Aviation Investigation Final Report

Location:	BEAUFORT, South Carolina	**Accident Number:**	MIA00FA056
Date & Time:	December 19, 1999, 20:35 Local	**Registration:**	N75CF
Aircraft:	Beech E-90	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal, 1 Serious
Flight Conducted Under:	Part 91: General aviation - Positioning		

Analysis

The PIC was cleared for an ASR approach to the destination airport. The co-pilot was looking outside to obtain a visual reference on the destination airport. They broke out of the clouds at about 900 feet, and were descending at about 480 feet per minute. The ceiling was overcast, ragged, and very dark with no visible horizon. The co-pilot looked back inside the cockpit to check the radios when he heard a thump. The PIC had continued the descent below the minimum descent altitude, the airplane collided with the marsh and crashed.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:
The pilot-in-commands failure to maintain the appropriate altitude (minimum descent altitude) during an area surveillance radar (ASR) approach, resulting in an in-flight collision with swampy terrain. Contributing to the accident was the co-pilot's failure to maintain a visual lookout during the ASR approach.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - NORMAL

Findings
1. LIGHT CONDITION - DARK NIGHT
2. (C) ALTITUDE - NOT MAINTAINED - PILOT IN COMMAND

3. (F) TERRAIN CONDITION - SWAMPY
4. (F) VISUAL LOOKOUT - NOT MAINTAINED - COPILOT/SECOND PILOT

Factual Information

HISTORY OF FLIGHT

On December 19, 1999, at about 2035 eastern daylight time, a Beech E-90, N75CF, registered to the University of South Carolina Athletic Department, operating as a 14 CFR Part 91 positioning flight, crashed during an area surveillance radar approach to runway 24 Beaufort County Airport, (73J) Beaufort, South Carolina. Visual meteorological conditions prevailed and an IFR flight plan was filed. The airplane was destroyed by a postcrash fire. The airline transport-rated pilot-in-command (PIC) was fatally injured, and the copilot (CP) sustained serious injuries. The flight originated from Hilton Head, South Carolina, about 13 minutes before the accident.

The CP stated they departed HXD at about 2022, and activated their IFR flight plan. The PIC was flying the airplane. They climbed to their assigned altitude, and were given a frequency change to Marine Beaufort approach control. They completed the descent and landing checklist; all flight operations were normal. The flaps were extended to the approach position, the landing gear was lowered, and the propeller was set at 1,900 rpm. The airspeed was about 140, decreased to 130, and then down to 120 knots. They were cleared for the approach on about a six-mile final. The PIC was on the instruments and the CP stated he was outside, and checking the radios. They broke out of the clouds at about 900 feet, and were descending at about 480 feet-per-minute. The ceiling was overcast, ragged, and very dark with no visible horizon. The CP stated he could see some lights, but could not see the airport. He looked back inside the cockpit to check the radios, when he heard a thump. He thought the landing gear had collided with the terrain. The airplane started to cartwheel and eventually came to a complete stop inverted. The PIC yelled, "get me out of here." There were no other comments from the PIC. The CP stated he had difficulty in unbuckling his seatbelt. Once separated from the seatbelt, he climbed out of the cockpit area back into the passenger compartment, and exited the airplane through the main cabin door. He observed personnel walking towards the crash scene with flashlights and went towards their location. When they met, he stated the PIC was still in the airplane wreckage. He looked back at the airplane and observed a fire in the vicinity of the gear wheel. Two of the three people went to the crash site and he was taken to an emergency vehicle for treatment.

Transcripts of recorded communications between Marine Beaufort approach and N75CF revealed that N75CF was off HXD at 20:23:28 (01:23:28Z), and was instructed to climb and maintain 2,200 feet. N75CF was radar contact at 20:23:44, and was asked by the controller if he wanted another surveillance approach into Beaufort County Airport. N75CF stated that's affirmative. N75CF was provided radar vectors and instructed to climb to 2,300 feet. N75CF acknowledged the change in altitude and was observed on radar climbing. At 20:26:29, N75CF was provided a frequency change, and N75CF reported back on the new frequency at 20:26:44.

At 20:29:12, N75Cf asked the controller if he could put his IFR clearance on request to Morristown, New Jersey, and he requested the weather at the air station. The controller informed N75CF, "yeah we're showing uh trace layer five hundred feet uh overcast at twelve hundred visibility five miles with mist....about the same you had uh for the last approach." At 20:30:49, N75CF was instructed to left to a heading of 330 degrees, descend to and maintain 1,500 feet, which was acknowledged by the pilot. N75CF was informed at 20:31:20, that he was 11 miles east of Beaufort Airport, and to perform his landing check. At 20:31:39, was instructed to continue left hand turn heading 240 degrees and to stand by for the final controller. The final controller informed N75CF that his wheels should be down and asked N75CF how do you hear me. N75CF replied loud and clear. At 20:32:12, N75CF was informed he was 10 miles from the runway, minimum descent altitude is 580 feet, and the missed approach point is one mile from the runway. N75CF acknowledged the transmission. At 20:32:24, N75CL was informed he was 9 miles from the runway, well left of course and correcting, and at 20:32:31, N75CF was instructed not to acknowledge any further communications. At 20:34:06, N75CF was informed, "five miles from runway descend to your minimum descent altitude report the runway in sight." N75CF replied will do. At 20:31:51, seven evenly spaced clicks were heard on frequency with no modulation. At 20:35:12, N75CF was instructed that he was 2 miles from the runway slightly left of course, followed by four evenly spaced clicks on the frequency with no modulation. At 20:35:33, the controller stated, "seven five Charlie foxtrot uh how do you hear?" There was no response from N75CF. At 20:35:37, the controller stated, seven five Charlie foxtrot radar contact lost if runway not in sight climb and maintain one thousand five hundred fly the runway heading acknowledge."

PERSONNEL INFORMATION

The PIC held an airline transport pilot certificate issued on December 30, 1990, with ratings and limitations for airplane multiengine land B-727, B-757, B-767, commercial privileges airplane single engine land, and instrument airplane. In addition, the pilot held a flight engineer rating issued on June 14, 1969. The pilot's logbook was not located in the airplane wreckage and is presumed to be destroyed by post crash fire.

The PIC was employed by the University of South Carolina, on December 1, 1999, as the chief pilot for the University of South Carolina Athletic Department. He indicated on the Pilot Qualifications sheet that he had 200 hours in single engine airplanes, 400 hours in piston multiengine airplanes, 850 turbo-prop airplanes, and his biennial flight review was conducted on May 26, 1990, in a Beech 90. Review of training records obtained from SIMCOM International Flight Academy revealed the pilot had completed the King Air E-90 Recurrent course on October 2, 1999. He indicated on SIMCOM Pilot's Data form that he had accumulated 21,000 total flight hours, 15, 500 multiengine, 10,500 instrument, and that he had flown 200 hours in the last 12 months.

Review of records on file with the FAA Aeromedical Certification Division, Oklahoma City, Oklahoma, revealed the PIC held a second class medical certificate issued on August 2, 1999, with the limitation stating, "Holder shall possess correcting glasses for near vision while

exercising the privileges of this airman's certificate." The pilot indicated on his application for the medical certificate that he had accumulated 21,250 total flight hours with 115 flown in the last six months.

The CP holds a commercial pilot certificate issued on July 2, 1969, with ratings and limitations for airplane single and multiengine land, instrument airplane. He indicated on the NTSB Pilot/Operator Aircraft Accident Report that he had accumulated 23,000 total flight hours with 200 hours in the Beech E-90. He holds a second class medical certificate issued on February 16, 1999, with the limitation stating, "holder shall wear glasses which correct for near and distant vision while exercising the privileges of this airman certificate." He is a temporary employee with the Athletics Department serving as the student ticket manager and CP.

AIRCRAFT INFORMATION

Review of the airframe maintenance records revealed the altimeter and static system tests were inspected on March 24, 1998. The transponder was inspected on March 23, 1998.

METEOROLOGICAL INFORMATION

The nearest weather reporting facility at the time of the accident was Beaufort MCAS/Merritt Field, Beaufort, South Carolina. At 2056, surface weather observation was: 1,000 overcast, visibility 4 miles, temperature 56 degrees Fahrenheit, dewpoint temperature 56 degrees, wind from 350 degrees at 5 knots, and altimeter 30.05. Visual meteorological conditions prevailed at the time of the accident.

WRECKAGE AND IMPACT INFORMATION

The wreckage of N75CF was located in the tidal basin adjacent to Pine Island, about 1.97 nautical miles east north east of Beaufort County Airport, Beaufort, South Carolina.

Examination of the crash site revealed the airplane collided with the terrain in a descending attitude, left wing low on a heading of 267 degrees magnetic. The left main landing gear collided with terrain first, followed by the nose wheel, and the right main landing gear. All three landing gear separated from the airplane. Eight propeller slashes from the left propeller were located 24 feet down the crash debris line measuring 37 inches, 37 inches, 38 inches, 40 inches, 42 inches,47 inches, and 58 inches. Ten propeller strikes began right after the right main landing gear separated measuring 25 inches, 35 inches, 37 inches, 41 inches, 42 inches,44 inches,49 inches, 56 inches, and 60 inches apart. The fuselage and left wing tip collided with the ground. The airplane slid forward and collided with a berm 128 feet down the crash debris line. The airplane became airborne, rolled left 90-degrees and the wing tip collided with the ground. The airplane continued its roll until inverted, the vertical fin collided with the ground, and the left wing tip and propeller separated from the airframe. The cockpit cabin roof collided with the ground 573 feet down the crash debris line. The right elevator assembly separated from the fuselage. The airplane yawed to the left and the remainder of the left wing

outboard of the engine nacelle separated and came to rest 1,165 feet from the initial point of impact. The left and right auxiliary fuel tanks ruptured. The left and right tanks were not ruptured. The airplane came to rest inverted 986 feet from the initial impact point on a heading of 265 degrees magnetic, 1.83 nautical miles east north east of the airport. A postcrash fire ensued consuming the cockpit and aft passenger area.

Examination of the airframe, and flight controls revealed no evidence of a precrash mechanical failure or malfunction. All components necessary for flight were present at the crash site. Continuity of the flight control system was confirmed for pitch, roll, and yaw.

The left engine was transported to Pratt & Whitney Engine Services, Inc., Atlanta, Georgia, for analysis. Disassembly of the engine revealed rubbing and scoring was present on the compressor turbine down stream side due to axial contact with the power turbine guide vane rim. Scoring was present on the power turbine guide vane ring down stream side and on the power turbine disk. No evidence of distress was present on the engine hot section. Magnesium corrosion debris was present on the reduction gear box chip detector. (For additional information see Pratt & Whitney Engine Report, an attachment to this report.)

Examination of the left propeller assembly revealed the propeller separated from the engine at the reduction gear box housing, and the piston cylinder separated from the propeller. One propeller blade sustained "s" bending, was bent forward at mid-blade, bent aft at the tip, and dents were present on the trailing edge. Another propeller blade was bent aft, twisted forward toward the low pitch with dents on the trailing edge. Paint was abraded on the leading edge of the camber side. Rotational scoring was present in the paint on the flat side. The remaining propeller blade was bent aft 180-degrees at the mid blade point with a slight twist towards the low pitch, and there was no significant leading or trailing edge damage. (For additional information see Hartzell Propeller Teardown Report, an attachment top this report.)

The right engine was transported to Pratt & Whitney Services, Inc., Atlanta, Georgia, for analysis. Disassembly of the right engine revealed light rubbing and scoring was present on the compressor turbine down stream side due to axial contact with the power turbine guide vane rim. Light scoring was present on the power turbine guide vane ring downstream side and the propeller turbine disk. The compressor turbine shroud revealed circumferential rubbing due to radial contact with the compressor turbine blade tips. Tip and shroud material was heat fused into the compressor turbine guide vane airfoils. Magnesium corrosion debris was present on the reduction gear box chip detector. (For additional information see Pratt & Whitney Engine Report, an attachment to this report.)

The right propeller remained attached to the engine. All three propeller blades were bent aft at the mid blade, all three blade tips were curled, and twisted toward low pitch. Hartzell concluded that the left and right propellers were operating normally, and both engines were developing power. An estimate of the blade angles or amount of power could not be made. There were no propeller discrepancies noted that could have precluded normal operation. (For additional information see Hartzell Propeller Teardown Report, an attachment to this report.)

MEDICAL AND PATHOLOGICAL INFORMATION

Postmortem examination of the pilot was conducted by Dr. Melissa A. Sims, Forensic Pathology Fellow, Medical University of South Carolina, Charleston, South Carolina, on December 20, 1999. The cause of death was subluxation of the C-1 and C-2 vertribate. Postmortem toxicology of specimens from the pilot was performed by the Forensic Toxicology Research Section, Federal Aviation Administration, Oklahoma City, Oklahoma. No carbon monoxide or cyanide was detected in the blood. No ethanol was detected. Diltiazem a prescription drug for high blood pressure medication was present in the liver.

The co-pilot was transported to Beaufort Memorial Hospital on December 19, 1999, and was released on December 22, 1999. He sustained a laceration to the forehead, deep right shoulder lateral laceration in muscle body of the deltoid, and a large laceration of the right hand extending from the ulna aspect of his wrist to the base of the 3rd digit. Toxicology specimens performed by the Beaufort Memorial Hospital Laboratory were negative for alcohol, basic, acidic, and neutral drugs.

TEST AND RESEARCH

A flight check of the ASR approach runway 24 at Beaufort County Airport, Beaufort, South Carolina, was requested and conducted by the FAA Atlanta Flight Inspection Field Office on December 20, 1999, with no deficiencies noted. An Air Traffic equipment check was conducted by the United States Marine Corp Air Traffic Control Maintenance on December 20, 1999, with no deficiencies noted.

ADDITIONAL INFORMATION

The wreckage of N75CF was released to Mr. Chris Cartwright, Atlanta Air Salvage on December 21, 1999. Both engines and propellers were released to Mr. Cartwright on January 20, 2000.

Pilot Information

Certificate:	Airline transport; Commercial	**Age:**	66,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	August 2, 1999
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	21250 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N75CF
Model/Series:	E-90 E-90	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	LW212
Landing Gear Type:	Retractable - Tricycle	**Seats:**	7
Date/Type of Last Inspection:	May 5, 1999 Continuous airworthiness	**Certified Max Gross Wt.:**	10100 lbs
Time Since Last Inspection:	130 Hrs	**Engines:**	2 Turbo prop
Airframe Total Time:	10316 Hrs	**Engine Manufacturer:**	P&W
ELT:	Installed	**Engine Model/Series:**	PT6A-28
Registered Owner:	UNIV OF SC ATHLETIC DEPT.	**Rated Power:**	680 Horsepower
Operator:		**Operating Certificate(s) Held:**	None
Operator Does Business As:		**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:	NBC ,39 ft msl	**Distance from Accident Site:**	8 Nautical Miles
Observation Time:	20:56 Local	**Direction from Accident Site:**	299°
Lowest Cloud Condition:	Unknown	**Visibility**	4 miles
Lowest Ceiling:	Overcast / 1000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	350°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	13°C / 13°C
Precipitation and Obscuration:	N/A - None - Drizzle		
Departure Point:	HILTON HEAD , SC (HXD)	**Type of Flight Plan Filed:**	IFR
Destination:	(73J)	**Type of Clearance:**	IFR
Departure Time:	20:22 Local	**Type of Airspace:**	Class E

Airport Information

Airport:		**Runway Surface Type:**	
Airport Elevation:		**Runway Surface Condition:**	
Runway Used:	0	**IFR Approach:**	ASR
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal, 1 Serious	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal, 1 Serious	**Latitude, Longitude:**	32.330493,-80.680465(est)

Administrative Information

Investigator In Charge (IIC):	Smith, Carrol
Additional Participating Persons:	JAMES A MALEK; WEST COLUMBIA , SC THOMAS A BERTHE; SOUTH BURLINGTO, VT STUART E BOTHWELL; WICHITA , KS THOMAS MCCREARY; PIQUA , OH
Original Publish Date:	December 5, 2000
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=48369