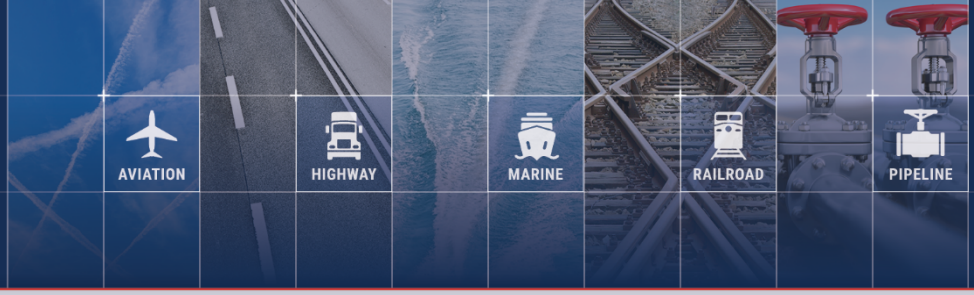

Aviation Investigation Final Report

Location:	Seligman, Arizona	**Accident Number:**	WPR22FA345
Date & Time:	September 13, 2022, 11:00 Local	**Registration:**	N43605
Aircraft:	Piper PA46	**Aircraft Damage:**	Substantial
Defining Event:	VFR encounter with IMC	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The student pilot was enroute at an altitude about 17,700 ft mean sea level (msl) on a cross-country flight with a passenger in his high-performance airplane. The pilot was receiving visual flight rules flight following services from air traffic control, who advised him of an area of moderate to heavy precipitation at the airplane's 12 o'clock position. The pilot replied that he had been able to "dodge" the areas of precipitation, but that they were getting bigger. There were no further communications from the pilot. Shortly thereafter, the airplane entered a left turn that continued through 180° before the airplane began a descent from its cruise altitude. The flight track ended in an area of moderate to extreme reflectivity as depicted on weather radar and indicated that the airplane was in a rapidly descending right turn at 13,900 ft when tracking information was lost.

The wreckage was scattered across a debris field about 2 miles long. Examination of the wreckage revealed lateral crushing along the left side of the fuselage and the separation of both wings and the empennage. Wing spar signatures and empennage and wing impact marks suggested positive wing loading before the wing separation and in-flight breakup.

The area of the accident site was included in a Convective SIGMET advisory for thunderstorms, hail, and wind gusts of up to 50 kts. A model atmospheric sounding near the accident site indicated clouds between about 15,000 ft and 27,000 ft, as well as the potential for light rime icing from 15,500 ft to 23,000 ft.

Review of the pilot's logbook revealed that he had about 47 total hours of flight experience, with about 4 hours of instruction in simulated instrument conditions. A previous flight instructor reported that the pilot displayed attitudes of "anti-authority" and "impulsivity."

Ethanol was detected in two postmortem tissue specimens; however, based on the distribution and amount detected, the ethanol may have been from postmortem production, and it is unlikely to have contributed to the crash.

Fluoxetine, trazodone, and phentermine were also detected in the pilot's postmortem toxicology specimens. The pilot had reported his use of fluoxetine for anger and irritability. Anger and irritability are nonspecific symptoms that may or may not be associated with mental health conditions, including depression, certain personality disorders, and bipolar disorder. These conditions may be associated with impulsive behavior, increased risk taking, lack of planning, not appreciating consequences of actions, and substance use disorders. Both trazodone and phentermine have the potential for impairing effects; however, an unimpaired pilot with the pilot's relative inexperience would have been likely to lose aircraft control during an encounter with instrument meteorological conditions (IMC). It is therefore unlikely that the pilot's use of trazodone and phentermine affected his handling of the airplane in a way that contributed to the crash.

Based on review of the pilot's Federal Aviation Administration (FAA) medical certification file, no specific conclusion can be drawn regarding any underlying psychiatric condition that may have contributed to his decision to attempt and continue the flight into IMC, as that decision was consistent with his previous pattern of risk-tolerant behavior. The pilot had not formally been diagnosed with a mental health disorder in his personal medical records reviewed other than substance use disorders. The psychological and psychiatric evaluations reviewed were not for diagnostic and treatment purposes, but for evaluation for FAA medical certification, and therefore did not generate diagnoses. There is evidence that the pilot had a pattern of poor decision-making, high-risk tolerance, and impulsive behavior.

The circumstances of the accident are consistent with the student pilot's decision to continue into an area of deteriorating weather conditions, his encounter with instrument meteorological conditions and convective activity, and loss of visual references, which resulted in spatial disorientation and a loss of aircraft control. During the descent, the airplane exceeded its design limitations, resulting in structural failure and an in-flight breakup.

Probable Cause and Findings

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

The student pilot's continued visual flight into instrument meteorological conditions, which resulted in spatial disorientation, a loss of control, exceedance of the airplane's design limitations, and in-flight breakup.

Findings

Personnel issues	Total experience - Pilot
Personnel issues	Total instruct/training recvd - Pilot
Personnel issues	Decision making/judgment - Pilot
Aircraft	Descent rate - Capability exceeded
Aircraft	Airspeed - Capability exceeded
Environmental issues	Thunderstorm - Decision related to condition
Environmental issues	Clouds - Response/compensation

Factual Information

History of Flight

Enroute	VFR encounter with IMC (Defining event)
Enroute-change of cruise level	Aircraft structural failure

On September 13, 2022, about 1100 mountain standard time, a Piper PA46-310P airplane, N43605, was substantially damaged when it was involved in an accident near Seligman, Arizona. The student pilot and passenger were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot departed from Double Eagle II Airport (AEG), Albuquerque, New Mexico, and proceeded west, climbing the airplane to about 17,200 ft msl, and established visual flight rules flight following services with air traffic control. At 1041, the pilot contacted Los Angeles Air Route Traffic Control Center and advised that the airplane was at 17,700 ft. At 1055, the controller advised the pilot of an area of moderate to heavy precipitation at the airplane's twelve o'clock. The pilot indicated that they had been able to "dodge" areas of precipitation thus far, but that they were getting bigger. ADS-B flight track information showed that, about this time, the airplane entered a left turn to the south at an altitude about 17,700 ft. After about 180° of turn, the airplane began to descend as it continued the left turn. About 1103, the controller noted that the airplane had changed course and asked the pilot if he needed assistance; however, there was no response from the pilot.

The end of the flight track data indicated that the airplane was in a descending right turn at an altitude of 13,900 ft. The end of the flight path was coincident with a cell of heavy to extreme reflectivity as depicted on weather radar.

Security video located near the accident site showed heavy rain and gusty wind conditions at the time of the accident. An object was noted falling vertically from the cloud layer near the area of the accident site.

Student pilot Information

Certificate:	Student	**Age:**	42,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:**	
Medical Certification:	None None	**Last FAA Medical Exam:**	December 30, 2020
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	December 30, 2020
Flight Time:	47 hours (Total, all aircraft)		

Passenger Information

Certificate:		**Age:**	42,Female
Airplane Rating(s):		**Seat Occupied:**	Right
Other Aircraft Rating(s):		**Restraint Used:**	Unknown
Instrument Rating(s):		**Second Pilot Present:**	No
Instructor Rating(s):		**Toxicology Performed:**	
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:			

Review of the pilot's logbook indicated that, since December 2020, the pilot accumulated a total of 47 hours of flight experience, with 12.5 hours recorded in the accident airplane. The logbook indicated that the pilot had received a total of 4 hours of training in simulated instrument conditions.

In an interview with an FAA inspector, the pilot's flight instructor stated that he provided the accident pilot with about 20 hours of instruction in the pilot's Cessna 182. The instructor stopped working with the pilot when the pilot was unable to obtain a medical certificate. The instructor's last flight with the pilot was in the accident airplane about 2 months before the pilot purchased the airplane. The instructor stated that the pilot seemed to fly well but described him as "anti-authority" and "impulsive" and stated that the pilot tended to fly fast with higher than normal power settings. The instructor further stated that the pilot continued to fly with an unknown commercial pilot after they stopped flying together. During that time, the pilot was rumored to fly solo in his Cessna 182.

The pilot's most recent application for a medical certificate was deferred. In a subsequent evaluation by a Human Intervention Motivational Study (HIMS) aviation medical examiner, the pilot reported a history of alcohol and drug use. The pilot also reported that he was taking

fluoxetine for anger and irritability. The pilot was issued a final denial letter by the Federal Aviation Administration on September 1, 2022, which stated that he was not eligible for medical certification or for further reconsideration.

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N43605
Model/Series:	PA46 310P	**Aircraft Category:**	Airplane
Year of Manufacture:	1984	**Amateur Built:**	
Airworthiness Certificate:	None	**Serial Number:**	46-8408052
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Continental
ELT:		**Engine Model/Series:**	TSIO-520BE
Registered Owner:	WILSON CHAD ALLEN	**Rated Power:**	310 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

The six-seat, low-wing, retractable landing gear airplane with cabin pressurization capability was manufactured in 1984. The airplane was powered by a Continental Motors TSIO-520BE engine, rated at 310 horsepower. The engine drove a two blade, metal, constant speed propeller. Each propeller blade was equipped with an electric deice boot.

Airplane documentation and maintenance logbooks were not available for review.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KCMR,6677 ft msl	**Distance from Accident Site:**	28 Nautical Miles
Observation Time:	10:55 Local	**Direction from Accident Site:**	113°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots / 18 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	200°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.19 inches Hg	**Temperature/Dew Point:**	20°C / 10°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Albuquerque, NM (AEG)	**Type of Flight Plan Filed:**	None
Destination:	Henderson, NV (HND)	**Type of Clearance:**	Traffic advisory;VFR flight following
Departure Time:	09:08 Local	**Type of Airspace:**	Class E

WSR-88D2 Level-II base reflectivity weather radar imagery from the Flagstaff, Arizona, site (KFSX) is presented in Figure 1. The end of the accident airplane's flight path was coincident with a cell of heavy-to-extreme reflectivity.

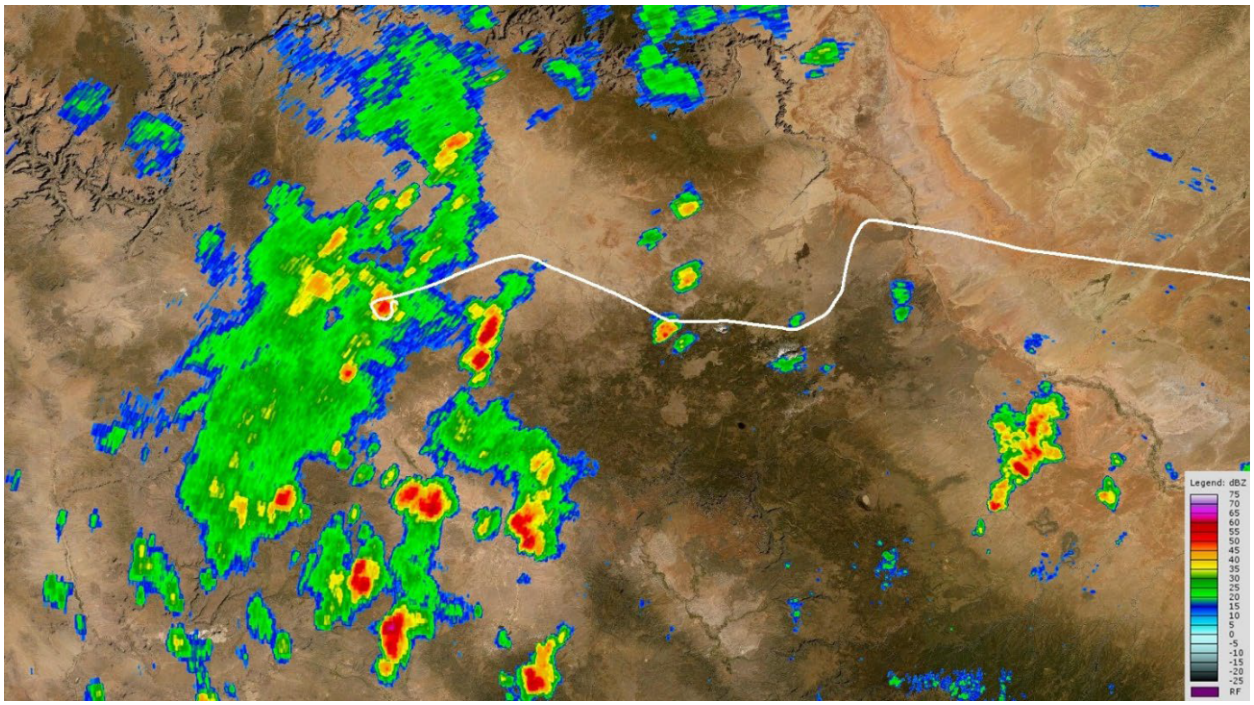

Figure 1-KFSX 0.484° Level-II base reflectivity product from a sweep initiated at 1059:00. The accident aircraft's flight path through 1100:25 is depicted by the white line. Reflectivity has been "smoothed" and reflectivity values less than 10 dBZ have been masked out.

A review of the Earth Networks Total Lightning Network lightning database revealed lightning activity between 1045 and 1105 around the accident location.

A High-Resolution Rapid Refresh model sounding near the accident location depicted winds aloft about 25 knots from the southwest at an altitude of 15,000 ft. Clouds were indicated between about 15,000 and 20,000 ft. The most unstable Convective Available Potential Energy parameter was 714 Joules/kilogram. Maximum vertical velocity for the most unstable atmosphere was calculated as about 7,675 ft per minute. Light rime icing potential was indicated between about 15,500 ft and 23,500 ft.

A Convective SIGMET advisory was issued by the National Weather Service Aviation Weather Center at 0955 for an area that included the accident location. The SIGMET advised of an area of thunderstorms with cloud tops to FL390 (39,000 ft). This SIGMET was superseded by another SIGMET, issued at 1055. In addition to the area of thunderstorms, this SIGMET advised of hail up to one inch in diameter and wind gusts to 50 kts possible.

Whether and to what extent the pilot obtained weather information before departure or during the flight was not determined.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	35.4839,-112.72019(est)

The accident site comprised a debris field spread about 2 miles across desert terrain. The left flap and rudder were not located during the recovery efforts.

Examination of the recovered wreckage revealed lateral crushing along the length of the left side of the fuselage and the separation of both wings and the empennage. Postaccident examination of the wreckage revealed no evidence of any preimpact mechanical malfunctions or failures that would have precluded normal operation.

The fuselage was crushed laterally along the left side of the fuselage, reducing the width of the cabin area to about half. The engine remained attached to the fuselage and exhibited impact damage to the left side. The propeller assembly separated from the engine crankshaft propeller flange. The propeller blades remained attached to the hub and did not exhibit evidence of rotation at the time of impact. The spinner was crushed on one side. The main cabin door remained attached to the fuselage and the nose baggage door separated. The occupied seats and instrument panel were crushed. Examination of the instruments revealed no nonvolatile memory, and switch positions could not be determined. The fuselage upper exterior surface revealed black rubber transfer marks. Control cable continuity was established from near the cabin area to the control surfaces, through overload separations of the aileron control cables. Damage and compression of the fuselage structure precluded continuity determination within the cabin.

The left wing separated at the wing root area. The left wing spar inboard section was visible and remained attached to the main wreckage. The spar end revealed separation signatures consistent with positive wing loading. The fracture surfaces exhibited angled, dull, grainy appearances consistent with overstress separation. The inboard upper spar cap was deformed upwards near the separation.

The separated outboard left wing was recovered in two large sections and separated near wing station (WS) 135. The inboard section of the wing displayed trailing edge damage; the flap was not attached. The main landing gear remained attached to the inboard section. The aileron remained attached to the outboard wing section; the tip was impact damaged. The upper wing skin was damaged and curled outboard from the separation. The fracture surfaces between the two outboard left-wing sections exhibited angled, dull, grainy appearances consistent with an overstress separation or positive wing loading.

The left aileron cables remained attached to their respective components and were separated near the wing root with the ends exhibiting a splayed, broomstraw appearance consistent with tension overload.

The lower surface of the left aileron displayed an imprint about 20 inches from the inboard end consistent in appearance with button head rivets spaced about 1 inch apart.

The right wing separated near WS 86, leaving about 4 ft of the wing attached to the fuselage. Both the main and the aft wing spars were deformed upwards at the fracture location consistent with positive wing loading. The fracture surfaces were consistent with overstress separation. The wing displayed leading edge damage near WS 156.

The right aileron was separated from the wing and was impact damaged. The aileron cables remained attached to their respective components and were separated near WS 100 with the ends exhibiting a splayed, broomstraw appearance consistent with tension overload. The flap was found in two sections; the inboard portion remained attached to the inboard wing section, which was attached to the fuselage. The outboard flap section was found in the debris field and was impact damaged.

The empennage separated from the fuselage near the aft pressure bulkhead at fuselage station (FS) 250 but remained attached to the elevator and rudder control cables.

The vertical stabilizer forward and aft spars separated from the empennage at their roots. The vertical stabilizer skin separated from the spars. There was a circular impact mark and rubber transfer marks near the left side of the leading edge about 51 inches from the root.

The horizontal stabilizer, most of the elevator, elevator tab, and the FS 327 frame had separated from the empennage as one unit. The left side of the stabilizer was buckled, and the inboard leading edge was deformed upward. The right side of the stabilizer was separated about midspan; the leading edge was deformed upward and aft, and the outboard skin was impact separated. Several white paint transfer marks and black rubber transfer marks were noted to the deice boot and upper skin of the stabilizer. The right side of the elevator had impact damage. The elevator control stops remained mounted to the control rod and were unremarkable. The FS 327 frame displayed a semi-circular crush impression consistent with contact by the elevator control rod, above where the rod passed through to the elevator. The tail tiedown loop remained mounted to the FS 327 frame and was deformed to the left.

Medical and Pathological Information

An autopsy of the pilot was performed by the Coconino County Health and Human Services Medical Examiner's Office, Flagstaff, Arizona, which listed the cause of death as multiple blunt force injuries, and manner of death as accident.

The FAA Forensic Sciences Laboratory performed toxicological testing of postmortem vitreous fluid and liver, lung, and muscle tissue. Ethanol was detected in lung tissue at 0.034 g/hg and in muscle tissue at 0.026 g/hg. Ethanol was not detected in vitreous fluid or liver tissue. Fluoxetine and norfluoxetine were detected in liver and muscle tissue. Trazodone was detected in liver tissue at 993 ng/g and muscle at 118 ng/g. Phentermine was detected in liver tissue at 2503 ng/g and muscle at 273 ng/g. Dextromethorphan, loratadine, and desloratadine were detected in liver and muscle tissue. No blood was available for testing.

Fluoxetine is a prescription medication commonly used to treat major depressive disorders, obsessive compulsive disorders, and bulimia. Fluoxetine is the only antidepressant medication with an indication to treat bipolar disorder as a single medication. Fluoxetine generally carries a warning that it may impair judgement, thinking, and motor skills, and that caution should be used when operating heavy machinery until the person using the medication is certain the drug does not adversely affect them.

Trazodone is a prescription antidepressant medication that may be used to treat major depression and is also commonly used to treat insomnia. It typically carries a warning that it can slow thinking and motor skills, and that users should not drive, operate heavy machinery, or do other dangerous activities until they know how the drug affects them.

Phentermine is an amphetamine derivative used as a short-term adjunct with diet modification and exercise to increase weight loss. Phentermine generally carries a warning that use may impair the ability to operate a motor vehicle or operate heavy machinery. Phentermine also carries a warning regarding the risk of abuse as it is a stimulant, and its use may also contribute to insomnia due to its stimulant effects.

Dextromethorphan is a cough suppressant found in numerous over-the-counter cough syrups and cold medications. Dextromethorphan is not typically impairing at levels associated with medicinal use.

Loratadine is a second-generation antihistamine available over the counter. It is commonly available in combination medications to treat allergy and cold symptoms. Loratadine is not generally considered impairing. Desloratadine is a metabolite of loratadine.

Additional Information

The Federal Aviation Administration Civil Aeromedical Institute's publication, "Introduction to Aviation Physiology," defines spatial disorientation as a “loss of proper bearings; state of mental confusion as to position, location, or movement relative to the position of the earth.” Factors contributing to spatial disorientation include changes in acceleration, flight in instrument flight rules (IFR) conditions, frequent transfer between visual flight rules and IFR conditions, and unperceived changes in aircraft attitude.

The FAA’s Airplane Flying Handbook (FAA-H-8083-3B) describes some hazards associated with flying when the ground or horizon are obscured. The handbook states, in part, the following:

The vestibular sense (motion sensing by the inner ear) in particular can and will confuse the pilot. Because of inertia, the sensory areas of the inner ear cannot detect slight changes in airplane attitude, nor can they accurately sense attitude changes that occur at a uniform rate over a period of time. On the other hand, false sensations are often generated, leading the pilot to believe the attitude of the airplane has changed when, in fact, it has not. These false sensations result in the pilot experiencing spatial disorientation.

Preventing Similar Accidents

Reduced Visual References Require Vigilance (SA-020)

The Problem

About two-thirds of general aviation accidents that occur in reduced visibility weather conditions are fatal. The accidents can involve pilot spatial disorientation or controlled flight into terrain. Even in visual weather conditions, flights at night over areas with limited ground lighting (which provides few visual ground references) can be challenging.

What can you do?

- Obtain an official preflight weather briefing, and use all appropriate sources of weather information to make timely in-flight decisions. Other weather sources and in-cockpit weather equipment can supplement official information.

- Refuse to allow external pressures, such as the desire to save time or money or the fear of disappointing passengers, to influence you to attempt or continue a flight in conditions in which you are not comfortable.
- Be honest with yourself about your skill limitations. Plan ahead with cancellation or diversion alternatives. Brief passengers about the alternatives before the flight.
- Seek training to ensure that you are proficient and fully understand the features and limitations of the equipment in your aircraft, particularly how to use all features of the avionics, autopilot systems, and weather information resources.
- Don't allow a situation to become dangerous before deciding to act. Be honest with air traffic controllers about your situation, and explain it to them if you need help.
- Remember that, when flying at night, even visual weather conditions can be challenging. Remote areas with limited ground lighting provide limited visual references cues for pilots, which can be disorienting or render rising terrain visually imperceptible. When planning a night VFR flight, use topographic references to familiarize yourself with surrounding terrain. Consider following instrument procedures if you are instrument rated or avoiding areas with limited ground lighting (such as remote or mountainous areas) if you are not.
- Manage distractions: Many accidents result when a pilot is distracted momentarily from the primary task of flying.

See https://www.ntsb.gov/Advocacy/safety-alerts/Documents/SA-020.pdf for additional resources.

The NTSB presents this information to prevent recurrence of similar accidents. Note that this should not be considered guidance from the regulator, nor does this supersede existing FAA Regulations (FARs).

Administrative Information

Investigator In Charge (IIC):	Swick, Andrew
Additional Participating Persons:	Kathryn Whitaker; Piper Aircraft; Phoenix, AZ Micheal McComb; FAA FSDO; Las Vegas, NV
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Last Revision Date:	
Investigation Class:	Class 3
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=105929