



# Aviation Investigation Factual Report

<b>Location:</b>	PEORIA, Illinois	<b>Incident Number:</b>	CHI96GA154
<b>Date &amp; Time:</b>	May 8, 1996, 10:33 Local	<b>Registration:</b>	N961LL
<b>Aircraft:</b>	Beech 200	<b>Aircraft Damage:</b>	Minor
<b>Defining Event:</b>		<b>Injuries:</b>	8 None
<b>Flight Conducted Under:</b>	Part 91: General aviation - Public aircraft		

## Factual Information

On June 8, 1996, at 1033 central daylight time, a Beech 200, N961LL, registered to the State of Illinois-Department of Transportation, was struck by lightning approximately 23 miles southwest of the Greater Peoria Regional Airport, Peoria, Illinois. The airplane was being operated as a public use aircraft under 14 CFR Part 91, when the incident occurred. Neither of the pilots, nor any of the six passenger on board were injured. The Governor of Illinois and the Illinois Secretary of Transportation were among the passengers. The airplane sustained minor damage as a result of the lightning strike. The airplane was operating on an IFR flight plan in instrument meteorological conditions. The flight originated from Springfield, Illinois, at 1017 cdt.

The captain stated that he received a weather briefing using the Pan Am Weather Satellite along with radar from the W.S.I. system. The co-pilot stated that DUATs was also used. The captain reported that the weather briefing "indicated a large area of rain with probable embedded thunderstorms between Springfield and Moline." The co-pilot reported they received updated radar information shortly before departing which showed "continuous rain showers between SPI and MLI, intensity varying between levels one and five." The captain reported that based on the weather information available he "made the determination that the flight could be conducted safely."

The crew stated that after takeoff during the climb to 14,000 feet they initiated a couple of heading changes to avoid the heaviest precipitation as indicated on the airborne weather radar. The co-pilot stated they were using ranges between 20 and 80 miles on the weather radar and ranges between 50 and 200 miles on the storm scope. He stated that the radar temporarily went blank while he was switching ranges but restored itself when he turned it off and back on. The captain stated that above 8,000 to 9,000 feet during the climb, they encountered continuous light to occasional moderate turbulence. The co-pilot reported "The storm scope was showing heavy strikes to our left and only occasional sporadic strikes ahead and to our right."

Both pilots stated they saw a flash and knew right away they had been hit by lightning. The captain stated he felt a "twitch" in the rudder pedals but that he had no problems controlling the airplane. Both pilots stated they noticed the smell of ozone which slowly changed to the smell of an electrical fire. The co-pilot stated they looked into the back of the airplane and saw smoke being emitted from the center ceiling panel just above the aft facing seat. He stated that one of the passengers was pointing a fire extinguisher at the ceiling wanting to know if he should fire it. The co-pilot stated he did not see any visible flames and he told the passenger not to fire the extinguisher. Both pilots had donned their oxygen masks during this scenario. The oxygen masks in the cabin had deployed and the passengers donned these masks. The captain called for the co-pilot to depressurize the airplane; however, with the oxygen masks on

they did not have interphone communication so he (the captain) depressurized the cabin with the dump switch to eliminate the smoke. The captain stated he then turned off all electrical power. The captain then reinstated the essential electrical equipment and the Chicago Air Route Traffic Control Center (ARTCC) to declare an emergency. The ARTCC controller issued vectors to the Greater Peoria Regional Airport where an uneventful landing was accomplished.

The captain stated that when he used the rudder to turn the airplane off of the runway he felt that "something was interfering with full and free rudder travel although the nose wheel steering was still very effective." The airplane was taxied to a clear area on the ramp and the passengers were deplaned normally.

According to one of the passengers, "Three to four minutes after the lightning flash a small amount of smoke was detectable emitting from an overhead light in the ceiling of the center of the cabin just forward of the two rear facing seats. Shortly thereafter flames (or sparks) were visible inside the lens covering of the fixture followed by flames (or sparks) about one inch in length and two inches in width shooting down into the cabin at the rear portion of the lens." This passenger stated that the smoke inside the airplane "intensified to such an extent that sitting in the left forward facing seat I could not see the passenger facing me in the left rear facing seat. However, within 30 seconds all of the smoke had been expelled from the aircraft."

#### Damage to Aircraft

Post incident inspection of the airplane revealed the radome, left propeller, left wing, cabin temperature sensing unit and the tailcone fairing were damaged by the lightning strike.

The exterior paint of the radome contained numerous pits from the lightning strike. The pits did not go through to the interior honeycomb surface of the radome.

One propeller blade tip on the left propeller was melted away over 1.5 inches in length to a depth of .05 inches.

The lightning traveled under the left wing leaving six burn marks which were spaced four to eight inches apart from the leading edge of the wing back to the trailing edge. These marks were in a line approximately 34 inches outboard of the wheel well. The trailing edge of the left wing flap was burned away over a length of approximately 4 inches to a depth of .1 of an inch.

The rear position light detached from the tailcone and was hanging by its electrical wiring which was dangling next to the rudder. Approximately the last 12 inches of insulation on the wire was burned away. Smoke deposits were observed on the aft 12 to 18 inches of the internal surface of the tailcone fairing. The right side of the fiberglass tailcone fairing contained a three inch split adjacent to the rudder cutout area. The edges of the split were delaminated and did not show any signs of burning or charring. This allowed the bottom edge of the tailcone to drop and onto the top portion of the rudder. The aluminum tailcone bulkhead contained two 3/4 inch diameter holes through it. The fairing's horizontal stabilizer aluminum

attach brackets were melted with one nut plate missing on one bracket and partial damage to the other one. The upper surface aluminum fairing, forward of the tail fairing, showed melted aluminum around several of the attach screws.

A burned area, 1.5 x .5 inch, was found on the cabin temperature sensor located in the overhead liner of the passenger cabin. Smoke damage was present around the edge of the cover plate for the sensor. The internal electrical circuit in the left engine bleed air bypass valve was found shorted to ground. This circuit drives the bypass valve to the "hot" position and is directly connected to the cabin temperature controller through a switch in the cockpit. No other smoke damage was noted in either the overhead liner or under the floor boards within the cabin.

#### Weather Information

The closest weather observation facility was at the Greater Peoria Regional Airport 23 miles northeast of the airplane's position at the time of the lightning strike. The 1032 cdt weather observation was 1,300 feet overcast, 2 miles visibility, thunderstorms with moderate rain and fog, temperature 61 degrees F, dewpoint 60 degrees F, winds from 250 degrees at 4 knots, altimeter 30.01 inches hg, with remarks that the surface visibility was 2 1/2 miles.

Convective SIGMET 39C was issued at 0955 cdt. This SIGMET covered an area which included the position of N961LL when the lightning strike occurred. The SIGMET stated: Area severe thunderstorms moving from 280 degrees at 25 knots. Tops above 45,000. Hail to 2 inches...wind gusts to 65 knots possible. See attached Meteorology Group Chairman Factual Report.

At 1021 cdt, the crew of N961LL asked the Springfield Departure controller, "What are you paintin on radar out this way?" The controller responded, "...I'm showin ah cell to the west of you it extends about fifteen to twenty miles south of the ah your position and then probably about ten miles north of your position to probably from about ah three one zero radial off capitol to the ah two two zero radial." N961LL then asked, "How does it look off our right now on a heading of about three thirty from us?" The controller responded, "...weather area showing extends out all the way north of the airport probably fifty miles."

At 1025 cdt, the crew of N961LL asked the ARTCC controller what he was showing on radar. The controller responded that there was weather all the way between N961LL's position and Moline. N961LL responded, "okay ah we seem to have no radar power right now could you give me ah point me ah to the direction of least intensity." The controller responded, "I could only say your best bet would be to go back it ah looks to be the same all the way." The controller continued, "...if I had to trust this radar I have I would say you would need to turn about thirty degrees to the left go towards ah Burlington then northbound into Moline." The pilot responded that they would turn 30 degrees to the left.

The pilots and aircraft occupants stated that the lightning strike which contacted the airplane

was the only lightning they visibly saw during the flight.

### Additional Information

Section III, page 13 of the Illinois Department of Transportation Air Operations Manual states "Flights into areas reporting thunderstorms, tornados, hurricanes, severe wind shear, hail, etc., should be avoided by visual means, airborne radar or ATC assistance." In addition, section III, page 3 of the same document states, "No flights are to be conducted under IFR or night VFR conditions when current weather reports indicate that thunderstorms or other potentially hazardous weather conditions that can be detected with airborne thunderstorm detection equipment may reasonably expected along the route to be flown, unless airborne thunderstorm detection equipment is installed and in proper working order."

The airplane was equipped with both weather radar and a storm scope which according to the flight crew were utilized during the flight. Information provided by the Illinois Department of Transportation indicates that according to the Storm Scope Operators Manual, only 20% of discharges detected are in the form of visible lightning. The remaining indications are a result of electrical activity associated with updrafts and downdrafts.

### Pilot Information

<b>Certificate:</b>	Airline transport	<b>Age:</b>	47, Male
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	Airplane multi-engine; Airplane single-engine	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 1 Valid Medical--no waivers/lim.	<b>Last FAA Medical Exam:</b>	January 9, 1996
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	13205 hours (Total, all aircraft), 7017 hours (Total, this make and model), 8919 hours (Pilot In Command, all aircraft), 124 hours (Last 90 days, all aircraft), 47 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Beech	<b>Registration:</b>	N961LL
<b>Model/Series:</b>	200 200	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	BB1139
<b>Landing Gear Type:</b>	Tricycle	<b>Seats:</b>	11
<b>Date/Type of Last Inspection:</b>	May 2, 1996 Continuous airworthiness	<b>Certified Max Gross Wt.:</b>	12500 lbs
<b>Time Since Last Inspection:</b>	6 Hrs	<b>Engines:</b>	2 Turbo prop
<b>Airframe Total Time:</b>	8015 Hrs	<b>Engine Manufacturer:</b>	P&W
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	PT6A-42
<b>Registered Owner:</b>	STATE OF ILLINOIS - DOT	<b>Rated Power:</b>	850 Horsepower
<b>Operator:</b>		<b>Operating Certificate(s) Held:</b>	None
<b>Operator Does Business As:</b>		<b>Operator Designator Code:</b>	

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Instrument (IMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	PIA ,660 ft msl	<b>Distance from Accident Site:</b>	23 Nautical Miles
<b>Observation Time:</b>	10:42 Local	<b>Direction from Accident Site:</b>	45°
<b>Lowest Cloud Condition:</b>	Unknown	<b>Visibility</b>	1.75 miles
<b>Lowest Ceiling:</b>	Overcast / 1900 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	5 knots / None	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	200°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	30 inches Hg	<b>Temperature/Dew Point:</b>	16°C / 16°C
<b>Precipitation and Obscuration:</b>	Moderate - None - Rain		
<b>Departure Point:</b>	SPRINGFIELD (SPI )	<b>Type of Flight Plan Filed:</b>	IFR
<b>Destination:</b>	MOLINE (MLI )	<b>Type of Clearance:</b>	IFR
<b>Departure Time:</b>	10:15 Local	<b>Type of Airspace:</b>	Class E

## Airport Information

<b>Airport:</b>	GREATER PEORIA REGIONAL PIA	<b>Runway Surface Type:</b>	
<b>Airport Elevation:</b>		<b>Runway Surface Condition:</b>	
<b>Runway Used:</b>	0	<b>IFR Approach:</b>	
<b>Runway Length/Width:</b>		<b>VFR Approach/Landing:</b>	Precautionary landing

## Wreckage and Impact Information

<b>Crew Injuries:</b>	2 None	<b>Aircraft Damage:</b>	Minor
<b>Passenger Injuries:</b>	6 None	<b>Aircraft Fire:</b>	In-flight
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	8 None	<b>Latitude, Longitude:</b>	40.629631,-89.689476(est)

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Sullivan, Pamela
<b>Additional Participating Persons:</b>	DONALD R MORRIS; SPRINGFIELD , MO THOMAS R CAMPOGNOLA; WICHITA , KS E C OLSON; WICHITA , KS
<b>Report Date:</b>	December 10, 1996
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class</a>
<b>Note:</b>	
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=10113">https://data.nts.gov/Docket?ProjectID=10113</a>

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