# National Transportation Safety Board
# Aviation Accident Final Report

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| **Location:** | Grand Canyon, AZ | **Accident Number:** | LAX03LA168 |
| **Date & Time:** | 05/28/2003, 1720 MST | **Registration:** | N64TS |
| **Aircraft:** | Aero Commander 500B | **Aircraft Damage:** | Substantial |
| **Defining Event:** | | **Injuries:** | 1 Serious, 2 Minor, 1 None |
| **Flight Conducted Under:** | Part 91: General Aviation - Personal | | |

## Analysis

The airplane did not gain altitude after takeoff and collided with trees and terrain off the departure end of the runway. Prior to takeoff the pilot received a computerized weather briefing that showed generally good conditions. The tower controller cleared the pilot to taxi to the active runway (runway 21) and issued winds, which were 300 degrees at 10 knots, a direct crosswind. During the initial climb after liftoff, the pilot saw that the airplane had stopped climbing and he asked for and received the wind information again. With the airplane not climbing and headed directly for some trees, the pilot maneuvered the airplane towards a clearing but the left wing hit a tree and the airplane descended into the ground. The pilot reported no mechanical problems with the airframe and engines. The density altitude was calculated to be 9,481 feet. The aircraft's gross weight at the time of takeoff was 6,000 pounds. Review of the Airplane Flight Manual climb performance charts for that aircraft weight at the pressure altitude and reported outside air temperature discloses that the airplane should have had a positive rate of climb of about 1,100 feet per minute. The airport was equipped with a wind information recording system, which had four sensors. Three sensors recorded wind information at ground level only. They were placed, one each, at the approach, middle, and departure ends of the runway. Wind data was recorded every 10 seconds. The system does not have the capability to predict or warn of wind shear events. During the aircraft's departure, the approach end sensor recorded winds at 068 degrees at 1 knot; the middle sensor recorded winds at 293 degrees at 5 knots; and the departure sensor recorded winds at 302 degrees at 2 knots. At the next data sampling (10 seconds later), the departure end sensor recorded a wind increase of 10 knots, and the approach end recorded a wind shift from a headwind to a tailwind at 10 knots. A full analysis of the weather conditions indicated that due to developing convection over the runway the airplane likely encountered a wind shear (increasing tailwind) event that seriously degraded the takeoff and climb performance.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot's encounter with a wind shear just after liftoff.

## Findings

Occurrence #1: IN FLIGHT ENCOUNTER WITH WEATHER
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings
1. (C) WEATHER CONDITION - SUDDEN WINDSHIFT
2. (C) WEATHER CONDITION - WINDSHEAR
3. (C) AIRCRAFT PERFORMANCE,CLIMB CAPABILITY - EXCEEDED
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Occurrence #2: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: DESCENT - UNCONTROLLED

Findings
4. OBJECT - TREE(S)
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Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
5. TERRAIN CONDITION - GROUND

## Factual Information

On May 28, 2003, about 1720 mountain standard time, an Aero Commander 500B, N64TS, collided with trees and terrain shortly after takeoff from the Grand Canyon National Park (GCN), Grand Canyon, Arizona. The pilot operated the airplane under the provisions of 14 CFR Part 91. The airplane sustained substantial damage. The certificated airline transport pilot and one passenger sustained minor injuries, one passenger was seriously injured, and the third passenger was not injured. The personal cross-country flight was departing GCN en route to the Rialto Municipal (Miro Field) (L67), Rialto, California. Visual meteorological conditions prevailed, and a flight plan had not been filed. The wreckage was at 37 degrees 57 minutes north latitude and 112 degrees 08 minutes west longitude.

The pilot and passengers arrived at the Grand Canyon on May 27, 2003, for an overnight stay, with a return to Rialto scheduled on the 28th. The pilot stated that they fueled at Rialto so they would not have to refuel at the Grand Canyon for the return trip.

The pilot went into the local fixed base operator (FBO) and obtained a computerized weather briefing upon arriving at the airport about 1600 the day of the accident. He stated that at the time the weather was "generally good." After obtaining the weather briefing, he went out to the airplane to do a weight and balance calculation. During the previous evening/nighttime there had been an infestation of locusts, and the pilot wanted to check the screens inside the cowling to make sure there were no blockages. He opened the cowlings and a couple of moths flew out. No blockages were noted.

While the pilot was performing the preflight, the passengers boarded the airplane. During the preflight he removed the gust locks, checked the oil, and rechecked the fuel, which he estimated to be 90 gallons. He also sumped the fuel drains, with no discrepancies encountered. After completing the preflight, he redistributed the passengers per the weight and balance calculations.

The pilot started the airplane and obtained the current Automatic Terminal Information Service (ATIS) information. He then contacted ground control for taxi. He was cleared to taxi to the run-up area. While in the run-up area, he recalculated the density altitude because the temperature had dropped considerably due to weather. He then leaned the airplane for climb-out performance per the airplane flight manual. No mechanical anomalies were noted with the run-up.

The pilot indicated that a Grand Canyon Airlines airplane had taken off to the south on runway 21 about 10 minutes prior to his departure. There were some thunderstorms in the vicinity of the airport; however, they were in the north and northeast sectors. The pilot reported that it was clear and there were blue skies to the south.

The pilot was then cleared to taxi to the active runway (runway 21), and noted that it was sprinkling. He asked the tower for a wind check. A tower controller reported that the winds were from 300 degrees at 10 knots (a direct crosswind).

The pilot applied full power for takeoff, and everything appeared normal. The airplane accelerated to 100 miles per hour (mph) and he rotated the airplane for takeoff. He initially noted a positive rate of climb, and retracted the landing gear. The airspeed did not increase or decrease from 100 mph, and the climb-out was very "slow." At that point, the airplane had already crossed over the boundary fence and it became clear that the climb rate was

insufficient to avoid hitting the trees. He maneuvered the airplane to the right of the departure path towards a clearing. The tower controller also pointed out the clearing to the pilot.

As he was navigating between two trees, the left wing struck a tree and the airplane made a decelerating turn to the left. The pilot stated that at no time did the stall warning horn activate. He kept the airplane as level as he could, with a slight nose high attitude. When the airplane struck the terrain, it was at a relatively flat attitude.

The pilot and two passengers exited through the main door of the airplane, and one passenger kicked out the windshield. When they got out of the airplane, the pilot noted that fuel was spilling on the ground, but there was no fire. While waiting for rescue personnel, about 2-3 minutes later, it started to rain and then stopped.

The pilot reported that the engines were functioning normally. The engines had been overhauled in 1996. He further stated that he believes the wind switched on him during takeoff; it went from a 90-degree crosswind to a tailwind.

According to the local tower controller, he cleared the airplane for takeoff and issued a wind check. After takeoff, the pilot again asked for a wind check, which the controller issued and indicated that it was a direct crosswind. He observed that the airplane was not climbing, and advised him of a valley to the pilot's right. There were no further transmissions.

Weather issued at the time of the accident by the tower controller were winds 300 degrees at 10 knots; few clouds at 12,000 feet above ground level; temperature 29 degrees Celsius; dew point 03 Celsius; and altimeter 30.29 inches of Mercury.

According to the airport/facilities directory, the Grand Canyon National Park Airport is at an elevation of 6,609 feet. Utilizing a density altitude program, the National Transportation Safety Board investigator-in-charge calculated the density altitude as 9,481 feet, with a pressure altitude of 6,268 feet.

According to the pilot, the aircraft gross weight at the time of takeoff was 6,000 pounds. Review of the Airplane Flight Manual climb performance charts for that aircraft weight at the pressure altitude and reported outside air temperature discloses that the airplane should have had a positive rate of climb of about 1,100 feet per minute.

METEOROLOGICAL INFORMATION

The Safety Board National Resource Specialist - Meteorology, obtained wind information from the Grand Canyon Airport. The airport has four wind sensors on the field, three of which record data. The sensors are placed, one each, at the approach end, middle, and departure end of runway 21. Wind data is recorded every 10 seconds. At the time (1720 MST), the accident airplane was departing the approach sensor recorded winds at 068 degrees at 1 knot; the middle sensor recorded winds at 293 degrees at 5 knots; and the departure sensor recorded winds at 302 degrees at 2 knots. During the time period of 1720-1723, the departure sensor recorded a wind increase to 10 knots. The middle sensor recorded a maximum headwind of 5 knots, and the approach end recorded a wind shift from a headwind (maximum 7 knots) to a tailwind at 10 knots.

The specialist further noted that the developing convection over runway 21 likely resulted in a decreasing airplane performance wind shear (increasing tailwind) along the runway as the accident airplane departed. Surface weather data indicated a peak wind of 340 degrees true (326 magnetic) at 18 knots at 1725, which resulted in about an 8-knot tailwind and about a 16-

knot crosswind to runway 21.

According to the Federal Aviation Administration (FAA) a WME system was in place at the time of the accident. The WME provides immediate readings at ground level only, it does not have the capability to predict and warn of wind shear events. The FAA reported that on the day of the accident the WME was operational.

## Pilot Information

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| **Certificate:** | Airline Transport | **Age:** | 75, Male |
| **Airplane Rating(s):** | Multi-engine Land; Single-engine Land | **Seat Occupied:** | Left |
| **Other Aircraft Rating(s):** | None | **Restraint Used:** | Seatbelt |
| **Instrument Rating(s):** | Airplane | **Second Pilot Present:** | No |
| **Instructor Rating(s):** | None | **Toxicology Performed:** | No |
| **Medical Certification:** | Class 2 | **Last FAA Medical Exam:** | 04/01/2002 |
| **Occupational Pilot:** | | **Last Flight Review or Equivalent:** | 03/01/2003 |
| **Flight Time:** | 26110 hours (Total, all aircraft), 850 hours (Total, this make and model), 26110 hours (Pilot In Command, all aircraft), 24 hours (Last 90 days, all aircraft), 9 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft) | | |

## Aircraft and Owner/Operator Information

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| **Aircraft Make:** | Aero Commander | **Registration:** | N64TS |
| **Model/Series:** | 500B | **Aircraft Category:** | Airplane |
| **Year of Manufacture:** | | **Amateur Built:** | No |
| **Airworthiness Certificate:** | Normal | **Serial Number:** | 1442-156 |
| **Landing Gear Type:** | Retractable - Tricycle | **Seats:** | 7 |
| **Date/Type of Last Inspection:** | 06/01/2002, Annual | **Certified Max Gross Wt.:** | 6750 lbs |
| **Time Since Last Inspection:** | 77.5 Hours | **Engines:** | 2 Reciprocating |
| **Airframe Total Time:** | 4587.3 Hours as of last inspection | **Engine Manufacturer:** | Lycoming |
| **ELT:** | Installed, not activated | **Engine Model/Series:** | IO-540-E1B5 |
| **Registered Owner:** | Joseph Ciabattoni | **Rated Power:** | 295 hp |
| **Operator:** | Joseph Ciabattoni | **Operating Certificate(s) Held:** | None |

## Meteorological Information and Flight Plan

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| **Conditions at Accident Site:** | Visual Conditions | **Condition of Light:** | Day |
| **Observation Facility, Elevation:** | GCN, 6609 ft msl | **Distance from Accident Site:** | 1 Nautical Miles |
| **Observation Time:** | 1654 MST | **Direction from Accident Site:** | 210° |
| **Lowest Cloud Condition:** | Clear | **Visibility** | 10 Miles |
| **Lowest Ceiling:** | None | **Visibility (RVR):** | |
| **Wind Speed/Gusts:** | 11 knots / 14 knots | **Turbulence Type Forecast/Actual:** | / |
| **Wind Direction:** | 50° | **Turbulence Severity Forecast/Actual:** | / |
| **Altimeter Setting:** | 30.3 inches Hg | **Temperature/Dew Point:** | 30°C / 1°C |
| **Precipitation and Obscuration:** | No Obscuration; No Precipitation | | |
| **Departure Point:** | Grand Canyon, AZ (GCN) | **Type of Flight Plan Filed:** | None |
| **Destination:** | Rialto, CA (L67) | **Type of Clearance:** | VFR |
| **Departure Time:** | 1720 PDT | **Type of Airspace:** | |

## Airport Information

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| **Airport:** | Grand Canyon National Park (GCN) | **Runway Surface Type:** | Asphalt |
| **Airport Elevation:** | 6609 ft | **Runway Surface Condition:** | Dry |
| **Runway Used:** | 21 | **IFR Approach:** | None |
| **Runway Length/Width:** | 8999 ft / 150 ft | **VFR Approach/Landing:** | None |

## Wreckage and Impact Information

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| **Crew Injuries:** | 1 Minor | **Aircraft Damage:** | Substantial |
| **Passenger Injuries:** | 1 Serious, 1 Minor, 1 None | **Aircraft Fire:** | None |
| **Ground Injuries:** | N/A | **Aircraft Explosion:** | None |
| **Total Injuries:** | 1 Serious, 2 Minor, 1 None | **Latitude, Longitude:** | 35.952222, -112.146944 |

## Administrative Information

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| **Investigator In Charge (IIC):** | Tealeye C Cornejo | **Report Date:** | 07/31/2006 |
| **Additional Participating Persons:** | Richard Wright; Federal Aviation Administration; Las Vegas, NV | | |
| **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/. | | |