National Transportation Safety Board
Aviation Accident Final Report

Location:	San Antonio, TX	**Accident Number:**	DFW05FA020
Date & Time:	11/14/2004, 1718 CST	**Registration:**	N40731
Aircraft:	Piper PA-31-350	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	5 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The twin-engine airplane collided with a residential structure and terrain following a loss of control after the pilot experienced difficulties maintaining course during an Instrument Landing System (ILS) approach while on instrument meteorological conditions. The impact occurred approximately 3.7 miles short of the approach end of the runway. Radar data depicted that after the 8,700-hour commercial pilot was vectored to the ILS Runway 3 approach, the airplane remained left throughout the approach before turning right of the localizer approximately 2 miles before the final approach fix (FAF). Radar then showed the aircraft turn to the left of course line. When the aircraft was abeam the FAF, it was approximately 1 mile left of the course line. As the aircraft closed to approximately 1.5 miles from the runway threshold, the aircraft had veered about 1.3 miles left of the course line (at which time air traffic control instructed the pilot to turn left to a heading of 270 degrees). The aircraft continued to turn left through the assigned heading and appeared to be heading back to the ILS course line. According to the radar, another aircraft was inbound on the ILS course line and Air Traffic Control Tower (ATCT) instructed the pilot to turn left immediately. Thereafter, the aircraft went below radar coverage. A witness, located approximately 1.25 miles northwest of the accident site, reported that he heard a very loud noise, and then observed an airplane flying toward a building, approximately 60 feet in height. The airplane was observed to have pitched-up approximately 45 - 90 degrees just before the building and disappeared into the clouds. A second witness located approximately 1 mile northwest of the accident site reported that he heard a low flying aircraft, and then observed a white twin-engine airplane banking left out of the clouds. The airplane leveled out, and flew into the clouds again a few seconds later. The witness stated that the airplane was at an altitude of 100-200 feet above the ground. A third witness located adjacent to the accident site reported that they heard the sound of a low flying airplane in the distance. As the sound became louder and louder, they looked up and observed the airplane in a near vertical attitude as it impacted trees and the side of an apartment complex. Examination of the airplane did not reveal any pre-impact mechanical anomalies. A weather observation taken approximately 15 minutes after the accident included a visibility 4 statue miles, light drizzle and mist, and an overcast ceiling at 400 feet.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to maintain control during an ILS approach. Contributing factors were the prevailing instrument meteorological conditions(clouds, low ceiling and drizzle/mist), and the pilot's spatial disorientation.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: APPROACH - FAF/OUTER MARKER TO THRESHOLD (IFR)

Findings
1. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
2. (F) SPATIAL DISORIENTATION - PILOT IN COMMAND
3. (F) WEATHER CONDITION - LOW CEILING
4. (F) WEATHER CONDITION - DRIZZLE/MIST

Occurrence #2: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: DESCENT - UNCONTROLLED

Findings
5. OBJECT - RESIDENCE

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
6. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On November 14, 2004, approximately 1718 central standard time, a Piper PA-31-350 twin-engine airplane, N40731, registered to and operated by Dash Air Charter Inc., of San Antonio, Texas, was destroyed when it impacted a multi-unit residential building and the ground following a loss of control while on an instrument approach to runway 3 at the San Antonio International Airport (SAT), San Antonio, Texas. The commercial pilot and four passengers were fatally injured. Instrument meteorological conditions (IMC) prevailed, and an instrument flight plan was filed for the 14 Code of Federal Regulations Part 91 personal flight. The 499-nautical mile cross-country flight originated from the Dodge City Regional Airport (DDC), near Dodge City, Kansas, approximately 1345, with the intended destination of SAT.

According to information provided to the NTSB investigator-in-charge (IIC) by friends and family members, the passengers on board the aircraft were returning home after a hunting trip. Information provided by the FAA and weather reporting services revealed that the en route portion of the flight from Dodge City was flown in instrument meteorological conditions. There were no reports of problems from the pilot during the approximate 3 1/2-hour en route portion of the flight. As the airplane neared its intended destination of San Antonio, the pilot established communications with San Antonio Air Traffic Control Tower (ATCT) and maneuvered to execute the Instrument Landing System (ILS) Runway 3 instrument approach.

The following are excerpts of radio communications between the pilot of N40731 and approach controllers (ATCT) in the minutes prior to the accident.

Agencies Making Transmissions: Abbreviations:

Piper PA-31-250, N40731: N40731

San Antonio Approach Control, Radar South: A/C

San Antonio ATCT, Local Control 2: ATCT

2301:01 N40731

approach navajo seven three one five thousand

2301:05 A/C

navajo seven three one san antonio approach roger

2304:16 A/C

navajo seven three one turn right heading one eight zero

2304:20 N40731

right turn to one eight zero

2307:15 A/C

navajo seven three one descend and maintain four thousand

2307:19 N40731

five for four seven three one

2309:39 A/C

navajo seven three one descend and maintain uh oh disregard just three thousand five hundred for navajo seven three one heading zero nine zero

2309:47 N40731

three thousand five hundred zero nine zero

2310:18 A/C

navajo seven three one is uh three miles from resoc turn left heading zero six zero maintain three thousand five hundred til resoc cleared ils runway three maintain maximum forward speed

2310:28 N40731

okay uh left turn zero six zero join the localizer maintain three point five til resoc

2314:04 A/C

low

2314:05 ATCT

uh local is uh navajo seven three one going around we're not talking to navajo seven three one if you thought he was on us

2314:12 A/C

navajo seven three one san antonio

2314:13 N40731

(unintelligible)

2314:14 A/C

okay navajo seven three one looks like you've lost the localizer uh turn left heading two seven zero climb and maintain three thousand five hundred

2314:22 N40731

left turn two seven zero three thousand five hundred

2315:16 A/C

navajo seven three one say altitude

2315:18 N40731

climbing to three thousand

2315:20 A/C

say altitude now

2315:22 N40731

two thousand climbing

2315:24 A/C

navajo seven three one looks like you're in a left turn northeast bound you got traffic one o'clock and a mile a hard left turn now heading three zero zero hard left turn

2315:42 A/C

navajo three thou navajo seven three one maintain three thousand five hundred i show you at one thousand eight hundred

2315:52 A/C

navajo seven three one i've lost your transponder

2315:58 A/C

navajo seven three one san antonio

2316:02 ATCT

local

2316:04 A/C

do you see that navajo anywhere

2316:05 ATCT

no we don't are you talking to him

2316:07 A/C

he he answered me one time and now he's not talking to me

2316:09 ATCT

well i we broke out one mike echo he's one two zero heading to three thousand he says he's low on fuel we'll put him back on you

2316:14 A/C

all right

2316:18 A/C

navajo seven three one san antonio

2316:22 A/C

navajo seven three one san antonio approach

No further communications were received from N40731.

Radar data received from the FAA showed that the aircraft remained initially left of the localizer course line before turning right of the localizer approximately 2 miles before the final approach fix (FAF). Radar then showed the aircraft turn to the left of course line. When the aircraft was abeam the FAF, it was approximately 1 mile left of the course line. As the aircraft closed to approximately 1.5 miles from the runway threshold, the aircraft had veered about 1.3 miles left of the course line (at which time ATCT instructed the pilot to turn left to a heading of 270 degrees). The aircraft continued to turn left through the assigned heading and appeared to be heading back to the ILS course line. According to the radar, another aircraft was inbound on the ILS course line and ATCT instructed the pilot to turn left immediately. Thereafter, the

aircraft went below radar coverage (approximately 1200 feet msl).

A witness, located approximately 1.25 miles northwest of the accident site, reported to the NTSB investigator-in-charge (IIC) that he heard a very loud noise, and then observed a small white airplane flying toward a building, approximately 60 feet in height. The airplane pitched up approximately 45 - 90 degrees just before the building and disappeared into the clouds. A second witness located approximately 1 mile northwest of the accident site reported to the IIC that he heard a low flying aircraft, and then observed a white twin-engine airplane banking left out of the clouds. The airplane leveled out, and flew into the clouds again a few seconds later. The witness added that he "saw no indications of problems, smoke, or visible damage to the airplane." The witness stated that the airplane was at an altitude of 100-200 feet above the ground. A third witness located adjacent to the accident site reported that they heard the sound of a low flying airplane in the distance. As it became louder and louder, they looked up and observed the airplane in a near vertical attitude as it impacted trees and the side of an apartment complex.

PERSONNEL INFORMATION

The pilot held a commercial pilot certificate with airplane single-engine land, airplane multi-engine land, and instrument ratings. The pilot was last issued a second-class medical certificate on December 9, 2003, with the limitation stated "must wear corrective lenses and posses glasses for near and interim vision." The pilot had reported on his medical application he had accumulated a total flight time of 8,700 hours. The pilot's logbook was located during the on-scene investigation. At the last entry recorded on August 24, 2003, the pilot had accumulated 8,426.4 hours of flight. Entries observed within an aircraft flight log, kept by the pilot, stated that between October 21, 2003, and November 13, 2004, the pilot had accumulated an additional 164.3 hours of flight, totaling 8590.7 hours.

The pilot's most recent flight review was on July 17, 2003, in a PA-31.

AIRCRAFT INFORMATION

The 1981-model Piper PA-31-350, serial number 31-8152003, was a low wing, twin-engine semimonocoque design airplane, with a retractable landing gear, configured for a maximum of eight occupants. The airplane was powered by two normally aspirated, direct drive, air-cooled, horizontally opposed, fuel injected, six-cylinder engines driving a four bladed "Q-tip" Hartzell propeller. The left engine was a Lycoming TSIO-540-J2B engine (serial number RL-1298-68A) and the right engine was a Lycoming LTIO-540-J2B engine (serial number L-6186-61A), both rated at 350 horsepower.

According to the airframe and engine logbooks, the airplane's most recent 100-hour/annual inspection was on July 31, 2004, with a total airframe time of 2,248.7 hours. No open discrepancies were noted within the aircraft or engine logbooks. At the time of the last annual, it was noted that the left and right engines had accumulated 723-hours since major overhaul.

Using an estimated weight for the four passengers of 185 pounds, and the pilot's last reported weight at the time of his medical application, of 156 pounds, an estimated weight of 100 pounds for the dog on board, and approximately 50 pounds of baggage on board, the representative from the airframe manufacturer calculated the weight and balance to be 52.4 pounds over the maximum gross weight of the airplane at the time of departure, and was within the airplane's center of gravity limitations at the time of the accident.

METEOROLOGICAL INFORMATION

At 1653, the automated surface observing system at SAT reported wind from 060 degrees at 14 knots, visibility 4 statute miles, light drizzle and mist, overcast cloud ceiling at 400 feet, temperature 54 degrees Fahrenheit, dew point 52 degrees Fahrenheit, and an altimeter setting of 30.28 inches of Mercury.

At 1732, the automated surface observing system at SAT reported wind from 050 degrees at 9 knots, visibility 4 statute miles, light drizzle and mist, overcast cloud ceiling at 400 feet, temperature 54 degrees Fahrenheit, dew point 51 degrees Fahrenheit, and an altimeter setting of 30.29 inches of Mercury.

The National Weather Service (NWS) Surface Analysis Chart for 1800, which provided the station model data across Texas. Light continuous rain was indicated over western, northern, and central Texas, with mist indicated over southern Texas. In the San Antonio area, the station model indicated wind from the northeast at 10 knots, overcast ceiling, temperature 54 degrees Fahrenheit, dew point 52 degrees Fahrenheit, and a sea level pressure at 1024.5-mb.

The NWS Radar Summary Chart for 1719 depicted an area of echoes over southern Kansas, Oklahoma, southern New Mexico, most of Texas, and the Texas Gulf Coast. The strongest echoes identified with thunderstorms and rain showers were depicted over the southeast Gulf coast and over northern and central Texas, moving in a north and northeast direction.

The Geostationary Operations Environmental Satellite number 12 (GOES-12) data revealed at 1702 an overcast layer of clouds over the San Antonio area and the accident site with several vertically developed cloud tops associated with nimbostratus or towering cumulus type clouds embedded in the low stratiform cloud cover.

Data from the Weather Surveillance Radar-1988, Dopler (WSR-88D), located approximately 28 miles east-northeast of the accident site depicted at 1714, scattered echoes associated with light rain and rain showers across the area with reflectivities of 35 dBZ or less. Within 10 miles of the accident site, the strongest reflectivities were in the range of 5 to 15 dBZ. No organized thunderstorms were identified in the immediate vicinity of San Antonio surrounding the period of the accident.

Data from the United States Naval Observatory, located in Washington D.C., indicated that the following conditions existed on November 14, 2004, for San Antonio, Texas.

Beginning civil twilight:	0633
Sunrise:	0658
Sun Transit:	1219
Sunset:	1739
End of Civil Twilight:	1804

A staff meteorologist for the Safety Board prepared a factual report as part of supporting documentation, which included the following for the arrival area: surface weather observations, pilot reports, winds and temperatures aloft data, Geostationary Operational Environmental Satellite-12 data, National Weather Service WSR-88D data, and aviation area forecast.

AIDS TO NAVIGATION

Runway 3 features several instrument approaches, including RNAV/GPS RWY 3, NDB RWY 3, and the ILS/LOC RWY 3 approach. The approach procedure is provided with three different sets of minimums depending on whether a full ILS is being flown, a localizer only approach is being flown or a circling approach to another runway is being executed.

The ILS RWY 3 approach could be initiated via a radar vector to intercept to the final approach course at 4,000 or 3,500 feet msl depending on the location of the vector. The initial approach fix for the approach (RESOC) has a designated altitude of 3,500 until established on the 3.00 degree glide slope. The final approach fix (FAF) for the approach is located 5.4 miles from the runway threshold. The decision height for the approach was 986 feet msl (200 feet height above touchdown) and is based on flying the full ILS with a fully operational ILS receiver. The published missed approach procedure for the approach is to climb to 1,700 feet msl, then execute a climbing left turn to 3,500 feet msl, heading 025 degrees, then proceed outbound via the SAT R-040 to SHEPE Intersection/SAT 18.4 DME and hold.

AERODROME INFORMATION

The San Antonio International Airport (SAT), operates under Class C airspace, which encompasses a 20 nautical mile ring from the center of the airport. SAT features three asphalt runways, 12R/30L, 3/21, 12L/30R. Runway 3 is a 7,505-foot long and 150-foot wide runway. Runway 3 is also equipped with an Instrument Landing System/Localizer instrument approach.

WRECKAGE AND IMPACT INFORMATION

The main wreckage was located within a residential community, approximately 3.7 miles southwest of SAT. The Global Positioning System (GPS) coordinates recorded at the accident site using a hand held GPS unit were 29 degrees 29.999' minutes North latitude and 098 degrees 31.490' minutes West longitude, at a field elevation of approximately 779 feet msl. The airplane impacted a residential apartment building in a vertical attitude and came to rest in an almost vertical attitude on a heading of 210 degrees. Wreckage debris remained within a 200 foot circumference from the main wreckage.

Examination of the accident site revealed a hole in the roof of the apartment building. The shape of the hole was consistent with the shape of the left outboard wing tip and winglet in a vertical attitude. A portion of the outboard left wing, including the winglet, was found in the apartment. The balcony of the apartment was damaged, as well as the outer wall of the apartment building. The carport adjacent to the main wreckage was also damaged. Multiple cars were burned from a small flash fire and damaged by debris from the airplane. Multiple tree branches were found within the main wreckage from two large trees within the main wreckage crater. Various pieces of wreckage were spread throughout the area, including a static port, found approximately 200 feet from the main wreckage in the apartment parking lot.

Examination of the airplane revealed that the fuselage was fragmented throughout its entire length. Several window frames were found within the wreckage debris field. Fragments of the leading edge of the left wing were found within the wreckage area and were crushed aft. A portion of the right wing that contained the aileron bellcrank assembly was found separated, and was located adjacent to the main wreckage. The aileron bellcrank assembly was detached, but remained with the section of wing. The aileron cables remained attached to the bellcrank and exhibited "broom straw" fraying. The flap actuator displayed "0" threads and was

consistent with the flaps in the "up" position. The right main landing gear remained attached to the right wing and was observed in the retracted position.

The empennage was severely fragmented to the horizontal stabilizer attach point. The empennage remained attached to the remaining portion of the fuselage via control cables. These cables were cut to facilitate removal of the wreckage. The vertical stabilizer remained attached to its attach point. The rudder remained attached to its respective mounts. Control continuity for the rudder and rudder trim was established forward to the area where the empennage was separated. The vertical stabilizer was crushed aft throughout its span. The rudder trim jack screw exhibited 9 threads, which correlated to a neutral trim setting.

The left horizontal remained attached to the empennage and the leading edge was crushed aft throughout its span. The elevator remained attached to its respective mounts. The right horizontal remained attached to the empennage and leading edge was crushed aft throughout its length. The elevator remained attached to its respective mounts. The elevator push-pull control tube was found separated approximately six inches aft of the bellcrank. The separation was consistent with fire damage. Control continuity was established throughout the push-pull rod to the flight control surfaces. The elevator trim exhibited one thread which correlates to a position between full nose down and neutral.

The cockpit area was destroyed. A few of aircraft instruments were recovered. The left engine tachometer needle was found indicating 2,100 rpm's and the right tachometer needle was found indicating 2,000 rpm's. The manifold pressure gauge was found separated from the instrument panel. The left indicated over 50 inches of manifold pressure and the right indicated 42 inches of manifold pressure. The throttle quadrant was located and the mixture, propeller, and throttle levers were observed in the full forward position. A needle "slap" mark on the airspeed indicator was observed at 117 knots.

The left engine was found approximately seven feet beneath the surface of soft, sandy, and wet soil. The engine was separated from the engine nacelle. All four propeller blades and propeller hub remained attached to the engine. All four blades displayed leading edge blade polishing throughout their respective spans, and were bent aft.

The right engine was approximately three feet below the base of an approximate 38 inch diameter tree within soft, sandy, and wet soil. Three inch horizontal cuts were observed in the root base of the tree. The propeller was also separated from the engine.

FIRE

A small post impact flash fire ensued. The local fire department reported that they extinguished the fire using minimal liquid and foam fire suppression fluids. Several occupants of the apartment complex were treated for smoke inhalation at the local hospital and were later released.

MEDICAL AND PATHOLIGCAL INFORMATION

An autopsy and toxicological test were requested. The Bexar County Medical Examiner, of San Antonio, Texas, stated that an autopsy was unable to be preformed, and it was possible that they might be able to send a sample to CAMI for a toxicology test.

SURVIVAL ASPECTS

Due to damage to the airplane, it was undetermined if the occupants were wearing seatbelts.

However, one seatbelt was found at the accident site separated from the airframe and seat, and remained fastened.

ADDITIONAL INFORMATION

According to the FAA Advisory Circular (AC) 61-21A, "The flight attitude of an airplane is generally determined by reference to the natural horizon. When the natural horizon is obscured, attitude can sometimes be maintained by reference to the surface below. If neither horizon nor surface references exist, the airplane's attitude must be determined by artificial means - an attitude indicator or other flight instruments. Sight, supported by other senses such as the inner ear and muscle sense, is used to maintain spatial 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 spatial disorientation. Spatial disorientation to a pilot means simply the inability to tell "which way is up."

The FAA AC 61-27C (Section II, "Instrument Flying: Coping with Illusions in Flight") states that spatial disorientation cannot be completely prevented, but it be ignored or sufficiently suppressed by pilots' developing an "absolute" reliance upon what the flight instruments are reporting about the attitude of their aircraft.

The wreckage was released to the owner's representative.

Pilot Information

Certificate:	Commercial	**Age:**	58, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim.	**Last FAA Medical Exam:**	12/09/2003
Occupational Pilot:		**Last Flight Review or Equivalent:**	07/31/2004
Flight Time:	8590 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N40731
Model/Series:	PA-31-350	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	31-8152003
Landing Gear Type:	Retractable - Tricycle	**Seats:**	7
Date/Type of Last Inspection:	07/31/2004, Annual	**Certified Max Gross Wt.:**	7000 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:	2248.7 Hours as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	TSIO-540-J2B
Registered Owner:	Dash Air Charter Inc.	**Rated Power:**	350 hp
Operator:	Dash Air Charter Inc.	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	**Condition of Light:**	Dusk
Observation Facility, Elevation:	SAT, 809 ft msl	**Distance from Accident Site:**	3 Nautical Miles
Observation Time:	1732 CST	**Direction from Accident Site:**	200°
Lowest Cloud Condition:	Thin Overcast / 400 ft agl	**Visibility**	4 Miles
Lowest Ceiling:	Overcast / 400 ft agl	**Visibility (RVR):**	
Wind Speed/Gusts:	9 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	50°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.28 inches Hg	**Temperature/Dew Point:**	12°C / 11°C
Precipitation and Obscuration:			
Departure Point:	Dodge City, KS (DDC)	**Type of Flight Plan Filed:**	IFR
Destination:	San Antonio, TX (SAT)	**Type of Clearance:**	IFR
Departure Time:	1345 CST	**Type of Airspace:**	Class C

Airport Information

Airport:	SAN ANTONIO INTL (SAT)	**Runway Surface Type:**	Unknown
Airport Elevation:	809 ft	**Runway Surface Condition:**	Unknown
Runway Used:	3	**IFR Approach:**	ILS
Runway Length/Width:	7505 ft / 150 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	4 Fatal	**Aircraft Fire:**	On-Ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	5 Fatal	**Latitude, Longitude:**	29.533611, -98.469722

Administrative Information

Investigator In Charge (IIC):	Alexander Lemishko	**Report Date:**	07/07/2005
Additional Participating Persons:	Frank G Fortmann; Federal Aviation Administration; San Antonio, TX Donald E Eick; National Transportation Safety Board; Washington, DC		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		