Aviation Investigation Final Report

Location:	COATESVILLE, Pennsylvania	**Accident Number:**	NYC00FA064
Date & Time:	January 10, 2000, 05:19 Local	**Registration:**	N905DK
Aircraft:	Aerostar 601P	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Positioning		

Analysis

While operating in IMC, the pilot was vectored to the final approach course for an ILS approach. Weather at the airport was ceiling 200 feet and visibility 3/4 mile in mist. The pilot was cleared for the approach, which he acknowledged. No other transmissions were received from the accident airplane. Radar data showed the airplane intercept the final approach course, then track inbound. The airplane crossed the outer marker 420 feet below the glide slope. The last radar return showed the airplane at 440 feet agl, 3.9 miles from the runway. The airplane impacted the ground at a shallow angle about 1 mile north of the airport on the opposite side of the missed approach procedure. The elevation of the accident site was approximately 40 feet lower than the airport. The pilot had about 350 hours of total flight experience. No pre-impact failures were identified with the airframe, engines, flight controls, or flight instruments.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to follow the published instrument approach procedure, and his failure to establish a climb after passing the missed approach point.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: APPROACH

Findings
1. OBJECT - TREE(S)
2. (C) IFR PROCEDURE - NOT FOLLOWED - PILOT IN COMMAND
3. (C) CLIMB - NOT OBTAINED - PILOT IN COMMAND

Factual Information

HISTORY OF FLIGHT

On January 10, 2000, at 0519 Eastern Standard Time, an Aerostar 601P, N905DK, was destroyed when it impacted terrain near the Chester County G.O. Carlson Airport, Coatesville, Pennsylvania. The certificated commercial pilot and pilot rated passenger were fatally injured. Instrument meteorological condition prevailed, and an instrument flight rules (IFR) flight plan was filed and activated. The positioning flight departed Millville, New Jersey, and was conducted under 14 CFR Part 91.

According to Federal Aviation Administration (FAA) records, on the day before the accident, at 1610, the pilot obtained a preflight weather briefing in person from the Millville Automated Flight Service Station (AFSS) for the accident flight. On the day of the accident, at 0435, the pilot contacted Millville AFSS by radio and filed an IFR flight plan to Chester County, and declared himself the pilot-in-command. At 0437, the pilot requested current weather conditions for Millville from the AFSS. He was told, wind 120 degrees at 5 knots, altimeter 29.93 inches of mercury, visibility 3/4 mile in mist, ceiling 200 feet overcast, temperature 6 degrees Fahrenheit, and dewpoint 6 degrees Fahrenheit.

At 0445, the pilot received his IFR clearance to Chester County, and reported airborne at 0452. At 0458, he checked in with Philadelphia Approach Control, and was instructed to proceed direct to the Modena VOR for a visual approach to Chester County. At 0509, the approach controller instructed the pilot to turn right 10 degrees, and join the localizer for the ILS Runway 29. The controller gave no reason for the change in approaches. The pilot acknowledged the transmission, and the controller added maintain 3,000 feet, which was also acknowledged. At 0512, the pilot was cleared for the ILS Runway 29 approach, and at 0513, radar services were terminated. The pilot acknowledged both transmissions. No other communications were received from the accident airplane.

According to radar data, the accident airplane intercepted the final approach course for the ILS Runway 29, about 3 miles outside the outer maker, on a ground track of approximately 314 degrees magnetic and 2,600 feet. After intercepting the course, the ground track for the airplane changed from 314 degrees to approximately 296 degrees; afterward, the ground track remained relatively constant, and coincided with the localizer course. The airplane crossed the outer marker, which was located 5.8 miles from the runway, about 1,900 feet. The next return was at 1,400 feet, 4.8 miles from the runway, and the last return was at 1,100 feet, 3.9 miles from the runway.

A witness, approximately 750 feet from the accident site, who was driving parallel to the debris path, stated he did not see the airplane before impact, nor did he notice anything unusual until

the airplane contacted the ground. He added that when the airplane hit, a fire erupted and he felt an over pressurization. The fire lasted for approximately 12 seconds, and the flames reached about 250 feet in height.

The accident happened during the hours of darkness. The wreckage was located 39 degrees, 59.40 minutes north latitude, 75 degrees, 52.70 minutes west longitude, and about 630 feet elevation.

PERSONNEL INFORMATION

According to FAA records, the pilot held a commercial pilot certificate with ratings for airplane single engine land, multi-engine land, and instrument airplane. The pilot's logbook was not recovered and presumed destroyed in the post-crash fire. On the pilot's last application for a FAA second class medical certificate dated August 20, 1998, he reported 350 hours of total flight experience.

The pilot had an Authorization for Special Issuance Medical Certificate for diabetes mellitus requiring oral medication. The authorization for a second-class airman medical certificate was issued by the manager of the Aeromedical Certification Division on September 23, 1998, with a scheduled expiration of August 31, 1999. As part of the submission supporting this Authorization, the pilot included a letter from his personal physician dated September 10, 1998, which noted:

"I've been treating this patient since 1997 currently the patient is taking two tablets of Glyburide 5 mg twice and glucophage 500 mg two times a day. Patient has zero side effects from this medication since onset. ...[The pilot] is also maintaining satisfactory control of his diabetes as demonstrated through his last glycohemoglobin .... Patient is seen in our office on a regular basis. Patient has no signs of cardiovascular, neurological or renal diseases. Ophthalmic examinations are performed once a year. Presently the ophthalmic examination of [the pilot] is normal...."

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was preformed on the pilot, by Dr. Donald A. Nicklas, M.D. on January 10, 2000, at the Medical Examiners Office in Brandywine, Pennsylvania.

A toxicological test was performed on the pilot and the pilot rated passenger by the FAA Toxicology and Accident Research Laboratory, Oklahoma City, Oklahoma, on March 15, 2000. According to the toxicological report, the pilot had 180 mg/dl of glucose in vitreous and 7182 mg/dl of glucose in urine.

AIDS TO NAVIGATION

The final approach course for the ILS Runway 29 approach into Chester County was 293

degrees magnetic. The glide slope intercept altitude was 2,400 feet. At the outer marker, glide slope altitude was 2,320 feet. (Radar data depicted the airplane at 1,900 feet.) Decision height for the ILS straight-in to Runway 29, all categories, was 911 feet, or 250 feet agl. Minimum visibility for the approach was 3/4 mile. Minimum decent altitude for the localizer straight-in to Runway 29, all categories, was 960 feet, or 299 feet agl. Minimum visibility for this approach was 1 mile. The missed approach procedure for both approaches was climbing left turn (southwest) to 2,400 feet, direct Modena VOR and hold. The day after the accident, an in-flight inspection of the localizer, glide slope, and outer maker were conducted. All preformed satisfactorily.

METEOROLOGICAL INFORMATION

At 0550, an automated weather station at Chester County reported a ceiling of 200 feet and a visibility of 3/4 mile in mist.

WRECKAGE AND IMPACT INFORMATION

The airplane impacted the ground approximately 1 mile north of the airport on the opposite side of the missed approach procedure. The debris path was oriented on a northeast heading. It was 650 feet long and 80 feet wide at the end. In addition, the center of the debris path was broken down into 1-foot increments called stations. The start of the debris path, station 1, was marked by freshly broken branches on top of a 35-foot tree. At station 30, two trees about 10 feet apart, and approximately 30 feet tall were burned and sooted. The tree on the left had a fresh vertical-scrape mark on the southwest side. The mark was approximately 2 feet long and started about 3 feet from the base of the tree. At station 34, were fresh ground scars on a 3-foot drop-off that bordered a four-lane highway. The angle from the first broken branches to the ground scars was approximately 30 degrees.

The debris path crossed the highway perpendicular. The guardrail that separated the east and west lanes had fresh impact marks, and was sooted. Lying on the highway at station 90 was the right engine propeller. At station 110 was a third set of trees. These trees were also sooted and burned. At the base of the trees were sections of the cabin, left wing, and right wing, along with melted aluminum. The vertical stabilizer was also located in this area.

At station 120 was the left engine propeller minus one of its three blades, which was located about 5 feet away. The horizontal stabilizer was located at station 170, and sections of the cockpit were located at station 320. The cockpit area was comprised of portions of the instrument panel, cabin floor, and instrument panel wiring. It was absent of fire damage, and comprised about 5 percent of the overall wreckage. At station 420 was a section of the aft cabin with the inboard section of left wing attached, and a portion of the internal fuel tank. This section of wreckage was approximately 6 feet long and 10 feet wide. From station 420 to 520, were small sections of structure and engine accessories. The left engine was located at station 530, and the right engine was at station 610. A turbocharger from the left engine marked the end of the debris path at station 650.

A post-crash fire consumed approximately 30 percent of the flight control system, preventing verification of continuity. The sections of the flight control system that were not consumed and examined, exhibited no signs consistent with a pre-impact failure. Sections of the right and left flap were recovered. The majority of both the right and left ailerons were also recovered. Overall, the left wing displayed more damage than the right wing.

The left and right horizontal stabilizers remained connected to the tail section. The vertical stabilizer had separated from the tail, and the tail had separated from the fuselage. The elevator counterweight had separated from its mounts consistent with overload. Portions of the left and right elevator, including the trim tabs, were attached to the horizontal stabilizer. The rudder was still attached to the vertical stabilizer, and the rudder trim tab was approximately neutral.

TESTS AND RESEARCH

The left main landing gear, actuator piston was extended 6.1 inches, consistent with a gear transient position. The piston on the right main landing gear actuator was extended approximately 4.7 inches, also consistent to a transient position. The left flap-actuator piston was extended 4.5 inches, consistent with 12-degrees of flaps.

The left propeller was separated from the engine at the propeller hub flange. The No. 3 propeller blade had separated from the propeller hub, and had a section of the hub attached to it. In addition, the blade was bent opposite the direction of rotation. All three blades displayed chordwise scratching, leading edge gouging, and "S" bending.

The right propeller had also separated from the engine at the propeller hub flange. Approximately 6 inches of the No. 1 blade tip had separated from the propeller. The No. 2 blade had leading edge gouging, and longitudinal scratching. The No. 3 blade had leading edge gouging and scratches oriented approximately 45 degrees to the chord of the blade.

Each engine was equipped with two turbochargers. All four turbochargers were found separated from their respective engines. The left engine, right turbocharger examination, revealed rotational scaring on both the intake and exhaust sides. Examination of the left engine, left turbocharger revealed rotational scaring on the intake side.

The right engine, right turbocharger had rotational scaring on both the intake and exhaust sides. In addition, the exhaust shroud was impacted with mud and debris, and the intake shroud had dirt and debris partially covering its surface. The right engine, left turbocharger, also had rotational scaring on the exhaust side.

During the examination of the left engine, all 12 sparkplugs were removed and found absent of debris. All six fuel nozzles were removed and examined. Five of the nozzles were absent of debris. One of the nozzles had a green piece of vegetation inside of it that measured

approximately 0.05 inches long and 0.02 inches wide. The fuel divider case was opened, and a tear was found in the fuel divider diaphragm that was approximately 0.6 inches long.

The left engine driven fuel pump was disassembled. The shaft was intact, along with the vanes and vane housing. Both magnetos were found separated from the left engine. A rotational force was applied, and spark was observed on all 12 towers. The left engine vacuum pump was removed. The shear coupling was intact. A rotational force was applied, and the pump developed suction. When the engine crankshaft was rotated by hand, the accessory gears turned, and thumb compression was obtained on all six cylinders. All six cylinders were borescoped, and no anomalies were observed.

During the right engine examination, all 12 sparkplugs were removed and found absent of debris. All six fuel-nozzles were removed, and found absent of debris. The fuel divider was opened, and the diaphragm was intact. The engine driven fuel pump was disassembled. The shaft was intact, along with the vanes and vane housing. Both magnetos were found attached to the engine accessory case, and then removed for examination. A rotational force was applied to the left magneto, and spark was observed on four of the six towers. The right magneto had a hole in it consistent with impact damage. Looking into the hole, internal damage was observed. This damage was also consistent with impact damage. A rotational force was applied, but no spark was obtained from the right magneto. When the right engine crankshaft was rotated by hand, the accessory gears turned, and thumb compression was obtained on all six cylinders. The cylinders were borescoped, and no anomalies were identified.

In addition, while rotating the right engine crankshaft, the vacuum pump drive shaft turned. Resistance was then felt, and a pop was heard. After the pop, the shaft no longer rotated. The pump was removed, and the shear coupling was found broken. An internal examination of the pump revealed that the vane housing was fractured, along with some of the vanes.

Because of the tear in the left engine fuel divider diaphragm, information was requested from the engine manufacturer about how the tear would effect engine performance. The manufacture provide the following information regarding an engine that was involved in a completely separate accident that had a similar tear:

A test was preformed on an AEIO-540-D4A5 engine that was known to be running at the time of impact. The engine displayed only "minor" impact damage to the bottom of the engine and no impact damage to the top of the engine was observed. After the accident and while the engine was on the airplane, fuel was observed squirting from the fuel-manifold cap-vent when the fuel boost pump was on, and the throttle and mixture controls were full forward. The manifold was then disassembled, and a ruptured fuel divider diaphragm was identified. The engine was later tested using the suspected fuel manifold. The engine would not start, and fuel was observed discharging from the cap-vent. A replacement manifold was installed, and the engine started and ran. After the engine test was completed, the original manifold was reinstalled. Again, the engine would not start. The manifold was removed from the engine,

and bench checked. Fuel pressure from 1 psi to 15 psi was applied to the fuel manifold fuel inlet. During the test, no fuel was observed flowing from any of the six fuel fittings. The only fuel identified was coming from the cap-vent.

ADDITIONAL INFORMATION

According to a witness, on the day of the accident, he was waiting at Chester County for the accident airplane to pick him up, and fly him to Merrill C Meigs Airport, Chicago, Illinois, which he had already paid for. According to a FAA inspector, the operator was in the process of obtaining, but did not have a 14 CFR Part 135 operating certificate.

The wreckage was released to a representative of the owners insurance company.

Pilot Information

Certificate:	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 Invalid Medical for flight	**Last FAA Medical Exam:**	August 20, 1998
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	350 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Aerostar	**Registration:**	N905DK
Model/Series:	601P 601P	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	61P-0308-081
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	March 9, 1999 Annual	**Certified Max Gross Wt.:**	5700 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Lycoming
ELT:		**Engine Model/Series:**	IO-540
Registered Owner:	N3193X BONANZA CORP	**Rated Power:**	290 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:	40N ,660 ft msl	**Distance from Accident Site:**	2 Nautical Miles
Observation Time:	05:54 Local	**Direction from Accident Site:**	330°
Lowest Cloud Condition:	Unknown	**Visibility**	0.75 miles
Lowest Ceiling:	Overcast / 200 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	130°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	6°C / 4°C
Precipitation and Obscuration:	N/A - None - Fog		
Departure Point:	MILLVILLE , NJ (MIV)	**Type of Flight Plan Filed:**	IFR
Destination:	(40N)	**Type of Clearance:**	IFR
Departure Time:	04:45 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	CHESTER COUNTY G O CARLSO 40N	**Runway Surface Type:**	Asphalt
Airport Elevation:	660 ft msl	**Runway Surface Condition:**	Wet
Runway Used:	29	**IFR Approach:**	ILS
Runway Length/Width:	5400 ft / 100 ft	**VFR Approach/Landing:**	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	2 Fatal	**Latitude, Longitude:**	39.980175,-75.809516(est)

Administrative Information

Investigator In Charge (IIC):	Muzio, David
Additional Participating Persons:	PAUL W BASILOTTO; PHILADELPHIA , PA ROBERT OHNMEISS; WILLIAMSPORT , PA
Original Publish Date:	April 19, 2001
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=48485