



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	Bessemer, AL	<b>Accident Number:</b>	MIA02FA037
<b>Date &amp; Time:</b>	12/01/2001, 0143 CST	<b>Registration:</b>	N499BA
<b>Aircraft:</b>	Cessna 208B	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>		<b>Injuries:</b>	2 Fatal
<b>Flight Conducted Under:</b>	Part 135: Air Taxi & Commuter - Non-scheduled		

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## Analysis

The flight departed from Little Rock, Arkansas, about 2356 cst, and approximately 49 minutes after takeoff, the FAA approved un-augmented Automated Weather Observing System (AWOS-3) installed at the destination airport began reporting the visibility as 1/4 statute mile; the visibility continued to be reported as that value for several hours after the accident. Title 14 CFR Part 135.225 indicates no pilot may begin an instrument approach procedure to an airport with an approved weather reporting facility unless the latest weather report issued by that weather reporting facility indicates that weather conditions are at or above the authorized IFR landing minimums for that airport. The listed minimums for the ILS approach to runway 05 was in part 3/4 mile visibility. A METAR taken at the destination airport approximately 2 minutes after the accident indicated overcast clouds existed at 100 feet, the temperature and dew point were 4 and 2 degrees Celsius, respectively, and the altimeter setting was 30.16 inHg. No precipitation was present across Arkansas, Mississippi, or Alabama, and no radar echoes were noted along the accident airplane's route of flight. The freezing level near the departure and destination airports at the nominal time of 0600 (4 hours 17 minutes after the accident) was 12000 and 14,500 feet mean sea level, respectively. A witness at the airport reported the fog was the thickest he had seen since working at the airport for the previous year. The flight was cleared for an ILS approach to runway 05, and the pilot was advised frequency change was approved. The witness waiting at the airport reported hearing a sound he associated with a shotgun report. Radar data indicated that between 0138:47, and 0142:11, the airplane was flying on a northeasterly heading and descended from 2,400 feet msl, to 900 feet msl. At 0142:11, the airplane was located .43 nautical mile from the approach end of runway 05. The next recorded radar target 24 seconds later indicated 1,000 feet msl, and was .20 nautical mile from the approach end of runway 05. The touchdown zone elevation for runway 05 is 700 feet msl. The airplane crashed in a wooded area located approximately 342 degrees and .37 nautical mile from the approach end of runway 05; the wreckage was located approximately 4 hours after the accident. Examination of trees revealed evidence the airplane was banked to the left approximately 24 degrees, and the descent angle from the trees to the ground was calculated to be approximately 22 degrees. All components necessary to sustain flight were either attached to the airplane or in close proximity to the main wreckage. There was no evidence of post crash fire and a strong odor of fuel was noted at the scene upon NTSB arrival.

A 8-inch diameter pine tree located near the initial ground impact sight exhibited black paint transfer and a smooth cut surface that measured approximately 46 inches in length. The bottom portion of the cut was located 4 feet above ground level. The flap actuator was found nearly retracted; examination of the components of the flap system revealed no evidence of preimpact failure or malfunction. Examination of the flight control system for roll, pitch, and yaw revealed no evidence of preimpact failure or malfunction. Examination of the engine and engine components with TSB of Canada oversight revealed no evidence of preimpact failure of the engine or engine components. Examination of the propeller with FAA oversight revealed no evidence of preimpact failure or malfunction. Examination of the components of the autopilot system, selected avionics and flight instruments from the airplane with FAA oversight revealed no evidence of preimpact failure or malfunction. The pilot's attitude indicator had been replaced on October 14, 2001, and according to FAA personnel, the mechanic and facility that performed the installation did not have the necessary equipment to perform the operational checks required to return the airplane to service. The FAA flight checked the ILS approach to runway 05 two times after the accident and reported no discrepancies.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The poor in-flight planning by the pilot-in-command for his initiation of the ILS approach to runway 05 with weather conditions below minimums for the approach contrary to the federal aviation regulations, and the failure of the pilot to maintain control of the airplane during a missed approach resulting in the in-flight collision with trees then terrain.

## Findings

Occurrence #1: IN FLIGHT COLLISION WITH OBJECT  
Phase of Operation: MISSED APPROACH (IFR)

### Findings

1. WEATHER CONDITION - FOG
2. (C) WEATHER CONDITION - BELOW APPROACH/LANDING MINIMUMS
3. (C) IN-FLIGHT PLANNING/DECISION - POOR - PILOT IN COMMAND
4. (C) IFR PROCEDURE - INITIATED - PILOT IN COMMAND
5. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
6. OBJECT - TREE(S)

## Factual Information

### HISTORY OF FLIGHT

On December 1, 2001, about 0143 central standard time, a Cessna 208B, N499BA, registered to and operated by Air Carriers, Inc., using call sign "Fast Check 600", collided with trees then terrain during an instrument landing system (ILS) approach to runway 05, at Bessemer Airport, Bessemer, Alabama. Instrument meteorological conditions (IMC) prevailed at the time and an instrument flight rules (IFR) flight plan was filed for the 14 CFR Part 135, on-demand, non-scheduled, domestic, cargo flight from Little Rock, Arkansas, to the Bessemer Airport, Bessemer, Alabama. The airplane was destroyed and the commercial-rated pilot and a pilot-rated passenger (another company pilot) were fatally injured. The flight originated approximately 2356 from the Adams Field Airport, Little Rock, Arkansas.

Shortly after takeoff, the flight was radar identified and cleared to fly direct to the Bessemer Airport. At 0009, air traffic control (ATC) communications were transferred from the Little Rock Air Traffic Control Tower to the Memphis Air Route Traffic Control Center (Memphis ARTCC). The flight remained in contact with that facility from 0009 to 0122; radar data indicates that between 0011 and 0122, the flight was conducted at 9,000 feet mean sea level (msl). At 0055, the R13 sector controller provided the pilot the Birmingham altimeter setting of 30.17 inHg. At 0122, ATC communications were transferred to Birmingham Air Traffic Control Tower (KBHM ATCT).

According to a transcription of communications between the pilot of Fast Check 600 and the Birmingham ATCT, at 0122:51, the pilot contacted the facility and advised the controller that the flight was at 9,000 feet msl. The controller acknowledged the contact and advised the pilot "expect lower in one zero miles and visual approach Bessemer airport." The pilot responded with, "600." At 0126:41, the controller cleared the flight to descend and maintain 4,000 feet msl, which was acknowledged. At 0126:57, the pilot requested radar vectors for the instrument landing system approach, to which the controller responded initially roger, followed by, "maintain three thousand till brookwood cleared ILS runway five approach to Bessemer." The pilot acknowledged the descent clearance and at 0137:44, he advised the controller that the flight was "about to intercept", to which the controller replied, "fast check six hundred roger change to advisory frequency is approved report your cancellation in the air this frequency or on the ground clearance delivery frequency." The pilot acknowledged the transmission from the controller with, "fast check six hundred." There were no further recorded radio transmissions from the accident pilot, and there was no record that the Birmingham ATCT controller provided the pilot with an altimeter setting.

A witness who was on the airport waiting for the flight to arrive reported hearing the engine sound at a distance, and then heard a sharp sound he associated with a shotgun report north of runway 5. The witness reported heavy fog existed at the airport at the time of the accident.

Review of radar data from Atlanta Air Route Traffic Control Center (ARTCC) associated with the accident airplane revealed that between 0138:47, and 0142:11, the airplane was flying on a northeasterly heading and descended from 2,400 feet msl, to 900 feet msl. At 0142:11, the airplane was located at 33 degrees 18 minutes 12 seconds North latitude, and 086 degrees 56 minutes 22 seconds West longitude, or approximately 225 degrees and .43 nautical mile from the approach end of runway 05. The next recorded radar target 24 seconds later at 0142:35, was indicating 1,000 feet msl, and was located at 33 degrees 18 minutes 41 seconds North

latitude, and 086 degrees 55 minutes 56 seconds West longitude, or 005 degrees and .20 nautical mile from the approach end of runway 05. The touchdown zone elevation for runway 05 is 700 feet msl.

A search for the airplane was conducted; the wreckage was located approximately 4 hours after the accident.

#### PERSONNEL INFORMATION

The pilot-in-command seated in the left front seat was the holder of a commercial pilot certificate, with airplane single and multi-engine land, and instrument airplane ratings. He was issued a second-class medical certificate on August 30, 2001, with the limitation, "Holder shall wear lenses that correct for distant vision and possess glasses that correct for near vision while exercising the privileges of his airman certificate."

Air Carriers, Inc., and BancServ Air, Inc., are owned by the same individual. Air Carriers, Inc., and BancServ Air, Inc., were assigned Air Carrier certificate number DKBA109S and VKSA957T, respectively. Air Carriers, Inc., and BancServ Air, Inc., were authorized by the Federal Aviation Administration (FAA) to conduct on-demand cargo only operations, and on-demand operations, respectively, in accordance with the certificates issued under Title 14 CFR Part 119.

Review of the pilot-in-command's Air Carriers, Inc., training file revealed he completed his initial new hire basic indoctrination training, and general emergency training in Cessna 206 and 210 airplanes on October 11, 2000. He completed initial hazardous materials training on October 12, 2000, and completed the initial new-hire equipment ground training for Cessna 210 airplanes on October 13, 2000. Initial new-hire equipment flight training that consisted of 3.1 hours in an undesignated type airplane was completed on October 14, 2000. He was assigned as pilot-in-command in Cessna 206 and 210 airplanes on October 16, 2000; he was not assigned as pilot-in-command on Cessna 208 airplanes. His last airman competency/proficiency check flight in accordance with 14 CFR Part 135.293, and 297 occurred on November 17, 2001, which consisted of a .8 hour flight in a Cessna 210 airplane. The result of the flight check was listed as "approved."

The pilot-in-command's training file with BancServ Air, Inc., indicates he received initial flight and ground training in Cessna 208 airplanes on February 27, 2001. An airman competency/proficiency check flight form dated February 28, 2001, indicates he passed the flight check that was flown in the accident airplane. He was assigned that same day as pilot-in-command on Cessna 208 airplanes for BancServ Air, Inc.

The pilot-rated passenger seated in the right front seat was the holder of a commercial pilot certificate, with ratings airplane single and multi-engine land, and instrument airplane. He was also the holder of a flight instructor certificate with ratings airplane single engine, multi-engine, instrument airplane, that was issued on January 16, 2001. He was issued a first class medical certificate with no limitations on June 21, 2001. He completed his ground and flight training with Air Carriers, Inc., on July 23, 2001, and was assigned to fly as pilot-in-command Cessna 206 and 210 airplanes. He had not been trained in the Cessna 208 airplane. His last airman competency/proficiency check flight in accordance with 14 CFR Part 135.293, 297, and 299 occurred on July 21, 2001, which consisted of a 1.4 hours flight in a Cessna 210 airplane. The result of the flight check was listed as "approved."

#### AIRCRAFT INFORMATION

The airplane was a Cessna 208B, serial number 208B0689, manufactured in 1998. It was equipped with a 675 shaft horsepower Pratt & Whitney PT6A-114A engine, and a McCauley 3GFR34C703/106GA-0 propeller. The airplane was also equipped with a Shadin Key Data Recorder, a Bendix/King KFC-150 autopilot/flight director system, and an altitude preselector. BancServ Air, Inc., maintained the airplane in accordance with a Federal Aviation Administration (FAA) Approved Aircraft Inspection Program (AAIP). The last recorded altimeter, transponder, and static system checks were performed on May 10, 2000, by Southern Avionics.

The engine was last overhauled on April 3, 2001, and installed in the airplane on May 12, 2001, at an airframe total time of 3,891.8 hours and 3,214 total landings. The airplane had accumulated approximately 976 hours at the time of the accident since the overhauled engine was installed. The last recorded inspection (AAIP #12) occurred on November 19, 2001, at an airplane total time of 4,783.2 hours, and 4,004 total aircraft landings. The airplane had accumulated approximately 84 hours since the inspection at the time of the accident.

Review of the "Mechanical Irregularity Log" sheets recovered from the wreckage that begin with an entry dated April 13, 1999, and end with an entry dated July 16, 2001, revealed no logged discrepancies pertaining to the flight instruments. A BancServ Air, Inc., "Service Order" document dated October 14, 2001, has a discrepancy that states, "Pilots attitude indicator tumbles." On October 14, 2001, the pilot's Flight command indicator was replaced with an overhauled unit. The comments section in the maintenance record indicates, "ops ck good", and was signed off by an airframe and powerplant mechanic. According to FAA personnel, the mechanic and facility that performed the installation did not have the necessary equipment to perform the operational checks required to return the airplane to service.

#### METEOROLOGICAL INFORMATION

The pilot phoned the Anniston, Alabama, Automated Flight Service Station at 1558 hours on November 30, 2001, and filed three flight plans that included the accident flight. While in contact with that facility, the briefing specialist (specialist) asked the pilot if he needed a weather briefing to which he responded, "think I got it all." The pilot was advised the only airmet for the routes of flight was for moderate turbulence below 20,000 feet. The specialist reported looking at radar and advised the pilot, "I don't see any precipitation that should affect you, nothing...." He advised the specialist that he had NOTAM information.

A FAA approved un-augmented Automated Weather Observing System (AWOS-3) is installed at the accident airport. Review of the weather reports for the accident airport taken in 5-minute intervals revealed that at 2350 (approximately 6 minutes before takeoff), the vertical visibility was 500 feet overcast, and the visibility was 1/2 mile. At 2355, (approximately 1 minute before takeoff), the visibility was 1 mile with clear skies reported. The visibility increased to a maximum of 7 statute miles, which occurred at 0005 (approximately 9 minutes after takeoff), then began decreasing to 1/4 statute mile, which occurred at 0045 (approximately 49 minutes after takeoff). The recorded visibility remained at 1/4 statute mile or less from 0045 until several hours after the accident. A METAR observation taken at 0145 (approximately 2 minutes after the accident), indicates the wind was from 280 degrees at 0 knots, the visibility was 1/4 mile (no sensor was installed to determine weather phenomena); overcast clouds existed at 100 feet. The temperature and dew point were 4 and 2 degrees Celsius, respectively, and the altimeter setting was 30.16 inHg.

Review of 14 CFR Part 135.225, titled "Takeoff, approach and landing minimums" revealed no pilot may begin an instrument approach procedure to an airport unless it has a weather reporting facility operated by the U.S. National Weather Service, a source approved by the U.S. National Weather Service, or a source approved by the Administrator, and, "The latest weather report issued by that weather reporting facility indicates that weather conditions are at or above the authorized IFR landing minimums for that airport."

NTSB personnel located in Washington, D.C., prepared a meteorological factual report that indicates at 0115, no precipitation was present across Arkansas, Mississippi, or Alabama, and no radar echoes were noted along the accident airplane's route of flight. Upper air stations near the departure and destination airports indicate that at the nominal time of 0600 (4 hours 17 minutes after the accident), the freezing level was at 12000 and 14,500 feet mean sea level, respectively.

A witness who was located on the airport awaiting the arrival of the accident airplane reported that about the time of the accident, the fog was the thickest he had seen since working at the airport for the previous year.

Another company pilot on a flight from St. Petersburg, Florida, to Birmingham, Alabama, who landed at Birmingham approximately 2 minutes before the accident, reported hearing the accident flight being vectored on the approach. Due to the fact that he was scheduled to fly into the accident airport after his flight landed at Birmingham, he checked the AWOS at the accident airport two times. The first time when his flight was approximately 65 miles from his destination, and again when his flight was 30 miles from it. The visibility was reported to be less than 1/4 mile with 100-foot indefinite ceiling when he checked it the first time, and 1/4 mile visibility with again 100-foot indefinite ceiling when he checked it the second time. He executed a visual approach to runway 36 at Birmingham, and while in-bound there, he observed "widespread dense fog", and couldn't see the rotating beacon at the accident airport.

#### COMMUNICATIONS

The witness who was at the accident airport awaiting the arrival of the accident airplane reported in writing hearing a sound he associated with "...tapping on radio system outside: It was like when someone is attempting to do a microphone check. Shortly after I heard, "Flt 600 ??? [Bessemer]." He reported during an interview hearing the pilot report "INS."

#### AIRPORT INFORMATION

The airport is equipped with one asphalt runway designated 05/23, which is 5,700 feet long and 100 feet wide, and is served by an instrument landing system (ILS) approach to runway 05. The FAA approved un-augmented Automated Weather Observing System (AWOS-3) broadcasts on 118.825 MHz.

Review of the ILS Runway 05 instrument approach procedure depicted in the Southeast U.S. Terminal Procedures publication in effect on the date of the accident revealed the decision height and visibility for a straight in ILS approach to runway 05 for all categories of aircraft is 900 feet mean sea level and 3/4 mile visibility. The published missed approach procedure is to climb to 1,400 feet msl, then climbing right turn to 3,000 feet and proceed direct to the Brookwood VORTAC (OKW) and hold.

#### WRECKAGE AND IMPACT INFORMATION

The airplane crashed in a wooded area, impact damage to several trees was noted. The main

wreckage was located at 33 degrees 18.794 minutes North latitude and 086 degrees 56.145 minutes West longitude, or 342 degrees and .37 nautical mile from the approach end of runway 05. All components necessary to sustain flight were attached or in close proximity to the wreckage which was upright on a magnetic heading of 280 degrees. The main wreckage was located approximately 107 feet and 209 degrees from the first tree contact location. There was no in-flight or postcrash fire; a strong odor of fuel was noted at the accident site on NTSB arrival.

Examination of the accident site revealed the first observed contact to a tree was located at 33 degrees 18.817 minutes North latitude and 086 degrees 56.131 minutes West longitude. Damage to trees located 37 feet past the first tree impact site were located left and right of a line from the first tree contact to the main wreckage (centerline). The trees were located 3 feet left and 33 feet to the right of centerline and were contacted 14 feet and 30 feet above ground level (agl), respectively. The angle of bank was later calculated to be approximately 24 degrees. Continuing along the centerline towards the main wreckage, a stand of trees located to the left and right of the centerline were damaged approximately 5 feet agl; the trees were located approximately 62 feet from the first tree contact location. Components from the airplane were noted along the wreckage path. The first observed ground contact location was noted 81 feet from the first tree contact location; the angle from the first tree contact point to the ground contact point was determine to be approximately 22 degrees. A 8-inch diameter pine tree located near the initial ground impact sight exhibited black paint transfer and a smooth cut surface that measured approximately 46 inches in length. The cut was oriented vertically and was not completely through the diameter; the bottom point of the cut was located 4 feet agl.

Examination of the airplane revealed the outboard 76 inches of the left wing with attached aileron was separated from the wing; the separated section was found in close proximity to the main wreckage. Examination of the attached section of the left wing that was parallel to the fuselage revealed the aft fuel shutoff valve was not connected with the forward fuel shutoff valve. The forward and aft fuel shutoff valves of the left wing were found in the "on" position and near the "on" position, respectively. The right wing was separated from the airplane and was also found in close proximity to the main wreckage. The forward and aft fuel shutoff valves of the right wing were connected. The forward and aft fuel shutoff valves were found approximately 1/8 inch from "on" and "on", respectively. Damage to the left wing in the area of the lift strut attach point was noted; the leading edge of the left wing was separated. The leading edge of the right wing exhibited evidence of semi-circular indentations consistent with tree contacts. Examination of the leading edges of the left wing lift strut, separated section of the left wing, and left horizontal stabilizer revealed dirt/debris adhering to the surface. No evidence of preimpact failure or malfunction was noted to the flight control system for roll, pitch, or yaw. The cabin roof was separated at the aft doorframe bulkhead.

Examination of the flap control system revealed the flap actuator was extended approximately 6.5 inches which equates to nearly fully retracted. The left flap remained connected at the inboard and middle flap tracks but was separated at the outboard flap track; the outboard section of the flap was folded under the remaining section of the flap. Examination of the components of the left flap system revealed the "tube assembly-short" P/N 2662018-4, was "D" shaped and fractured consistent with bending approximately 5 inches from the left hand inboard bellcrank assembly. The "flap cable assembly" P/N 2660001-105, was attached to the left hand flap bellcrank assembly but was fractured consistent with tension overload in the area of the outboard attach point. There were no other fracture or separations noted of the

components of the left flap system. The right flap remained connected to the middle and outboard flap tracks; the middle flap track was separated from the wing structure. The inboard section of the right flap including the inboard flap track was separated but found in close proximity to the wreckage. Examination of the components of the right flap system revealed the "flap cable assembly" P/N 2660001-105, was attached to the outboard attach point on the flap but was fractured consistent with tension overload near the right hand flap bellcrank assembly. The "bellcrank connecting rod assembly" P/N 2522179-1, was flattened and fractured consistent with bending in close proximity to the right hand flap bellcrank assembly. The flap inboard pushrod assembly was connected to the right hand flap bellcrank assembly and the inboard flap attachment bracket, but the flap attachment bracket was separated from the flap. The "right hand interconnect rod assembly" P/N 2660020-4, was bent and fractured at the rod end which connects to the right hand inboard bellcrank assembly. There were no other fracture or separations noted of the components of the right flap system.

Examination of the cockpit revealed that the auxiliary vacuum pump switch was fully out. The left and right landing light, strobe light, pitot static and stall heat switches were in the "off" position, while the navigation and beacon light switches were in the "on" position. The pilot's altimeter was set to approximately 30.27 inHg, and was indicating 700 feet mean sea level when first examined. The condition lever was at the low idle position and the propeller control was approximately 1/2 inch above the minimum dent, both controls were bent to the right. The emergency power lever was also bent to the right and was located forward of the mechanical stop in the emergency power lever slot. A 1/4 inch long gouge was noted on the left side of the emergency power lever slot forward of the mechanical stop; the gouge became progressively deeper moving aft. No obvious damage was noted to the mechanical stop that extends in the emergency power lever slot. Full right aileron trim was noted. All circuit breakers on the circuit breaker panel were in. Autopilot, avionics, and pilot's and co-pilot's flight instruments were retained for further examination.

Examination of the engine compartment revealed continuity from the cockpit to the engine compartment for propeller, emergency power lever, condition lever, and power lever controls. The primary vacuum system line was crushed associated with impact damage in several locations along its length, bent, and fractured behind the standby vacuum pump bracket. The vacuum ejector nozzle was clear; no obstructions were noted.

Examination of the propeller at the manufacturer's facility with FAA oversight revealed no evidence of preimpact failure or malfunction. The reverse stop and feather mechanisms were undamaged. Counterweight impact signatures on the No. 3 hub socket indicate that the propeller was at a blade angle of approximately 20 degrees at the time of impact.

The engine assembly was examined at the engine manufacturer's Service Investigation Facilities in Canada, with Transportation Safety Board of Canada (TSB) oversight. Visual inspection of the engine revealed minimal impact damage; no fire damage was noted. The compressor discharge air (P3) and power turbine control (Py) lines were intact and continuous; no cracks or discontinuities of either line were noted. The reduction and accessory gearbox chip detectors, oil filter, fuel filter, and P3 filter were all noted to be clean. The first, second, and third stage compressor disks, blades, stators and shrouds exhibited circumferential rubbing and/or scoring, as did the centrifugal impeller and shroud in the area of the inducer. No distress was reported to the Nos. 1 and 2 bearings and airseals, combustion chamber liner, or large and small exit duct. No distress was noted to the compressor turbine guide vane ring,



while the compressor turbine shroud exhibited circumferential scoring. Light circumferential scoring was noted on the downstream side of the compressor turbine disk at the outer rim area. Circumferential rubbing of the power turbine shroud was noted, with an area of heavy smearing noted. The power turbine shaft and the Nos. 3 and 4 bearings were noted to rotate freely by hand. The second stage coupling input spline was fractured; heavy rubbing was noted on the fracture surface. No distress of the first or second stage gearing was noted. Continuity to all accessory drive pads was noted. The fuel heater was found to be spring loaded to the "full hot" position. The engine manufacturer reported that the position as found of the fuel heater would not affect normal engine operation.

Accessories/controls from the engine consisting of the fuel control unit, fuel pump, propeller and overspeed governor, flow divider, oil to fuel heater, bleed valve, igniters, primary/secondary, and inlet fuel nozzles were also examined with TSB oversight at the manufacturer's facility in Canada. Impact damage to the exciter box precluded operational test. Approximately 5 minutes into bench testing of the fuel pump, the main drive shaft fractured. The fractured shaft was replaced, the pump was reinstalled on the test bench, testing was resumed then halted due to a noise heard emanating from the pump. Disassembly of the pump revealed binding of the idler gear to the floating bearing consistent with impact damage. Bench testing of the remaining components revealed discrepancies when compared with new components, but there was no evidence of preimpact failure of any of the components.

Examination of the pilot's altimeter and vertical speed indicator, and the co-pilot's vertical speed indicator was performed with FAA oversight at the manufacturer's facility in Wichita, Kansas. The results of the examination of the pilot's altimeter revealed the barometric setting was 30.265 inHg. Impact damage was noted to the barometric shaft knob, pressure port fitting and electrical connections at the rear of the instrument, and rear cover of the instrument. Testing of the altimeter was performed in a vacuum chamber due to leakage caused by impact damage. Minor discrepancies with scale error and friction, encoder, and barometric output were reported, and were consistent with impact damage. Both vertical speed indicators were functionally tested which revealed discrepancies to both in the zero adjustment range, and scale error test. Disassembly of both units revealed discrepancies to both consistent with impact damage. According to the vice president of engineering of the altimeter manufacturer, the barometric knob would have to be rotated approximately 180-degrees counter-clockwise to change the altimeter setting from 30.16 inHg to the as found setting of 30.265 inHg.

The autopilot and avionics components from the airplane were examined with FAA oversight at the manufacturer's facility. Bench testing of the KC 192 Flight computer, KS 270A Pitch servo, KS 272A Pitch trim servo, and KI 256 Flight command indicator was performed with the components connected to a test harness. A slave roll servo was installed due to impact damage to the accident roll servo. The testing revealed the KI 256 Flight command indicator did not initially erect when gyro pressure was applied. Removal of the instrument cover revealed the gyro erection vanes were found loose. The vanes were clipped into position, and gyro pressure was applied again. All autopilot modes were found to function normally, as well as the KI 256 Flight command indicator. The autopilot responded correctly to roll and pitch commands. The KI 256 Flight command indicator display showed zero roll/pitch when the gyro was placed in the zero deflection position on the test fixture. The autopilot responded correctly to pitch commands when directed from the mode controller. The NAV/ILS modes were not functionally tested, but the modes engaged. The communication and navigation frequencies in

use of the No. 1 Communication Transceiver/Navigation Receiver (Nav/Comm) were found to be 127.67, and 111.75 (I-EKY Localizer) MHz, respectively. The communication and navigation frequencies in use of the No. 2 Nav/Comm were found to be 123.00 (Common Traffic Advisory Frequency), and 111.00 (Brookwood VORTAC/IAF) MHz, respectively. Impact damage precluded testing of the DME indicator, Pictorial Navigation Indicator (HSI), No. 2 Nav/ILS indicator, and remote directional gyro. Operational testing of the Altitude/Vertical Speed Preselector, Altitude Alerter was performed; the unit was found to operate normally; no discrepancies were reported. The last known position displayed in the GPS Receiver was 33 degrees 18.81 minutes North latitude and 086 degrees 56.10 minutes West longitude. The unit also displayed 277 degrees 0 nautical mile from the reference point of the accident airport.

#### MEDICAL AND PATHOLOGICAL INFORMATION

Postmortem examinations of the pilot and pilot-rated passenger were performed by Elizabeth Miller, M.D., Forensic Pathology Fellow with the Jefferson County Coroner, Birmingham, Alabama. The cause of death for both was listed as severe blunt force trauma.

The FAA Toxicology Accident and Research Laboratory (FAA CAMI) and the University of Alabama, at Birmingham (UAB) performed toxicological analysis of specimens of the pilot and of the pilot-rated passenger. The results of analysis by FAA CAMI of specimens of the pilot and pilot-rated passenger were negative for carbon monoxide, cyanide, ethanol, and tested drugs. The results of analysis by UAB of specimens of the pilot and pilot-rated passenger were negative for ethanol, drugs of abuse, and cyanide; alkaline drug screen of specimens of the pilot-rated passenger was also negative. Carbon monoxide (<5 percent saturation) was detected in blood specimens of the pilot and pilot-rated passenger.

#### TESTS AND RESEARCH

The engine trend monitor (ETM) Key Recorder, ETM Remote Display, and Remote ETM3, were examined with FAA oversight at the manufacturer's facility. No data was found stored in the ETM Remote processor; four hundred forty records including records from the accident flight were downloaded from the ETM Key Recorder. Record number 0436, captioned "Takeoff", taken at 0054:36, recorded an indicated airspeed of 70 knots, and an outside air temperature (OAT) of 5 degrees Celsius; the record was later determined to be from the Adams Field Airport, Little Rock, Arkansas. Three "Power Check Report" records were recorded after takeoff. The first power check report record (0437) occurred approximately 16 minutes 12 seconds after the takeoff record, and recorded a pressure altitude of 8,210 feet, an OAT of 9 degrees Celsius, and an indicated airspeed of 100 knots. The second power check report record (0438) occurred approximately 46 minutes 12 seconds after the takeoff record, and recorded a pressure altitude of 8,240 feet, an OAT of 10 degrees Celsius, and an indicated airspeed of 103 knots. The third power check report record (0439) occurred approximately 1 hour 16 minutes 12 seconds after the takeoff record, and recorded a pressure altitude of 8,240 feet, an OAT of 11 degrees Celsius, and an indicated airspeed of 101 knots. The final record (0440) captioned "Landing", occurred 1 hour 44 minutes 53 seconds after the takeoff record. The last record indicated the airplane was located at 33 degrees 18.6 minutes North latitude and 086 degrees 55.9 minutes West longitude; the pressure altitude and OAT were not recorded. The last recorded position was later determined to be located 030 degrees and .15 nautical mile from the approach end of runway 05.

As discussed in the previous paragraph, the ETM Key Recorder recorded the temperature

during takeoff from the departure airport to be 5 degrees Celsius. The temperature taken at the departure airport approximately 3 minutes before the flight departed was recorded to be 6 degrees Celsius.

According to the president of the manufacturer of the ETM system, the "Takeoff" report is programmed to occur at 65 knots, and the "Power Check Report" is programmed to occur every 30 minutes assuming no torque change in the previous 5 minutes, the altitude is stable at plus or minus 50 feet, and the indicated airspeed is plus or minus 3 knots. The "Landing" report is programmed to occur when the indicated airspeed is less than 45 knots and the vertical speed is zero for 5 seconds. Additionally, the accuracy of the recorded OAT is to be within plus or minus 1 degree. The ETM processor is connected to the airplane's pitot static system at the co-pilot's airspeed indicator; the ETM system is calibrated when it is manufactured.

Review of the "Aircraft Flight Log" sheets found in the wreckage revealed one of the sheets had the accident flight leg partially completed; the only information lacking was the accumulated aircraft time and landings, and accumulated engine cycles. The temperature and pressure altitude were recorded to be "8", and "8.8", respectively. As previously mentioned, the ETM Key Recorder indicated the OAT was 9, 10, and 11 degrees Celsius when recorded three times during the accident flight.

The last displayed coordinates in the GPS receiver were later determined to be located .46 nautical mile and 277 degrees from the accident airport. The first impacted tree was determined to be located 287 degrees and 166 feet from the last known position displayed in the GPS Receiver.

The airplane annunciator panel was examined with FAA oversight at the airplane manufacturer's facility. Examination of the bulbs revealed the filaments of the left and right bulbs of the door warning annunciator exhibited slight stretching; the filaments did not contact the glass envelope. No other bulb filament stretching was reported.

The airplane was last fueled at 2345 (approximately 2 hours before the accident), while at the Adams Field Airport, Little Rock, Arkansas, where 228 gallons of Jet-A with prist were added.

According to the Director of Operations of Air Carriers, Inc., the accident flight was dispatched as an Air Carriers, Inc., flight, using call sign "Fast Check", which is to be used only for Air Carriers, Inc., airplanes.

The accident airplane registration was not listed in the FAA approved Air Carriers, Inc., operations specifications in section DO85 titled "Aircraft Listing", or in section DO73, titled, "Approved Aircraft Inspection Program (AAIP), both of which were dated October 23, 2001.

Review of the Airport Facility Directory in effect on the date and time of the accident for the accident airport revealed, "RWY 05. Glide slope unusable beyond 4 [degrees right] of course."

On the day of the accident and again 2 days later, the FAA flight checked the runway 05 ILS approach and all related facilities of the approach. The second flight check 2 days after the accident was due to incorrect height programmed into the computer located on the flight check airplane during the first flight check. The "Flight Inspection Report-Instrument Landing System" document indicates the result of the December 3rd flight check was "Satisfactory" with the glide slope being listed as "Restricted." The glide slope was restricted for use only whenever an airplane is beyond 4 degrees right of course, and was first documented during a "Flight Inspection Report-Instrument Landing System" of the runway 05 ILS approach

document dated January 30, 2001.

Review of a plot of Atlanta Air Route Traffic Control Center radar data provided by Cessna Aircraft Company revealed that during the ILS approach to runway 05, between 0141:23 and 0142:11, there was no indication that the airplane went more than 4 degrees right of course. The last radar target at 900 feet msl located southwest of the approach end of runway 05 was plotted to be on the localizer centerline. Further review of the Atlanta Air Route Traffic Control Center radar data revealed that between 0141:23, and 0142:11 (the last radar target approximately 1/2 nautical mile southwest of the approach end of runway 05), the average groundspeed was calculated to be approximately 114 knots.

#### ADDITIONAL INFORMATION

The wreckage minus the retained components was released to Deanes L. Rowedder, of Kern and Wooley LLP, on November 18, 2003. All NTSB retained components were also released to Deanes L. Rowedder, on November 25, 2003.

#### Pilot Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	62, Male
<b>Airplane Rating(s):</b>	Multi-engine Land; Single-engine Land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Seatbelt
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 2 Valid Medical--w/ waivers/lim.	<b>Last Medical Exam:</b>	08/30/2001
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	11/17/2001
<b>Flight Time:</b>	5773 hours (Total, all aircraft), 990 hours (Total, this make and model), 5603 hours (Pilot In Command, all aircraft), 390 hours (Last 90 days, all aircraft), 130 hours (Last 30 days, all aircraft), 6 hours (Last 24 hours, all aircraft)		

## Other Flight Crew Information

<b>Certificate:</b>	Flight Instructor; Commercial	<b>Age:</b>	33, 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>	Seatbelt
<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>	Yes
<b>Medical Certification:</b>	Class 1 Valid Medical--no waivers/lim.	<b>Last Medical Exam:</b>	06/21/2001
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	1675 hours (Total, all aircraft), 1595 hours (Pilot In Command, all aircraft), 326 hours (Last 90 days, all aircraft), 77 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Manufacturer:</b>	Cessna	<b>Registration:</b>	N499BA
<b>Model/Series:</b>	208B	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	No
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	208B0689
<b>Landing Gear Type:</b>	Tricycle	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	11/19/2001, AAIP	<b>Certified Max Gross Wt.:</b>	8750 lbs
<b>Time Since Last Inspection:</b>	84.2 Hours	<b>Engines:</b>	1 Turbo Prop
<b>Airframe Total Time:</b>	4867 Hours	<b>Engine Manufacturer:</b>	Pratt & Whitney Canada
<b>ELT:</b>	Installed, activated, aided in locating accident	<b>Engine Model/Series:</b>	PT6A-114A
<b>Registered Owner:</b>	Air Carriers, Inc.	<b>Rated Power:</b>	675 hp
<b>Operator:</b>	Air Carriers, Inc.	<b>Air Carrier Operating Certificate:</b>	On-demand Air Taxi (135)
<b>Operator Does Business As:</b>		<b>Operator Designator Code:</b>	DKBA

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	Condition of Light:	Night
Observation Facility, Elevation:	KEYY, 700 ft msl	Observation Time:	0145 CST
Distance from Accident Site:	1 Nautical Miles	Direction from Accident Site:	95°
Lowest Cloud Condition:		Temperature/Dew Point:	4° C / 2° C
Lowest Ceiling:	Overcast / 100 ft agl	Visibility	0.25 Miles
Wind Speed/Gusts, Direction:	, 280°	Visibility (RVR):	
Altimeter Setting:	30.16 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:			
Departure Point:	LITTLE ROCK, AR (LIT)	Type of Flight Plan Filed:	IFR
Destination:	Bessemer, AL (KEYY)	Type of Clearance:	IFR
Departure Time:	2356 CST	Type of Airspace:	Class G

## Airport Information

Airport:	Bessemer Airport (KEYY)	Runway Surface Type:	Unknown
Airport Elevation:	700 ft	Runway Surface Condition:	Unknown
Runway Used:	05	IFR Approach:	ILS
Runway Length/Width:		VFR Approach/Landing:	Unknown

## Wreckage and Impact Information

Crew Injuries:	2 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Fatal	Latitude, Longitude:	33.313333, -86.935833

## Administrative Information

**Investigator In Charge (IIC):** Timothy W Monville **Adopted Date:** 03/30/2004

**Additional Participating Persons:** Edward T Jeszka; FAA Flight Standards District Office; Vestavia Hills, AL  
Donald Hall; Air Carriers, Inc.; Bessemer, AL  
Thomas J Teplik; Cessna Aircraft Company; Wichita, KS  
Thomas Berthe; P&W Canada Corp.; Longueuil,  
Phil Goettel; Honeywell, Inc.; Olathe, KS  
Rasheed Reda; Shadin Company, Inc.; St. Louis Park, MN  
Thomas M Knopp; McCauley Propeller Systems; Vandalia, OH  
Eldon Griffin; FAA, MIDO; Minneapolis, MN  
Marvin Trease; FAA, FSDO; Kansas City, MO  
Stanley P Faske; FAA, FSDO; Cincinnati, OH  
Toshio Kawawa; United Instruments, Inc.; Wichita, KS

**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](mailto:pubinq@ntsb.gov), or at 800-877-6799. Dockets released after this date are available at <http://dms.nts.gov/pubdms/>.

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