



Aviation Investigation Final Report

Location:	Truckee, California	Accident Number:	WPR14FA127
Date & Time:	March 3, 2014, 10:32 Local	Registration:	N9281F
Aircraft:	Piper PA 46 350P	Aircraft Damage:	Substantial
Defining Event:	Loss of control in flight	Injuries:	1 Fatal, 1 Serious
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The commercial pilot was conducting a personal flight. The airplane was en route to the destination airport from the south and was cleared via the initial approach fix for the published GPS approach. The pilot reported that he had the weather at the airport, which was overcast at 3,000 ft above ground level. For all arrivals except from the west, the GPS approach diagram depicts a racetrack procedure turn at the initial approach fix (IAF) to align with the final approach course. The air traffic controller instructed the pilot to cross the IAF and then cleared him for the GPS approach into the airport. The airplane crossed the IAF and made a right turn to parallel the final approach course, which was not the required procedure turn, and the pilot did not slow the airplane's airspeed. The controller terminated radar services.

The airplane then made a heading correction to intercept the final approach course but did not descend and continued to maintain its speed. The airplane remained northeast of the final approach course and 2,000 ft above the minimum descent altitude (MDA) all the way to the missed approach point. The pilot did not slow the airplane to an appropriate airspeed for the approach nor configure the airplane for landing. The pilot then announced that he had a missed approach to air traffic control (ATC) and made a left turn toward the depicted holding fix to the north. Instead of proceeding directly to the holding fix, the airplane continued its left turn for about 270 degrees and proceeded away from the fix. The pilot asked ATC for vectors to the holding fix. A controller replied that the airplane was below the minimum vectoring altitude and advised the pilot to proceed to the west toward lower terrain. The pilot stated that he was in instrument meteorological conditions and was picking up ice. Moments later, during the last minute of flight, the airplane entered a series of progressively lower altitude excursions southeast of the airport descending 1,300 ft, then climbing 700 ft, then descending 2,000 ft, then climbing 1,600 ft, and finally descending 1,300 ft and impacting terrain. The fact that the pilot did not execute the procedure turn after crossing the IAF, did not slow the airplane down, did not descend to the MDA, and did not climb to the required altitude or proceed in the direction of the holding fix after the missed approach point all indicate that the pilot had decreased situational awareness. Further, the final series of extreme altitude excursions are consistent with the pilot experiencing spatial disorientation.

After the accident, the pilot could not recall the events leading up to the accident. He did state that he normally approached the airport from the west. In that case, a right turn at the IAF to directly align with the final approach course would be the normal procedure. The pilot had an iPad that contained the approach plate for the approach being flown, and the approach had been displayed on the device 30 minutes before the execution of the approach, but it was not displayed any time after that. The pilot stated that he normally used the panel-mounted GPS navigation system in the airplane to conduct instrument approaches and that he was using that system at the time of the accident. Pilot records show that the he had not performed the required six instrument approaches within the 6 calendar months preceding the flight; thus, he was not instrument current to operate as pilot-in-command under instrument flight rules conditions.

Probable Cause and Findings

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

The pilot's failure to properly execute the missed approach in instrument conditions. Contributing to the accident were the pilot's lack of instrument proficiency, as demonstrated by his failure to execute the required procedure turn to align with the final approach course and to configure the airplane for the approach, and his loss of situational awareness and the onset of spatial disorientation during the missed approach.

Findings	
Personnel issues	Situational awareness - Pilot
Personnel issues	Recent instrument experience - Pilot
Personnel issues	Incorrect action performance - Pilot
Personnel issues	Spatial disorientation - Pilot

Factual Information

History of Flight

Approach-IFR missed approach	Loss of control in flight (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On March 3, 2014, at 1032 Pacific standard time, a Piper PA-46-350P, N9281F, collided with terrain approximately 7 miles east of the Truckee-Tahoe Airport, Truckee, California. The commercial pilot was seriously injured and the single passenger was fatally injured. The airplane was registered to, and operated by, the commercial pilot under the provisions of 14 Code of Federal Regulations, Part 91. The airplane's left wing had separated from the fuselage resulting in substantial damage to the airframe. Marginal visual flight rules (MVFR) conditions prevailed for the flight, which operated on an instrument flight rules (IFR) flight plan. The flight originated at John Wayne-Orange County Airport, Santa Ana, California, about 0800.

Oakland Air Route Traffic Control Center (ARTCC) communications received the pilot's request for an instrument approach into Truckee at 0959. ARTCC cleared the pilot direct to the Truckee Airport via direct LOLLA intersection maintaining 16,000 feet mean sea level (msl). At 1010, the pilot was cleared to cross LOLLA at or above 12,000 feet msl and then was cleared for the GPS-A approach into Truckee. At 1015, ARTCC approved crossing LOLLA at or above 11,300 feet. Radar track data and airplane GPS data showed the airplane approach the initial approach fix (IAF), LOLLA, at 11,200 feet mean sea level (msl), at approximately 200 knots ground speed, and on a 317-degree (magnetic) course. At 1019, the radar track crossed LOLLA and started a right turn to the east. At 1022, ARTCC terminated radar services, which the pilot acknowledged. The radar track depicts the airplane continue in a right turn to align on a course of about 134 degrees, maintaining about 11,200 feet, and 180 knots ground speed. The track depicted about a 30-degree intercept to the final approach course of 104 degrees while maintaining approximately 200 knots, but remained northeast of the final approach course all the way to the missed approach point.

At 1024, the track was northeast of the missed approach point (MARDR), at 10,200 feet (2,000 feet above the minimum descent altitude), and 187 knots ground speed. The published minimum descent altitude (MDA) for the Truckee-Tahoe GPS-A approach is 8,200 feet mean sea level (2,300 feet agl). At 1025, the pilot announced on the ARTCC frequency that he "has a missed approach." The published missed approach procedure is a climbing left turn to 11,500 feet via 312 degrees to TRUCK waypoint and hold. The radar track depicts the airplane making a slight left turn proceeding to the east, making a left 220-degree turn between 11,200 and 11,500 feet, and then continuing in the southeast direction. ARTCC makes radar contact and then asks the pilot if he is heading to TRUCK intersection. The pilot responds in the affirmative, however, a few moments later he requests a higher altitude and a vector to the holding fix (TRUCK). ARTCC cleared the pilot to 15,000 feet and advises that the minimum IFR altitude is 13,000. At 1030, the pilot reported that he was picking up ice and was in instrument meteorological conditions. ARTCC advised him to fly to the west towards lower terrain. ARTCC advised the pilot that they could not give him a vector because he was below the vector altitude, and

asks if he flew the missed approach procedure. The pilot responded that he did not "pick it up."

The last minute of GPS data shows a series of progressively lower altitude excursions southeast of the airport starting at 11,800 down to 10,500, then up to 11,200 down to 9,200, and up to 10,800 and then down to 8,500 and finally up to 9,800 followed by a descent down to the terrain at 8,000 feet.

The pilot stated to the NTSB investigator-in-charge (IIC) that he had two GPS receivers onboard the airplane. These included a panel mounted Garmin GNS 430 unit that he used for navigation, and a portable Garmin GPSmap 396 unit that he used primarily for weather information via XM WX satellite weather. He also stated that in the past when flying the GPS-A in to Truckee, he normally approaches the IAF (LOLLA) from the west, makes a right-hand turn on to the final approach course, and configures the airplane with full flaps, gear down, throttle back, maintaining 120 knots. He could not recall the last time he had flown the GPS-A approach in to Truckee.

The Truckee GPS-A approach does depict a westerly initial approach fix (IAF), SIGNA, located 13.4 miles west of LOLLA. From SIGNA direct to LOLLA the required altitude is 11,000 feet on a course of 055 degrees. No procedure turn is required after crossing LOLLA; the pilot can make a right 49-degree turn directly onto the final approach course.

Pilot Information

Certificate:	Commercial	Age:	70, Male
Airplane Rating(s):	Single-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	3-point
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	Airplane multi-engine; Instrument airplane	Toxicology Performed:	Yes
Medical Certification:	Class 2 Without waivers/limitations	Last FAA Medical Exam:	March 30, 2012
Occupational Pilot:	No	Last Flight Review or Equivalent:	July 23, 2013
Flight Time:	(Estimated) 3600 hours (Total, all aircraft), 2000 hours (Total, this make and model)		

The pilot, age 70, held a commercial pilot certificate with ratings for single engine land and instrument airplane issued on May 15, 2004, and a second-class Federal Aviation Administration (FAA) medical certificate issued on March 2, 2012. The pilot's flight logbook showed that the most recent entry was the flight review and instrument proficiency check was completed on June 23, 2011, and he had 3,037.2 hours of flight time. On his March 2, 2012, second-class medical application he reported his total flight experience to be 3,600 hours. The pilot reported during a conversation with the NTSB investigator-in-charge (IIC) that he had about 2,000 hours of flight experience in the PA-46, and that he had not flown instruments regularly, and he had done some instrument training last summer (2013).

The Certified Flight Instructor (CFI) who had performed the pilot's 2011 flight review stated to an FAA inspector that he had performed a flight review and instrument proficiency check with the accident pilot on July 23, 2013, 223 days prior to the accident flight.

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	Registration:	N9281F
Model/Series:	PA 46 350P	Aircraft Category:	Airplane
Year of Manufacture:	1997	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	4636095
Landing Gear Type:	Retractable - Tricycle	Seats:	6
Date/Type of Last Inspection:	March 1, 2014 Annual	Certified Max Gross Wt.:	4299 lbs
Time Since Last Inspection:	2 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	1861 Hrs at time of accident	Engine Manufacturer:	LYCOMING
ELT:	Installed	Engine Model/Series:	TIO-540-AE2A
Registered Owner:	FARNELL R RICHARD TRUSTEE	Rated Power:	310 Horsepower
Operator:	FARNELL R RICHARD TRUSTEE	Operating Certificate(s) Held:	None

The six-seat, low wing, retractable-gear, single engine airplane, serial number 4636095, was manufactured in 1997. It was powered by a Lycoming TIO-540-AE2A, 350-hp engine and equipped with a Hartzell 3 bladed composite constant speed propeller model number HC-I3YR-1E. A review of the airframe and engine maintenance logbooks showed that an annual inspection was performed on March 1, 2014, at a total airframe time of 1,858.5 hours, and engine time of 1,858.5 hours since new. The hobbs meter read 1,861.0 following the accident.

The PA-46-350P pilot operating manual, in section 4, Normal Procedures, Approach and Landing, states the normal technique is airspeed between 80-85 knots indicated airspeed (kias) with flaps down, and 95 kias with flaps up. For an instrument approach the pilot stated that he normally configures the airplane with the gear down, flaps down, and flies at 120 kias.

Section 9 of supplement 4 of the pilot operating manual supplies information necessary for the operation of the ice protection system. The ice protection system was designed and tested for operation in meteorological conditions for Federal Aviation Regulation (FAR) 25, appendix C, for continuous maximum and intermittent maximum icing conditions.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	KTRK, 5901 ft msl	Distance from Accident Site:	5 Nautical Miles
Observation Time:	10:50 Local	Direction from Accident Site:	270°
Lowest Cloud Condition:	Clear	Visibility	6 miles
Lowest Ceiling:	Overcast / 2200 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	5 knots / None	Turbulence Type Forecast/Actual:	/
Wind Direction:	300°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.11 inches Hg	Temperature/Dew Point:	4°C / 1°C
Precipitation and Obscuration:	Light - None - Rain		
Departure Point:	Santa Ana, CA (KSNA)	Type of Flight Plan Filed:	IFR
Destination:	Truckee, CA (KTRK)	Type of Clearance:	IFR
Departure Time:	08:30 Local	Type of Airspace:	Class E

The NWS Surface Analysis Chart for 1000 PST on March 3, 2014, chart depicted a high pressure system to the south of the accident site over the California and Nevada border at 1022-hectopascals (hPa) and another off the southern California coast at 1023-hPa. No frontal boundaries were identified over the region influencing California during the period.

The National Center for Atmospheric Research (NCAR) - Research Application Laboratory (RAL) regional radar mosaic image for 1032 PST showed several areas of very light echoes associated with light rain moving from the Pacific across northern California to the west-northwest of the accident site.

Truckee-Tahoe Airport (KTRK) weather at 0950 PST (1750Z), wind from 180° at 7 knots, visibility 9 miles, ceiling overcast at 3,000 feet, temperature 6° Celsius (C), dew point 0° C, altimeter 30.11 inches of mercury (Hg). Remarks: no special reports issued. Truckee-Tahoe Airport (KTRK) weather at 1050 PST (1850Z), wind from 300° at 5 knots, visibility 6 miles in light rain, ceiling overcast at 2,200 feet, temperature 4° C, dew point 1° C, altimeter 30.11 inches of Hg.

The NOAA Earth System Research Laboratory/Global Systems Division (ESRL/GSD) Aircraft Meteorological Data Reports (AMDAR) provided upper air data closer to the time of the accident from aircraft departing from Reno/Tahoe International Airport, Reno, Nevada (–RNO) immediately after the accident. The first ascent sounding from aircraft #10324 at 1149 PST sounding depicted the freezing level at 8,000 feet. Two distinct temperature inversions were also noted, the first between 12,000 and 13,500 feet, and the other between 14,000 and 15,000 feet. The wind profile indicated light southerly winds below 5,000 feet, with wind veering to the west at 7,000 feet with little change in direction with altitude with increasing speeds. A low-level wind maximum was identified at 13,500 feet or the top of the first inversion with wind from 269° at 38 knots. Another AMDAR aircraft #11115 with a moisture sensor departed KRNO at 1239 PST ascent sounding depicted the freezing level at 8,600 feet with an inversion between 13,000 and 14,000 feet. The moisture sensor indicated convergence in the dew point temperature in a layer near 10,000 feet with relative humidity of 80%, which was consistent with the

KRNO observations in section 2.2, which reported broken to overcast clouds at 5,500 feet agl or approximately 10,000 feet msl.

The Geostationary Operational Environmental Satellite number 15 (GOES-15) data was obtained from an archive at the Space Science Engineering Center (SSEC) at the University of Wisconsin-Madison (UW) in Madison, Wisconsin, and processed using the Safety Board's Man-computer Interactive Data Access System (McIDAS) software. The GOES-15 visible image depicted a multiple layers of high and low clouds over northern California and over the accident site, with the low clouds becoming oriented in several north-to-south oriented bands in the immediate vicinity of the accident site and east over Nevada. The banded cloud elements oriented perpendicular to the ambient flow and are commonly referred to as transverse bands, and are often associated with mountain wave activity and turbulence. The 1030 PST images shows an overcast layer of clouds over the Truckee area with the transverse banding pattern in the clouds beginning in the vicinity of the accident site and eastward into Nevada and are directly over RNO during this period. A review of the images revealed that the bands of low clouds immediately over and east of the accident site do not move downstream with the wind with time as the high clouds do, but remain relative stationary consistent with orographic clouds associated with mountain wave activity.

The FAA air traffic control display Corridor Integrated Weather System (CIWS) display for 1030 depicted several areas of very light intensity echoes west of the Truckee—Tahoe area and a larger area of echoes associated with rain with tops from 20,000 to 23,000 feet to the northwest. The image was also plotted over a satellite image, which shows the banding structure in the clouds over Nevada immediately east of the accident site.

The FAA Contract Automated Flight Service Station (AFSS) provider Lockheed Martin Flight Services and the Direct Users Access Terminal System (DUATS) providers indicated that there was no request for any weather briefing services on March 2-3, 2014, and no contact en route with Flight Watch during the period.

WRECKAGE & IMPACT INFORMATION

The wreckage was located in mountainous terrain 7 miles east of the Truckee-Tahoe Airport, at an elevation of 7,933 feet mean sea level (msl). The fuselage had come to rest in a snow-covered open area surrounded by mature pine trees. The left wing had sheared off at the wing root and was resting against the empennage. The left horizontal stabilizer had also sheared off at the root. The right wing remained attached to the fuselage, the vertical stabilizer, rudder, right horizontal stabilizer and elevator remained attached to the empennage. The entire fuselage remained intact with no observable reduction of occupiable space. The cabin was accessed through the main cabin door by rescuers. The fuel selector knob was observed in the center (left tank) position. The pitot heat switch was ON. The wreckage was recovered and transported to a facility in Pleasant Grove, California, for further examination.

On April 9, 2014, representatives from the airframe and engine manufacturers examined the airplane under the supervision of the NTSB investigator-in-charge. The main fuselage was strapped down to a trailer where access to the cabin door and full access to the engine was available. The right wing was cut off at the wing root by the recovery personnel. The landing gear damage patterns were consistent with the gear being up during terrain impact. The one-piece elevator separated from the horizontal stabilizer

at the hinge points. The fuselage retained most of its structural shape, but did exhibit a vertical crease deformation 14 inches behind the main wing spar and behind the cockpit. Control continuity was established from all control surfaces to the cockpit. The elevator trim drum exhibited 6 exposed threads, corresponding to slight nose down trim. Mechanical continuity was established on the engine by rotating the crankshaft and achieving thumb compression and valve movement on all cylinders. Both magnetos were removed from their mounting pads, and both produced spark when rotated by hand. Engine control continuity was established by tracing the engine throttle, mixture, and propeller control cables from the engine to the control levers in the cockpit.

MEDICAL & PATHOLOGICAL INFORMATION

The FAA's Civil Aerospace Medical Institute performed forensic toxicology on blood samples obtained from the pilot while he was hospitalized. The results were negative for ethanol, and positive for ephedrine, midazolam, ondansetron, and phenylpropanolamine all detected in blood.

Airport Information

Airport:	Truckee-Tahoe KTRK	Runway Surface Type:	
Airport Elevation:	5901 ft msl	Runway Surface Condition:	
Runway Used:	10	IFR Approach:	Circling;Global positioning system
Runway Length/Width:	7000 ft / 100 ft	VFR Approach/Landing:	None

Wreckage and Impact Information

Crew Injuries:	1 Serious	Aircraft Damage:	Substantial
Passenger Injuries:	1 Fatal	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Fatal, 1 Serious	Latitude, Longitude:	39.297779,-120.011947(est)

Additional Information

FAA-H-8083-15B – Instrument Flying Handbook

The Instrument Flying Handbook describes the pilot's responsibility to execute a procedure turn to align with the final approach course unless either the airplane is being radar vectored to the final approach course, or the annotation "NoPT" (no procedure turn) is shown on the approach procedure for the segment being flown.

"Holding in Lieu of Procedure Turn

A holding pattern in lieu of a procedure turn may be specified for course reversal in some procedures. In such cases, the holding pattern is established over an intermediate fix (IF) or a FAF. The holding pattern distance or time specified in the profile view must be observed. Maximum holding airspeed limitations as set forth for all holding patterns apply. The holding pattern maneuver is completed when the aircraft is established on the inbound course after executing the appropriate entry. If cleared for the approach prior to returning to the holding fix and the aircraft is at the prescribed altitude, additional circuits of the holding pattern are neither necessary nor expected by ATC. If pilots elect to make additional circuits to lose excessive altitude or to become better established on course, it is their responsibility to advise ATC upon receipt of their approach clearance. When holding in lieu of a procedure turn, the holding pattern must be followed, except when RADAR VECTORED to the final approach course is provided or when NoPT is shown on the approach course."

Air Traffic Controllers Handbook (JO 7110.65V), Chapter 4, section 8, paragraph e3.

"For both RNAV and conventional approaches, intercept angles greater than 90 degrees may be used when a procedure turn, a hold-in-lieu of procedure turn pattern, or arrival holding is depicted and the pilot will execute the procedure. If a procedure turn, hold-in-lieu of procedure turn, or arrival holding pattern is depicted and the angle of intercept is 90 degrees or less, the aircraft must be instructed to conduct a straight-in approach if ATC does not want the pilot to execute a procedure turn or hold-in-lieu of procedure turn."

Pilot Instrument Proficiency Requirements

Part 61.57 – Recent flight experience – pilot in command

"c) Instrument experience. Except as provided in paragraph (e) of this section, a person may act as pilot in command under IFR or weather conditions less than the minimums prescribed for VFR only if:

(1) Use of an airplane, powered-lift, helicopter, or airship for maintaining instrument experience. Within the 6 calendar months preceding the month of the flight, that person performed and logged at least the following tasks and iterations in an airplane, powered-lift, helicopter, or airship, as appropriate, for the instrument rating privileges to be maintained in actual weather conditions, or under simulated conditions using a view-limiting device that involves having performed the following--

(i) Six instrument approaches.

(ii) Holding procedures and tasks.

(iii) Intercepting and tracking courses through the use of navigational electronic systems.

(d) Instrument proficiency check. Except as provided in paragraph (e) of this section, a person who has failed to meet the instrument experience requirements of paragraph (c) for more than six calendar months may reestablish instrument currency only by completing an instrument proficiency check. The instrument proficiency check must consist of the areas of operation and instrument tasks required in the

instrument rating practical test standards."

Personal Electronic Device (iPad 2)

An Apple iPad 2, serial number DMPGWPHDDKPH, personal electronic device was located in the cockpit by on-scene personnel. The iPad was retained by the NTSB IIC and sent to the NTSB Vehicle Recorders Laboratory for examination and nonvolatile memory download. Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed that the iPad had sustained significant impact damage. An internal inspection was performed and no significant damage was observed to the internal circuitry. The damaged LCD2 and touchscreen digitizer were replaced with surrogate parts and the unit was charged, powered up in a Faraday cage, and placed in Airplane mode.

Information stored on the device was captured by exploring aviation related Apps via touchscreen navigation. A download was also accomplished using industry standard forensic software.

Several aviation and weather related Apps were found installed on the iPad, including: MyRadar, Aeroweather, AirNav, Duat, FlightAware, Weather, The Weather Channel, AccuWeather, and ForeFlight. Of these, only The Weather Channel and ForeFlight displayed flight related data when manually running the Apps while in Airplane Mode.

The weather app displayed a screen showing current conditions at Carnelian Bay, California, with the message that this information had been updated more than 2 hours ago.

ForeFlight contained several tabs for navigating through its various functions including: Airports, Maps, File & Brief, and Plates. Under the Airports tab ForeFlight displayed data for KSNA: John Wayne Airport-Orange County, in Santa Ana, California. Under the Maps tab ForeFlight displayed a VFR sectional chart with information specifying a route from KSNA5 to KTRK6 displayed in the summary bar. Under the Plates tab ForeFlight displayed three approach plates - KTRK: GPS RWY 19, KTRK: VOR/DME RNAV or GPS-A, and KSNA: RNAV (GPS) Y RWY 19R. Under the File & Brief tab ForeFlight displayed a message stating 'No flight plans'.

The iPad contained approximately seventy images consistent with weather observation and flight planning activities. These images contained satellite and radar weather depictions, approach charts, and en-route maps. These images were all dated March 2, 2014, with time stamps ranging from 0640 PST to 1026 PST. The most recent five images contained thumbnails depicting three different approach plates - the KTRK: GPS RWY 19, the KTRK?: VOR/DME RNAV or GPS-A, and the KSNA: RNAV (GPS) Y RWY 19R. The second most recent image was a ForeFlight display of the VOR/DMA RNAV or GPS-A approach plate. This image was dated March 3, 2014 and time stamped 0943:28 PST. The most recent image depicted a single page from an e-book. This image was dated March 3, 2014, and time stamped 0957:10 PST.

The forensic software creates a timeline of iPad activities based on known file creation date and timestamps. The last entry in the iPad timeline before the accident was dated March 3, 2014, and time stamped 0957:14. This entry corresponded with the creation of a log-file containing data consistent with an attempted Kindle7 synchronization event.

Spatial Disorientation

Advisory Circular 60-4A – Pilots Spatial Disorientation, addresses spatial disorientation as follows.

"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: Gerald Rose; FAA; Reno, NV
Charles Little; Piper ; Chino Hills, CA
Mark Platt; Lycoming; Phoenix, AZ
Troy Helgeson; Lycoming; Denver, CO

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Last Revision Date:

Investigation Class: [Class](#)

Note:

Investigation Docket: <https://data.nts.gov/Docket?ProjectID=88868>

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](#).