National Transportation Safety Board
Aviation Accident Final Report

Location:	AUGUSTA, GA	**Accident Number:**	ATL93FA143
Date & Time:	08/07/1993, 1515 EDT	**Registration:**	N90BP
Aircraft:	BEECH C-90	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	4 Fatal
Flight Conducted Under:	Part 135: Air Taxi & Commuter - Non-scheduled		

Analysis

THE INSTRUMENT FLIGHT WAS CLEARED FOR AN ILS APPROACH TO THE DESTINATION AIRPORT. WHILE MANEUVERING FOR THE FINAL APPROACH COURSE, THE FLIGHT ENCOUNTERED CONVECTIVE ACTIVITY (THUNDERSTORMS). THE PILOT WAS QUESTIONED BY THE TOWER CONCERNING HIS POSITION ON THE APPROACH COURSE. THE TOWER RADAR PLACED THE FLIGHT'S POSITION 1/4 TO 1/2 MILE EAST OF THE FINAL APPROACH COURSE. THE PILOT STATED THAT HE WAS ON THE LOCALIZER. SUBSEQUENT FUNCTIONAL CHECKS OF THE ILS SYSTEM BY AIR WAYS FACILITIES, FAILED TO REVEAL A PROBLEM WITH THE ILS APPROACH SYSTEM. THE AIRPLANE COLLIDED WITH TREES ABOUT ONE AND ONE HALF MILES NORTHEAST OF THE AIRPORT AND ONE HALF MILE EAST OF THE APPROACH COURSE. WEATHER REPORTS RECORDED LEVEL FOUR THUNDERSTORM ACTIVITY WITHIN THE IMMEDIATE VICINITY OF THE DESTINATION AIRPORT. WRECKAGE EXAMINATION FAILED TO DISCLOSE ANY MECHANICAL PROBLEMS WITH THE AIRPLANE. THE AIR TRAFFIC CONTROLLERS PROVIDED THE PILOT WITH CURRENT WEATHER CONDITIONS AT THE AIRPORT THROUGHOUT THE FINAL MINUTES OF THE FLIGHT, THEREFORE THE PILOT WAS AWARE OF THE THUNDERSTORM ACTIVITY NEAR AND AT THE AIRPORT.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: WAS THE PILOT'S FAILURE TO ADEQUATELY EVALUATE INFLIGHT WEATHER CONDITIONS WHICH RESULTED IN A LOSS OF CONTROL WHEN THE AIRPLANE ENCOUNTERED A THUNDERSTORM.

Findings

Occurrence #1: IN FLIGHT ENCOUNTER WITH WEATHER
Phase of Operation: APPROACH - FAF/OUTER MARKER TO THRESHOLD (IFR)

Findings
1. (C) WEATHER CONDITION - THUNDERSTORM
2. (C) IN-FLIGHT PLANNING/DECISION - INADEQUATE - PILOT IN COMMAND
3. (C) WEATHER EVALUATION - POOR - PILOT IN COMMAND

Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: APPROACH - FAF/OUTER MARKER TO THRESHOLD (IFR)

Occurrence #3: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: DESCENT - UNCONTROLLED

Findings
4. OBJECT - TREE(S)

Factual Information

HISTORY OF FLIGHT

On August 7, 1993, at 1515 eastern daylight time, a Beech C-90, N90BP, collided with trees during final approach to Bush Field, Augusta, Georgia. The airplane was operated by Critical Care Medflight, Inc., as Lifeguard N909BP, under instrument flight rules and 14 CFR Part 135. Instrument weather conditions prevailed at the time of the accident, and the flight was issued a valid instrument flight clearance. The commercial pilot, two medical personnel and an infant were fatally injured. The airplane was destroyed by impact forces and a post impact fire. The flight departed Adel, Georgia, at 1423 hours. The purpose of the flight was to transport the one day old infant from Adel to the Medical College of Georgia in Augusta for treatment.

At 1052, the pilot filed an instrument flight plan from Adel, Georgia, via Direct User Access Terminal Services (DUATS). At 1423, N90BP departed Adel, and was issued an instrument flight clearance to Augusta. Air Traffic Control procedures and instrument handling were routine throughout the flight.

At 1456, the pilot established radio contact with Augusta Approach Control, and told the Air Traffic Controller that he had Automatic Terminal Information Service (ATIS) information "Quebec." The pilot also requested and was given approval to deviate around weather. Approach Control advised the pilot to expect the ILS Approach to runway 17. At 1508, the pilot was advised of a thunderstorm moving over the airport with winds 220 degrees at 21 knots. The pilot rogered the information, and stated that he was out of the worst of the weather.

At 1509, the pilot requested and was given a 060 degree heading; the pilot was told to expect a tight turn at the marker. At 1510, the controller reported that visibility at the airport was down to two miles; the pilot reported that he was in good visual weather conditions. At 1511, four and one half miles from the marker, the flight was cleared for an ILS Approach to runway 17; at 1513, the flight was cleared to land. The controller again informed the pilot of the reduced visibility at the airport, (the Runway Visual Range (RVR) was 2000 feet), and that rain showers were still over the airport.

At 1514, the controller questioned the pilot about his position on the approach course, which appeared to have been one quarter to one half mile east of the final approach course. At 1515, the pilot replied that he was on the localizer (see attached transcription of communications). Seconds later, two emergency locator beeps were heard. The flight crew on a Delta Air Lines' flight waiting for takeoff never made visual contact with the approaching aircraft. Additionally, the Delta flight crew observed the approaching airplane on the aircraft's Traffic and Collision Avoidance System (TCAS) radar; TCAS contact was maintained until the airplane descended to 400 feet.

PERSONNEL INFORMATION

Information on the pilot is included in this report at the data field labeled, First Pilot Information. The pilot's flight experience information was provided by the operator. A review of the pilot's data disclosed that, on November 8, 1991, the pilot was hired by Critical Care Medflight as a Piper PA-31 captain. On March 17, 1993, the pilot completed 14 CFR Part 135 requirements and was upgraded to a captain on the Beech 90 aircraft. According to the operator, the pilot's personal flight logs were not availabe for review, and the pilot flight experience information examined was from company records. The Director of Operation

further stated that there is no requirement to record actual instrument flight time, but all Part 135 flights are conducted under instrument flight rules. The flight time recorded on the Operator Accident Report Form (NTSB Form 6120.1/2) within the last 90 days reflects instrument flight experience.

AIRCRAFT INFORMATION

Information on the aircraft is contained in this report at the data field labeled, Aircraft Information. Examination of historical maintenance recorded revealed that the aircraft inspection program, approved by the FAA, was accomplished within the prescribed intervals. According to the operator, the life support equipment onboard the airplane was not part of the aircraft equipment list, but supplied by the hospital in Adel for this flight.

METEOROLOGICAL INFORMATION

Meteorological information is contained in this report at the data field labeled Weather Information. Instrument weather conditions prevailed at the time of the accident. A weather study further revealed that, the 1400 surface weather map, prepared by the National Weather Service, showed a stationary front extending east-west from central Mississippi through north-central Alabama and Georgia to central South Carolina. An outflow boundary was indicated from western Florida curving northeast through south- central Georgia.

The 1700 surface map showed that the front had moved further north and was oriented east-west across northern Alabama, northern Georgia, and north-central South Carolina. The outflow boundary was indicated from northern Florida curving northeastward into the vicinity of Augusta, Georgia.

The Augusta Surface Weather Observations forms indicated that thunderstorms began at Augusta at 1440. The location of the thunderstorm was south of the airport and was moving northeast. At 1506, the observer stated that the thunderstorm was overhead through south of the airport. At 1511, the observer indicated that the thunderstorm had increased to moderate intensity and the visibility had decreased to 2 miles. The observer indicated that he checked the weather radar at 1513 and observed light to moderate thunderstorms in the local area. The observer further stated that he was notified of the aircraft mishap at 1518.

Radar photographs were taken of the Athens plan position indicator (PHI) scope at approximately five-minute intervals around the time of the accident. The photograph taken at 1506 shows a cell with a maximum VIP level of four located over and just to the south of the Augusta (Bush Field) airport. The photograph taken about 1518 showed that the cell moved northeast and was centered four nautical miles northeast of Bush Field. The maximum intensity of the cell remained at level four.

The Terminal Forecasts (FTs) for Augusta (Bush Field) issued on August 7, at 1236 hours, valid from August 7, 1300 to August 8, 1300, forecasted 1,500 feet scattered, 4,500 feet scattered, ceiling 9,000 feet broken, wind 230 degrees at six knots; occasional ceiling 4,500 feet broken, visibility five miles, light rain showers fog. The 1600 forecast called for 1,500 feet scattered ceiling 4,500 feet broken, wind 250 degrees at eight knots; occasional ceiling 400 feet overcast, visibility 3 miles, moderate rain showers and fog; a chance of visibility 1 mile, thunderstorm with heavy rain showers.

Personnel at the Augusta Air Traffic Control Tower (ATCT) made Automatic Terminal Information Service (ATIS) recordings on August 7. A review of air traffic data disclosed that,

N90BP reported on Augusta Approach Control frequency at 1456 and advised that the airplane was descending with Information Quebec. The ATIS Quebec information incorporated the 1440 Special Weather Observations. Weather observations were transmitted from the NWS office to the Augusta ATCT by means of the Automated Weather Information System (AWIS). Transmission times follow:

Weather Observation	Transmission Time	
AGS SP 1440	1443 AGS SA 1453	1456 AGS SP 1507 *
1509 AGS SP 1511	1513 AGS L 1520	1525

* The correct observation time as listed on the Surface Weather Observations forms was 1506

WRECKAGE AND IMPACT INFORMATION

Wreckage debris was scattered over an area 325 feet long and 75 feet wide. The main wreckage rested 275 feet southeast of the beginning of the swath through the trees. Freshly cut tree branches were located in the vicinity of the trees northwest of the main wreckage. Fire damaged the aircraft nose section, cockpit, center section and empennage (see attached wreckage distribution and photographs).

Examination of the accident site revealed that the left engine separated from the nacelle. It was located 10 feet left of the main wreckage, lying inverted and oriented approximately 120 degrees to the main wreckage centerline. The lower cowling, engine mount structure and firewall, and miscellaneous nacelle debris remained attached, with severe impact damage and deformation. There was negligible post impact fire damage. The cowling was removed for detail inspection.

The forward housing of the reduction gearbox separated at the flange and was located approximately 8 feet forward of the main engine. The aft portion of the forward housing was disintegrated, exposing the second stage gearing. The propeller shaft was fractured immediately aft of the propeller flange. The propeller shaft was free to rotate; the propeller governor was in place and intact. The propeller overspeed governor and N1 tach generator were fractured from their mounting pads and not located.

The Right engine also separated from the wing nacelle and was located approximately 7 feet to the right of the main wreckage lying upright, and oriented approximately 70 degrees to the main wreckage centerline. The cowling, engine mount structure and firewall, and miscellaneous nacelle debris remained attached, with severe impact damage and post impact fire damage. The cowling was partially removed for a detailed inspection.

The forward housing of the right reduction gearbox was fractured at the mounting pad for the propeller overspeed governor. The propeller shaft was fractured immediately aft of the propeller flange. The propeller shaft was seized. The propeller governor, propeller overspeed governor, and N1 tach generator were in their normally installed positions.

The Left propeller was separated from the engine propeller shaft and located approximately 145 feet aft and 20 feet to the left of the main wreckage. The right propeller was separated from the engine propeller shaft and located approximately 60 feet forward of the main wreckage.

LEFT ENGINE

Both engine assemblies were removed from the accident site for further examinations and

inspections. The subsequent engine examination of the left engine did not remove the compressor turbine guide vane ring assembly and shroud. The downstream side of the guide vane assembly was intact with no indications of distress. The compressor turbine shroud was circumferentially rubbed around its inner diameter with black and blue discoloration from approximately the 11-7 o'clock position.

The left compressor turbine disc and blade assembly was intact. The outer diameter of the disc face and blade root backs, on the downstream side were discolored and circumferentially machined through 360 degrees up to a depth of approximately 1/32 inches. All compressor turbine blade tips were worn and discolored, with the rub marks parallel to the direction of rotation. A silver metallic material was fused to blade leading edges.

The left engine compressor 1st, 2nd, and 3rd stage discs and blades were intact. The 1st stage blade tips were worn, discolored, and had feathered edges, with the rub marks parallel to the direction of rotation. One 1st stage compressor blade leading edge had a gouge approximately 1/3 inches wide by 3/16 inches deep. The 2nd and 3rd stage compressor blade tips were also worn with rub marks parallel to the direction of rotation. Additionally, all 2nd and 3rd stage compressor blades had trailing edge deformation with rub marks parallel to the direction of rotation, for approximately 1/3 of the blade length closest to the root.

The compressor 1st, 2nd and 3rd stage stators and shrouds were intact. Each of the three stages of compressor shrouds were discolored and circumferentially rubbed around their inner diameters, with material transfer through 360 degrees. The 2nd and 3rd stage stator vane tips and vane leading edges were worn with the rub marks parallel to the direction of rotation. The vanes in the 2nd and 3rd stage stators, from approximately the 5- 9 o'clock positions, were bent to approximately 20 degrees, in the direction of rotation.

The centrifugal impeller was intact. The impeller blade contours were worn, with black and blue discoloration, feathered edges, and circumferential rub marks. The centrifugal impeller shroud was also intact with material transfer, black and blue discoloration, with circumferential rubbing and scoring on the contoured surface.

RIGHT ENGINE

The right engine power turbine guide vane ring and interstage baffle assembly was intact. The upstream side of the interstage baffle outer rim was circumferentially rubbed and discolored through 360 degrees. The upstream side of the interstage baffle inner cup was circumferentially machined and elongated. The downstream side of the interstage baffle outer rim was discolored, circumferentially machined and deformed approximately 1/3 inches.

The power turbine shroud was circumferentially rubbed, machined, and discolored around its inner diameter. The axial position of the power turbine disc was found displaced 1/3 inch aft (upstream) of its normal run position. The power turbine blades were found displaced approximately 1/4 inch forward (downstream) of its normal run position, with circumferential rubbing on the downstream disc outer rim; however, the blades remained within their respective broach slots with the blade tip shrouds engaged.

The blade tip shrouds were worn, with rub marks parallel to the direction of rotation. The upstream side of the power turbine disc outer diameter and hub spigot were circumferentially rubbed through 360 degrees.

The pneumatic lines on the left engine were continuous from the gas generator outlet to the

fuel control inlet but fractured between the fuel control outlet and the propeller governor inlet. The pneumatic lines on the right accident engine were impact and fire damaged but continuous from the gas generator outlet to the fuel control inlet and the fuel control outlet to the propeller governor inlet. All fittings and safeties were intact; however, the fuel control was consumed by fire. In both cases, the integrity of the pneumatic lines was compromised invalidating any test for contamination.

MEDICAL AND PATHOLOGICAL INFORMATION

The postmortem examination of the pilot was performed by Dr. Thomas Young at the Georgia Department of Forensic Science in Atlanta, Georgia, on August 8, 1993. The toxicological examinations for alcohol and drugs were negative.

ADDITIONAL INFORMATION

Following the accident, the ILS approach facilities for runway 17 were ground checked for accuracy. The functional checks revealed that the approach system was in compliance (see attached Airways Facilities Accident Checklist). No operational errors were reported by other pilots landing in Augusta on runway 17 subsequent to the accident.

The wreckage was released to:

Mr. Harry Brooks (Insurance Adjustor) Atlanta, Georgia

Pilot Information

Certificate:	Commercial	**Age:**	36, Male
Airplane Rating(s):	Multi-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):	Airplane Single-engine; None	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	07/01/1993
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	1875 hours (Total, all aircraft), 300 hours (Total, this make and model), 62 hours (Last 90 days, all aircraft), 32 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	BEECH	**Registration:**	N90BP
Model/Series:	C-90 C-90	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	LJ-718
Landing Gear Type:	Retractable - Tricycle	**Seats:**	5
Date/Type of Last Inspection:	06/18/1993, AAIP	**Certified Max Gross Wt.:**	9705 lbs
Time Since Last Inspection:	59 Hours	**Engines:**	2 Turbo Prop
Airframe Total Time:	3301 Hours	**Engine Manufacturer:**	P&W
ELT:	Installed, not activated	**Engine Model/Series:**	PT6A-21
Registered Owner:	AIR MEDICAL LEASING	**Rated Power:**	550 hp
Operator:	CRITICAL CARE MEDFLIGHT	**Operating Certificate(s) Held:**	On-demand Air Taxi (135)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	AGS, 143 ft msl	**Distance from Accident Site:**	2 Nautical Miles
Observation Time:	1520 EDT	**Direction from Accident Site:**	10°
Lowest Cloud Condition:	Unknown / 1100 ft agl	**Visibility**	2 Miles
Lowest Ceiling:	Broken / 1100 ft agl	**Visibility (RVR):**	2000 ft
Wind Speed/Gusts:	6 knots / 22 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	310°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	23°C / 22°C
Precipitation and Obscuration:			
Departure Point:	ADEL, GA (15J)	**Type of Flight Plan Filed:**	IFR
Destination:		**Type of Clearance:**	IFR
Departure Time:	1423 EDT	**Type of Airspace:**	Class E

Airport Information

Airport:	BUSH FIELD (AGS)	**Runway Surface Type:**	Concrete
Airport Elevation:	145 ft	**Runway Surface Condition:**	Wet
Runway Used:	17	**IFR Approach:**	ILS
Runway Length/Width:	8000 ft / 150 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	3 Fatal	**Aircraft Fire:**	On-Ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	4 Fatal	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	PHILLIP POWELL,	**Report Date:**	08/17/1994
Additional Participating Persons:	JERRY L FRADENBURG; COLLEGE PARK, GA JAMES SKEEN; WASHINGTON, DC JEROME FRECHETTE; WASHINGTON, DC		
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/.		