



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	Fort Huachuca, AZ	<b>Accident Number:</b>	WPR14FA194
<b>Date &amp; Time:</b>	05/17/2014, 1020 MST	<b>Registration:</b>	N40TC
<b>Aircraft:</b>	AERO COMMANDER 500 S	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of engine power (total)	<b>Injuries:</b>	1 Fatal, 1 Serious
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Other Work Use		

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## Analysis

The commercial pilot reported that the purpose of the flight was to perform a check/orientation flight with the airline transport pilot (ATP), who was new to the area; the ATP was the pilot flying. The airplane was started, and an engine run-up completed. The commercial pilot reported that, during the takeoff roll, all of the gauges were in the “green.” After reaching an airspeed of 80 knots, the airplane lifted off the ground. About 350 ft above ground level (agl), the pilots felt the airplane “jolt.” The commercial pilot stated that it felt like a loss of power had occurred and that the airplane was not responding. He immediately shut off the boost pumps, and the ATP initiated a slow left turn in an attempt to return to the airport to land. The airplane descended rapidly in a nose-low, right-wing-low attitude and impacted the ground.

A witness reported that he watched the airplane take off and that it sounded normal until it reached the departure end of the runway, at which point he heard a distinct “pop pop,” followed by silence. The airplane then entered an approximate 45-degree left turn with no engine sound and descended at a high rate with the wings rolling level before the airplane went out of sight. Another witness made a similar statement. Based on the witnesses’ statements and photographs of the twisted airplane at the accident site, it is likely that a total loss of engine power occurred and that, during the subsequent turn back to the airport, the ATP did not maintain sufficient airspeed and exceeded the airplane’s critical angle-of-attack, which resulted in an aerodynamic stall and impact with terrain.

Although a postaccident examination of the airframe and engines did reveal an inconsistency between the cockpit control positions and the positions of the fuel shutoff valves on the sump tank, this would not have precluded normal operation. No other anomalies were found that would have precluded normal operation.

## 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 adequate airspeed and his exceedance of the airplane's critical angle-of-attack after a total loss of engine power during the takeoff initial climb, which resulted in an aerodynamic stall and impact with terrain. The reason for the total loss of engine power could not be determined because an examination of the airframe and engines did not reveal any anomalies that would have precluded normal operation.

### Findings

<b>Aircraft</b>	Airspeed - Not attained/maintained (Cause) Angle of attack - Not attained/maintained (Cause)
<b>Personnel issues</b>	Aircraft control - Pilot (Cause)
<b>Not determined</b>	Not determined - Unknown/Not determined (Cause)

## Factual Information

### HISTORY OF FLIGHT

On May 17, 2014, about 1020 Mountain standard time, an Aero Commander 500S, N40TC, impacted terrain shortly after takeoff from Sierra Vista Municipal Airport – Libby Army Airfield, Fort Huachuca, Arizona (FHU). The airline transport pilot (ATP) survived the accident, but died as a result of his injuries about two week after the accident. The commercial pilot was seriously injured; the airplane sustained substantial damage throughout. The airplane was registered to, and operated by Ponderosa Aviation Inc. under the provisions of 14 Code of Federal Regulations Part 91 as an orientation flight. Visual meteorological conditions prevailed, and no flight plan was filed for the local area flight.

A statement as to the circumstances of the accident was not obtained from the ATP prior to him succumbing to his injuries.

The commercial pilot reported that the purpose of the flight was to perform a check/orientation flight with the ATP, who was new to the area. Both pilots conducted a thorough preflight inspection and discussed the airplane's characteristics, safety guidelines, and protocols. The airplane was started and a run-up was completed. The airplane started the takeoff roll and all gauges were in the "green;" the airspeed reached 80 knots and the airplane lifted off the ground. About 350 feet above the ground the pilots felt the airplane "jolt" and the airplane felt like it lost power; it was not responding. The commercial pilot immediately shut off the boost pumps, and the ATP initiated a slow left turn in an attempt to return to land; however, the airplane still did not respond. The airplane descended rapidly in a nose and right wing low attitude and impacted the ground at about a 45 degree angle. After impact, the commercial pilot turned off the master switch to stop the stall warning buzzer, and he exited the airplane.

Witnesses reported that they watched the airplane takeoff. The airplane sounded normal until it reached about 800 feet at the departure end of the runway; the witnesses heard a distinct "pop pop" sound then silence. The airplane made an approximate 45 degree left turn with no engine noise. The airplane descended at a high rate, the wings were leveled before it went out of sight. Shortly thereafter they observed a cloud of smoke.

### PERSONNEL INFORMATION

#### First Pilot - Airline Transport Pilot

The pilot, age 65, held an airline transport pilot certificate for airplane single-engine land/sea and multi-engine land issued February 22, 2008. He also held a flight instructor certificate for airplane single- and multi-engine land, an instrument rating issued February 24, 2013, and a second class medical certificate issued December 10, 2013 with the limitation that he must wear corrective lenses for distant, and have glasses for near vision. At his most recent medical examination he reported a total of 13,100 hours, 150 of which were in the last six months. The operator reported that the pilot had about 600 total hours in the accident airplane make and model.

#### Second Pilot - Commercial Pilot

The pilot, age 70, held a commercial pilot certificate for airplane single- and multi-engine land, and instrument airplane issued September 30, 2008, and a second-class airman medical

certificate issued July 16, 2013 with the limitation that he must wear corrective lenses. The pilot reported that he had a total of 16,560 hours; 4,100 of which were in the accident airplane make and model. The pilot further reported that prior to the accident he flew 80 hours in the make and model in the previous 90 days, and 15 hours in the make and model in the previous 30 days.

#### AIRCRAFT INFORMATION

The five-seat, high-wing, retractable gear airplane, serial number 3091, was manufactured in 1976. It was powered by two Lycoming IO-540-E1B5, 290-horsepower engines and equipped with Hartzell Propeller model HC-C3YR-2UF controllable pitch propellers. The airplane's last maintenance was a conditional inspection that occurred on April 28, 2014 at a recorded tachometer reading of 21,659.3.

It was reported that the airplane was repositioned to FHU on May 5, 2014 and was not flown until the day of the accident (5/17/14). When the airplane arrived at the airport it was filled up with 22 gallons of Avgas.

#### METEOROLOGICAL INFORMATION

At 0956 hours, the FHU weather was reported as wind from 320 degrees at 7 knots, visibility 10 statute miles, clear skies, temperature 28 degrees C, dewpoint -16 degrees C, and an altimeter setting of 30.11

#### AIRPORT INFORMATION

FHU is located at a field elevation of 4,719 feet and has three hard surfaced runways: runway 8/26, runway 12/30, and runway 3/21. The accident airplane used runway 8/26 which is made of concrete and is 12,001 feet long and 150 feet wide.

#### WRECKAGE AND IMPACT INFORMATION

The airplane came to rest on airport property with the cabin twisted 90 degrees from the wing structure. The wings and engines were level. The right wing was fractured about midspan, and all three propellers were bent aft. The outboard about three feet of the left wing was bent upward; two of the propellers on the left engine were bent forward and one was bent aft. The forward fuselage was mostly intact, however, it came to rest on its left side; the bottom sustained crush damage. The aft fuselage was fracture separated, and the empennage came to rest upside down.

#### TESTS AND RESEARCH

A postaccident examination of the airframe and engines revealed no anomalies that would have precluded normal operations.

##### Airframe

During a postaccident examination of the airframe, flight control continuity was established throughout. Continuity of the airframe's fuel system from the fuel tanks to the firewall components was also established throughout. It was noted that there was about 5 gallons of fuel within the sump fuel tank; however, there was no fuel within the fuel system from the sump tank to the engines. After further examination, it was noted that the left and right shut off valves mounted to the sump tank were in the "OFF" position. These valves are electrically actuated open and closed by switches within the cockpit. The right fuel switch in the cockpit

was in the "ON" position, and the left fuel switch was in the "OFF" position.

The sump tank shut off valves were removed from the tank and continuity of the electrical bundles was established. The boost pumps were removed and loosely assembled to the shutoff valves for functional testing; both the boost pumps and valves operated normally.

#### Left Engine

During the visual examination of the left engine, it showed no evidence of catastrophic failure. The overhead components and engine accessories were in place and no impact related damage was noted. The oil sump was intact and there was no indication of preimpact oil seepage or leakage. The oil filter was examined and was clear of debris. The top and bottom spark plugs were removed and exhibited normal wear signatures. The inside of the cylinders were examined using a borescope and they all exhibited normal wear signatures. The crankshaft rotated manually and cylinder compression, valve train, and accessory gear continuity was established. The magnetos and ignition system remained secured to the engine and were undamaged. The magnetos were removed and spark was observed on all ignition wires. After a few rotations the left magneto stopped producing spark; however, it was later functionally tested at a magneto facility, and it operated normally. All of the fuel lines remained secured to the engine and there was no evidence of leaking, nor was there any sign of fuel within any of the fuel lines or system components. The fuel nozzles were removed and clear of debris; the fuel manifold valve was disassembled and was clear of debris.

#### Right Engine

During the visual examination of the right engine, it showed no evidence of catastrophic failure. The overhead components and engine accessories were in place and no impact related damage was noted. The top and bottom spark plugs were removed and exhibited normal wear signatures. The inside of the cylinders were examined using a borescope and they all exhibited normal wear signatures. The crankshaft rotated manually and cylinder compression, valve train, and accessory gear continuity was established. The magnetos and ignition system remained secured to the engine and were undamaged. The magnetos were removed and spark was observed on all ignition wires. The oil sump was intact and there was no indication of preimpact oil seepage or leakage. The oil filter was examined and was clear of debris. The oil suction screen was removed and it contained a piece of metal that was later identified as a piece of the left magneto bearing retainer cage. All of the fuel lines remained secured to the engine and there was no evidence of leaking, nor was there any sign of fuel within any of the fuel lines or system components. The fuel nozzles were removed and clear of debris; the fuel manifold valve was disassembled and was clear of debris.

### History of Flight

Initial climb	Loss of engine power (total) (Defining event)
	Off-field or emergency landing
	Collision with terr/obj (non-CFIT)

## Pilot Information

<b>Certificate:</b>	Airline Transport	<b>Age:</b>	65, Male
<b>Airplane Rating(s):</b>	Multi-engine Land; Single-engine Land; Single-engine Sea	<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>	Yes
<b>Instructor Rating(s):</b>	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 2 With Waivers/Limitations	<b>Last FAA Medical Exam:</b>	12/10/2013
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	03/05/2014
<b>Flight Time:</b>	13175 hours (Total, all aircraft), 600 hours (Total, this make and model), 13075 hours (Pilot In Command, all aircraft), 8 hours (Last 90 days, all aircraft)		

## Pilot Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	70, Male
<b>Airplane Rating(s):</b>	Multi-engine Land; Single-engine Land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 2 With Waivers/Limitations	<b>Last FAA Medical Exam:</b>	07/16/2013
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	03/07/2014
<b>Flight Time:</b>	16560 hours (Total, all aircraft), 4100 hours (Total, this make and model), 15560 hours (Pilot In Command, all aircraft), 80 hours (Last 90 days, all aircraft), 20 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Make:	AERO COMMANDER	Registration:	N40TC
Model/Series:	500 S	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	3091
Landing Gear Type:	Retractable - Tricycle	Seats:	5
Date/Type of Last Inspection:	12/23/2013, AAIP	Certified Max Gross Wt.:	6750 lbs
Time Since Last Inspection:	26 Hours	Engines:	2 Reciprocating
Airframe Total Time:	21660 Hours at time of accident	Engine Manufacturer:	Lycoming
ELT:	Installed, activated, did not aid in locating accident	Engine Model/Series:	IO-540-E1B5
Registered Owner:	PONDEROSA AVIATION INC	Rated Power:	290 hp
Operator:	PONDEROSA AVIATION INC	Operating Certificate(s) Held:	Commuter Air Carrier (135)

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	FHU, 4719 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	0956 MST	Direction from Accident Site:	
Lowest Cloud Condition:	Clear	Visibility	10 Miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	7 knots /	Turbulence Type Forecast/Actual:	/ None
Wind Direction:	320°	Turbulence Severity Forecast/Actual:	/ N/A
Altimeter Setting:	30.11 inches Hg	Temperature/Dew Point:	28° C / -16° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Fort Huachuca, AZ (FHU)	Type of Flight Plan Filed:	None
Destination:	Fort Huachuca, AZ (FHU)	Type of Clearance:	None
Departure Time:	1020 MST	Type of Airspace:	

## Airport Information

Airport:	SIERRA VISTA MUNI-LIBBY AAF (FHU)	Runway Surface Type:	Concrete
Airport Elevation:	4719 ft	Runway Surface Condition:	Dry
Runway Used:	26	IFR Approach:	None
Runway Length/Width:	12001 ft / 150 ft	VFR Approach/Landing:	None

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal, 1 Serious	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	N/A	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Fatal, 1 Serious	<b>Latitude, Longitude:</b>	31.586389, -110.340000 (est)

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Samantha A Link	<b>Report Date:</b>	05/23/2016
<b>Additional Participating Persons:</b>	David J Montalvo; Federal Aviation Administration; Scottsdale, AZ Geoffrey Pence; Twin Commander Aircraft LLC; Arlington, WA John Butler; Lycoming Engines; Williamsport, PA		
<b>Publish Date:</b>	05/23/2016		
<b>Note:</b>	The NTSB did not travel to the scene of this accident.		
<b>Investigation Docket:</b>	<a href="http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=89222">http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=89222</a>		

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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](#).