Aviation Investigation Final Report

Location:	AMELIA, Ohio	**Accident Number:**	IAD98FA094
Date & Time:	August 15, 1998, 07:38 Local	**Registration:**	N8EM
Aircraft:	Beech A-36	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot departed on an IFR flight in instrument meteorological conditions without receiving a weather briefing. Weather reported in the area of the destination airport was ceiling 300 feet overcast with 1 mile visibility in fog. The instrument approach was flown 1 mile south of, and parallel to, the destination runway. The pilot performed a left turn during the missed approach procedure, followed by a right turn after he requested vectors for a return flight to the departure airport. Examination of radar data revealed that after the airplane completed the right turn and rolled out on the assigned heading, the airplane re-entered a right turn and descended in a right-hand spiral. Examination of the airframe and engine revealed no pre-impact anomalies. Photographs taken at the scene immediately following the accident showed reduced visibility due to fog.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot's loss of control in flight due to spatial disorientation. A related factor was the fog.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: MISSED APPROACH (IFR)

Findings
1. (F) WEATHER CONDITION - FOG

2. BECAME LOST/DISORIENTED - INADVERTENT - PILOT IN COMMAND
3. (C) SPATIAL DISORIENTATION - PILOT IN COMMAND

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
4. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On August 15, 1998, at 0738 eastern daylight time, a Beech A-36, N8EM, was destroyed when it collided with terrain in Amelia, Ohio, during a missed approach from the Clermont County Airport (I69), Batavia, Ohio. The certificated private pilot was fatally injured. Instrument meteorological conditions prevailed for the personal flight that originated at Hamilton, Ohio (HAO), at 0718, destined for I69. An instrument flight rules (IFR) flight plan was filed for the flight conducted under 14 CFR Part 91.

The purpose of the flight was to attend an American Bonanza Society (ABS) clinic at I69. In a telephone interview, the manager of the Clermont County Airport stated that ABS and Continental Teledyne provided thorough airplane inspections at very low cost. He said, "For 120 dollars, they get a 500 dollar inspection." The airport manager said the accident pilot had an appointment for 0730 at the clinic.

A review of Air Traffic Control (ATC) records revealed the pilot filed his IFR flight plan by telephone with the Dayton, Ohio, Flight Service Station (FSS), at 0707. There was no record that the pilot received a weather briefing prior to departure from HAO. The pilot received his IFR clearance over the aircraft's radio at 0718, from the Cincinnati Approach Control. The controller advised him that runway and weather information for the destination airport was unavailable.

A review of ATC voice communication tapes revealed the pilot requested the NDB runway 22 approach at I69. The pilot further requested the VOR approach if he was unable to complete the landing after the NDB approach.

After N8EM was established on the NDB 22 final approach course, ATC instructed the pilot to change to the UNICOM frequency at I69. At 0736, the pilot initiated the missed approach procedure and contacted Cincinnati Approach Control. The following excerpts were taken from the conversation between ATC and N8EM:

Pilot: "Eight echo mike missed approach at Clermont County."

Controller: "Bonanza eight echo mike radar contact. Turn left heading one five zero. Climb and maintain two thousand five hundred. We'll vector you for the VOR bravo."

Pilot: "Bonanza eight echo mike. Maybe I'll go back to Hamilton. It doesn't look...It's lower than that over here."

Controller: "Eight echo mike, okay. Turn right heading 360 for Hamilton. Climb and maintain three thousand, eight echo mike."

Pilot: "Three thousand and bonanza eight echo mike. And what was the heading?"

Controller: "Three six zero heading, right turn."

Pilot: "Zero...Three six zero."

The pilot then requested the localizer approach at Hamilton Airport. Radar contact was lost, at 0738. The airplane collided with terrain approximately 1.5 miles south of I69 on a magnetic heading of approximately 290 degrees.

A witness who held a private pilot's certificate and approximately 900 hours of flight experience stated he was about 1 mile south of the airport when he heard the airplane overhead. He said:

"I could hear him come around and, honest to God, it sounded like he was right on top of the trees. That thing was running beautiful, I mean it purred. I was looking for him, but I couldn't find him. The fog this morning, you couldn't see from here to that house. He was on treetop level, right above my head and I couldn't see him. Seriously, I was looking because he was so damn low. There was no engine trouble, he was running good."

In a statement provided to the Ohio State Police, a second witness stated he was standing approximately 300 yards from the crash site when he heard the airplane. He reported that he could not see the airplane due to thick fog. The witness stated:

"The plane sounded normal, the motor sounded smooth and normal, no sputtering or missing. The motor was running all the way until the plane crashed...The engine never quit. It stayed running until it hit the ground."

The accident occurred during the hours of daylight approximately 39 degrees, 03 minutes north latitude, and 84 degrees, 12 minutes west longitude.

PERSONNEL INFORMATION

The pilot held a private pilot certificate with ratings for airplane single engine land and instrument airplane. His most recent Federal Aviation Administration (FAA) Third Class Medical Certificate was issued on October 7, 1996.

The pilot's logbook revealed 621.5 hours of total time logged. The pilot had accumulated approximately 100 hours of actual instrument and 82 hours of simulated instrument time. The pilot's last instrument competency check was completed September 14, 1997.

AIRCRAFT INFORMATION

The airplane was a 1979 Beech A36. The airframe had accumulated 2,638 hours of total time. The last annual inspection was performed February 12, 1998 and the airplane accrued 54 hours of flight time since that date.

METEOROLOGICAL INFORMATION

Weather reported at HAO at the time of departure was: visibility 3/4 mile in fog and no wind.

Weather reported at the Cincinnati Municipal Airport/Lunken Field, 10 miles northwest of I69, at 0730 was: ceiling 300 overcast with 1 mile visibility in fog and no wind.

Photographs taken at the scene immediately following the accident by local police showed reduced visibility due to fog.

WRECKAGE AND IMPACT INFORMATION

The wreckage was examined at the site on August 15, 1998. There was a strong odor of fuel and all major components were accounted for at the scene. The distance from the initial ground scar to the main wreckage was approximately 130 feet. The wreckage path was divided into one foot increments identified as wreckage points (WP). The propeller was buried in a crater approximately 3 feet deep, 30 feet beyond the initial ground scar. All three propeller blades displayed similar twisting, bending, leading edge gouging, and chordwise scratching.

The engine was separated from the airframe and came to rest inverted at WP 69. The fuel lines between the flow divider manifold and the cylinders contained fuel.

The main wreckage came to rest inverted, facing opposite the direction of travel. The cockpit and cabin areas were completely destroyed by impact. The roof was separated from the airplane and lay perpendicular to the wreckage path and the fuselage. The right wing was separated from the airplane and disintegrated along the wreckage path. Control cable continuity was established from the cockpit area to all flight control surfaces except the right wing. Cable continuity was established from the cockpit area to the point of right wing separation where the cables appeared to have failed in overload.

MEDICAL AND PATHOLOGICAL INFORMATION

Dr. Gary L. Utz performed an autopsy on the pilot on August 15, 1998 for the Clermont County Coroner's Office.

The FAA Toxicology Accident Research Laboratory, Oklahoma City, Oklahoma performed toxicological testing.

TESTS AND RESEARCH

The engine was examined at the Lunken Airport, Cincinnati, Ohio, on August 17, 1998. The engine was rotated by hand and continuity was established through the powertrain to the accessory section. Compression was verified on five of six cylinders using the thumb method. The valves on the #5 cylinder would not fully close due to impact damage. Both magnetos were partially separated due to impact damage. The magnetos were removed and placed on a test stand. Both magnetos produced spark at all terminal leads.

The final approach course for the NDB Runway 22 approach at Clermont County Airport was the 229-degree bearing to the SPORTYS non-directional beacon. It was a terminal approach with the missed approach point at station passage at the beacon. The minimum descent altitude for aircraft equipped with dual ADF receivers was 1,340 feet. Dual ADF weather planning minimums for the straight-in Runway 22 approach were: ceiling 500 feet with 1 mile visibility.

Weather reported at the Cincinnati Municipal Airport/Lunken Field, 10 miles northwest of I69 at the time of departure was: ceiling 100 overcast with visibility 3/4 mile in fog.

Continuous Disk Recording (CDR) data for the accident airplane was obtained from the FAA's Cincinnati/Northern Kentucky International (CVG) Airport Surveillance Radar site. The National Transportation Safety Board's Office of Research and Engineering performed a recorded radar study with the data. The radar specialist prepared a graph of the airplane's ground track with synchronized voice communication transcripts superimposed over the flight path.

Examination of the airplane's ground track revealed that N8EM flew parallel to and approximately 1 mile south of runway 22 at the Clermont County Airport during the approach. The airplane's flight path converged slightly towards the runway and the airplane was approximately 1/2 mile south of the departure end of runway 22 when the pilot announced "...missed approach at Clermont County." The airplane began a left-hand turn as instructed by ATC, and then the pilot amended his request for a second approach. The pilot was instructed to turn right and was assigned a heading of 360 degrees.

The graph depicts the airplane rolling out on the assigned heading, re-entering a right-hand turn, and descending in a right-hand spiral until the radar target was lost. The descending spiral track is depicted over the area of the accident site.

ADDITIONAL INFORMATION

According to the Fundamentals of Aerospace Medicine published by the University of Oklahoma Health Sciences Center, the graveyard spiral results when "...the pilot has gotten himself or herself into a prolonged turn with a moderate amount of bank. After a number of seconds in the turn, the pilot loses the sensation of turning...As a result, when the pilot tries to stop the turn by rolling back to a wings-level attitude, he or she not only feels a turn in the

direction opposite that of the original turn, but also feels a bank in the direction opposite to the original bank. Unwilling to accept this sensation of making the wrong control input, the hapless pilot rolls back into the original banked turn."

According to the FAA Airman's Information Manual, paragraph 8-1-5, ILLUSIONS IN FLIGHT, 2(C) Graveyard Spiral: "An observed loss of altitude during a coordinated constant-rate turn that has ceased stimulating the motion sensing system can create the illusion of being in a descent with the wings level. The disoriented pilot will pull back on the controls, tightening the spiral and increasing the loss of altitude."

The airplane wreckage was released on August 17, 1998 to a representative of the owner's insurance company.

Pilot Information

Certificate:	Private	**Age:**	57,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	October 7, 1996
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	621 hours (Total, all aircraft), 90 hours (Total, this make and model), 20 hours (Last 90 days, all aircraft), 10 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N8EM
Model/Series:	A-36 A-36	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal; Utility	**Serial Number:**	E1439
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	February 12, 1998 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:	54 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2638 Hrs	**Engine Manufacturer:**	Continental
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-520-BA
Registered Owner:	JOHN K. KRIEG	**Rated Power:**	285 Horsepower
Operator:		**Operating Certificate(s) Held:**	None
Operator Does Business As:	8EM AVIATION SPECIALISTS	**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	LUK ,484 ft msl	**Distance from Accident Site:**	10 Nautical Miles
Observation Time:	07:30 Local	**Direction from Accident Site:**	290°
Lowest Cloud Condition:	Unknown	**Visibility**	1 miles
Lowest Ceiling:	Overcast / 100 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	0°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	20°C / 20°C
Precipitation and Obscuration:	N/A - None - Fog		
Departure Point:	HAMILTON , OH (HAO)	**Type of Flight Plan Filed:**	IFR
Destination:	BATAVIA , OH (I69)	**Type of Clearance:**	IFR
Departure Time:	07:18 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	CLERMONT COUNTY AIRPORT I69	**Runway Surface Type:**	Asphalt
Airport Elevation:	848 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	22	**IFR Approach:**	ADF/NDB
Runway Length/Width:	3705 ft / 75 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	39.019443,-84.210685(est)

Administrative Information

Investigator In Charge (IIC):	Rayner, Brian
Additional Participating Persons:	STAN P FASKE; CINCINNATI , OH DON KNUTSON; WICHITA , KS JOHN T KENT; SEAGOVILLE , TX
Original Publish Date:	March 31, 2000
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=43727