



# Aviation Investigation Final Report

<b>Location:</b>	Warm Springs, Oregon	<b>Accident Number:</b>	WPR21LA082
<b>Date &amp; Time:</b>	January 9, 2021, 13:37 Local	<b>Registration:</b>	N3RB
<b>Aircraft:</b>	Cessna 560	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>	Medical event	<b>Injuries:</b>	1 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

During the first 15 minutes of the flight, the pilot of the complex, high performance, jet airplane appeared to have difficulty maintaining the headings and altitudes assigned by air traffic controllers, and throughout the flight, responded intermittently to controller instructions. After reaching an altitude of 27,000 ft, the airplane began to deviate about 30° right of course while continuing to climb. The controller alerted the pilot, who did not respond, and the airplane continued to climb. Two minutes later, the airplane entered a tight, spiraling descent that lasted 8 minutes until the airplane impacted the ground at high speed in a right-wing-low attitude.

The airplane was highly fragmented on impact; however, examination did not reveal any evidence of structural failure, in-flight fire, a bird strike, or a cabin depressurization event, and both engines appeared to be producing power at impact.

Although the 72-year-old private pilot had extensive flight experience in multiple types of aircraft, including jets, he did not hold a type rating in the accident airplane, and the accident flight was likely the first time he had flown it solo. He had received training in the airplane about two months before the accident but was not issued a type rating and left before the training was complete. During the training, he struggled significantly in high workload environments and had difficulty operating the airplane’s avionics suite, which had recently been installed. He revealed to a fellow pilot that he preferred to “hand fly” the airplane rather than use the autopilot.

The airplane’s heading and flight path before the spiraling descent were consistent with the pilot not using the autopilot; however, review of the flight path during the spiraling descent indicated that the speed variations appeared to closely match the airplane’s open loop phugoid response as documented during manufacturer flight tests; therefore, it is likely that the pilot was not manipulating the controls during that time.

Review of the pilot’s medical history uncovered a number of conditions and medications that the pilot had not reported to the Federal Aviation Administration. The severity of injuries precluded obtaining any useful information regarding natural disease during autopsy, and no toxicology was performed. None of the pilot’s known medical conditions or medications would have directly caused incapacitation, but the pilot may have had undiagnosed disease or had some acute event that would have incapacitated him. His age, gender, high blood pressure, and hypertension placed him at risk for a heart attack or stroke. While the available evidence is consistent with a loss of airplane control following pilot incapacitation, the reason for his incapacitation could not be determined.

## Probable Cause and Findings

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

A loss of airplane control due to pilot incapacitation for reasons that could not be determined.

### Findings

<b>Personnel issues</b>	Aircraft control - Pilot
<b>Personnel issues</b>	Other loss of consciousness - Pilot
<b>Not determined</b>	(general) - Unknown/Not determined

## Factual Information

### History of Flight

<b>Enroute-climb to cruise</b>	Medical event (Defining event)
<b>Uncontrolled descent</b>	Collision with terr/obj (non-CFIT)

On January 9, 2021, at 1337 Pacific standard time, a Cessna 560, N3RB, was destroyed when it was involved in an accident near Warm Springs, Oregon. The pilot, who was the sole occupant, was fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 flight.

The pilot filed an instrument flight rules (IFR) flight plan to Boise Air Terminal/Gowen Field, Boise, Idaho. The reason for the flight could not be determined; however, family members and acquaintances stated that the pilot usually travelled with his dog, and because on this occasion he did not, he was likely planning to return that day. A friend also stated that Boise was a typical lunch destination for the pilot, and it would not be unusual for him to make a return trip in one day.

Security video footage from a fixed base operator at the departure airport in Troutdale, Oregon, revealed that the pilot boarded the airplane and closed the cabin door at 1244. Federal Aviation Administration (FAA) air traffic control audio recordings indicated that, about five minutes later, he initiated radio contact with the clearance controller and requested to open his IFR clearance. The controller provided the clearance, the pilot read it back correctly, and about nine minutes later, the pilot stated that he was ready to taxi and that he had information Foxtrot. The controller stated that information Golf was current and provided instructions to taxi to runway 07. The pilot replied, but only stated the altimeter setting, “3025”, and the ground controller asked him to respond with the full taxi instructions. The pilot responded, and about 1300 the airplane began to taxi to the runway hold short line.

The airplane arrived at the runway hold short line about 1304, and the ground controller asked if the pilot was ready for departure, to which the pilot replied, “just a minute.” About two minutes later, a partial transmission of the pilot’s voice could be heard, and the local controller asked twice if it was N3RB. The pilot stated that it was him, and the controller issued a takeoff clearance. The pilot responded, and at 1307, the airplane had taken off.

The pilot subsequently contacted the Portland Approach controller and was provided instructions to climb and maintain 15,000 ft mean sea level (msl). The pilot responded with, “up to 15,” following which the controller confirmed radar contact and instructed the pilot to turn left to a heading of 310°. The pilot did not respond, airplane did not turn, and over the next minute, both the Portland Approach and Troutdale Tower controllers made multiple attempts to contact the pilot. On the fifth attempt by the approach controller, the pilot responded and was again instructed to turn left. Automatic Dependent Surveillance –

Broadcast (ADS-B) data indicated that the airplane then began to turn left; after one minute, the controller issued a heading of 180° and told the pilot to expect vectors for the TIMEE intersection after reaching 10,000 ft. The pilot did not respond until the controller issued the instructions a second time.

About one minute later, the airplane had reached 10,000 ft msl and was on a southbound heading. The controller then issued a clearance direct to the TIMEE intersection.

The pilot responded, and the airplane began to turn left; however, its heading was about 15° left of that required to reach the TIMEE intersection.

By 1315:30, the airplane had reached an altitude of 12,000 ft msl, and the controller asked the pilot to verify he was direct TIMEE. The pilot responded that he was; however, the airplane's track had not changed, and the airplane was flying directly toward Mount Hood, about 27 miles to the east-southeast.

After the airplane had reached an altitude of 13,000 ft, the controller issued a right turn to 130°, and the pilot repeated the instructions correctly, but the airplane turned left. The controller asked of the pilot was flying direct TIMEE, to which the pilot replied, "I was."

The controller explained that the pilot was in fact flying northeast and provided another right turn to a heading of 130°. The pilot responded, and the airplane began a right turn, eventually rolling out on a 130° track, after which the controller issued a frequency change to Seattle Center. The pilot responded with the correct frequency, but about one minute later, he called back with a confirmation of the Seattle center frequency.

By this time, the airplane had reached an altitude of 14,000 ft, and after the pilot made contact with the Seattle Center controller, the controller immediately issued a low altitude alert warning, stating that the airplane was just above the minimum IFR altitude for that sector (at this time, the airplane was flying just south of the peak of Mount Hood). The controller then issued him a clearance to 23,000 ft msl.

The pilot responded, and the airplane continued to climb. The controller then asked the pilot if he was having problems with his radio, to which responded, "no, I think it's cleared up now, radio loud and clear." The controller subsequently issued the pilot with a clearance direct to BOI.

About 1323, as the airplane reached an altitude of 19,000 ft, the pilot was provided a new frequency for Seattle Center. He responded with an incorrect frequency and was corrected by the controller. The pilot then successfully made contact with the new controller, who issued a clearance to climb to 37,000 ft msl. The pilot responded, and the airplane continued to track in the general direction of BOI while continuing to climb.

At 1327, the airplane had reached an altitude of 27,000 ft when it began to deviate to the right while continuing to climb. The controller alerted the pilot that he was about 30° right of course, but the pilot did not respond. The airplane continued to climb until 1328:45, when it reached its highest altitude of 31,000 ft. The airplane began to descend and remained for the next eight

minutes in a spiraling and descending 1-mile radius right turn. (see Figure 1.) The last ADS-B target was recorded at 1336:27, with the airplane on a northwest heading at an altitude of 3,800 ft.

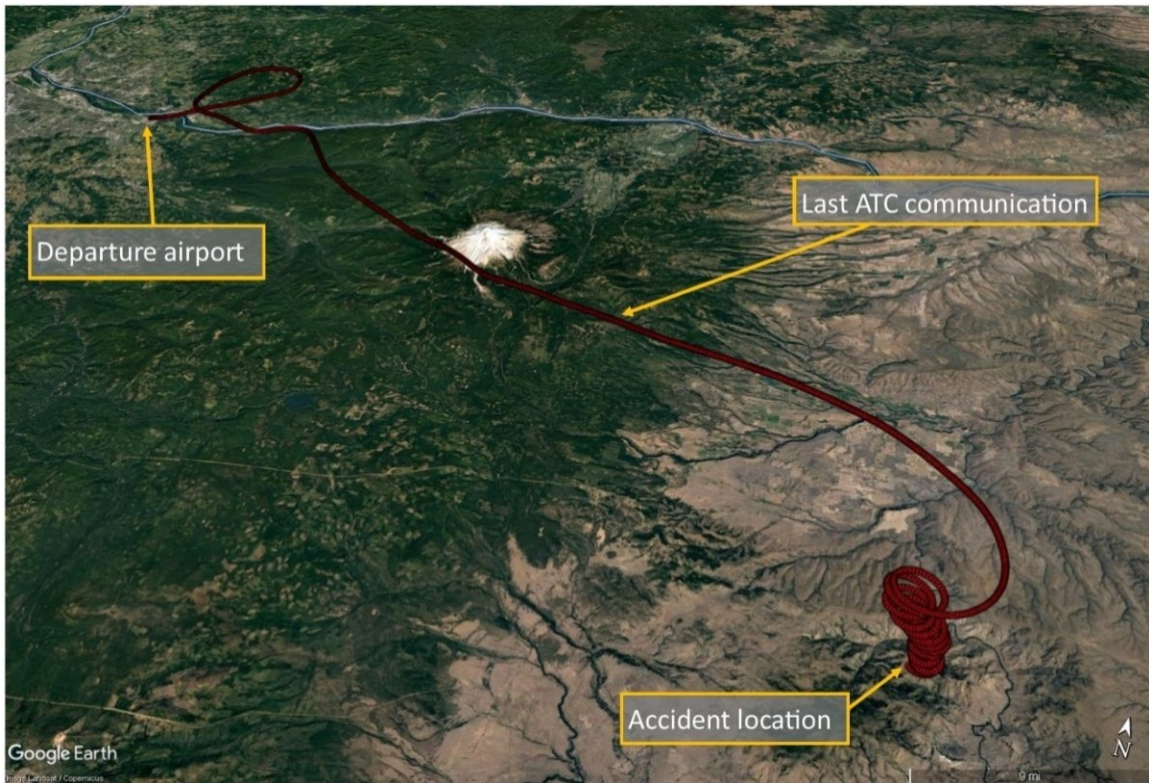


Figure 1 – Flight track

The airplane impacted the ground in the Mutton Mountain Range, at an elevation of 3,600 ft msl about 450 ft north of the last ADS-B target.

Hikers in the vicinity of the accident took photos of the smoke rising from the debris field. One of the photos captured a single, circular contrail at high altitude above the accident site. Likewise, the pilot of a single-engine airplane flying in the area, was able to capture the circular contrail on a forward-mounted video camera. The images did not reveal any evidence of smoke trails. A commercial airline flight crew overflying the area saw the airplane just before impact and did not see any vapors or smoke trailing from it.

## Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	72, Male
<b>Airplane Rating(s):</b>	Single-engine land; Single-engine sea; Multi-engine land; Multi-engine sea	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	4-point
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	
<b>Medical Certification:</b>	Class 2 With waivers/limitations	<b>Last FAA Medical Exam:</b>	September 2, 2020
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	(Estimated) 12350 hours (Total, all aircraft), 15 hours (Total, this make and model)		

The pilot held a private pilot certificate, and although he held type ratings for the Grumman G-111 Albatross and Learjet, FAA records did not indicate that he held a type rating for the Citation 560.

The pilot had taken Citation 560 training toward the end of 2020 at a facility in Arizona. The owner of that facility provided some of the flight training and stated that, when the pilot had initially approached him, his plan was to accomplish both his commercial pilot certificate, Citation type rating, and single-pilot exemption consecutively. They developed a custom syllabus to meet these goals; however, after the first few flights, it became apparent that, while the commercial and Citation ratings were possible, the single-pilot exemption would likely take significantly more time to accomplish. The decision was then made to abandon the single-pilot exemption and focus on a “crew method” of training.

As the training progressed, the pilot encountered significant difficulty mastering the operation of the autopilot and the Garmin 750 avionics suite, which had recently been installed. The owner of the training facility stated that the pilot struggled significantly in high-workload environments, such as while flying instrument approaches, where multiple configuration changes needed to be accomplished in a short amount of time, and that the presence of the Garmin 750 appeared to aggravate the situation. He stated that as his instructor/first officer, he was never able to transition from “instructor” into “first officer” mode. The pilot would typically make some progress on one flight, but during following flights, the results could be unpredictable, and the pilot could not make consistent, repeatable progress mastering the airplane. Additionally, although the pilot had a good general grasp of standard airwork, he was struggling in particular with steep turns.

After over a dozen flights over the course of 3 weeks, the training was not complete, and the pilot decided that he needed to leave to take care of some business at home and planned to return later to resume training. At that time, he had not performed to a level sufficient to be issued the type rating.

Since October 2020, the pilot had an arrangement with a contract pilot who flew the accident airplane, while he sat in the right seat. The contract pilot stated that he did not get a chance to see the pilot fly the airplane; however, during one of their flights, the pilot stated that he preferred to “hand fly” the airplane rather than use the autopilot, because he did not consider himself a professional pilot.

Review of historical flight data and statements provided by acquaintances and other pilots who flew with him indicated that the accident flight was likely the first time the pilot had flown the airplane solo.

### Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Cessna	<b>Registration:</b>	N3RB
<b>Model/Series:</b>	560	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1989	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	560-0035
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	11
<b>Date/Type of Last Inspection:</b>	January 6, 2020 Continuous airworthiness	<b>Certified Max Gross Wt.:</b>	16630 lbs
<b>Time Since Last Inspection:</b>	100 Hrs	<b>Engines:</b>	2 Turbo fan
<b>Airframe Total Time:</b>	13727.8 Hrs as of last inspection	<b>Engine Manufacturer:</b>	P&W CANADA
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	JT15D 5 SER
<b>Registered Owner:</b>	SX TRANSPORT LLC	<b>Rated Power:</b>	2900 Lbs thrust
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

Ownership of the airplane was transferred to the pilot in July 2020. As part of the negotiations for sale, an avionics upgrade was performed in April 2020, which included the addition of a Garmin 650 Xi and 750Xi avionics suite, along with a Garmin 335R ADS-B transponder, and a GDL 69A datalink receiver.

The current maintenance records were not located and were presumed to have been destroyed in the accident. The most recent recovered records indicated that a Phase B check was completed on January 6, 2020, at an airframe total time of 13,727.8 flight hours.

The airplane was serviced with 150 gallons of Jet A fuel 6 days before the accident.

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	DLS,247 ft msl	<b>Distance from Accident Site:</b>	41 Nautical Miles
<b>Observation Time:</b>	13:53 Local	<b>Direction from Accident Site:</b>	357°
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	Overcast / 10000 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	8 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	70°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	30.4 inches Hg	<b>Temperature/Dew Point:</b>	4°C / 1°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Troutdale, OR (TTD)	<b>Type of Flight Plan Filed:</b>	IFR
<b>Destination:</b>	Boise, ID (BOI)	<b>Type of Clearance:</b>	IFR
<b>Departure Time:</b>	13:07 Local	<b>Type of Airspace:</b>	Class E

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Destroyed
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	On-ground
<b>Ground Injuries:</b>		<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Fatal	<b>Latitude, Longitude:</b>	44.996186,-121.13765

Due to the Covid-19 pandemic, neither the NTSB nor the FAA responded to the accident site, and onsite photographic documentation was accomplished by local law enforcement personnel. A complete airframe and engine examination was later performed by representatives from the NTSB, FAA, Textron Aviation, and Pratt and Whitney Canada International at a recovery facility.

Review of photographs of the accident site revealed a 1,500-ft-long debris field on an approximate heading of 330° magnetic. The entire airplane sustained significant fragmentation and thermal damage, with the right wing displaying the most extensive fragmentation. All major structural and flight control surfaces were recovered in the immediate vicinity of the accident site. The thrust reverser assemblies were found in the stowed position and both engines displayed damage signatures consistent with operation at impact.

There was no evidence of bird strike, in-flight fire, or door opening.



Remnants of three emergency oxygen system mask assemblies were located. Two of the assemblies sustained damage preventing an assessment of their operational status, but the mask for one passenger system remained within its housing assembly, indicating that the oxygen system had not deployed. According to the Pilot's Operating Handbook, should the cabin altitude exceed 13,500 +/-600 ft, an altitude sensing switch will electrically actuate the passenger solenoid valve, supplying 70-psi oxygen pressure to the passenger manifold. This pressure is sufficient to operate the passenger mask actuators, deploy the doors, and drop the continuous-flow masks at each passenger seat. The oxygen control panel was located; however, the control valve switch was detached, and a determination of its status at the time of the accident could not be ascertained. The valves for the oxygen cylinder were broken off; therefore, the tanks were empty, and their oxygen quantity at impact could not be determined.

## **Flight recorders**

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The airplane was equipped with a cockpit voice recorder that was recovered and sent to the NTSB Recorders Division for data extraction. Examination revealed that the recorder had sustained a pre-existing internal failure and its recording tape contained no information from either the accident or any previous flights.

## **Medical and Pathological Information**

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During the 72-year-old pilot's most recent medical examination, on September 2, 2020, he reported having seasonal allergies and the use of loratadine (Claritin) to treat them. This drug is not considered impairing.

According to the autopsy performed by the Wasco County Medical Examiner's Office, the cause of death was generalized blunt force trauma and the manner of death was accident. Due to the severity of injury, a limited external examination was performed, and no specimens were submitted for toxicology testing. No natural disease was identified in the limited exam.

According to personal medical records, the pilot had a number of longstanding diagnoses, including anxiety, depression, high blood pressure, seasonal allergies, glaucoma, and high cholesterol.

His regular medications over the year preceding the accident included alprazolam and sertraline for his psychiatric disease, atorvastatin and fenofibrate for his high cholesterol, lisinopril-hydrochlorothiazide for his blood pressure, and three different eye drops to treat his glaucoma. In March 2020, he reported using cetirizine/pseudoephedrine (Zyrtec-D) to treat his seasonal allergies. He did not report the use of these medications during his most recent FAA medical exam.

Alprazolam is an FAA, “Do Not Fly” medication; air medical examiners are instructed not to issue medical certificates to applicants who use it. Sertraline, an SSRI medication, cannot be taken unless authorized by the FAA. The FAA considers cetirizine a conditionally acceptable sedating medication that may be used occasionally one to two times per week, but not for daily use.

Family members and friends of the pilot who listened to the audio recordings of the pilot’s interaction with air traffic control stated that he was generally quiet and soft spoken and that his voice sounded normal to them.

## Tests and Research

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### Performance Study

Interpolation of the ADS-B data during the spiraling descent indicated a right bank angle of between 60° and 70° and a descent rate of between -2,500 to -5,000 ft/min to impact.

The data also revealed 50- to 100-knot oscillations in groundspeed during the descent. The data was compared to flight test data for the Citation 560 series airplane, specifically the data used to simulate the longitudinal, open-loop, long period (or phugoid) response of the airplane after a pitch disturbance.

The data for the accident airplane displayed longitudinal dynamic characteristics that were similar to the flight test data for over a period of oscillation, or approximately 90 seconds.

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Simpson, Elliott
<b>Additional Participating Persons:</b>	Darren K Vaughn; FAA FSDO; Portland, OR Jennifer Barclay; Textron Aviation ; Wichita, KS Nora Vallée ; Transportation Safety Board of Canada
<b>Original Publish Date:</b>	August 12, 2022
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class 3</a>
<b>Note:</b>	The NTSB did not travel to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=102508">https://data.nts.gov/Docket?ProjectID=102508</a>

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).