Aviation Investigation Final Report

Location:	Sugar Grove, Illinois	**Accident Number:**	CEN10FA108
Date & Time:	January 23, 2010, 18:52 Local	**Registration:**	N222AQ
Aircraft:	Smith AEROSTAR 601P	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of control in flight	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation		

Analysis

The visibility at the time of the accident was 1/2 mile with fog and the vertical visibility was 100 feet. A witness stated that the pilot checked the weather, but that he appeared to be in a hurry and took off without performing a preflight inspection of the aircraft. After takeoff, air traffic control instructed the pilot to turn left to a heading of 270 degrees. The pilot reported to the controller that he was at 1,300 feet climbing to 3,000 feet and the controller cleared the pilot to climb to 4,000 feet; the pilot acknowledged the clearance. Witnesses on the ground noted that the airplane was loud; one witness located about 1.5 miles from the departure airport reported that the airplane flew overhead at treetop height. The airplane impacted trees and a residence about 2.3 miles north-northeast of the departure airport. The airplane's turning ground track and the challenging visibility conditions were conducive to the onset of pilot spatial disorientation. Postaccident inspection failed to reveal any mechanical failure that would have resulted in the accident. The pilot purchased the airplane about three months prior to the accident; at that time he reported having 72.6 hours of instrument flight experience and 25 hours of multi-engine experience, with none in the accident airplane make and model. After purchasing the airplane, the pilot received 52 hours of flight instruction in the accident airplane in 7 days. Logbook records were not located to establish subsequent flight experience.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's spatial disorientation and subsequent failure to maintain airplane control.

Findings

Personnel issues	Spatial disorientation - Pilot
Aircraft	Altitude - Not attained/maintained
Environmental issues	Low ceiling - Effect on personnel
Environmental issues	Low visibility - Effect on personnel

Factual Information

History of Flight

Enroute-climb to cruise	Loss of control in flight (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On January 23, 2010, at 1852 central standard time, a Smith Aerostar 601P, N222AQ, collided with the terrain and a residence in Sugar Grove, Illinois. The pilot and passenger were fatally injured. Four occupants in the residence were not injured. The airplane was destroyed by impact forces and a post impact fire. Instrument meteorological conditions prevailed and an instrument flight rules flight plan was filed. The airplane departed from the Aurora Municipal Airport (ARR), Aurora, Illinois, at 1850. The destination for the flight was the Rocky Mountain Metropolitan Airport (BJC), Denver, Colorado.

The airplane departed on runway 09 at ARR. After departure the airplane was issued a left turn to a heading of 270 and was instructed to contact departure control. The pilot checked in with departure control reporting that he was leaving 1,300 feet climbing to 3,000 feet. The air traffic controller cleared the pilot to climb to 4,000 feet. The pilot acknowledged the clearance. There was no further contact between the pilot and air traffic control. There was no radar data available for the airplane.

The airplane impacted trees, the terrain, and a residence which was located approximately 2.3 miles north-northeast of ARR. The homeowner stated that she had just walked out of the kitchen when she heard a loud noise and the house shook. She stated she, her mother, and two children exited the front door of the house. She was not aware that an airplane hit the house until a neighbor told her what happened.

An employee at the fixed base operator (FBO) at ARR stated that she was working when the airplane arrived on the night before the accident and again when the airplane departed on the accident flight. She stated that the airplane was topped off with fuel when it arrived and was put in a hangar overnight.

The employee stated the pilot arrived back at the airport on the evening of the accident about 15 minutes prior to takeoff. She stated the pilot used his own computer to check the weather and file a flight plan. The pilot mentioned the fog and that there were areas of ice along the route of flight. The employee stated a lineman pulled the airplane out of the hangar and helped the passenger load their bags. She stated the pilot walked out to the airplane and departed without doing a preflight inspection. She stated that they seemed to be in hurry.

A witness who saw and heard the airplane was located about 1.5 miles northeast of ARR. He stated he was outside talking on the telephone and he had to stop his conversation because the airplane was so loud as it flew overhead, just clearing an oak tree on his property.

Several other witnesses reported they heard the airplane's engines just prior to the accident and that the weather was foggy at the time. The local fire chief who lived near the accident site reported he heard the airplane fly over his house and that it was very low and that the engines were producing power at the time.

PERSONNEL INFORMATION

The pilot, age 37, held a commercial pilot certificate with airplane single-engine land, airplane multi-engine land, and instrument airplane ratings. The pilot received his instrument airplane rating on April 10, 2009. On June 12, 2009, the pilot failed to pass the practical portion of his multi-engine examination. The pilot was re-examined, passed, and was issued his multi-engine rating on June 15, 2009. The pilot's last Federal Aviation Administration medical examination was completed on April 2, 2008, when he was issued a second-class medical certificate. The medical certificate did not contain any limitations.

The pilot's logbook records were not located during the investigation. On an aviation insurance application dated October 27, 2009, the pilot reported having 503.2 hours of total flight time of which 437.9 hours were as pilot-in-command. The pilot also reported having 72.6 hours of instrument flight time and 0 hours in the Aerostar 601.

A flight instructor who provided instruction for the pilot for his commercial pilot certificate and instrument rating stated the pilot had previously owned two other airplanes. He traded the last airplane in when he bought the Aerostar. He stated he tried to talk the pilot out of buying the Aerostar, because he thought it was too much airplane for him to handle.

Another flight instructor who provided flight instruction to the pilot in the accident airplane for insurance purposes stated they flew 52 hours in the airplane over a period of 7 days. Records provided by this instructor show the flying took place in November 2009. He stated they flew numerous instrument approaches around the state of Florida. The instructor stated that he told the pilot that the airplane was "unforgiving" and that it did not have a lot of lateral stability.

AIRCRAFT INFORMATION

The accident airplane was a 1974, Smith Aerostar 601P, serial number 61P-0164-004. The twin-engine airplane had a pressurized cabin and was not certified for flight into known icing conditions. The aircraft was registered to a company which was owned by the pilot. An aircraft Bill of Sale indicates the pilot purchased the airplane on November 10, 2009.

The airplane total time at the time of the accident was not determined. The last entry in the aircraft logbook was for an annual inspection dated November 11, 2009. At the time of this

inspection the aircraft total time was listed as 2,969.9 hours. According to the aircraft logbook, the last Pitot Static System and Altimeter check was on October 9, 2007.

The airplane was equipped with Lycoming IO-540-S1A5 engines. According to logbook records, the left engine, serial number L-12185-48, and the right engine, serial number L-12189-48, were both overhauled in June 2002. On August 1, 2002, both engines were reinstalled on N222AQ. The last logbook entry for both engines was for an annual inspection dated November 5, 2009. The time since overhaul for both engines was listed as 527.9 hours at the time of the annual inspection.

The aircraft was topped off with 133.2 gallons of 100LL aviation fuel prior to the accident flight.

METEOROLOGICAL INFORMATION

The weather conditions reported at ARR located 2.3 miles south of the accident site at 1852 were: Wind from 140 degrees at 7 knots; visibility 1/2 mile with fog; vertical visibility 100 feet; temperature 4 degrees Celsius; dew point 4 degrees Celsius; altimeter 29.63 inches of mercury.

Witnesses in the local area at the time of the accident reported the weather was foggy at the time.

Information received from Data Transformation Corporation (DTC) direct user access terminal (DUAT) indicated that the pilot filed a flight plan on the computer, but there was no record of him having requested weather information.

WRECKAGE AND IMPACT INFORMATION

The wreckage path was along a magnetic heading of 220 degrees. The initial impact was with a tree that was approximately 60 feet in height. A wingtip strobe light and pieces of red glass were found near the base of the tree along with an outboard section of the right wing. The tree contained one area of impact marks approximately 20 feet from the top and another area of impact marks about 40 feet from the top of the tree. The airplane contacted a second tree located about 25 feet further along the wreckage path. This tree was also approximately 60 feet in height and the top half of the tree was broken off. Near the base of this tree was the first ground scar which was approximately 4 feet in diameter and 12 inches deep. The right propeller was located in this hole. Just past the first impact ground scar was another impact area which was approximately 4 feet in diameter and 20 inches deep. The left engine, the left propeller, sections of the left wing, and the majority of the fuselage were located just beyond the second impact area. Approximately 10 feet beyond the fuselage was the empennage, horizontal stabilizers, elevators, vertical stabilizer, and rudder. The right engine was located next along the wreckage path. A 9-foot section of the right wing which included the engine nacelle was partially embedded in the garage of a residence. The garage wall that was

penetrated was located on the back side of the residence. Evidence of a fire was visible inside the garage. The three vehicles parked inside the garage sustained impact and fire damage. The wreckage path from the first tree impact to the garage was about 120 feet in length. Several small pieces of wreckage penetrated the house through the kitchen windows. A bundle of cockpit wiring was located on the driveway. The bottom skin of the cockpit was in the front yard and numerous pieces of aircraft wreckage were scattered over the residential property.

The fuselage and cockpit were destroyed. Numerous pieces of the fuselage were located throughout the wreckage path. The lower portion of the cockpit was separated from the remainder of the fuselage. The cockpit area was destroyed by impact and fire damage.

Two gyros were located amongst the wreckage. The gyros had been separated from their instruments. Both gyros were opened. One of the gyros contained rotational scoring on both the rotor and the inside of the housing. The other gyro contained rotational scoring and scrapes on the gyro.

The tachometer was located. Both the number one and number two engine needles were bent mid-span. The location of the bend on the needles corresponded to a mark on the face plate near 2,500 rpm.

The tail cone was separated just forward of the horizontal stabilizers. The right horizontal stabilizer and elevator sustained impact damage and remained attached to the tail cone. The outboard half of the right horizontal and elevator were bent downward. The left horizontal and elevator were separated approximately one foot outboard of their attach point. The elevator was separated from the horizontal stabilizer. The elevator was separated into two pieces. The leading edge of the left horizontal stabilizer contained a 12-inch area that was crushed back approximately 5 inches in a semi-circular shape. The vertical stabilizer was separated from the empennage. The rudder was separated from the vertical stabilizer. Both the rudder and vertical stabilizer displayed impact damage.

The right wing separated in three primary sections. The largest section was approximately 9 feet in length which included the engine nacelle. The landing gear and outboard section of the flap remained attached to this section of the wing. The engine had broken free from the nacelle. The other two outboard sections of the wing including the wing tip were found along the wreckage trail.

The left wing was separated into numerous pieces. The largest piece was the inboard section of the wing which was approximately 5 feet in length. This piece of the wing sustained impact and fire damage. Another section of the wing just outboard of the fuel filler cap was located. This section of the wing was crushed upward and it did not display any fire damage. A 5-foot inboard section of wing spar was separated from the wing. Numerous pieces of aileron were located throughout the wreckage path. The left main landing gear was separated from the wing.

Due to the amount of impact damage and fragmentation, flight control continuity could not be established.

Left Propeller
Two blades remained attached to the left propeller hub which was broken open. One attached blade was relatively straight. The other attached blade was bent rearward and the outboard half of the blade was twisted. The third blade was separated from the hub. The pitch stop on this blade was sheared. The blade contained an "S" shaped bend and chordwise scratches. The leading edge of the blade contained nicks and a section along the trailing edge of the blade was bent.

Right Propeller
Two blades remained attached to the right propeller hub. The hub was broken open and the third blade was detached. One blade that remained attached was twisted forward. The second attached blade was twisted rearward and the blade tip was missing. The pitch stop on the separated blade was sheared. The blade was bent rearward and twisted. The blade tip was missing. Chordwise scratches were visible on the back side of the blade.

Left Engine
The left engine was separated from the airplane. The position of the engine on the airplane was determined by matching the serial number to the engine log books. The oil sump along with the intake and exhaust systems sustained impact damage. The #2 cylinder head was broken off. Both the #1 cylinder top spark plug and the #2 cylinder bottom spark plug were missing. The #1 and #5 cylinders bottom plugs were missing. The remaining spark plugs were examined and their electrodes were intact and the color of the plugs was consistent with normal engine operation.

The fuel injector was secured on its mount and it was observed to be full of mud. Fuel was noted in the fuel inlet port to the fuel injector. The fuel screen was removed from the injector and it was observed to be clean. The fuel flow divider was opened and residual fuel was noted.

The inside of the cylinders and the piston heads were examined using a boroscope. No anomalies were noted.

Both magnetos were removed from the engine. The right magneto was destroyed by impact damage. The left magneto contained water and would not produce a spark when rotated with an electric drill.

Both turbochargers sustained impact damage. The left turbocharger rotated freely when turned by hand. The right turbocharger was separated from the engine and it would not rotate by hand.

The vacuum pump was removed from the engine. It rotated freely when the shaft was turned by hand. The pump was opened and was observed to be intact.

The engine could not be rotated by hand. Cylinders #1, #3, and #5 were removed to facilitate and internal inspection of the engine. The crankshaft, camshaft, and valve train were intact. This inspection revealed that the crankcase had been displaced by impact forces which bound the crankshaft and prevented the engine from being rotated.

Right Engine
The right engine was separated from the airplane. The data plate from this engine was missing. The serial number was retrieved from the crankcase. The position of the engine on the airplane was determined by matching the serial number to the engine log books.

The #1 cylinder head was broken off the engine exposing the intake and exhaust valve springs. The top of the crankcase contained a crack which extended from between the #1 and #3 cylinders across the top of the case and through the #2 and #4 cylinders. The propeller was separated from the engine with a portion of the propeller hub still attached to the crankshaft flange. With the exception of the #1 and #4 cylinders, all of the push rods sustained impact damage. The #1 cylinder push rods were missing and the #4 cylinder push rods were intact. The oil sump along with the intake and exhaust systems sustained impact damage. The #1 cylinder top plug along with the #3 and #5 cylinder bottom spark plugs were missing. The #2 and #4 cylinder bottom spark plugs were broken. The remaining spark plugs were examined and their electrodes were intact and the color of the plugs was consistent with normal engine operation.

The inside of the cylinders and the piston heads were examined using a boroscope. No anomalies were noted.

The fuel injector was separated from the engine. The fuel screen was removed from the injector and it was observed to be clean. Fuel was observed in the fuel screen and engine driven fuel pump. The fuel flow divider was opened and residual fuel was noted.

Both magnetos were attached to the engine. They were removed from the engine and rotated with an electric drill. The left magneto was observed to be full of water and it would not produce a spark. The right magneto produced a spark on all leads when rotated.

Both turbochargers rotated freely by hand.

The vacuum pump was removed from the engine. It rotated freely when the shaft was turned by hand. The pump was opened and was observed to be intact.

The crankshaft was rotated by hand at the crankshaft flange. Thumb compression and suction were obtained and valve train continuity was observed on all cylinders.

Cylinder head covers were removed and all of the valves were intact.

MEDICAL AND PATHOLOGICAL INFORMATION

On January 25, 2010, an autopsy was performed on the pilot by the Kane County Coroner's Office. The pilot's cause of death was "Aircraft crash resulting in massive blunt force trauma."

The FAA's Civil Aeromedical Institute in Oklahoma City, Oklahoma, performed toxicology tests on the pilot. The toxicological results showed Dextromethorphan was detected in the liver and kidney. Dextromethorphan is the active ingredient commonly found in over-the-counter cold and cough medications.

Pilot Information

Certificate:	Commercial	**Age:**	37,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Unknown
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 2	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	555 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Smith	**Registration:**	N222AQ
Model/Series:	AEROSTAR 601P	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:		**Serial Number:**	61P-0164-004
Landing Gear Type:		**Seats:**	6
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	LYCOMING
ELT:		**Engine Model/Series:**	O-540 SERIES
Registered Owner:	ENS Corp	**Rated Power:**	250 Horsepower
Operator:	Gary L. Bradford	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:	ARR,712 ft msl	**Distance from Accident Site:**	2 Nautical Miles
Observation Time:	18:52 Local	**Direction from Accident Site:**	30°
Lowest Cloud Condition:		**Visibility**	1 miles
Lowest Ceiling:	Overcast / 100 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	11 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	130°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.61 inches Hg	**Temperature/Dew Point:**	4°C / 4°C
Precipitation and Obscuration:	N/A - None - Mist		
Departure Point:	Aurora, IL (ARR)	**Type of Flight Plan Filed:**	IFR
Destination:	Denver, CO (BJC)	**Type of Clearance:**	IFR
Departure Time:	18:50 Local	**Type of Airspace:**	

Airport Information

Airport:	Aurora Municipal Airport KARR	**Runway Surface Type:**	Concrete
Airport Elevation:		**Runway Surface Condition:**	
Runway Used:	09	**IFR Approach:**	
Runway Length/Width:	6501 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:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	41.801666,-88.461669

Administrative Information

Investigator In Charge (IIC):	Sullivan, Pamela
Additional Participating Persons:	Dan Coleman; FAA-FSDO-DPA; West Chicago, IL John Butler ; Textron Lycoming ; Williamsport, PA
Original Publish Date:	June 27, 2011
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=75298