National Transportation Safety Board
Aviation Accident Final Report

Location:	DeWitt, AR	**Accident Number:**	CEN10LA236
Date & Time:	05/03/2010, CDT	**Registration:**	N5531X
Aircraft:	AERO COMMANDER S2R	**Aircraft Damage:**	Substantial
Defining Event:	Unknown or undetermined	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 137: Agricultural		

Analysis

The airplane was reported missing after failing to return from an aerial application flight. The airplane wreckage was located in a wooded area near the field being sprayed about 5 hours after the airplane's expected return time. Flight control continuity could not be verified due to damage to the airplane. Postaccident examination of the engine and propeller assemblies indicated that the engine was producing power and the propeller was rotating during the impact sequence. The reason for the airplane impacting the trees and terrain could not be determined.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot did not maintain clearance from terrain for undetermined reasons.

Findings

Not determined	Not determined - Unknown/Not determined (Cause)

Factual Information

HISTORY OF FLIGHT

On May 3, 2010, at an undetermined time, an Aero Commander S2R, N5531X, was substantially damaged after impacting trees and terrain near DeWitt, Arkansas. The commercial pilot was fatally injured. The aerial application flight was registered to and operated by AufderHeide Flying Service, Inc. and being conducted under the provisions of 14 Code of Federal Regulations Part 137. Visual meteorological conditions prevailed at the time of the accident. The flight originated from De Witt Municipal Airport (5M1), De Witt, Arkansas, at 1530 central standard time (CST).

There were no witnesses to the accident. According to the operator, the pilot departed 5M1 to conduct aerial application on two rice fields located about three miles south of 5M1. The fields were described as having thick woods on several sides. A search for the airplane began when the pilot did not return by 1630, his expected land time. The wreckage was located about 2030.

PERSONNEL INFORMATION

The pilot, age 51, held a commercial pilot certificate for airplane single-engine land, and a second class airman medical certificate issued January 15, 2010, with the limitation "Must have available glasses for near vision." A review of the pilot's log book indicated he had 8,257 total hours and approximately 650 hours in the make and model of the accident airplane. His last biannual flight review occurred on May 25, 2009.

AIRCRAFT INFORMATION

The single seat, low-wing, fixed gear airplane, serial number 1731R, was manufactured in 1973. It was powered by a Garrett TPE331-2-201A engine, serial number P-90252C, rated at 715 horsepower at 2,000 propeller revolutions per minute (RPM), equipped with a Hartzell HC-B3TN-5C 3-bladed propeller. The last airframe inspection was an annual type on December 12, 2009, at 10,231.2 total time airframe (TTAF). The last engine inspection was a 100-hour type on December 13, 2009, at 5,272.1 tachometer (TACH) time and 9,294.5 hours since new. The operator reported 10,350 hours TTAF at the time of the accident.

METEOROLOGICAL INFORMATION

A review of recorded data from the Stuttgart, Arkansas, (SGT) automated weather reporting station, about 15 miles northwest of the accident location, revealed at 1555 conditions were wind 230 degrees at 8 knots, visibility of 10 miles, and clear skies.

WRECKAGE AND IMPACT INFORMATION

The airplane impacted trees and terrain in a heavily wooded area on a southern heading. The left and right wings, the fuselage, and the empennage exhibited crushing and deformation. Flight control continuity could not be verified due to damage to the airplane. The outboard sections of two of the three propeller blades were separated and all three propeller blades exhibited twisting and leading edge damage.

MEDICAL AND PATHOLOGICAL INFORMATION

The Arkansas State Crime Laboratory, Medical Examiner Division, located in Little Rock, Arkansas, performed an autopsy on the pilot on May 5, 2010. The cause of death was attributed to blunt force injuries.

The FAA, Toxicology Accident Research Laboratory, located in Oklahoma City, Oklahoma, conducted toxicological testing on the pilot. Testing for carbon monoxide, cyanide, and ethanol were negative. The following drug was detected:

4.786 (ug/ml, ug/g) Acetaminophen detected in blood.

TESTS AND RESEARCH

The propeller and propeller hub assembly were examined by Hartzell Propeller Inc. under the supervision of a Federal Aviation Administration (FAA) inspector. The spring retainer sleeve had multiple impact marks that occurred at different piston/blade angle positions. The spinner dome was separate from the main propeller assembly and was severely damaged and fragmented. The spinner bulkhead had multiple bends. The feather stop was intact. The tips of two propeller blades were separated and each blade had bending and twisting with leading edge damage.

The engine was examined by individuals from Honeywell under the supervision of an FAA inspector. There was evidence of impact damage to the engine. The engine gear case was separated at the compressor inlet, the engine propeller shaft was not free to rotate, and the engine power section rotated with resistance. There was rotational scoring through 360 degrees on the propeller shaft immediately aft of the propeller shaft lock nut with corresponding rotational scoring damage on the forward inner bore of the sun gear. Rotational scoring was found through 360 degrees on the forward face of the propeller shaft roller bearing. Rotational scoring was present on the inside diameter of the compressor section mainshaft with corresponding rotational scoring damage on the High Speed Pinion (HSP)-to-power coupling shaft. Evidence of rotational scoring was also located on the first stage compressor impeller shroud surface and additional locations in the compressor section. There were metal spray deposits on the suction side of the first, second, and third stage turbine stator vanes and metal spray deposits on the suction side of the first and second stage turbine rotor blades. No pre-impact anomalies were noted with the engine. Within the gearbox section, there were four sets of witness marks, two witness marks per set with each set separated by 90 degrees, on the propeller shaft lock nut with corresponding metal transfer to two teeth of each planet gear. The ring gear retainers that were intact and in place exhibited witness marks consistent with the planet gear teeth profile. There was a witness mark on the forward face of the propeller pitch control housing corresponding to the locking clip on the propeller shaft.

The engine fuel control unit, propeller governor, and P2T2 sensor were examined at Woodward Governor Company under the supervision of an FAA inspector. No preimpact anomalies were noted with any of the units.

History of Flight

Maneuvering-low-alt flying	Unknown or undetermined (Defining event)

Pilot Information

Certificate:	Commercial	**Age:**	51, Male
Airplane Rating(s):	Single-engine Land	**Seat Occupied:**	Single
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 With Waivers/Limitations	**Last Medical Exam:**	01/15/2010
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	05/25/2009
Flight Time:	8259 hours (Total, all aircraft), 650 hours (Total, this make and model), 100 hours (Last 90 days, all aircraft), 55 hours (Last 30 days, all aircraft), 8 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	AERO COMMANDER	**Registration:**	N5531X
Model/Series:	S2R	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:		**Serial Number:**	1731R
Landing Gear Type:	Tailwheel	**Seats:**	1
Date/Type of Last Inspection:	12/19/2009, Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:	119 Hours	**Engines:**	1 Turbo Prop
Airframe Total Time:	10350 Hours	**Engine Manufacturer:**	Garrett
ELT:	Not installed	**Engine Model/Series:**	TPE331-2-201A
Registered Owner:	AUFDERHEIDE FLYING SERVICE INC	**Rated Power:**	715 hp
Operator:	AUFDERHEIDE FLYING SERVICE INC	**Air Carrier Operating Certificate:**	None

Meteorological Information and Flight Plan

Observation Facility, Elevation:	SGT, 224 ft msl	**Observation Time:**	1555 CDT
Distance from Accident Site:	25 Nautical Miles	**Condition of Light:**	Day
Direction from Accident Site:	340°	**Conditions at Accident Site:**	Visual Conditions
Lowest Cloud Condition:	Clear	**Temperature/Dew Point:**	30°C / 11°C
Lowest Ceiling:	None	**Visibility**	10 Miles
Wind Speed/Gusts, Direction:	8 knots, 230°	**Visibility (RVR):**	
Altimeter Setting:	29.9 inches Hg	**Visibility (RVV):**	
Precipitation and Obscuration:			
Departure Point:	De Witt Municip, AR (5M1)	**Type of Flight Plan Filed:**	None
Destination:	De Witt Municip, AR (5M1)	**Type of Clearance:**	None
Departure Time:	1530 CDT	**Type of Airspace:**	

Airport Information

Airport:	DeWitt Municipal Airport (5M1)	**Runway Surface Type:**	
Airport Elevation:	190 ft	**Runway Surface Condition:**	
Runway Used:	N/A	**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal		

Administrative Information

Investigator In Charge (IIC):	Daniel Baker	**Adopted Date:**	05/21/2012
Additional Participating Persons:	Scott Ford; FAA; Little Rock, AR		
Publish Date:	05/21/2012		
Investigation Docket:	http://dms.ntsb.gov/pubdms/search/dockList.cfm?mKey=75926		