Aviation Investigation Final Report

Location:	Hayden, Colorado	**Accident Number:**	CEN09FA098
Date & Time:	December 22, 2008, 12:18 Local	**Registration:**	N46SB
Aircraft:	Piper PA-46	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of control in flight	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

Radar data showed the airplane proceeding outbound for the procedure turn. The pilot reported that they were having trouble extending the landing gear and stated, " ... we're trying to turn back in and do our gear here all at the same time." Shortly thereafter, the other pilot reported that they had extended the gear and had "three good, three green lights, so we're hoping the gear is down." The pilot also said, "we are now turned inbound." She was told to contact Unicom. This was the last recorded radio transmission from the flight. The Unicom operator said that she heard the pilot say that they were "coming in." Radar data indicated the airplane crossed the localizer at almost a 90-degree angle and continued turning right until it started to intercept the localizer. The data then indicated that the airplane made a left turn away from the localizer that continued and terminated near the accident site. The turn was captured by six plots. The first plot showed the airplane had descended from 9,400 feet to 9,200 feet and its ground speed had increased from 85 knots to 152 knots. The second plot showed the altitude had increased to 9,700 feet and ground speed had decreased to 132 knots. The third plot showed the altitude had increased further to 10,200 feet and ground speed had dropped to 76 knots. The fourth plot showed the airplane had made almost a 180-degree turn and was at 8,900 feet and at a ground speed of 120 knots. The fifth plot showed the airplane was at 8,700 feet and 20 knots. The sixth and final plot showed the airplane at 8,400 feet and 38 knots. An examination of the airplane showed both wing flap jackscrews retracted and the landing gear actuators extended. The landing gear control switch was in the down position and the emergency gear extension knob was pulled out to full travel. Reduced visibility and clouds were in the vicinity of the airport at the time of the accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot's loss of situational awareness while maneuvering in adverse weather conditions, resulting in spatial disorientation.

Findings

Personnel issues	Spatial disorientation - Pilot
Personnel issues	Situational awareness - Pilot
Aircraft	(general) - Malfunction
Environmental issues	Low visibility - Contributed to outcome

Factual Information

History of Flight

Approach	Sys/Comp malf/fail (non-power)
Approach-IFR final approach	Loss of control in flight (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On December 22, 2008, at 1220 mountain standard time, a Piper PA-46-310P, N46SB, registered to and operated by the pilot, was destroyed when it collided with terrain following a loss of control during an instrument landing system (ILS) runway 10 approach to the Yampa Valley Airport (HDN), Hayden, Colorado. Instrument meteorological conditions prevailed at the time of the accident. The personal flight was being conducted under the provisions of Title 14 Code of Federal Regulations (CFR) Part 91, and an instrument flight rules (IFR) flight plan had been filed. The private pilot-in-command and commercial pilot on board the airplane were fatally injured. The cross-country flight originated at Hutchison (HUT), Kansas, at 1010 central standard time, and was en route to HDN.

The two pilots, husband and wife, had flown to HUT on December 7 to have an annual inspection performed on their airplane. They rented an automobile and returned home to Steamboat Springs, Colorado. When told the airplane was ready for pickup, they returned to HUT. The accident occurred as they were flying back to HDN.

The pilot obtained a weather briefing on the evening of December 21, and again at 0917 cst on the morning of December 22. In the latter briefing, he was told there was a stationary front along the Front Range, and a large low pressure area aloft approaching Colorado from the northern Rockies. These conditions were bringing deteriorating conditions including moisture --– mist, increasing snow, and fog --– and mountain obscuration due to clouds and precipitation. There were several AIRMETs (Airman Meteorological Information) in effect, one for marginal VFR (visual flight rules) and IFR conditions in Colorado, another for moderate turbulence below 18,000 feet, and another for moderate icing below 20,000 feet\1.

According to air traffic control (ATC) documents, an IFR release was issued for N46SB at 1010 cst. Radio contact with the flight was established at 1012 cst, and radar contact was made at 1013 cst. En route altitudes varied from 12,000 feet to FL200 (flight level 20,000 feet). At 1052:18 cst, the second pilot\2, hereinafter referred to as the pilot, reported they were accumulating light rime ice at 12,000. She then corrected herself and reported it was “trace” icing. At 1135:13 mst\3, Denver Air Route Traffic Control Center (ARTCC) cleared the flight direct to the Hayden VOR-DME (Very High Frequency Omnidirectional Radio Range, Distance Measuring Equipment). Other than for some deviations due to weather and clouds, the flight

proceeded uneventfully to HDN.

At 1149:07, the flight was cleared direct to INEDE, the initial approach fix (IAF) for the ILS approach to runway 10. The pilot declined the controller's request for a possible visual approach, citing that they were flying "in and out" of the clouds. Approach clearance was issued at 1211:10.

Radar showed the airplane proceeding outbound for the procedure turn. At 1216:55, the pilot reported they were "having trouble with getting their gear down ... we're trying to turn back in and do our gear here all at the same time." At 1218:12, the pilot reported that they "got the gear down," that they had "three good three green lights, so we're hoping the gear is down," and that "we are now turned inbound." She was told to contact HDN's CTAF (common traffic advisory frequency). This was the last recorded radio transmission from the flight. According to the HDN Unicom operator, she heard the pilot say they were "coming in."

Radar plots indicated the airplane crossed the localizer at almost a 90-degree angle and continued turning right until it started to intercept the localizer. Then it began a left turn that continued until radar coverage was lost, which was at 1920:11. It was about the time the pilot reported the landing gear was down that the airplane entered the left turn.

At 1220:27, the pilot of N3237S told DEN ARTCC, "Sounds like she was trying to call you guys. We thought we were hearing the Malibu calling ya. She was transmitting when you guys were talking with Execjet."

When other aircraft at HDN advised that they had not seen N46SB, ARTCC asked Execjet (EJA) 984 for the HDN visibility. They replied, "It's dropping a little bit, I'd says, in and out, it's ten miles at the surface, but the ceiling's dropping. On one side of the airport, it's three miles, the other side it's ten miles." At the approach end of runway 10, "That's probably the least visibility. It looks like at the most three miles."

At 1229:00, EJA 803 reported that "with the squelch off, we're picking up one [an ELT (emergency locator transmitter) signal]." At 1229:15, the pilot of N3237S told ARTCC, "When you were talking to Execjet, we're pretty sure we heard her making some sort of exclamation." He also told ARTCC, "In case you weren't briefed, sir, she was troubleshooting a gear item ... and she indicated that she was flying around V-F-R."

Routt County Search and Rescue (SAR) was alerted to the missing airplane approximately 1300, and a search was initiated approximately 1400. They reported encountering moderate to heavy snow and reduced visibility during the search. Using computer imagery supplied by ARTCC, a SAR spokesman said the airplane skirted a drainage area on the edge of a field before it made a couple of erratic turns to the north in the direction of a butte and descended abruptly from 8,000 feet. Aided by ELT signals, the wreckage was located approximately 1645 at a location 2.5 miles northwest of the Elk Head Reservoir near County Road 178.

PERSONNEL (CREW) INFORMATION

The pilot-in-command, age 67, held a private pilot certificate with airplane single-engine land and instrument ratings. He also held an FAA third class airman medical certificate, dated November 8, 2008, with a restriction for corrective lenses. According to the airplane insurance company, the pilot's last flight review was accomplished on November 8, 2008, in the PA-46-310P. On the application for airplane insurance, he listed his total flight time as being 1,967 hours, of which 823 hours were accrued in the Piper PA-46-310P. Because no logbooks were ever located, it could not be determined how much instrument flight time the pilot had accumulated.

The second pilot, age 67, held a commercial pilot certificate with airplane single-engine land and instrument ratings. She also held an FAA third class airman medical certificate, dated October 1, 2007, with a restriction for corrective lenses. According to the airplane insurance company, the pilot's last flight review was accomplished on November 8, 2008, in the PA-46-310P. On the application for airplane insurance, she listed her total flight time as being 2,067 hours, of which 798 hours were accrued in the Piper PA-46-310P. Because no logbooks were ever located, it could not be determined how much instrument flight time the pilot had accumulated.

AIRCRAFT INFORMATION

N48SB (s.n. 4608039), a model PA-46-310P, was manufactured by the Piper Aircraft Corporation in 1986. The original engine and propeller had been removed and replaced by a Continental TSIO-550-C1B engine (s.n. 814538-R), rated at 310 horsepower, driving a MT Propellers 4-blade composite, constant-speed propeller (m.n. MTV-A4-D).

The airplane received an annual inspection on December 22, 2008. Total time on the airframe and engine was 3,301.7 hours and 1,253 hours, respectively. During the inspection, adjustments were made to the nose landing gear to remove free play. A ground retraction test was performed.

METEOROLOGICAL INFORMATION

Weather at Yampa Valley Airport was recorded by a non-federal automated weather observation system (AWOS-3). At the time of the accident, the precipitation discriminator was inoperative. The following pertinent METARs (Aviation Routine Weather Report) were recorded at HDN and Craig, Colorado (CAG) (22 miles west of HDN):

HDN (1215): Wind, 350 degrees at 4 knots; visibility, 2.5 statute miles; sky condition, few clouds 1,500 feet, 3,200 feet scattered, 4,400 feet broken; temperature, -3 Celsius (C.); dew point, -6 C.; altimeter setting, 29.48 inches of Mercury.

CAG (1253): Wind, calm; visibility, 10 statute miles; sky condition, few clouds 2,600 feet, 4,100

feet broken, 5,500 feet overcast; temperature, -1 degrees C.; dew point, -5 degrees C.; altimeter setting, 29.51 inches of Mercury.

CAG (1353): Wind, 250 degrees at 6 knots; visibility, 6 statute miles; sky condition, light snow, 3,600 feet scattered, 4,700 feet overcast; temperature, 0 degrees C.; dew point, -3 degrees C.; altimeter, 29.28 inches of Mercury; remarks: snow began 1936.

AIDS TO NAVIGATION

There were no difficulties with aids to navigation. According to FAA monitoring devices, the ILS was operating satisfactorily prior to and at the time of the accident.

COMMUNICATIONS

There were no difficulties with communications.

AERODROME INFORMATION

Yampa Valley Airport (HDN) is located at 40 degrees, 28’52” North latitude, and 107 degrees, 13’03.58” West longitude, or 2 miles southeast of Hayden. It is situated at an elevation of 6,602 feet.

The airport has a rotating beacon and is served by one runway, 10-28. The runway is 10,000 feet long and 150 feet wide, constructed of asphalt and grooved. The runway has a 1,400-foot-long medium intensity approach lighting system with sequenced flashers (MALSF), runway end identification lights (REIL), and high intensity runway lights (HIRL) that are pilot-controlled. A 4-light PAPI (precision approach path indicator) is located on the left side of the runway, projecting a 3-degree glide path.

According to airport personnel, all airport facilities were operating normally prior to and at the time of the accident.

WRECKAGE AND IMPACT INFORMATION

Weather conditions precluded the on-site wreckage examination until December 29, 2008.

The accident site was at a location of 40 degrees, 34.179' North latitude, and 107 degrees, 24.934' West longitude, at an elevation of 6,563 feet, and was measured to be 10.5 miles and on 289 degrees from the Yampa Valley Airport.

Crush lines indicate the airplane impacted and rebounded terrain in a grass-covered meadow near the base of a small hill in a wings-level, 60-degrees nose-down attitude, and on a heading of 235 degrees. The impact crushed the cockpit area aft and upwards, and buckled the fuselage forward of the cabin door. The wings bore full-span compression damage with

heavier damage noted near the wing tips. Both wings were equipped with auxiliary fuel tanks. Both wing flap jackscrews were retracted and the landing gear actuators were extended. According to the Piper representative, this was consistent with the flaps being retracted and the landing gear being extended. Both the landing gear control switch and the emergency gear extension knob were impact damaged, but the former was in the down position and the latter was pulled out to full travel. Control continuity was established to all controls and no airframe anomalies were noted.

The vertical stabilizer/rudder had separated from the tail cone and lay nearby. The elevator trim tab was approximately 2 to 2.5 degrees tab down (nose up). The engine was buried up to the aft cowling. Approximately 18 inches of one composite propeller blade was visible.

The wreckage was examined again at Greeley, Colorado, on January 27, 2009. The engine was partially disassembled and examined. No discrepancies were noted. Valve and drive train continuity were established. The propeller hub remained attached to the crankshaft propeller flange, and portions of all four propeller blades remained attached to the hub.

MEDICAL AND PATHOLOGICAL INFORMATION

At the request of the Moffat County Coroner’s Office, autopsies were performed on both pilots in Golden, Colorado, on December 26, 2008. According to the autopsy reports both deaths were attributed to "massive bodily injury secondary to blunt force trauma sustained in an airplane crash."

Toxicology screens were conducted by FAA’s Civil Aeromedical Institute (CAMI) in Oklahoma City, Oklahoma. According to those reports, no carbon monoxide cyanide, or ethanol were detected in either pilot. With the exception of 0.044 (ug/ml, ug/g) chlorpheniramine (an antihistamine) detected in the second pilot, no drugs were detected.

TESTS AND RESEARCH

The Denver ARTCC provided radar plots that were derived from ERIT data. According to their quality assurance division, "ERIT is the raw, unprocessed, non-certified targets received from conventional radar and Multi-Lat radar. Two of the plots show red and green targets. The red targets were received from the GJT (Grand Junction, Colorado) radar site and the green targets came from the RIL (Rifle, Colorado) Multi-Lat site. None of the target's Mode C reports have been corrected for the barometric pressure. This causes the targets to appear approximately 400 feet higher than the aircraft's actual altitude."

Examination of radar data revealed the airplane flew over the Yampa Valley Airport and passed slightly to the left of the HDN VOR-DME (Distance Measuring Equipment) at 11,400 feet. As it proceeded outbound for the procedure turn, it descended to 10,800 feet and initiated a left turn. At 10,200 feet, a right turn was begun to intercept the localizer. The airplane, however, overshot the localizer (101 degrees) as it was passing through 9,650 feet. The right turn

continued back towards the localizer and the airplane descended to 9,400 feet. Ground speed was 85 knots.

The airplane then initiated a left turn away from the localizer that terminated near the accident site. The turn was captured by six radar plots. The first plot (1218:47) showed the airplane had descended from 9,400 feet to 9,200 feet and its ground speed had increased from 85 knots to 152 knots. At the second plot (1218:59), altitude had increased to 9,700 feet and ground speed had decreased to 132 knots. At the third plot (1219:11), altitude had increased further to 10,200 feet and ground speed had dropped to 76 knots. The fourth plot (1219:23) showed the airplane had made almost a 180-degree turn and was at 8,900 feet and at a ground speed of 120 knots. At the fifth plot (1219:47), the airplane was at 8,700 feet and 20 knots. The sixth and final plot (1220:11) showed the airplane at 8,400 feet and 38 knots.

According to Piper's "Malibu PA-46-310P Pilot's Operating Handbook and FAA Approved Airplane Flight Manual," the landing gear handle, indicator lights, and emergency gear extension control are located in the lower right corner of the pilot's instrument panel. The landing gear is hydraulically operated by an electrically driver hydraulic pump. Emergency extension of the landing gear requires the pilot to slow the airplane below 90 knots KIAS (knots indicated airspeed), pull (open) the hydraulic pump 25-amp circuit breaker, place the landing gear selector in the down position, and pull the emergency gear extend control.

1/All altitudes stated herein are above mean sea level (msl).

2/A review of tape recordings from N46SB indicate a female voice made all of the radio communications. A female was found seated in the right seat.

3/All times stated hereinafter are mountain standard time (mst).

Pilot Information

Certificate:	Private	**Age:**	67,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 3 With waivers/limitations	**Last FAA Medical Exam:**	November 8, 2008
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	November 8, 2008
Flight Time:	1967 hours (Total, all aircraft), 823 hours (Total, this make and model), 67 hours (Last 90 days, all aircraft)		

Pilot Information

Certificate:	Commercial	**Age:**	67,Female
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Right
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 3 With waivers/limitations	**Last FAA Medical Exam:**	October 1, 2007
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	November 8, 2008
Flight Time:	2067 hours (Total, all aircraft), 798 hours (Total, this make and model), 1 hours (Last 90 days, all aircraft)		

Information

Certificate:		**Age:**	
Airplane Rating(s):		**Seat Occupied:**	
Other Aircraft Rating(s):		**Restraint Used:**	
Instrument Rating(s):		**Second Pilot Present:**	Yes
Instructor Rating(s):		**Toxicology Performed:**	No
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:			

Pilot Information

Certificate:	Commercial	**Age:**	67,Female
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Right
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 3 With waivers/limitations	**Last FAA Medical Exam:**	November 18, 2008
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	2067 hours (Total, all aircraft), 798 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N46SB
Model/Series:	PA-46 310P	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	4608039
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	December 22, 2008 Annual	**Certified Max Gross Wt.:**	4100 lbs
Time Since Last Inspection:	3 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	3302 Hrs as of last inspection	**Engine Manufacturer:**	Continental
ELT:	Installed, activated, aided in locating accident	**Engine Model/Series:**	TSIO-520-C1B
Registered Owner:	Joseph F. Brumleve	**Rated Power:**	310 Horsepower
Operator:	Joseph F. Brumleve	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	HDN,6602 ft msl	**Distance from Accident Site:**	12 Nautical Miles
Observation Time:	12:15 Local	**Direction from Accident Site:**	290°
Lowest Cloud Condition:	Few / 1500 ft AGL	**Visibility**	2.5 miles
Lowest Ceiling:	Broken / 4400 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	350°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.47 inches Hg	**Temperature/Dew Point:**	-3°C / -6°C
Precipitation and Obscuration:			
Departure Point:	Hutchison, KS (HUT)	**Type of Flight Plan Filed:**	IFR
Destination:	Hayden, CO (HDN)	**Type of Clearance:**	IFR
Departure Time:	09:13 Local	**Type of Airspace:**	

Airport Information

Airport:	Yampa Valley HDN	**Runway Surface Type:**	
Airport Elevation:	4035 ft msl	**Runway Surface Condition:**	
Runway Used:		**IFR Approach:**	ILS
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	40.569721,-107.415557

Administrative Information

Investigator In Charge (IIC):	Scott, Arnold
Additional Participating Persons:	Lindsey Carlson; FAA Flight Standards District Office; Salt Lake City, UT
Original Publish Date:	September 10, 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=73123