Aviation Investigation Final Report

Location:	COLUMBUS, Ohio	**Accident Number:**	IAD98FA047
Date & Time:	April 23, 1998, 23:25 Local	**Registration:**	N258B
Aircraft:	Beech 58	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled		

Analysis

This was the pilot's first night trip for the company and his fourth stop on a seven leg trip. The previous three legs were reported as uneventful, and had lasted a total of 3 hours and 9 minutes. During arrival at night, the pilot was cleared by ATC to follow a Boeing 757 on final approach for runway 10R. He was cautioned three times about possible wake turbulence from the Boeing 757 and he confirmed that he had the jet in sight. A witness reported observing the aircraft roll 90 degrees perpendicular to the runway into a steep descending nose low attitude and collide with the terrain while in close trail behind the 757. Radar data showed that the accident airplane stayed above the flight path of the Boeing 757 3 to 5 miles out. The Boeing 757 touched down about 1,000 feet down the runway, while the accident airplane flew a steeper approach and impacted the runway about 700 feet from the approach end. According to the pilot's evaluation form dated April 8, 15 days before the accident, the pilot was counseled not to, 'Dive for the runway toward the end of the approach.' According to Advisory Circular dated October 1, 1991, when landing behind a larger aircraft-same runway, stay at or above the larger aircraft's final approach flightpath-note touchdown point-land beyond it. The reported winds at the time of the accident was calm. Examination of the engine and airframe did not disclose any evidence of mechanical malfunction.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's inadequate planned approach and his failure to follow wake turbulence avoidance procedures by not staying above the glide-path of the preceding Boeing 757, which resulted in a vortex turbulence encounter. Contributing to the accident was the wake turbulence, and night conditions.

Findings

Occurrence #1: VORTEX TURBULENCE ENCOUNTERED
Phase of Operation: APPROACH

Findings
1. TRAFFIC ADVISORY - ISSUED - ATC PERSONNEL(LCL/GND/CLNC)
2. SAFETY ADVISORY - ISSUED - ATC PERSONNEL(LCL/GND/CLNC)
3. (C) PROCEDURES/DIRECTIVES - NOT FOLLOWED - PILOT IN COMMAND
4. (C) PROPER GLIDEPATH - NOT PERFORMED - PILOT IN COMMAND
5. (C) WAKE TURBULENCE - ENCOUNTERED - PILOT IN COMMAND
6. LIGHT CONDITION - NIGHT

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

Findings
7. AIRCRAFT CONTROL - NOT POSSIBLE

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
8. TERRAIN CONDITION - RUNWAY

Factual Information

HISTORY OF FLIGHT

On April 23, 1998, at 2325 eastern daylight time, a Beech 58, N258B, operated by AirNet Express as Star Check Flight (USC616) of Columbus, Ohio, was destroyed and consumed by fire after it collided with terrain during approach to the Port Columbus International Airport, Columbus, Ohio. The certificated commercial pilot was fatally injured. Visual meteorological conditions prevailed and an instrument flight rules flight plan was filed. The flight was conducted under 14 CFR Part 135, and had originated at Indianapolis, Indiana, destined for Columbus, Ohio.

According to the AirNet Express Director of Flight Operations, this was the pilot's first trip as Pilot in Command (PIC), and his fourth stop on a seven leg trip. The previous three legs were reported as uneventful, and had lasted a total of 3 hours and 9 minutes. The pilot had departed Indianapolis, at 1915 central daylight time.

A review of the transcript of the recorded conversations between USC 616 and the Columbus Air Traffic Control Tower (ATCT), revealed that at 2313, USC 616 was cleared to follow a Boeing 757 that was at his 3 to 4 o'clock position and 7 miles. The Boeing 757 was descending from 10,000 feet to 6,000 feet, and also landing at Port Columbus. The pilot acknowledged that he had the Boeing 757 in sight.

At 2313:46, the ATCT controller cleared USC 616 to descend and maintain 4,000 feet. At 2315:56, the Boeing 757 was cleared to descend and maintain 5,000 feet. At 2316:19, the controller advised USC 616 that the Boeing 757 was at his 3 o'clock, and about 4 miles. The pilot of USC 616 acknowledged that he had the traffic and the airport in sight.

At 2316:28, the controller advised USC 616 to follow the Boeing 757 and, "caution wake turbulence he's going to descend through your altitudes." The pilot of USC 616 acknowledged this transmission.

At 2316:37, the controller cleared the Boeing 757 to descend to 3,000 feet. The controller also advised the Boeing 757 that another airplane, USC 616, was at his 8 to 9 o'clock position, 3 1/2 to 4 miles, descending out of 4,200 feet, and that USC 616 had the Boeing 757 in sight, and was going to follow them.

The flight continued, and at 2318:01, the controller advised the pilot of USC 616 not to exceed 170 knots behind the Boeing 757 and stated, "caution wake turbulence." The controller also advised the pilot to contact the Port Columbus tower.

At 2319:05, the tower controller advised USC 616 to follow the Boeing 757 and, "caution wake turbulence runway 10R cleared to land wind calm." The pilot of USC 616 acknowledged this transmission, at 2319:10, and there were no further radio transmissions between the tower and USC 616.

According to an Air Traffic Controller, who worked the South Radar Tracon position, the Boeing 757 checked in from the southwest and he initiated a 040 degree heading for runway 10R. USC 616 called from the west, the controller initiated a 080 heading for runway 10R, pointed out the Boeing 757 traffic to USC 616, and advised USC 616 that he would follow a Boeing 757.

The controller said, "...USC 616 was descended to 4,000 feet and then immediately to 3,000 feet. At approximately 20 DME I pointed out the Boeing 757 to USC 616 to USC 616 again. USC 616 reported the Boeing 757 and the field in sight and I instructed USC 616 to follow the Boeing 757, issued a wake turbulence advisory and advised USC 616 the Boeing 757 would descend through his altitudes. I descended [the Boeing 757] to 3,000 feet and pointed out the airport. [The Boeing 757] reported field in sight. I cleared [the Boeing 757] for a visual approach to runway 10R and changed frequency to the tower. I cautioned USC 616 again about the wake turbulence, issued a speed instruction and changed USC 616 to the tower frequency... ."

The tower controller said, "...I sequenced USC 616 behind (#2) [the Boeing 757], issued wake turbulence advisory, wind check, and clearance to land runway 10R... ."

Another controller said he had just signed on and that the Boeing 757 and USC 616 were already cleared to land on runway 10R. He said, "...USC 616 was cautioned on wake turbulence following...a Boeing 757. I observed USC 616 on a short final when I instructed [the Boeing 757] to exit on TY 'G' without delay. A fire was noticed shortly after at the approach end of runway 10R. USC 616 did not acknowledge any further transmissions... ."

Several witnesses outside on a ramp area observed USC 616 on its approach. One of the witnesses said, "...I do remember it following another [airplane] on final which was making a nice normal approach. As the first airplane landed the second one was still high. It seemed to, more or less maintain this altitude until shortly before the runway when it descended down to the runway to land. As it got to approximately 40 and 60 feet above the runway, the airplane rolled 90 degrees perpendicular to the runway. At that time the airplane turned, right wing down, to the runway and dropped below my vision...I then saw a big explosion and then heard a boom."

The accident occurred during the hours of daylight approximately 39 degrees, 59.77 minutes north latitude, and 82 degrees, 53.34 minutes west longitude.

PERSONNEL INFORMATION

The flight instructor held a commercial pilot certificate with a rating for airplane single engine

land. His most recent Federal Aviation Administration (FAA) First Class Medical Certificate was issued on March 18, 1998.

According to an employment application completed by the pilot on August 9, 1997, he reported over 1,250 hours of total flight experience, including 30 hours in multi-engine airplanes, of which 3 hours was as PIC. The pilot had received 6.1 hours of initial training in make and model by AirNet Express, and had completed a Airman Competency/Proficiency Check on April 13, 1998, in make and model. According to the pilot's evaluation form dated April 8, 15 days before the accident, the pilot was counseled not to "Dive for the runway toward the end of the approach." There was no record of wake turbulence avoidance training recorded on the evaluation form or checkride form.

AIRCRAFT INFORMATION

According to the airplane log books, the airframe accumulated over 3,894 hours, of which 12 hours had been since the 100 hour inspection that was completed on April 21, 1998.

METEOROLOGICAL INFORMATION

The 2251 surface weather observation for Columbus International Airport, was as follows:

Sky Clear; visibility, 10 miles; temperature, 54 degrees Fahrenheit (F); dew point, 36 F; winds, calm; and altimeter 29.87 inches Hg.

WRECKAGE AND IMPACT INFORMATION

Examination of the accident site revealed that the airplane impacted on runway one zero right, 700 feet from the approach end, and came to rest about 1,000 feet further down the runway, on its belly, on a magnetic heading of 018 degrees.

The nose landing gear initially impacted, followed by the right main landing gear, left main landing gear, and outboard wing. Both propellers made four strike marks on the runway surface. The initial two propeller strike mark spacings from the right and left propellers were 25 1/2 and 24 1/2 inches, respectively. According to an investigator with Beech, with a maximum flap extension speed of 122 KIAS, the right and left propeller rates would have been 1,937 and 2,016 RPM, respectively.

The nose section forward of the cabin area exhibited upward crushing and about a 10 degree displacement to the left of the airplane longitudinal axis.

The right wing exhibited upward distortion with leading edge up twisting on the wing tip. The right wing tip lower skin exhibited scrape marks oriented diagonally from forward outboard to aft inboard, about 15 degrees from the airplane longitudinal axis.

The left wing exhibited also exhibited upward distortion, but less than the right wing. Both wing leading edges exhibited relatively minor chordwise crushing.

The tail section exhibited minor distortion, except for the left elevator counterbalance horn that separated during the initial impact sequence.

The cockpit and instrument panel were partially consumed by the postcrash fire. The cabin and fuselage were destroyed by fire.

The control column assembly (single throw-over type) exhibited a left side position. The windshield had melted and draped over the cockpit engine control levers. The propeller, throttle, and mixture control levers exhibited mid-range positions.

The landing gear actuator exhibited a fully extended landing gear position. The right wing flap actuator measured 6 15/16 inches, the right and left elevator trim tab actuator measured one inch and 15/16 inches. According to a Beech Investigator, this position exceeded the maximum 30 degree flap travel, and about 2 1/2 degree down trim tab (nose up trim) and neutral trim tab deflections respectively.

The rudder trim tab actuator measured 3 3/4 inches which corresponded to about a 5 degree right trim tab left deflection (nose left trim).

The left front (pilot) seat structure remained secured to its seat track with the forward/aft seat adjustment assembly intact. The left front seat belt buckle assembly and end fitting of the shoulder harness were engaged.

All three blades of both propellers exhibited leading edge down twisting, ground and aft curled tips, and chordwise scratches.

The wreckage was moved to a hangar where it was examined on April 24 and 25, 1998, under the supervision of the National Transportation Safety Board. All major components of the airplane were accounted for at the hangar.

Both engines remained attached to their respective mounts. Both engine throttle butterfly valves exhibited nearly closed positions. Examination of the left engine revealed that the left propeller separated aft of the crankshaft mounting flange. Both left magnetos separated. There was a large break in the case separating the elevated rear portion of the case that serves as a mount for the magnetos from the rest of the case. The left engine sump was flattened and the engine exhibited fire damage.

The top spark plugs were removed and the plugs were gray in color. The fuel manifold was disassembled. The screen was clean and there was fuel in the unit.

Examination of the right engine revealed that the right propeller remained attached to the

crankshaft. The left magneto was separated. The case around the left hand magneto mount pad was broken. The top spark plugs were removed and were gray in color. The fuel manifold was disassembled, and the screen was clean. There was fuel in the unit.

Examination of the engine and airframe did not disclose any evidence of mechanical malfunction.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy of the pilot was done by Dr. William R. Adrion, Coroner, Franklin County Coroner's Office, Columbus, Ohio, on April, 24, 1998.

The toxicological testing report from the FAA Toxicology Accident Research Laboratory, Oklahoma City, Oklahoma, revealed negative for drugs and alcohol for the pilot.

ADDITIONAL INFORMATION

Advisory Circular-AC No. 90-23E--Aircraft Wake Turbulence

According to Advisory Circular dated October 1, 1991, every aircraft in flight generates a wake. This disturbance is caused by a pair of counterrotating vortices trailing from the wing tips. The vortices from large aircraft pose problems to encountering aircraft. The pilots must learn to envision the location of the vortex wake generated by larger (transport category) aircraft and adjust his/her flight path accordingly.

Pilots should be particularly alert in calm wind conditions and maneuvering in the vicinity of the airport where the vortices could remain in the touchdown area. Under certain conditions, airport traffic controllers apply procedures for separating aircraft operating under Instrument Flight Rules. Whether or not a warning has been given, the pilot is expected to adjust his/her operations and flightpath as necessary to preclude serious wake encounters. When landing behind a larger aircraft-same runway, stay at or above the larger aircraft's final approach flightpath-note touchdown point-land beyond it.

Hazardous Material

During the fire-fighting efforts, it was suspected that the cargo on board the airplane may have consisted of hazardous material. Consequently, a Hazardous Material Group was formed to evaluate the shipment documentation and post-crash impact on the environment. A copy of the report is attached.

Wreckage Release

The airplane wreckage was released on April 30, 1998 to the Director of Operations of AirNet Systems Inc.

Pilot Information

Certificate:	Commercial	**Age:**	32,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:**	No
Instructor Rating(s):	Airplane single-engine	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	March 18, 1998
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	1250 hours (Total, all aircraft), 23 hours (Total, this make and model), 1200 hours (Pilot In Command, all aircraft), 60 hours (Last 90 days, all aircraft), 30 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N258B
Model/Series:	58 58	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	TH-1141
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	April 21, 1998 100 hour	**Certified Max Gross Wt.:**	5400 lbs
Time Since Last Inspection:	12 Hrs	**Engines:**	2 Reciprocating
Airframe Total Time:	3894 Hrs	**Engine Manufacturer:**	Continental
ELT:	Installed, not activated	**Engine Model/Series:**	IO-520CB
Registered Owner:	AIRNET EXPRESS	**Rated Power:**	285 Horsepower
Operator:		**Operating Certificate(s) Held:**	On-demand air taxi (135)
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:	CMH ,815 ft msl	**Distance from Accident Site:**	
Observation Time:	22:51 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	0°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	12°C / 2°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	INDIANAPOLIS , IN (IND)	**Type of Flight Plan Filed:**	IFR
Destination:	PORT COLUMBUS , OH (CMH)	**Type of Clearance:**	IFR
Departure Time:	21:45 Local	**Type of Airspace:**	Class B

Airport Information

Airport:	PORT COLUMBUS INTERNATION CMH	**Runway Surface Type:**	Concrete
Airport Elevation:	815 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	10	**IFR Approach:**	Visual
Runway Length/Width:	10250 ft / 150 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	1 Fatal	**Latitude, Longitude:**	40.00951,-82.919479(est)

Administrative Information

Investigator In Charge (IIC):	Drake, Beverley
Additional Participating Persons:	MARK HARDEN; COLUMBUS , OH GEORGE HOLLINGSWORTH; RESTON , VA TOM LASSEIGNE; WASHINGTON , DC DON KNUTSON; WICHITA , KS
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Last Revision Date:	
Investigation Class:	Class
Note:	
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