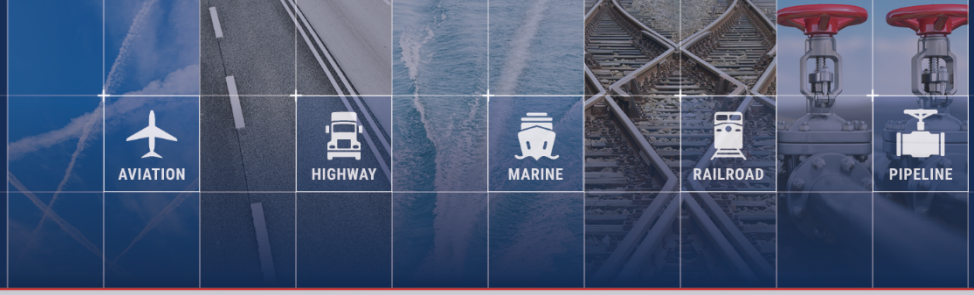

Aviation Investigation Factual Report

Location:	Mt Hood, Oregon	**Accident Number:**	WPR19FA077
Date & Time:	January 25, 2019, 14:59 Local	**Registration:**	N1332J
Aircraft:	Rockwell 112	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of control in flight	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

On January 25, 2019, at 1459 Pacific standard time, a Rockwell International 112, N1332J, was destroyed when it was involved in an accident near the summit of Mount Hood, Oregon. The private pilot sustained fatal injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

According to the pilot's wife, he often went flying on his own but sometimes to visit friends and family in Arizona. She stated that he would often go flying without her knowledge, and sometimes he would be away for a weekend and she would not be able to reach him. She stated that during the weeks leading up to the accident, the pilot had mentioned that he was planning a trip to Arizona.

On the day of the accident, she arranged to meet the pilot at their place of work, but when she arrived at 1100, he was not there. She sent him a text message, and he then called and told her that there had been a change of plans and he was at Troutdale Airport having maintenance performed on the airplane.

When the pilot had not arrived home at 1700, she sent him a text message. Her phone indicated the message was delivered but not read. She continued to send messages throughout the weekend, but did not receive a reply, and she assumed he had gone away again for a few days; however, when the pilot had not returned 2 days later, she became concerned and filed a missing person report with the Clark County Sheriff's Office. After an initial local search, the Federal Aviation Administration (FAA) issued an alert notice (ALNOT).

Using cell phone forensics and an airplane emergency locator transmitter (ELT) signal that could be heard in the vicinity of the eastern slopes of Mount Hood, the wreckage was located 4 days after the accident at 1520.

Radar data provided by the FAA indicated that the accident airplane passed over the Cascade Locks area at 1439 and followed the Columbia River eastbound. About 5 minutes later, the airplane began a right turn to the south, and by 1451, it was approaching Mount Hood from the north at a Mode C-reported altitude of about 10,000 ft mean sea level (msl). The airplane then followed a counterclockwise, 6-mile-wide orbit around the 11,239-ft summit. As the airplane circled south around the summit, its ground speed was about 147 knots; as it transitioned northbound, the ground speed reduced to about 107 knots. The airplane then began to get closer to the summit as it rolled out on a west heading. A few seconds later the airplane then turned back to the north, before turning back west one minute later, to continue the orbit.

By this time, it had reached its highest altitude of 11,900 ft msl about 1.5 miles north of the summit. The airplane continued to track around the mountain, coming to within about 1,500 ft of the summit horizontally as it passed to the west. As it reached the southern face, it began to rapidly descend, with the final two radar targets indicating a vertical speed of about 2,500 ft per minute (fpm). The last radar target was recorded at 1459:09, and indicated an altitude of 9,600 ft msl, about 400 ft northwest of the impact location. (see Figure 1.)

The pilot did not make radio contact with the Seattle Air Route Traffic Control Center at any time during the flight.

Figure 1. Radar-Derived Flight Path

Pilot Information

Certificate:	Private	**Age:**	63,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Unknown
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	April 24, 2017
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	September 24, 2017
Flight Time:	(Estimated) 1350 hours (Total, all aircraft), 1200 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Rockwell	**Registration:**	N1332J
Model/Series:	112 A	**Aircraft Category:**	Airplane
Year of Manufacture:	1975	**Amateur Built:**	
Airworthiness Certificate:	Normal; Utility	**Serial Number:**	332
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	January 18, 2019 Annual	**Certified Max Gross Wt.:**	3260 lbs
Time Since Last Inspection:	1 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	3515 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	C91A installed, not activated	**Engine Model/Series:**	IO-360-C1D6
Registered Owner:	On file	**Rated Power:**	200 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

The airplane was purchased by the pilot in September 2000.

Neither the airplane logbooks nor the airplane's airworthiness information on file with the FAA indicated that the airplane was equipped with a GPS receiver; however, a friend of the pilot stated that the pilot always carried an iPad mounted to the control yoke.

At the airplane’s most recent annual inspection 7 days before the accident, FAA Airworthiness Directive 12-02-10, which required the inspection of the elevator spar for cracks, was completed.

The most recent maintenance event was for a dynamic propeller balance, completed about 2 hours before the accident. The mechanic who performed the procedure stated that the annual inspection had revealed a crack in an engine turbocharger bracket, indicative of excessive vibration, and this was the reason the pilot wanted to have the balance performed. The mechanic stated that the balance procedure was routine and uneventful, and that the pilot wanted to get the work completed in advance of a trip he was taking to Arizona the following week.

Fueling records indicated that 30 gallons of aviation gasoline was added to the airplane 3 days before the accident. There was no evidence to suggest the airplane had been flown beyond the local area since then.

According to the airplane's flight manual, at a gross weight of 2,650 lbs with the landing gear and flaps retracted, the airplane's rate of climb at 12,000 ft with an outside temperature of -4°C, would have been about 220 fpm.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KPDX,107 ft msl	**Distance from Accident Site:**	41 Nautical Miles
Observation Time:	22:53 Local	**Direction from Accident Site:**	289°
Lowest Cloud Condition:	Few / 1400 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Broken / 2200 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.46 inches Hg	**Temperature/Dew Point:**	9°C / 3°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Portland, OR (TTD)	**Type of Flight Plan Filed:**	None
Destination:	Camas, WA (1W1)	**Type of Clearance:**	None
Departure Time:	14:30 Local	**Type of Airspace:**	Class E

The pilot did not request an official weather briefing through Leidos, and although he used an iPad configured with the ForeFlight weather and flight planning software, the subscription had expired in 2017. Whether the pilot checked or received weather information before or during the accident flight could not be determined.

During the 1-hour period before the accident, visual meteorological conditions and light surface wind (calm to 6 knots) existed at both the departure airport and at Ken Jernstedt Airfield (4S2), Hood River, Oregon, located at an elevation of 638 ft msl about 19 miles north-northeast of the accident site.

Soundings

The closest official upper air sounding to the accident site was from Salem, Oregon (KSLE), located 62 miles west-southwest of the accident site. Analysis of the 1600 sounding depicted the lifted condensation level at 2,253 ft msl and the convective condensation level at 12,926 ft msl. The sounding had a less than 60 percent relative humidity from the surface through 15,000 ft msl. The freezing level was located at 10,821 ft msl.

The sounding indicated alternating conditionally unstable and stable environments from the surface through 19,000 ft msl, with a conditionally unstable environment from 6,000 ft through 13,000 ft msl. No clouds or icing were indicated below 19,000 ft msl. The data indicated the possibility of light to moderate clear-air turbulence in several layers above 2,000 ft msl, along with the possibility of moderate to severe mountain wave conditions between 5,500 and 7,000 ft with updraft and downdraft speeds as high as 2,037 fpm. At 14,000 ft msl, moderate to severe mountain wave conditions were present, with updraft and downdraft speeds as high as 1,315 fpm.

Weather Research and Forecasting Model

A Weather Research and Forecasting Model (WRF) simulation indicated a rapid change in wind speed near the accident site, with speeds ranging from 20 knots to 48 knots over the course of 1 kilometer.

The vertical velocity data indicated that when the airplane was making its first pass south of Mount Hood, the flight path was in a location of updrafts, with speeds between 100 and 300 fpm. By the time the airplane made its second closer pass to the south, the flight path was in a location of downdrafts, with speeds greater than 2,000 fpm.

Further analysis revealed that, about the time of the accident, there were rapidly changing updraft and downdraft conditions between 8,500 and 14,500 ft directly above and within 2 kilometers horizontally of Mount Hood.

Winds and Temperature Aloft Forecast

The winds and temperature aloft forecast for Portland, Oregon, (PDX), (located about 47 miles Northwest of the accident site) indicated wind at 6,000 ft msl from 020° at 23 knots with a temperature of 9°C, wind at 9,000 ft from 360° at 31 knots with a temperature of 2°C, wind at 12,000 ft from 360° at 34 knots with a temperature of -4°C, and wind at 18,000 ft from 350° at 45 knots with a temperature of -15°C.

Satellite Data

The Geostationary Operational Environmental Satellite number 17 (GOES-17) imagery surrounding the time of the accident indicated a small amount of cloud cover directly above Mount Hood, with the cloud cover above the highest terrain moving from north to south. A stationary, wave-like pattern could be seen in the clouds between the accident site and Mount Rainier, located 100 miles to the north.

Airport Information

Airport:	PORTLAND-TROUTDALE TTD	**Runway Surface Type:**	Asphalt
Airport Elevation:	38 ft msl	**Runway Surface Condition:**	Dry
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:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	45.374168,-121.688888(est)

Due to the treacherous and remote nature of the accident site and the immediate threat of avalanches, an on-scene examination could not be performed. First response personnel, who recovered the pilot, were not able to gain access to the main wreckage; therefore, a description of the accident site was compiled using photographs provided by first responders.

Fragmented sections of the airplane were spread along the 70° slope of Eliot Glacier, on the northeast flank of Mount Hood. The first identifiable point of impact was represented by a horizontal slice in the snow and ice at an elevation of about 9,700 ft msl. Debris and slide marks in the snow extended down toward the main wreckage, which was located at an elevation of about 8,700 ft msl, and comprised the crushed fuselage, fragments of the left wing, and the entire right wing. The engine and horizontal stabilizer were identified about 200 ft below, with the lowest debris located around 8,000 ft msl. The entire area was strewn with crushed and fragmented airframe and engine components and surrounded by crevasses and deep, unstable snow. (see Figure 2.)

The airplane was not insured, and an immediate wreckage recovery was not possible. Seven months after the accident, representatives from the Forest Service returned to the site for field reconnaissance; however, by that time, most of the airplane had either disappeared into a crevasse or been pulverized and fragmented by avalanches. The airplane was never recovered.

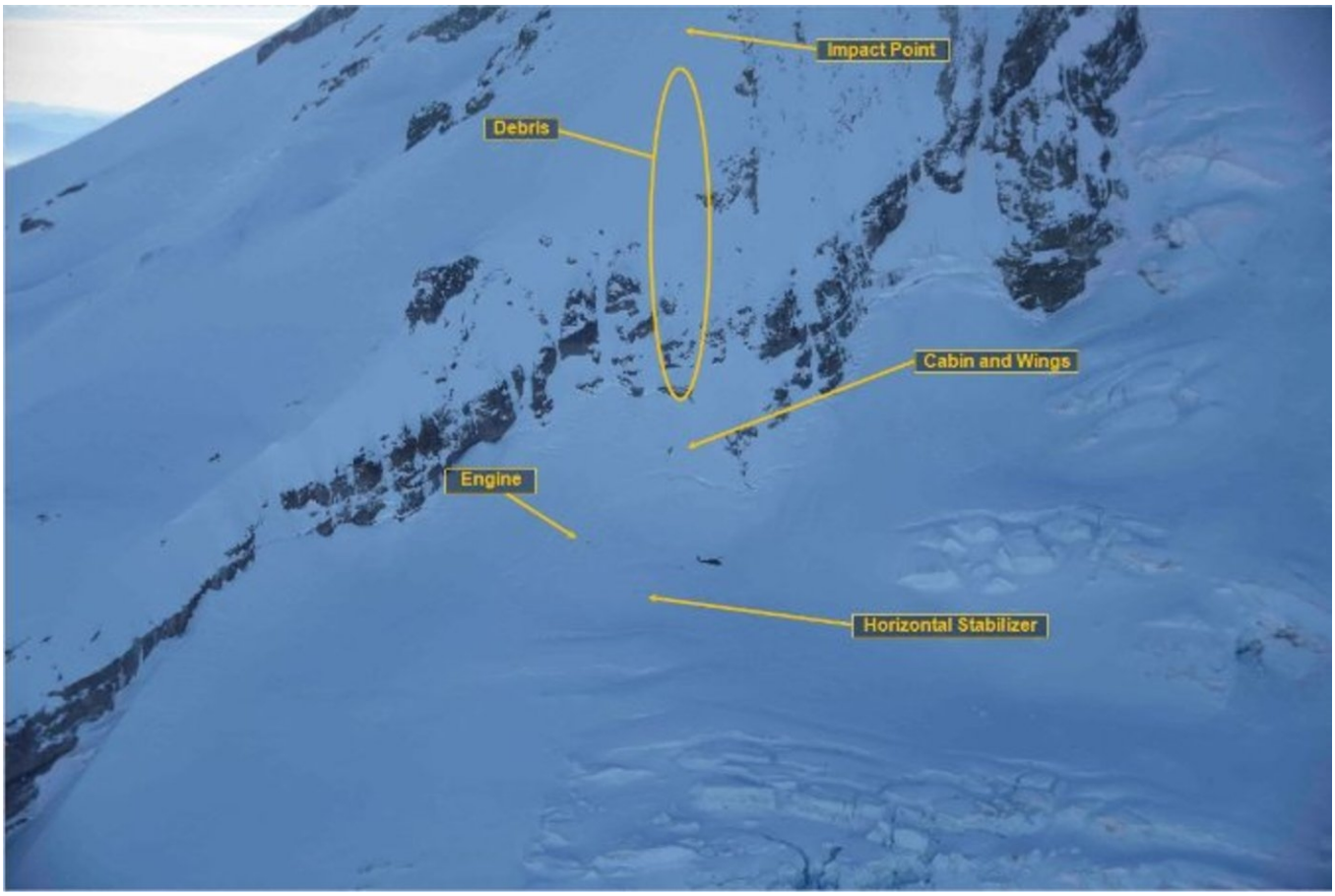

Figure 2. Accident Site

Medical and Pathological Information

According to the autopsy performed by the Office of the State Medical Examiner, Clackamas, Oregon, the pilot's cause of death was multiple blunt force traumatic injuries. The medical examiner noted the finding of a recent diagnosis of hepatitis and early cirrhosis of the liver. No other significant natural disease was identified.

Postmortem toxicological testing by the Oregon State Medical Examiner's Department of State Police Forensic Laboratory was positive for oxycodone (0.35 mg/L), noroxycodone (0.30 mg/L), and oxymorphone (<0.010 mg/L). Cannabinoids and modafinil were also present in chest cavity blood but not quantified. Toxicological examination of the pilot's urine detected the presence of oxycodone, noroxycodone, cannabinoids, and modafinil.

Toxicology testing by the FAA Forensic Sciences Laboratory revealed the inactive metabolite of marijuana, THCA, at 3 ng/mL in the pilot's chest cavity blood. THC, its psychoactive metabolite 11-hydoxy-delta-9-THC (20.3 ng/mL), and THCA (86.1 ng/mL) were detected in the pilot's urine. Oxycodone was detected in both chest cavity blood and urine (0.368 mg/L and 7.993 mg/L, respectively). The oxycodone metabolite oxymorphone was detected in chest cavity blood and in urine (14.747 mg/L). Mitragynine and modafinil were detected in chest cavity blood and urine; 7-hydroxymitragynine and metoclopramide were only detected in urine.

Oxycodone is a synthetic opiate used to treat severe pain. Among other precautions, the medication carries the warning that use may impair mental or physical ability to drive a car or operate machinery. Its usage has a high risk of addiction, abuse, and misuse. Therapeutic levels are typically between 0.013 to 0.099 mg/L for infrequent users, but tolerance, where increasing doses are needed to achieve the same effect, is seen in more frequent and chronic users. One study found that the range of oxycodone concentrations in 37 postmortem cases where oxycodone was an incidental finding was 0.017 to 1.300 mg/L.

The primary metabolite of oxycodone is noroxycodone, which is a considerably weaker analgesic. Oxymorphone is also a metabolite of oxycodone; while usually produced in lesser amounts, it also has analgesic properties. Oxycodone and its metabolites are excreted in the urine. The elimination half-life of oxycodone is about 4 hours.

Oxycodone is on the FAA pharmaceutical do not fly list. The pilot did not mention the use of Oxycodone to the aviation medical examiner at the time of his last application for an FAA medical certificate.

Mitragynine and 7-hydroxymitraginine are the primary psychoactive compounds found in the leaves of the southeast Asian kratom tree. It has stimulant effects at low doses, such as increased alertness, physical energy, and talkativeness, and sedative effects at high doses. It is considered a drug of concern by the U.S. Drug Enforcement Administration (DEA) , and the U.S. Food and Drug Administration (FDA) has asked the DEA to attempt to place the drug into Schedule 1 drugs with high potential for abuse and no medical value, similar to heroin. The FDA has not approved mitragynine for any medical use.

Metoclopramide is a prescription medication for short-term gastroesophageal reflux treatment for those who do not respond to conventional therapy. Side effects include restlessness, drowsiness, and fatigue. Metoclopramide can impair physical and mental abilities needed to drive a motor vehicle or operate machinery. Additive sedative effects occur when taken concurrently with alcohol, sedatives, or narcotics.

The FAA states that airmen should not fly while using any medication that carries a label precaution or warning that it may cause drowsiness or advises the user, "be careful when driving a motor vehicle or operating machinery.

Personal medical records showed that the pilot had experienced a back injury requiring surgery in December 2017. At medical office visits in December 2018, he complained of fatigue, poor sleep, and continued back pain. He reported use of ibuprofen, kratom, and marijuana. The pilot had a recent

diagnosis of hepatitis C and a diagnosis of esophageal reflux.

The pilot's wife reported that he was recently experiencing lower back problems, and she presumed it was because of the physical nature of his work, which involved installing commercial flooring. He was planning to have surgery to resolve the problems the month following the accident.

The mechanic who performed the propeller balancing on the day of the accident stated that the pilot usually appeared in good health; however, he noted that on the morning of the accident, the pilot appeared in pain, was hobbling, and was having trouble getting in and out of the airplane.

Additional Information

The pilot's wife stated that she had flown with him around Mount Hood on multiple occasions and provided a video of a previous flight. The video revealed the airplane flying in a clockwise direction around the north face of the mountain, about 1 to 2 miles from and level with the summit. Toward the end of the recording, the airplane flew almost directly over the area of the accident site.

The FAA published "Tips on Mountain Flying," (FAA-P-8740-60), in 1999. The "Mountain Wave" and "Wind Aloft" sections included the following:

When the wind speed is above about 25 knots and flowing perpendicular to the ridge lines, the air flow can form waves, much like water flowing over rocks in a stream bed. The waves form downwind from the ridge line and will be composed of very strong up and down drafts, plus dangerous rotor action under the crests of the waves. If enough moisture is present, lenticular clouds can form to give a visual indication of the wave action.

The winds aloft reports are very important to your mountain flight planning process. You should pay close attention to the forecasts at and above the mountain ridges of the terrain you will be flying into. In the west, that usually means the 9,000 and 12,000 foot forecasts. In the east, you will look at lower winds. Winds above 25 knots at these levels should be a warning sign that should cause you to think about delaying your trip.

Administrative Information

Investigator In Charge (IIC):	Simpson, Eliott
Additional Participating Persons:	Tim Gunther; Federal Aviation Administration FSDO; Hillsboro, OR Mark Platt; Lycoming Engines; Williamsport, PA
Report Date:	
Last Revision Date:	
Investigation Class:	Class 2
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=98913