Aviation Investigation Final Report

Location:	Cascade, Idaho	**Accident Number:**	WPR18FA141
Date & Time:	May 13, 2018, 12:30 Local	**Registration:**	N2377R
Aircraft:	Cessna 182G	**Aircraft Damage:**	Destroyed
Defining Event:	Controlled flight into terr/obj (CFIT)	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The private pilot had planned to fly his airplane to his newly purchased hangar at the destination airport. On the morning of the accident, the pilot monitored weather conditions along his proposed route of flight through internet applications and highway traffic cameras. The pilot told a friend that the ceilings at the destination airport were about 700 ft and rising and that the traffic cameras showed marginal weather conditions. The pilot also told his friend that he would wait to depart until early to mid-afternoon as long as the weather conditions improved. The investigation could not determine, with the available evidence, whether the pilot was aware of the published AIRMETs for mountain obscuration and icing along his route of flight during the time surrounding the accident.

When the pilot departed, the weather at the destination airport was consistent with visual meteorological conditions. However, another pilot flying a similar route as the accident pilot (but in the opposite direction) experienced low ceilings near the accident site shortly before the accident, so that pilot reversed course and landed safely. Radar data associated with the accident airplane and the debris path signatures indicated that the accident pilot likely encountered similar weather conditions and started to reverse course when the airplane impacted tree tops and then the ground. The orientation and length of the wreckage path were consistent with controlled flight into terrain. Postaccident examination of the airframe and engine revealed no evidence of any preimpact mechanical malfunctions or failures.

The pilot did not hold an instrument rating. He may have been aware of the AIRMETs for mountain obscuration and icing along his route of flight as he had been monitoring highway traffic cameras for any improvement in the weather conditions. Nevertheless, his poor decision to attempt the flight was likely influenced by his long-anticipated desire to finish moving into his new hangar at his destination airport. The pilot's route of flight was along a highway about 4,800 ft mean sea level located in a valley bordered by 5,500 foot tall mountains to his left and 6,500 foot tall mountains on his right and an overcast cloud layer at 1,100 ft above ground level. Radar data showed an airplane in a turn from a northern heading to a southern heading was likely from the accident airplane as it terminated near the

accident site. This evidence and the impact signatures suggests the pilot probably encountered ground fog or an area of low visibility, but impacted a tree and terrain while attempting to turn around.

After the accident airplane departed, the pilot was handed off to a developmental (trainee) departure controller who provided radar services for the airplane in class C airspace, even though the airplane did not have a functioning transponder, which was inconsistent with the air traffic control (ATC) facility's standard operating procedures. Further, the developmental departure controller did not inform the controller relieving him, during the position relief briefing, of the accident airplane, which was also inconsistent with standard operating procedures. As a result, the oncoming departure controller was unable to track the accident airplane's position (because there were no alphanumeric data associated with the radar target) or terminate radar services when the airplane left the class C airspace (because he was unaware of the flight). Additionally, although the developmental departure controller did not generate a flight progress strip or use a memory aid to track the accident airplane, the facility's standard operating procedures did not require the use of flight progress strips for departing visual flight rules airplanes. However, the use of a flight progress strip might have aided the departure controller's situational awareness of the airplane. Because the accident was not survivable, the delay in identifying that the airplane had crashed did not impact the survivability of the accident.

Although some of the ATC services provided for the accident flight after takeoff were not performed in accordance with the facility's standard operating procedures, those ATC services did not likely contribute to the circumstances of the accident. Had the lack of a functioning transponder impacted operations, the ATC facility would have advised the pilot that he could not proceed or to wait until an opportunity of reduced traffic.

Probable Cause and Findings

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

The non-instrument-rated pilot's improper decision to initiate a visual flight rules flight into an area with low ceilings due to mountain obscuration, which resulted in controlled flight into terrain.

Findings

Personnel issues	Decision making/judgment - Pilot
Personnel issues	Total instrument experience - Pilot
Environmental issues	Obscuration - Decision related to condition
Environmental issues	Obscuration - Effect on operation
Environmental issues	Low ceiling - Decision related to condition
Environmental issues	Low ceiling - Effect on operation
Environmental issues	Mountainous/hilly terrain - Contributed to outcome

Factual Information

History of Flight

Enroute-cruise	VFR encounter with IMC
Enroute-cruise	Controlled flight into terr/obj (CFIT) (Defining event)

On May 13, 2018, about 1230 mountain daylight time, a Cessna 182G, N2377R, was destroyed after it collided with mountainous terrain near Cascade, Idaho. The private pilot was fatally injured. The airplane was owned and was being operated by the pilot as a Title 14 *Code of Federal Regulations* Part 91 personal flight. Visual meteorological conditions prevailed at the time of the accident, and no flight plan was filed for the flight, which departed Boise Air Terminal/Gowen Field (BOI), Boise, Idaho, about 1208 and was destined for McCall Municipal Airport (MYL), McCall, Idaho.

According to a recording of air traffic control (ATC) services provided to the flight, the pilot contacted the BOI clearance delivery controller about 1202 to request a visual flight rules departure to MYL. The controller issued a departure frequency and transponder code, which the pilot acknowledged, but he informed the controller that the airplane's transponder was "not coming up, [and] may be a little cold. I'll punch it in when it does." After the airplane's departure, the local controller advised the pilot, "left turn on course McCall approved," and the pilot repeated the instruction. About 1 minute later, the pilot contacted the BOI departure controller and reported "transponder still not up but I am with ya." Shortly afterward, the local controller contacted the departure controller and informed him of the accident airplane's location.

About 1210, the departure controller informed the accident pilot that radar contact was established. The pilot acknowledged this communication, which was his final transmission to ATC. The departure controller was going off duty, so about 1211 he provided the departure controller coming on duty with a position relief briefing, which included traffic, weather, and additional controller position information but did not include any information about the accident airplane.

ATC radar data from the Federal Aviation Administration (FAA) included the airplane's location. According to the data, the airplane departed uneventfully and tracked in a northerly direction. BOI radar contact ceased about 20 nautical miles (nm) north of BOI. About 1229:00, a return was detected about 1 nm southwest of the accident site. The return then turned to the east almost immediately after its track was detected, and the final radar return was recorded at 1229:47, about 0.5 nm northwest of the accident site. About 6 hours later, after the BOI ATC tower received telephone calls from concerned parties about the status of the accident flight, the clearance delivery controller contacted the Salt Lake Air Route Traffic Control Center to advise that the accident airplane had not arrived at its destination. Afterward, an alert notice was issued at 1912 for the flight. The airplane wreckage was found the next day.

The pilot's route of flight was to the north along a highway with an elevation between 4,500 and 5,000 ft mean sea level (msl); 5,500-ft msl mountains were to the west and 6,500 ft mountains were to the east of the highway. The highway was located in a valley and surrounded by ridgelines, just south of the accident site. A global positioning system device recovered from the accident site yielded no useful

information.

Pilot Information

Certificate:	Private	**Age:**	34,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	January 26, 2015
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	September 3, 2017
Flight Time:	328.6 hours (Total, all aircraft), 231 hours (Total, this make and model)		

The pilot, age 34, held a private pilot certificate with a rating for airplane single-engine land. His most recent second-class airman medical certificate was issued on January 26, 2015, with no limitations.

The pilot's logbook records, which were current as of March 11, 2018, showed that he had 276 hours of total flight experience, all of which were accumulated in the accident airplane make and model, including about 4 hours that were accumulated in the 90 days that preceded the accident flight. The pilot's most recent flight review was completed on September 3, 2017. He did not hold an instrument rating and had amassed about 7 total flight hours in simulated instrument conditions at the time of the accident.

According to the pilot's friends, the pilot lived in Boise, but he had recently purchased a large airplane hangar at MYL and was planning to move to McCall and renovate the hangar. One of the pilot's friends stated that he was in the process of moving some final items, including his airplane, to the hangar when the accident occurred.

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N2377R
Model/Series:	182G G	**Aircraft Category:**	Airplane
Year of Manufacture:	1964	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	18255477
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	November 11, 2017 Annual	**Certified Max Gross Wt.:**	2348 lbs
Time Since Last Inspection:	16 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	4878 Hrs as of last inspection	**Engine Manufacturer:**	Continental Motors
ELT:	C91 installed, activated, aided in locating accident	**Engine Model/Series:**	O-470
Registered Owner:		**Rated Power:**	230 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

According to FAA records, the airplane was manufactured in 1964 and was registered to the pilot on September 17, 2013. The airplane was powered by a Continental O-470-R direct-drive, air-cooled, 230-horsepower engine. An excerpt from the airplane's maintenance logbook revealed that the most recent annual inspection of both the airframe and engine was completed on November 17, 2017, at a tachometer time of 4,878 flight hours, which was 16 flight hours before the accident. At the time of the inspection, the engine had accumulated 6,335 total flight hours and 1,423 flight hours since major overhaul. Additional airplane records were not available.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	2871 ft msl	**Distance from Accident Site:**	40 Nautical Miles
Observation Time:	11:53 Local	**Direction from Accident Site:**	360°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Broken / 7000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	320°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.02 inches Hg	**Temperature/Dew Point:**	14°C / 7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	BOISE, ID (BOI)	**Type of Flight Plan Filed:**	None
Destination:	MC CALL, ID (MYL)	**Type of Clearance:**	VFR;VFR flight following
Departure Time:	12:08 Local	**Type of Airspace:**	Class E

Weather Conditions About the Time of the Accident

The pilot of another airplane that departed MYL for BOI about 1010 on the day of the accident reported that he followed a river adjacent to the north/south highway that connects McCall and Boise. When the airplane was about 35 nm north of BOI (near the accident site), he encountered ground fog, which forced him to descend the airplane below 700 ft above ground level (agl), the approximate height of the cloud layer. The pilot reported that the low visibility conditions prompted him to turn back and land in Cascade about 1050. The area he reversed course had a terrain elevation of about 4,500 ft msl.

Satellite imagery showed low- to mid-level broken-to-overcast clouds over the accident pilot's route of flight and the accident site. Sounding data revealed the presence of overcast clouds from 1,100 ft agl with tops to 18,500 ft.

The 1153 recorded weather observation at BOI included wind from 320° at 4 knots, visibility 10 statute miles, broken clouds at 7,000 and 10,000 ft agl, temperature 14°C, dew point 7°C, and an altimeter setting of 30.02 inches of mercury.

The 1151 recorded weather observation at MYL included wind from 300° at 5 knots, visibility 10 statute miles, few clouds at 2,100 ft agl, broken clouds at 6,000 ft agl, overcast clouds at 9,000 ft agl, temperature 11°C, dew point 5°C, and an altimeter setting of 30.01 inches of mercury.

Weather Forecasts

Two AIRMET advisories were valid for the accident site at the time of the accident. AIRMET Sierra was issued at 0845 and 1145 and forecasted mountain obscuration conditions due to clouds, precipitation, and mist. AIRMET Zulu was issued at 0845 and forecasted moderate icing between 9,000 ft and FL200 (about 20,000 ft) near the accident site.

Weather Planning

No evidence indicated that the pilot received an official weather briefing before his departure.

According to a friend of the pilot who was with him on the morning of the accident before he departed, the pilot had been monitoring the weather through traffic cameras along the north/south highway that connected Boise and McCall and internet weather applications. The pilot's friend stated that, according to the pilot, the ceilings at MYL were about 700 ft and rising, and the highway cameras showed marginal weather conditions.

When the pilot left his friend's house about 0930, the pilot stated that he would continue checking the weather but would likely wait until early to mid-afternoon to depart as long as the weather improved.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	44.240001,-116.073333

The airplane debris path was located in a wooded area about 41 nm north of BOI and was oriented on a 195° magnetic heading. All major structures of the airplane were accounted for at the accident site, as shown in figure 1. The initial impact point (IIP) was identified by two scars located about halfway up a 70-ft tree. The terrain elevation of the IIP was about 5,800 ft msl. The nose landing gear was located at the base of the tree, and wing fragments were distributed along the wreckage path. A large ground scar was located about 50 ft forward of the IIP in the debris path. The main wreckage comprised the empennage, right wing, main cabin, and engine and was located about 110 ft forward of the IIP. The empennage was vertically oriented and at rest against the right wing, which was beneath a portion of the cabin and instrument panel. The left wing was found in the debris path.

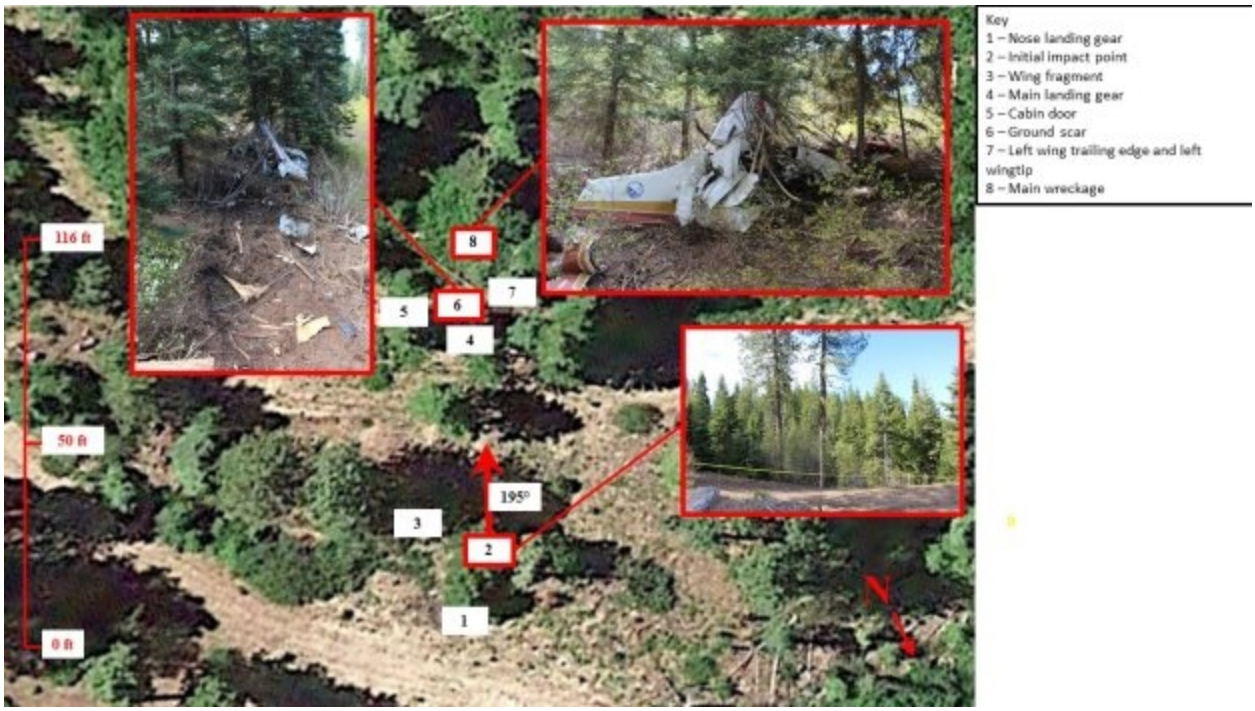

Figure 1: Wreckage Diagram

The rudder, aileron, and elevator cables were traced from the cockpit to their respective control surfaces through separations. The right and left wings were breached, and a smell consistent with 100 low-lead aviation grade fuel was detected. The wing flap jackscrew was observed in the neutral position, consistent with a flaps retracted setting.

The elevator trim cables were traced from the aft fuselage to the elevator trim tab. The right elevator actuator rod measured about 1.5 inches, which is consistent with a 10° trim tab up deflection.

The fuel selector valve remained attached to the main cabin and was positioned in the BOTH detent. The unit was subsequently rotated to each of the three fuel tank ports, and no obstructions were observed. The gascolator fuel screen did not display any contaminants, and no fuel was present in the gascolator bowl.

Mechanical continuity was established throughout the engine's rotating group as the crankshaft was manually rotated at the propeller flange. Thumb compression and suction were obtained for all six cylinders. The combustion chambers remained mechanically undamaged, and there was no evidence of foreign object ingestion or detonation.

The ignition system was functionally tested with the original ignition harness while the engine crankshaft was manually rotated. Some of the ignition harness leads did not display a spark. As the crankshaft was rotated, the top left spark plugs and a bottom cylinder (No. 5) produced a spark when the snaps of the impulse coupling from the left magneto were heard. During a subsequent rotation, the top right spark plugs produced a spark when the snaps of the impulse coupling from the right magneto were heard. An examination of the top and bottom spark plugs revealed signatures consistent with normal

wear.

The carburetor was partially separated from the engine and remained attached to the wye plenum. The throttle linkage remained attached to the throttle arm, and the mixture linkage remained attached to the throttle plate but were damaged. Manual movement of the throttle and mixture levers resulted in coinciding movement of their respective shafts. The metal carburetor floats appeared normal and did not display any residual fuel.

Both propeller blades remained attached to the propeller hub, and the assembly separated from the engine crankshaft at the propeller flange. Propeller mounting bolts were stripped from the hub. Both blades displayed twisting toward low pitch and chordwise paint erosion.

Additional Information

ATC Services

The accident airplane, which was equipped with a transponder, was assigned a beacon code for the flight by the clearance delivery controller. After the airplane's departure, the local controller instructed the accident pilot to contact departure control. A developmental departure controller—a trainee who was accompanied by an on-the-job instructor—was working the position when the pilot made contact. The pilot indicated that he was experiencing a problem with the airplane's transponder, but the departure controller was able to establish radar contact with the airplane and provide radar services. This controller did not generate a flight progress strip or use a memory aid to track the airplane. BOI Order 7110.57 stated that flight progress strips were optional for departing visual flight rules (VFR) aircraft, such as the accident airplane.

The airplane was operating in class C airspace at the time. FAA directives required that airplanes operating in class C airspace be equipped with a functional transponder, unless given an exception, which could only be provided by a facility directive or letter of agreement. The facility did not have a procedure to address aircraft that were not equipped with a transponder, and there was no letter of agreement. Nevertheless, the departure controller applied class C air traffic service to a VFR airplane without a working transponder. The accident airplane continued northbound into the BOI class C outer areas and then left the BOI-designated airspace.

At 1211:16, the developmental departure controller was relieved from his position (along with his instructor) by another departure controller. The developmental departure controller conducted a recorded transfer of position responsibility and relief briefing with the oncoming controller, but the briefing did not include the accident airplane. BOI standard operating procedures stated that a primary target (such as the accident airplane) was to be identified in a position relief briefing. When the clearance delivery control contacted the Salt Lake Air Route Traffic Control Center at 1830:31 to report that the airplane had not arrived at its destination, the controller indicated that the automated system had not captured the flight information because the airplane was a primary target.

Medical and Pathological Information

The Valley County Coroner's Office, McCall, Idaho, performed an autopsy on the pilot. His cause of death was "traumatic blunt force injuries." The report indicated that no drugs of abuse and other tested prescription drugs were identified but that the pilot had a low level of ethanol in his chest cavity blood.

Toxicology testing performed at the FAA's Forensic Sciences Laboratory identified ethanol in the pilot's urine, blood, lung, and muscle specimens. The ethanol was from postmortem production as no ethanol was identified in the liver.

Administrative Information

Investigator In Charge (IIC):	Stein, Stephen
Additional Participating Persons:	Rudy Rossi; Federal Aviation Administration; Boise, ID Ricardo Asensio; Textron Aviation; Wichita, KS Nicole Charnon; Continental Motors Group; Mobile, AL
Original Publish Date:	May 19, 2020
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=97251