



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	Mendoza, Texas	<b>Accident Number:</b>	CEN10FA065
<b>Date &amp; Time:</b>	December 7, 2009, 11:34 Local	<b>Registration:</b>	N600YE
<b>Aircraft:</b>	NEW PIPER AIRCRAFT INC PA-46-500TP	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of control in flight	<b>Injuries:</b>	2 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

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## Analysis

\*\*\*This report was modified on May 22, 2014. Please see the docket for this accident to view the original report.\*\*\*

The pilot was established on the localizer portion of the instrument landing system approach outside the final approach fix in visual meteorological conditions above clouds. He was then given vectors away from the localizer course by an air traffic controller. The vectors were close together and included a left 90-degree turn, a descent, and a 180-degree right turn back toward the localizer course. During the right turn and descent, the airplane continued turning with increasing bank and subsequently impacted the ground. According to a pilot weather report and flight path data the pilot entered clouds as he was starting the right turn toward the localizer. The combination of descending turns while entering instrument conditions were conducive to spatial disorientation. Further, the heading changes issued by the air traffic controller were rapid, of large magnitude, and, in combination with a descent clearance, likely contributed to the pilot's disorientation. Diphenhydramine, a drug that may impair mental and/or physical abilities, was found in the pilot's toxicological test results. While the exact effect of the drug at the time of the accident could not be determined, it may have contributed to the development of spatial disorientation.

## Probable Cause and Findings

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

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The pilot's spatial disorientation, which resulted in his loss of airplane control. Contributing to the pilot's spatial disorientation was the sequence and timing of the instructions issued by the air traffic controller. The pilot's operation of the airplane after using impairing medication may also have contributed.

## Findings

Personnel issues	Incorrect action selection - ATC personnel
Environmental issues	(general) - Effect on personnel
Personnel issues	Spatial disorientation - Pilot
Personnel issues	Aircraft control - Pilot
Aircraft	(general) - Not attained/maintained
Personnel issues	OTC medication - Pilot

# Factual Information

## History of Flight

Approach-IFR initial approach	Air traffic event
Approach-IFR initial approach	Other weather encounter
Approach-IFR initial approach	Loss of control in flight (Defining event)

On December 7, 2009, at 1134 central standard time, a New Piper Aircraft Inc, PA-46-500TP, N600YE, was substantially damaged after impacting terrain following a sudden loss of altitude during vectors for an instrument approach in instrument meteorological conditions near Mendoza, Texas. The private pilot and one passenger were fatally injured. The personal flight was being conducted under the provisions of 14 Code of Federal Regulations Part 91 with an Instrument Flight Rules (IFR) flight plan. The cross-country flight originated at the Aransas County Airport (RKP), Rockport, Texas and was arriving at Austin-Bergstrom International Airport (AUS), Austin, Texas.

The airplane departed RKP about 1059. The pilot began receiving vectors from AUS radar approach controllers at 1127. Preliminary radar data and air traffic control transcripts indicate the pilot was at 4,000 feet mean sea level (msl) and established inbound on the localizer to runway 35R at AUS about 1132:00. At 1132:22 the pilot was told to "expect short vectors" and received a left turn vector to 260 degrees heading for spacing on a preceding airplane. At 1132:40 the pilot was told to descend to 3,100 feet msl. At 1133:04, at an altitude of 3,800 feet msl, a heading of 286 degrees, and a groundspeed (GS) of 175 knots, the pilot was told to turn right to 080 degrees. The pilot acknowledged the assigned heading (pilot's last radio transmission) and the airplane continued a left turn until 1133:13 and a heading of 272 degrees, when radar indicated the airplane began a right turn at 172 knots GS. At 1133:22 the airplane was at 3,300 feet msl, 284 degrees heading, and 174 knots GS. At 1133:31 the airplane was at 2,800 msl, 330 degrees heading, and 200 knots GS. At 1133:36 the airplane was at 2,000 msl, 006 degrees heading, and 222 knots GS. At 1133:40 the airplane was at 1,200 msl, 046 degrees heading, and 254 knots groundspeed.

## Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	64, Male
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 3 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	December 12, 2007
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	3513 hours (Total, all aircraft)		

The pilot, age 64, held a private pilot certificate with ratings for single-engine land airplane and instrument airplane. The pilot held a current Class 3 medical certificate with no waivers/limitations, issued December 12, 2007. The pilot's flight logbooks were not located during the investigation. On the pilot's last application for a flight physical he indicated 2,847 total hours.

One of the pilot's flight instructors was interviewed. He indicated the pilot first flew N600YE on September 28, 2009. Prior to flying N600YE, the pilot had been qualified in a different PA-46 that was equipped with a different avionics suite than the Avidyne suite installed in N600YE. The flight instructor said the pilot had completed a two day recurrent training program on May 27, 2009, which included 11 hours of ground training and 4 flight hours. The pilot also completed a flight review and an instrument proficiency check during that training, reporting 3,513 hours at that time. Prior to the recurring training in May 2009, the flight instructor also provided the pilot's initial PA-46 familiarization training in December, 2007, pilot recurrent training in April, 2008, and pilot recurrent training in November, 2008.

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	NEW PIPER AIRCRAFT INC	<b>Registration:</b>	N600YE
<b>Model/Series:</b>	PA-46-500TP	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	No
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	4697250
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	6
<b>Date/Type of Last Inspection:</b>	June 19, 2009 Annual	<b>Certified Max Gross Wt.:</b>	
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Turbo prop
<b>Airframe Total Time:</b>	452.3 Hrs as of last inspection	<b>Engine Manufacturer:</b>	P&W CANADA
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	PT6A-42A
<b>Registered Owner:</b>		<b>Rated Power:</b>	850 Horsepower
<b>Operator:</b>		<b>Operating Certificate(s) Held:</b>	None

The 2006 model airplane, serial number 4697250, was a low wing, single engine airplane powered by a Pratt & Whitney Canada PT6A-42A engine driving a Hartzell HC-E4N-3Q propeller. The last airframe inspection was an annual type on June 19, 2009, with airplane total time of 452.3 hours. The last engine inspection was a 100-hour inspection on June 19, 2009.

### Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Instrument (IMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	AUS, 542 ft msl	<b>Distance from Accident Site:</b>	14 Nautical Miles
<b>Observation Time:</b>	11:40 Local	<b>Direction from Accident Site:</b>	360°
<b>Lowest Cloud Condition:</b>	Thin Overcast / 200 ft AGL	<b>Visibility</b>	1 miles
<b>Lowest Ceiling:</b>	Overcast / 200 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	13 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	20°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	30.06 inches Hg	<b>Temperature/Dew Point:</b>	11° C / 10° C
<b>Precipitation and Obscuration:</b>	Light - Showers - Rain		
<b>Departure Point:</b>	Rockport, TX (RKP )	<b>Type of Flight Plan Filed:</b>	IFR
<b>Destination:</b>	Austin, TX (AUS )	<b>Type of Clearance:</b>	IFR
<b>Departure Time:</b>	10:59 Local	<b>Type of Airspace:</b>	

Reported weather at AUS at 1140 was temperature 52 degrees Fahrenheit (F), dew point 50 degrees F, and relative humidity 94 percent. Wind was 020 degrees at 13 knots, 1 ¼ mile visibility, light rain, and overcast ceiling at 200 feet. A pilot weather report (PIREP) at 1050 reported cloud tops at 3,000 feet msl 3 miles south of AUS.

### Airport Information

<b>Airport:</b>	Austin-Bergstrom Int'l Airport AUS	<b>Runway Surface Type:</b>	
<b>Airport Elevation:</b>	542 ft msl	<b>Runway Surface Condition:</b>	Unknown
<b>Runway Used:</b>	35R	<b>IFR Approach:</b>	ILS
<b>Runway Length/Width:</b>	12248 ft / 150 ft	<b>VFR Approach/Landing:</b>	None

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	1 Fatal	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 Fatal	<b>Latitude, Longitude:</b>	30.000555,-97.676109

The airplane impacted a pasture about 0.16 miles southeast of the last radar return. Ground scars indicate the airplane impacted in an 80 to 90 degrees right bank and 18 degrees nose low. The debris field was about 1,000 feet long. Both wings, the engine, and forward cockpit had separated from the fuselage. All flight control surfaces were accounted for in the debris field. Wing fractures, cable separations, and control rod fractures were consistent with overload. Flight control cable continuity could not be verified to the cockpit area due to structural fragmentation. Leading edges of two of the four propeller blades showed gouging and had one to two inch deep gouges.

## Additional Information

The air traffic controller responsible for the airplane at the time of the accident stated during a post accident interview that his intent of issuing the pilot the 260 degree heading followed by the 080 degree heading was to build one mile spacing on the outbound leg and one mile spacing on the inbound leg, followed by a 020 degree heading to re-intercept the localizer before the airplane reached two miles outside the approach gate. When asked if he had ever discussed pilot spatial disorientation and how it can affect pilots, he stated he had heard of it before, but was not sure where. When asked if he had ever participated in a discussion of how control actions can induce vertigo or disorientation in pilots, he noted that turning or descending "into the soup" can cause those conditions.

According to FAA Advisory Circular (AC) 60-4A, Pilot's Spatial Disorientation, tests with qualified instrument pilots indicated that it can take as much as 35 seconds to establish full control by instruments after the loss of visual reference with the surface.

## Medical and Pathological Information

Central Texas Autopsy, PLLC, located in Lockhart, Texas, performed an autopsy on the pilot on December 8, 2009. The cause of death was attributed to multiple traumatic injuries.

The Federal Aviation Administration (FAA), Bioaeronautical Sciences Research Laboratory, located in

Oklahoma City, Oklahoma, conducted toxicological testing on the pilot. Testing for carbon monoxide was negative. Testing for cyanide, volatiles, and drugs detected the following:

- Diphenhydramine detected in liver.
- Diphenhydramine detected in kidney.

Diphenhydramine is a sedating antihistamine used to treat allergy symptoms and as a sleep aid. It is available over the counter under the trade names Benadryl and Unisom. Diphenhydramine carries the following FDA warning: may impair mental and/or physical ability required for the performance of potentially hazardous tasks (e.g., driving, operating heavy machinery). The samples provided for toxicological analysis were insufficient to determine any level of impairment.

## Tests and Research

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Two Avidyne Entegra Primary Flight Displays (PFD's) and an Avidyne Entegra Multi-function Display (MFD) Compact Flash (CF) card were recovered and sent to the National Transportation Safety Board (NTSB) Vehicle Recorders Division. One PFD unit was from the pilot position (left seat) and the second PFD was from the copilot position (right seat). Both PFD units were extensively damaged in the accident. PFD data was downloaded from the pilot's PFD. Data from the copilot's PFD was not recovered. No data was recovered from the MFD CF card due to damage.

The recovered PFD data did not indicate any system anomalies that would have contributed to the accident and indicated the engine was operating normally prior to impact. The recorded flight path data was consistent with radar data for the accident flight. The recorded data did not include specific discreet codes to record specific autopilot indications. The recorded data did record information related to the flight director (FD). The recorded FD data was consistent with the FD Display being active until at least 11:33:20. At 11:33:20 a data dropout occurred. When the data dropout returned at 11:32:24 the FD Display indication was "Not Display".

The airplane was equipped with an S-Tech Magic 1500 autopilot system. The Magic 1500 was designed with several autopilot disconnect limits; one of them being that when the airplane roll angle meets or exceeds 38 degrees for five seconds with the autopilot connected, the autopilot will disconnect. The PFD data indicated that between 11:33:14 and 11:33:20 the airplane increased in right bank from about 20 degrees to 50 degrees. Following the data dropout between 11:33:20 and 11:33:24, the bank angle recorded was approximately 68 to 70 degrees right bank for the remainder of the recorded data.

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Baker, Daniel
<b>Additional Participating Persons:</b>	David R Beniingfield; FAA; San Antonio, TX Charles Little; Piper Aircraft Co. Doug Hardy; Pratt and Whitney Canada
<b>Original Publish Date:</b>	December 19, 2011
<b>Note:</b>	The NTSB traveled to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=75136">https://data.nts.gov/Docket?ProjectID=75136</a>

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).