHR,4021 ft msl	**Distance from Accident Site:**	35 Nautical Miles
Observation Time:	16:53 Local	**Direction from Accident Site:**	90°
Lowest Cloud Condition:	Clear	**Visibility**	3 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/ None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.88 inches Hg	**Temperature/Dew Point:**	26°C / 4°C
Precipitation and Obscuration:	N/A - None - Smoke		
Departure Point:	Sheridan, WY (SHR)	**Type of Flight Plan Filed:**	None
Destination:	WY	**Type of Clearance:**	None
Departure Time:	15:30 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	2 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 Fatal	**Latitude, Longitude:**	44.860279,-107.671386

Administrative Information

Investigator In Charge (IIC):	Kaiser, Jennifer
Additional Participating Persons:	Bruce J Hanson; FAA Flight Standards Field Office; Casper, WY Trent D Baines; U.S. Air Force; Colorado Springs, CO Ricardo Asensio; Cessna Aircraft Company; Wichita, KS Josh Cawthra; Teledyne Continental Motors; Mobile, AL Lyle Letteer; Civil Air Patrol; Dobbins, GA
Original Publish Date:	January 31, 2008
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=66482