Aviation Investigation Final Report

Location:	Mt Tom, Oregon	**Accident Number:**	WPR15FA152
Date & Time:	April 21, 2015, 17:00 Local	**Registration:**	N1729J
Aircraft:	Piper PA 28-140	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of control in flight	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

Radar data indicated that, after takeoff, the uncertificated, noninstrument-experienced pilot flew the airplane north toward the destination, which required the airplane to cross mountainous terrain, and climbed to an altitude of at least 6,300 ft mean sea level (msl). About 11 minutes after departure, the radar data showed an abrupt left turn to a southwest direction, which was followed by a loss of radar contact 19 seconds later. The abrupt left turn is indicative of a steep bank angle. The radar data also showed that the airplane descended rapidly over a ground distance of about 0.5 mile from at least 6,300 ft msl to 3,100 ft msl where it collided with terrain near the peak of a mountain. The steep left turn and the rapid descent are consistent with a loss of control. Further, the airplane's wreckage distribution was consistent with a high velocity collision with trees and terrain.

Weather observations indicated that instrument meteorological conditions (IMC) were likely present in the vicinity of the accident site around the time of the accident. The closest official weather observing station, located 11 miles from the accident site, reported a broken ceiling at 4,300 ft msl and an overcast cloud base at 5,000 ft msl. An unofficial weather observing station at an elevation of 2,100 ft, located 7 miles from the accident site, reported relative humidity greater than 90 percent, indicative of cloud or fog formation.

It is likely that the pilot encountered IMC conditions and lost visual reference to the ground or horizon. Given the pilot's lack of certification and instrument flight experience, the loss of visual reference likely resulted in spatial disorientation, leading to a loss of control of the airplane.

The pilot's toxicology testing detected amphetamine and donepezil in the muscle and liver; quetiapine in the liver; tetrahydrocannabinol (THC) in the liver, lung, and brain; and THC's inactive metabolite tetrahydrocannabinol carboxylic acid in the liver, lung, and brain. The pilot was likely being treated with donepezil for memory loss following a brain injury, but the condition being treated with quetiapine was not identified. While both a traumatic brain injury with memory loss and psychiatric disorder(s) could significantly degrade the pilot's cognitive skills and decision-making ability to safely operate the

airplane, the investigation was unable to determine the extent of either condition, what role they played in the accident, or if the pilot had side effects from the medications. The toxicology results demonstrate that the pilot had used marijuana and amphetamine at some point before the accident, but the timing of use or blood levels around the time of the accident could not be obtained. Therefore, the investigation was unable to determine if the pilot's use of marijuana (source of THC) and amphetamine impaired his ability to safely operate the aircraft or if either drug contributed to the accident.

Probable Cause and Findings

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

The noncertificated pilot's continued visual flight into instrument meteorological conditions, which resulted in spatial disorientation leading to the pilot's loss of control of the airplane and subsequent collision with mountainous terrain.

Findings

Personnel issues	Decision making/judgment - Pilot
Personnel issues	Spatial disorientation - Pilot
Personnel issues	Aircraft control - Pilot
Personnel issues	Qualification/certification - Pilot
Personnel issues	Total instrument experience - Pilot
Environmental issues	Mountainous/hilly terrain - Contributed to outcome
Environmental issues	Below VFR minima - Effect on personnel

Factual Information

History of Flight

Enroute	VFR encounter with IMC
Enroute	Loss of control in flight (Defining event)
Enroute	Collision with terr/obj (non-CFIT)

On April 21, 2015, about 1700 Pacific daylight time, a Piper PA-28-140, N1729J, collided with terrain near the peak of Mt Tom, Oregon. The unlicensed pilot sustained fatal injuries and the airplane was destroyed. The airplane was registered to Sover Lince Society of Organic Agriculture and operated as a 14 Code of Federal Regulations, Part 91 flight. Instrumentmeteorological conditions prevailed, and no flight plan had been filed. The flight originated from Hobby Field Airport, Creswell, Oregon, at 1649, and was destined for Pearson Field, Vancouver, Washington.

A concerned family member reported the pilot was overdue the evening of April 21. The wreckage was located the afternoon of April 24 near the peak of Mt Tom (3,143 ft), at an elevation of 3,100 feet, by a National Guard helicopter. Radar first identified the airplane at 1649 north of Cresswell on a northerly heading, however, the airplane was not reporting altitude information (transponder Mode C). About 1700:17 the radar track made an abrupt left turn to a southwest direction followed by a loss of radar contact at 1700:36. A careful study of the radar data revealed that the lowest altitude the radar could receive a primary return signal was 5,250 feet mean sea level (msl) along the airplane's flight path. In the vicinity of the accident the lowest altitude the radar received a primary return signal was 6,300 feet msl. The location of the final radar return measured horizontally along the ground was about a half mile from the location where the airplane impacted terrain.

Pilot Information

Certificate:	None	**Age:**	41,Male
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	None None	**Last FAA Medical Exam:**	February 24, 1994
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 288.1 hours (Total, all aircraft), 7.8 hours (Total, this make and model), 1.6 hours (Last 90 days, all aircraft), 0 hours (Last 30 days, all aircraft)		

The pilot, age 41, did not hold a pilot certificate or medical certificate. Two pilot logbooks were recovered at the accident scene. The logbooks indicate that the pilot received flight training

through solo in 1994. The pilot logged 224.9 hours in a Cessna 150 between 2002-2003 and no instructional flights were recorded during this period. No flights were recorded between 2003 and 2014. Between January 9 through January 20, 2015, six flights in the accident airplane were recorded totaling 7.8 hours. Combining the two logbooks, the pilot's total flight time was 288.1 hours.

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N1729J
Model/Series:	PA 28-140	**Aircraft Category:**	Airplane
Year of Manufacture:	1968	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	28-24142
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	October 9, 2014 Annual	**Certified Max Gross Wt.:**	2150 lbs
Time Since Last Inspection:	8 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	3622 Hrs at time of accident	**Engine Manufacturer:**	LYCOMING
ELT:		**Engine Model/Series:**	O-320-E2A
Registered Owner:	On file	**Rated Power:**	140 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

The four-seat, low-wing, fixed-gear airplane, serial number 28-24142, was manufactured in 1968. It was powered by a Lycoming O-320-E2A 140-hp engine and equipped with a Sensenich fixed pitch propeller. The airplane was purchased by the registered owner in January, 2015.The airplane maintenance logbooks were not located, however, maintenance invoices and documents were provided by a fixed base operator (FBO) located at Pierce County Airport, Washington, where the previous owner had maintained the airplane. Total airframe time is estimated to be 3,622 hours at the time of the accident. Total engine time was 3,622 hours since new, and 137 hours since top overhaul. The most recent annual inspection was completed October 9, 2014.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KEUG,366 ft msl	**Distance from Accident Site:**	13 Nautical Miles
Observation Time:	16:54 Local	**Direction from Accident Site:**	225°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Broken / 3900 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	15 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	330°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	16°C / 8°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Cresswell, OR (77S)	**Type of Flight Plan Filed:**	None
Destination:	Vancouver, WA (VUO)	**Type of Clearance:**	None
Departure Time:	16:45 Local	**Type of Airspace:**	Class E

An Automated Surface Observing Station (ASOS) was located at Mahlon Sweet Field Airport (EUG) in Eugene, Oregon, which is located about 11 miles southwest of the accident location at an elevation of 374 feet. At 1654 EUG reported a wind from 340° at 13 knots, visibility of 10 statute miles or greater, ceiling broken at 3,900 feet above ground level (agl), overcast cloud base at 5,000 feet agl, temperature of 16° Celsius (C) and a dew point temperature of 8°C, altimeter setting of 30.00 inches of mercury; remarks included: station with a precipitation discriminator.

Unofficial meteorological reporting station BRUO3 (owned by the Bureau of Land Management) was located about 7 miles northeast of the accident site at an altitude of about 2,130 feet. Reports from BRUO3 during the time surrounding the accident at 1714, temperature 10 C, dew point 9 C, relative humidity 93%, wind from 316 at 1.7 knots gusting to 10.4 knots.

The only publicly disseminated pilot report was made within two hours of the accident time over the state of Oregon. A Beechraft Bonanza at an unknown altitude reported at 1524, while 5 miles away on the 130° radial from Portland-Hillsboro Airport, overcast cloud bases at 2,700 feet above msl during decent.

An amended Area Forecast that included Oregon was issued at 1558. Cloud heights are forecasted above 8,000 feet msl. The portion of the Area Forecast directed toward the Willamette Valley forecasted for the accident time: broken ceiling at 2,500 feet, broken cloud base at 4,000 feet, cloud tops at 8,000 feet, occasional light rain. The portion of the Area Forecast directed toward the Cascades forecasted for the accident time: scattered to broken clouds at 6,500 feet with cloud tops to 9,000 feet, broken cirrus.

An Airmen's Meteorological Information (AIRMET) Sierra advisory for mountain obscuration was active for the accident location at the accident time.

A complete meteorological weather study is available in the official docket of this investigation.

WRECKAGE & IMPACT INFORMATION

The wreckage was located in a densely wooded area populated by mature douglas fir trees and sword ferns, near the top of Mt Tom, at an elevation of 3,100 feet, with wreckage distributed on the 43° sloped terrain. Numerous trees along a magnetic bearing of 338° from the wreckage had been topped, with freshly cut branches on the ground directly below the trees. The length of the debris field was approximately 111 feet. On April 27 the wreckage was removed from the accident site and transported to a recovery yard in Dallas, OR.

On April 28 investigators examined the airframe and engine. All flight control surfaces were contained within the wreckage, and control continuity was established from the stabilator, rudder, and ailerons to the cockpit though multiple cable overload breaks. The left wing had sustained impact damage consistent with a collision with trees, the fuselage and right wing sustained impact damage consistent with ground collision and post impact fire. The fuselage and cabin of the airplane was consumed by fire. The engine sustained a front impact on the left side of the engine, dislodging the number 2 cylinder off its mounting pad and aft, with tree-wood material imbedded into the cooling fins of the cylinder. The crankshaft propeller flange was bent and displaced aft into the engine case. The propeller was not present on the propeller flange. The magnetos were impact and fire damaged. The fuel pump had been dislodged off the engine and damaged by fire. The carburetor float bowl had been displaced off of the carburetor. The engine mixture and throttle control cables remained attached to the carburetor.

The propeller had separated from the propeller flange, and was located about 10 yards from the main wreckage. The spinner had been crushed and plastically deformed into the propeller hub. One blade of the two bladed propeller exhibited very little damage and the other blade was deformed forward, bow like, from the shank to the tip.

The attitude and directional instrument gyros were disassembled and examined. Both gyros exhibited skuff and score marks on the interior of the gyro housing, and both rotors had evidence of rotational scuffing/scoring on the exterior.

MEDICAL & PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot by the Oregon State Medical Examiner on May 7, 2015. The cause of death was listed as multiple blunt force trauma.

FAA Bioaeronautical Research Laboratory toxicology testing detected amphetamine and donepezil in muscle and liver; quetiapine in liver; tetrahydrocannabinol (THC) in liver (42.4 ng/mL), lung (692.1 ng/mL), and brain (22.9 ng/mL); and its inactive metabolite tetrahydrocannabinol carboxylic acid (THC-COOH) in liver (539.6 ng/mL), lung (85.1 ng/mL), and brain (18.6 ng/mL).

Amphetamine is a stimulant on Schedule II of the list of controlled substances used to treat attention deficit disorder, narcolepsy, and obesity and is also marketed under various names including Adderall.

Donepezil is prescribed to treat the cognitive symptoms of Alzheimer's disease and memory loss following traumatic brain injuries and is also marketed with the name Aricept. 3,4 It carries a warning

about slow heart rate "… may manifest as bradycardia or heart block in patients both with and without known underlying cardiac conduction abnormalities. Syncopal episodes have been reported in association with the use of [donepezil]." Additionally, the medication "increases the risk of generalized convulsions."

Quetiapine is prescribed to treat schizophrenia and bipolar disease and is marketed as Seroquel.

Airport Information

Airport:	Hobby Field 77S	**Runway Surface Type:**	
Airport Elevation:	541 ft msl	**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:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	44.217224,-122.979164

Additional Information

The following was extracted from AC 60-4A, "Pilot's Spatial Disorientation"

"The attitude of an aircraft is generally determined by reference to the natural horizon or other visual references with the surface. If neither horizon nor surface references exist, the attitude of an aircraft must be determined by artificial means from the flight instruments. Sight, supported by other senses, allows the pilot to maintain orientation. However, during periods of low visibility, the supporting senses sometimes conflict with what is seen. When this happens, a pilot is particularly vulnerable to disorientation. The degree of disorientation may vary considerably with individual pilots. Spatial disorientation to a pilot means simply the inability to tell which way is "up."

Administrative Information

Investigator In Charge (IIC):	McKenny, Van
Additional Participating Persons:	Erik Ramsayer; FAA; Portland, OR Charlie Little; Piper; Chino Hills, CA Troy Helgeson; Lycoming; Denver, CO
Original Publish Date:	November 2, 2016
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=91080