National Transportation Safety Board
Aviation Accident Final Report

Location:	Chittenden, VT	**Accident Number:**	NYC02FA051
Date & Time:	01/25/2002, 1710 EST	**Registration:**	N104CS
Aircraft:	Smith Aerostar 601P	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The airplane collided with mountainous terrain during approach to the destination airport. While approaching the airport, the pilot requested vectors for a localizer approach to runway 19. Due to traffic, air traffic control (ATC) issued the pilot a holding clearance. The airplane was approaching the holding fix about 8,000 feet, when the pilot advised ATC that the airplane was picking up a little ice. ATC initially offered an amended clearance of 9,000 feet, but the pilot declined. Subsequently, he accepted the clearance and climbed back to 9,000 feet. ATC then told the pilot that after one more airplane had landed, he would be issued an approach clearance. The airplane was about 9,200 feet when the pilot replied "thank you." Review of radar data revealed that the accident airplane made one complete 360-degree turn, and one 270-degree turn on the non-holding side of the published holding pattern. During the two turns, the airplane descended to approximately 8,400 feet, climbed to 8,900 feet, then descended again to 8,300 feet. The two turns were tighter than the expected standard 2-minute turns in a holding pattern, with radii ranging from 0.3 to 0.4 nautical miles and 0.1 to 0.2 nautical miles respectively. Following the two holding turns, no more radio transmissions or radar returns were received by ATC. Examination of the wreckage did not reveal any pre-impact mechanical malfunctions. Another pilot flying in the area reported moderate rime ice at 8,000 feet, but added that he climbed out of the ice and was between cloud layers at 9,000 to 10,000 feet.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to maintain aircraft control while holding.

Findings

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

Findings
1. WEATHER CONDITION - ICING CONDITIONS
2. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
3. WEATHER CONDITION - CLOUDS

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

Findings
4. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On January 25, 2002, about 1710 eastern standard time, a Smith Aerostar 601P, N104CS, was destroyed when it impacted terrain in Chittenden, Vermont. The certificated private pilot and passenger were fatally injured. Visual meteorological conditions prevailed for the flight that departed Johnstown-Cambria County Airport (JST), Johnstown, Pennsylvania; destined for Rutland State Airport (RUT), Rutland, Vermont. An instrument flight rules flight plan was filed for the personal flight conducted under 14 CFR Part 91.

Review of air traffic control (ATC) data from the Federal Aviation Administration (FAA) revealed:

At 1646:09, the pilot was at 11,000 feet msl, and requested vectors for the Localizer Runway 19 approach to RUT. ATC advised the pilot that he was "number two" for the approach.

At 1654:32, ATC advised the pilot that he was "number three" for the approach, and queried the pilot to copy holding instructions.

At 1654:47, ATC instructed the pilot to hold at the GITEW intersection as published, expect a further clearance at [1720], and asked what altitude he'd like to hold at. The pilot asked for 8,000 or 9,000 feet, and was cleared to 8,000 feet.

At 1656:47, ATC advised the pilot to amend the clearance and hold at 9,000; the pilot complied.

At 1703:51, the pilot was subsequently cleared to 8,000 feet.

At 1705:23, the pilot advised the he was picking up "a little bit of ice." ATC asked if the pilot would like to return to 9,000 feet, but the pilot replied, "negative, I might as well start keeping working my way down."

At 1705:34, ATC advised that the pilot would be at 8,000 feet for a while; the pilot subsequently requested 9,000 feet and ATC issued the clearance and advised of icing at 7,000 and 8,000 feet.

At 1707:13, ATC advised the pilot that once the airplane ahead of him landed, he would then be issued and approach clearance. At that time, according to the radar data, the airplane had flown approximately 1/2 of the first holding circuit, and was about 9,200 feet.

At 1707:19, the pilot said "thank you," and no more transmissions were received from N104CS. The airplane then completed the first circuit, but had descended to approximately 8,400 feet.

About 1708, it flew a second, tighter circuit, and climbed back to 8,900 feet; but then descended to 8,300 feet at 1708:29. The last radar return was at 17:09:02, near the vicinity of the accident site, with no altitude return.

PILOT INFORMATION

The pilot held a private pilot certificate, with ratings for single engine land, multi engine land, and instrument airplane.

His most recent Federal Aviation Administration (FAA) first class medical certificate was issued on March 27, 2001. On the application for the medical certificate, the pilot reported

900 hours of total flight time.

The pilot's logbook was not recovered. According to one of his instructors, the pilot had accumulated approximately 1,000 hours of total flight experience; of which, about 250 hours were in the same make and model as the accident airplane.

AIRCRAFT INFORMATION

The aircraft logbooks were not recovered. However, the maintenance facility that performed the last annual inspection provided a copy of their work order. According to the work order, the most recent annual inspection was performed on January 17, 2002. At that time, the airplane had accumulated 1,780.5 hours of total flight time.

METEOROLOGICAL INFORMATION

The pilot telephoned the Altoona, Pennsylvania Flight Service Station (FSS), about 1200 EST on January 25, 2002. The pilot advised that he was planning a flight from JST to RUT, at an altitude of 11,000 feet, departing about 1430.

The FSS specialist provided the pilot a standard weather briefing for his planned route of flight, which included an IFR advisory, AIRMET Sierra, for mountains being obscured by clouds, precipitation, and mist; valid for New England until 2200 EST.

The briefing also included AIRMET Zulu for Icing: light occasional moderate rime/mixed icing in clouds and precipitation below 14,000 feet, with the freezing level from the surface to 4,000 feet, valid for New England until 2200 EST.

Additionally, the FSS specialist noted that the temperature was -6 degrees C at the departure airport, and -13 degrees C at the destination airport, and told the pilot to "keep that in mind."

The FSS specialist concluded the standard briefing and the pilot filed an IFR flight plan.

The pilot telephoned the Altoona FSS again, about 1435 EST, and requested an update on RUT weather. The FSS specialist provided the pilot an abbreviated briefing, which included the AIRMET for icing, "as you get up towards Rutland."

About the time of the accident, several aircraft were flying in the vicinity of RUT. A pilot, of another airplane that was flying at 8,000 feet msl over central Vermont, stated that his airplane was picking up moderate rime ice. Specifically, the ice was accumulating on the leading edges of the airplane at 1/2-inch in 10 minutes. The pilot added that he requested a higher altitude, and was out of the ice and between cloud layers at 9,000 to 10,000 feet.

Another pilot, who was descending toward RUT, stated that he observed light to mixed ice from 15,000 feet to 11,000 feet; and from 9,000 feet to 7,000 feet.

The reported weather at RUT, at 1715, was: wind from 240 degrees at 11 knots, gusting to 19 knots; visibility 10 miles; broken ceiling at 3,000 feet, overcast ceiling at 3,900 feet; temperature 34 degrees F, dew point 25 degrees F; altimeter 29.95 inches Hg.

WRECKAGE INFORMATION

The wreckage was located on January 27, 2002, on the west face of Round Mountain, at an elevation of approximately 2,700 feet msl. The wreckage was examined on January 28, and all major components of the airplane were accounted for at the scene. No debris path was observed, and the wreckage was confined to a single area, oriented on a 150-degree magnetic

heading. Additionally, tree branches directly above the wreckage sustained damage, but there was no damage observed to any other trees.

The cabin and cockpit area were consumed by fire. Due to the damage, flight control continuity could not be verified. The vertical and right horizontal stabilizers were located in the cabin area; both were crushed and charred. Due to the damage, trim settings could not be verified. A crushed and partially separated portion of the left horizontal stabilizer was found aft of the wreckage. The left and right main landing gear were located near the retracted position. The nose gear was separated, and located aft of the wreckage. The left and right wings were charred, and exhibited crushing damage. Both flaps were in the retracted position.

The investigative team was unable to access the engines. One propeller blade was recovered from the right engine, and exhibited "s"-bending. Additionally, branches with fresh 45-degree cuts were found near the right engine. One propeller blade was recovered from the left engine. It exhibited chordwise scratching and leading edge gouging.

After the wreckage was recovered, the engines were further examined. The top spark plugs were removed from the left engine for examination. They were light gray in color, and the electrodes were absent of debris. The bottom spark plugs were destroyed. The left magneto was rotated via an electric drill, and produced spark at all towers. The right magneto was destroyed. When the crankshaft was rotated by hand, piston movement was noted in all cylinders. Due to several damaged push rods, thumb compression could not be attained on all cylinders. Rocker arm movement was noted at valves: number one intake, number two exhaust, number three intake and exhaust, number four intake and exhaust, and number six intake. Lifter movement was felt at valves: number one exhaust, number two intake, number five intake and exhaust, and number six exhaust.

The left engine turbocharger exhibited rotational scoring damage to the induction impeller blades. The accessory drive gears were intact. The vacuum pump gear was intact, but the rotation drum was damaged. However, the vanes were intact and the case exhibited rotational scoring. The oil filter was opened for inspection, and was absent of metallic contamination.

The right engine turbocharger exhibited rotational scoring damage to the induction impeller blades. The vacuum pump was sustained fire damage, and both magnetos were destroyed. The spark plugs were removed for inspection. They were light gray in color and the electrodes were intact. The crankshaft could not be rotated, and the engine was subsequently disassembled for inspection.

All cylinders were removed. The number one and number two cylinders sustained impact damage. The pistons, piston rings, and connecting rods were intact. Oil was present on the crankshaft main bearing surfaces. Further examination of the crankshaft revealed that the number one connecting rod was jammed within the crankshaft journals. However, it was noted that the crankshaft journals had bent consistent with impact forces, and there was inadequate clearance between the journals and the connecting rod. The connecting rod was retained for further examination.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot by the Office of the Chief Medical Examiner, Burlington, Vermont.

Toxicological testing was conducted at the FAA Toxicology Accident Research Laboratory,

Oklahoma City, Oklahoma.

TESTS AND RESEARCH

A Safety Board Metallurgist examined the right engine number one connecting rod. The examination revealed gouge marks on the side faces of the connecting rod. No heat tint was noted, and the gouge marks were consistent with the crankshaft cheeks deforming toward each other during impact.

Review of an Aircraft Performance Radar Study, completed by a Safety Board engineer, revealed:

"Figures 1 and 2 show the flight path of the airplane relative to GITEW intersection, which is the Initial Approach Fix for the RUT Runway 19 Localizer Approach. Figure 1 shows the flight path overlaid on the RUT LOC 19 approach plate, and Figure 2 shows a close-up view of the aircraft maneuvers near GITEW towards the end of the data. The Figures indicate that the airplane made one complete 360 [degree] turn and one 270 [degree] turn on the East (non-holding) side of the published holding pattern at GITEW. The Figures also show that these turns were tighter than those one would expect from standard 2 minute turns in a holding pattern; at 150 KTAS, the radius of a 2 minute standard turn is about 0.8 NM; the 360 [degree] turn in Figure 1 has a radius ranging from 0.3 to 0.4 NM, and the 270 [degree] turn has a radius ranging from about 0.1 to 0.2 NM. The Figures do not show the straight, 1 minute legs that would be expected in a holding pattern."

ADDITIONAL INFORMATION

The wreckage was released to a representative of the owner's insurance company on January 30, 2002.

Pilot Information

Certificate:	Private	**Age:**	64, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim.	**Last FAA Medical Exam:**	03/27/2001
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	1000 hours (Total, all aircraft), 250 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Smith	**Registration:**	N104CS
Model/Series:	Aerostar 601P	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	61P-0404-141
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	01/17/2002, Annual	**Certified Max Gross Wt.:**	6000 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:	1780 Hours as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	IO-540
Registered Owner:	Laurel Mt Aerostar	**Rated Power:**	300 hp
Operator:	Timothy A. Patrick	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Night
Observation Facility, Elevation:	RUT, 787 ft msl	**Distance from Accident Site:**	18 Nautical Miles
Observation Time:	1715 EST	**Direction from Accident Site:**	204°
Lowest Cloud Condition:		**Visibility**	10 Miles
Lowest Ceiling:	Broken / 3000 ft agl	**Visibility (RVR):**	
Wind Speed/Gusts:	11 knots / 19 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	240°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.95 inches Hg	**Temperature/Dew Point:**	1°C / -4°C
Precipitation and Obscuration:			
Departure Point:	Johnstown, PA (JST)	**Type of Flight Plan Filed:**	IFR
Destination:	Rutland, VT (RUT)	**Type of Clearance:**	IFR
Departure Time:	1530 EST	**Type of Airspace:**	Class E

Airport Information

Airport:	Rutland State Airport (RUT)	**Runway Surface Type:**	Asphalt
Airport Elevation:	787 ft	**Runway Surface Condition:**	Dry
Runway Used:	19	**IFR Approach:**	None
Runway Length/Width:	5000 ft / 100 ft	**VFR Approach/Landing:**	None

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:**	43.819444, -72.892222

Administrative Information

Investigator In Charge (IIC):	Robert J Gretz	**Report Date:**	06/25/2003
Additional Participating Persons:	Robert Martellotti; New Piper Aircraft; Vero Beach, FL Dave Moore; Lycoming Engines; Williamsport, PA Ray Cloutier; FAA FSDO-05; Portland, ME		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		