National Transportation Safety Board
Aviation Accident Final Report

Location:	CLEVELAND, OK	**Accident Number:**	FTW96FA073
Date & Time:	12/21/1995, 1442 CST	**Registration:**	N421EP
Aircraft:	Cessna 421C	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	6 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

At 1350 cst, a McAlester FSS specialist gave a preflight briefing to a Cessna 421 pilot concerning IMC (instrument meteorological conditions) along the route & advised that VFR flight was not recommended. Cloud tops were at 12,000', & freezing level was at 1,600'. A PIREP at 1416 cst reported light mixed icing from 6,400' to 9,000' at Oklahoma City. At 1424 cst, the pilot departed Tulsa (VFR), then radar service was terminated. No further communication was received from the airplane. Radar data showed that it climbed westerly, reaching 9,800' at 1440 cst; during the next 88 seconds, its heading & altitude deviated until it descended through 3,200'. Ground witnesses saw the airplane descend out of low clouds in a 'flat spin' & crash. No preimpact mechanical failure was found. The airplane's gross weight was about 150 lbs over its maximum limit. In November 1995, the pilot received 10 hrs of Cessna 421 simulator training; his instructor noted in training records that he met minimum standards for VFR, but 'under IMC conditions,' he 'could not maintain altitude within 1,300 feet or heading within 40 degrees.' Postmortem toxicology tests showed 0.079 mcg/ml Nordiazepam (metabolite of Valium) in kidney fluid, 0.044 mcg/ml Desipramine (metabolite of Imipramine, an antidepressant) in spleen fluid, 0.733 mcg/ml Diphenhydramine (Benadryl) in spleen fluid, & 0.353 mcg/ml Diphenhydramine in lung fluid. These medications are not approved by the FAA for use while flying. The airplane was equipped for flight in icing & IFR conditions.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot's continued VFR flight into instrument meteorological conditions (IMC), and his failure to maintain control of the airplane after encountering adverse weather conditions, which resulted in a stall/spin. Factors relating to the accident were: pilot impairment due to a medication that was not approved by the FAA for use while flying, the adverse weather conditions, and the pilot's lack of instrument proficiency in the Cessna 421 airplane.

Findings

Occurrence #1: IN FLIGHT ENCOUNTER WITH WEATHER
Phase of Operation: CLIMB - TO CRUISE

Findings
1. (F) WEATHER CONDITION - CLOUDS
2. (F) WEATHER CONDITION - LOW CEILING
3. (F) WEATHER CONDITION - ICING CONDITIONS
4. (C) VFR FLIGHT INTO IMC - CONTINUED - PILOT IN COMMAND

Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: CLIMB - TO CRUISE

Findings
5. AIRCRAFT WEIGHT AND BALANCE - EXCESSIVE - PILOT IN COMMAND
6. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
7. (C) STALL/SPIN - INADVERTENT - PILOT IN COMMAND
8. (F) USE OF INAPPROPRIATE MEDICATION/DRUG - PILOT IN COMMAND
9. (F) LACK OF FAMILIARITY WITH AIRCRAFT - PILOT IN COMMAND

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

Factual Information

HISTORY OF FLIGHT

On December 21, 1995, approximately 1442 central standard time, a Cessna 421C, N421EP, registered to and operated by Insured Titles of Tuscaloosa, Inc., was destroyed when it impacted terrain during an uncontrolled descent near Cleveland, Oklahoma. The instrument rated private pilot and his five passengers were fatally injured. The personal flight was conducted under Title 14 CFR Part 91 and originated in Tuscaloosa, Alabama, with a destination of Aspen, Colorado. After a refueling stop, the airplane departed the Tulsa International Airport in Tulsa, Oklahoma, approximately 1424. While on the ground in Tulsa, the pilot received a telephone weather briefing, but did not file a flight plan. According to witnesses, instrument meteorological conditions prevailed in the Cleveland area at the time of the accident.

At 1350, the pilot telephoned the McAlester Automated Flight Service Station and stated that he was "v f r here at Tulsa" with a destination of Aspen and requested a weather briefing. The briefer advised the pilot of an AIRMET in effect for instrument meteorological conditions along his route of flight "from Ponca City through ... western Kansas" and stated that "v f r is not recommended through that area." At 1424, the pilot was cleared for takeoff on runway 36L at the Tulsa International Airport. The airplane remained in contact with air traffic control until 1437, at which time the Tulsa Radar West controller advised the pilot that radar service was terminated. The pilot's acknowledgment of this transmission was the last recorded radio communication from the airplane.

Radar data provided by the FAA indicated that, between 1428:59 and 1440:27, the airplane was in a climb from 2,500 to 9,800 feet MSL. During the next 1 minute and 28 seconds, the data indicated the airplane descended to 5,400 feet MSL, climbed to 8,300 feet MSL, and then entered another descent. The last radar hit, recorded at 1441:55, indicated the airplane was approximately 0.1 nautical miles south of the accident site descending through 3,200 feet MSL. See the enclosed NTSB Recorded Radar Study for further details.

About 1440, a witness who was outside her residence, approximately 2 1/2 nautical miles east of the accident site, heard an airplane fly over headed west. The witness stated that she "heard only one engine and it was missing badly." The witness further stated that the airplane "was very low," but she was not able to see it due to the overcast. A plot based on the recorded radar data indicated that the airplane was approximately 8,500 feet MSL when it passed about 1/4 mile north of this witness's location.

Witnesses observed the airplane descend out of a cloud layer in a "flat spin," impact the ground, and "burst" into flames. One of the witnesses heard an airplane that "sounded like it was doing aerobatics," looked up and observed the airplane "drop straight down out of the clouds, going around and around with the nose and tail switching ends." This witness reported the weather conditions as a ceiling of 500 feet with "good" visibility below the clouds and "light snow flurries." Another witness stated that, when he first saw the airplane "in the flat spin," it was coming through a "scud layer of 500-1000 feet AGL."

A witness who was inside his residence approximately 1 nautical mile south of the accident site heard "an engine sputtering." The witness stepped outside, observed a twin engine airplane circle "like it was going to land," and then proceed westbound. A plot based on the recorded

radar data indicated that the flight path of the accident airplane did not pass over the location of this witness.

PERSONNEL INFORMATION

The airplane was purchased by Insured Titles of Tuscaloosa, Inc., a company of which the pilot was president, in October 1995. From November 6 to November 10, 1995, the pilot attended a Cessna 421 initial pilot training program consisting of 20 hours ground instruction and 10 hours simulator instruction. A review of the course training records indicated that the pilot's completion status was unsatisfactory. According to the simulator instructor, the pilot's instrument scan was "extremely slow and insufficient to the extent that under IMC conditions he could not maintain altitude within 1300 feet or heading within 40 degrees when given even the simplest of tasks." The instructor's notes indicated that, on November 8, the pilot requested that "all remaining time in the simulator be given under VFR conditions with system orientation." On November 10, the instructor noted that the pilot's "continued poor aircraft control coupled with limited cockpit scan, awareness and system retention prevented satisfactory completion of system requirements even under VFR conditions."

The pilot had previously owned a Cessna 340A and had attended an initial pilot training course for this airplane from January 6 to January 10, 1992, and a recurrent course from February 25 to February 27, 1993. Review of the training records for these courses revealed that both were completed to VFR standards. According to the simulator instructor for the recurrent course, the pilot "was able to control the aircraft under the most least complicated problems presented," and met the "very minimum standards for VFR operations," but was "not within IFR standards at all."

The pilot's personal logbooks were not located during the investigation. According to a data sheet which the pilot completed prior to attending the Cessna 421 course in November 1995, he had accumulated a total flight time of 1,320 hours, a total multi-engine time of 633 hours, and a total instrument time of 135 hours.

AIRCRAFT INFORMATION

According to maintenance personnel at the fixed base operation (FBO) in Tuscaloosa, Alabama, where the airplane was based, the airplane logbooks were kept in the left wing locker. The logbooks were not recovered during the on scene examination of the airplane, and it is presumed that they were destroyed in the post-crash fire. Examination of records provided by the FBO in Tuscaloosa and a maintenance facility in Dallas, Texas, which had been performing the maintenance on the airplane for the previous owner, revealed no evidence of any uncorrected maintenance discrepancies. The last annual inspection was completed July 7, 1995, at an airframe total time of 3,414 hours.

The airplane was equipped with an IMC compatible avionics package which included an autopilot with a flight director system. When the airplane was manufactured, equipment required for flight into known icing conditions was installed.

Estimates indicated that the airplane was loaded over the gross weight limit at the time of the accident. Records from the July 1995 annual inspection indicated an empty weight of 5,501 pounds for the airplane and an empty weight center of gravity of 151.8 inches. The airplane had been modified in accordance with Supplemental Type Certificate SA5981SW; this modification increased the airplane's maximum takeoff weight from 7,450 pounds to 7,560 pounds with an allowable center of gravity range at 7,560 pounds of 153.0 to 157.5 inches.

According to FBO personnel at the Tulsa International Airport, the airplane received "a top off on fueling including the locker tank" before departing Tulsa. Estimates of the weights of the pilot and passengers were provided by FBO personnel, and baggage weight was estimated based on the on scene examination of the airplane. Weight and balance calculations were performed using tables provided by the manufacturer. As shown on the enclosed Weight and Balance Form, weight at the time of the accident was calculated at 7,710 pounds with a center of gravity of 155.3 inches.

METEOROLOGICAL INFORMATION

The following weather conditions were reported at 1453 for Tulsa International Airport, located 28 nautical miles southeast of the accident site: Measured ceiling 7,500 feet overcast; visibility greater than 10 miles; temperature 35 degrees F; dewpoint 26 degrees F; wind 140 degrees at 3 knots; altimeter setting 30.13 inches of mercury.

The following weather conditions were reported at 1453 for Ponca City Municipal Airport, located 40 nautical miles northwest of the accident site: Estimated ceiling 800 feet broken, 1,500 feet overcast; visibility 5 miles in light snow and fog; temperature 33 degrees F; dewpoint 30 degrees F; wind 200 degrees at 8 knots; altimeter setting 30.10 inches of mercury.

Geostationary Operational Environmental Satellite (GEOS) images for 1445 showed clouds in the Tulsa area and in the area of the accident site with tops of about 12,000 feet MSL. The freezing level was estimated to be 1,600 feet MSL based on the upper air data from Norman, Oklahoma, at 1800. Layers of moisture were evident above the freezing level up through 10,000 feet MSL.

The following Pilot Weather Report was made at 1416 from a Mooney 20 flying at an altitude of 11,000 feet MSL, 15 nautical miles south of the Tulsa VOR: Skies 10,600 feet overcast; clear above; no turbulence; during climb out of Oklahoma City, first cloud layer base at 2,100 feet, top at 3,000 feet; second cloud layer base at 6,400 feet, top at 8,300 to 9,000 feet; third cloud layer base at 10,000 feet, top at 10,600 feet; light mixed icing between 6,400 and 9,000 feet. (Oklahoma City is located approximately 80 nautical miles southwest of the accident site.)

WRECKAGE AND IMPACT INFORMATION

The accident site was located approximately latitude 36 degrees 20 minutes 39 seconds north and longitude 96 degrees 25 minutes 21 seconds west at an elevation of about 890 feet. The airplane was resting upright on a measured magnetic heading of 195 degrees on a wooded hillside with a slope of approximately 17 degrees. It remained intact with the exception of the empennage which separated and rotated about 80 degrees towards the left side of the fuselage.

Post-impact fire destroyed the fuselage and the right wing. The left wing and both engine accessory sections sustained extensive fire damage. No evidence of pre-impact fire was observed. Control continuity could not be confirmed due to the extent of the fire and impact damage.

The left engine remained attached to the airframe and the propeller remained connected to the propeller shaft. No leading edge damage or chordwise scratching was evident on any of the three blades, all of which remained attached to the hub. One of the blades was straight, one was bowed forward about 10 degrees, and one was bent forward about 7 inches out from the hub.

The right engine remained attached to the airframe and the propeller hub remained connected to the propeller shaft. Two of the blades were broken out of the hub; one of these was buried tip first in the ground and could not be pulled out by hand. The other separated blade was bowed back 45 degrees, twisted at the midpoint, and displayed chordwise scratching. The blade that remained attached to the hub displayed leading edge damage and the tip was bent aft and twisted.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy of the pilot was performed by R. L. Hemphill, MD, of the Office of the Chief Medical Examiner in Tulsa, Oklahoma. Toxicological testing was positive for diazepam (Valium), imipramine (Tofranil, antidepressant), diphenhydramine (Benadryl), and acetaminophen (Tylenol). Diazepam was detected in kidney fluid; metabolites of diazepam, temazepam and oxazepam, were detected in urine, and 0.079 ug/ml nordiazepam, also a metabolite of diazepam, was detected in kidney fluid. Imipramine was detected in kidney fluid; 0.044 ug/ml desipramine, a metabolite of imipramine, was detected in spleen fluid, and desipramine was also detected in lung and kidney fluid. Tests showed 0.733 ug/ml diphenhydramine in spleen fluid and 0.353 ug/ml diphenhydramine in lung fluid; diphenhyramine was also detected in kidney fluid. Acetaminophen was detected in urine at 12.200 ug/ml.

Diazepam, imipramine, and diphenhydramine are not approved by the FAA for use while flying. According to Dr. Soper of the FAA's Civil Aeromedical Institute, the levels of these drugs detected "could have caused impairment of judgment in the cockpit."

TESTS AND RESEARCH

On March 5, 1996, the wreckage was reexamined under the supervision of the NTSB investigator-in-charge. Inspection revealed that the cabin heater, a Janitrol B4050, S/N 10813031, sustained minimal impact and fire damage. After removal of the heater from the fuselage, the heater's combustion chamber was tested for leakage in accordance with Airworthiness Directive 82-07-03. A pressure of 6 psi was applied to the combustion chamber and, after 45 seconds, the pressure in the chamber was 4 psi. A combustion chamber is considered serviceable if, after 45 seconds, the pressure in the chamber exceeds 1 psi.

Both engines were shipped to the manufacturer for a teardown and inspection which took place under the supervision of an NTSB investigator on January 23, 1996. Both engines "exhibited normal operational signatures throughout" and "appeared to be in operational condition prior to this accident." See the enclosed powerplants report for further details. A teardown and examination of both turbochargers and their components was also conducted on January 23, 1996, at the engine manufacturer's facility. As stated in the enclosed turbocharger report, "no pre-existing conditions were found that would preclude normal turbocharger system operation prior to impact."

Both propellers were shipped to the manufacturer for a teardown and inspection which took place under the supervision of an FAA inspector on March 26, 1996. Both propellers were "operating at, or very near, the low pitch stop at impact." The "minimal" impact damage to the left propeller indicated it was "operating under low power at impact." "Substantially more damage" was sustained by the right propeller "indicating higher power and energy at impact." See the enclosed propeller report for further details.

ADDITIONAL INFORMATION

The wreckage was released to the owner on April 5, 1996.

Additional Persons (continued from page 5)

Thomas M. Knopp McCauley Accessory Division Vandalia, OH 45377

Pilot Information

Certificate:	Private	**Age:**	66, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Valid Medical--w/ waivers/lim.	**Last FAA Medical Exam:**	05/11/1994
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	1320 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N421EP
Model/Series:	421C 421C	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	421C-1236
Landing Gear Type:	Retractable - Tricycle	**Seats:**	8
Date/Type of Last Inspection:	07/07/1995, Annual	**Certified Max Gross Wt.:**	7610 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Continental
ELT:	Installed	**Engine Model/Series:**	GTSIO-520-N
Registered Owner:	INSURED TITLES OF TUSCALOOSA	**Rated Power:**	375 hp
Operator:	INSURED TITLES OF TUSCALOOSA	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	, 0 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	0000	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Unknown / 0 ft agl	**Visibility**	5 Miles
Lowest Ceiling:	Overcast / 500 ft agl	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:		**Temperature/Dew Point:**	
Precipitation and Obscuration:			
Departure Point:	TULSA, OK (TUL)	**Type of Flight Plan Filed:**	None
Destination:	ASPEN, CO (ASE)	**Type of Clearance:**	None
Departure Time:	1424 CST	**Type of Airspace:**	Class E

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	5 Fatal	**Aircraft Fire:**	On-Ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	6 Fatal	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	GEORGIA R SNYDER	**Report Date:**	01/08/1997
Additional Participating Persons:	RICHARD J FLETCHER; OKLAHOMA CITY, OK STEPHEN T WILSON; WICHITA, KS FRED H FIHE; MOBILE, AL STEVEN G MACON; PHOENIX, AZ		
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/.		