Aviation Investigation Final Report

Location:	Tafton, Pennsylvania	**Accident Number:**	NYC06FA155
Date & Time:	June 25, 2006, 12:50 Local	**Registration:**	N8371X
Aircraft:	Piper PA-34-220T	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	3 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

About an hour before takeoff, the pilot obtained an updated weather briefing, which included a discussion about thunderstorm activity along the route of the flight. About 2 hours 30 minutes after takeoff, the pilot was deviating around thunderstorm activity when the airplane disappeared from radar. A witness near the accident heard the engine "revving up and down," a "muffled pop," and then silence, before seeing debris falling from the sky, well above the tree line. Examination of the airplane revealed that it experienced an in-flight breakup; however, no evidence of a mechanical malfunction was identified. Weather radar images indicated the airplane entered a developing area of moderate to heavy intensity echoes consistent with a convective cell or thunderstorm. The pilot advised air traffic control he was receiving weather information through a portable GPS receiver, with a weather subscription service. There were no published Convective SIGMETs (significant meteorological information), SIGMETs, or Center Weather Advisories for thunderstorms, current at the time of the accident for the area encompassing the accident site. The pilot received his airplane multiengine rating, on May 13, 2006, as of as of June 18, 2006, the pilot had accumulated about 1,720 hours of total flight experience, which included 32.6 hours in multiengine airplanes; of which 26.8 hours were accumulated in the accident airplane. In addition, the pilot had logged about 140 and 68 hours of actual and simulated instrument flight experience; respectively. Except for 0.4 hours of simulated instrument flight experience logged during his multiengine rating check ride; the pilot had not logged any additional instrument flight experience in multiengine airplanes.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's inadvertent encounter with a thunderstorm, which resulted in a loss of aircraft control, and a subsequent in-flight breakup.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: CRUISE

Findings
1. WEATHER CONDITION - THUNDERSTORM
2. (C) FLIGHT INTO ADVERSE WEATHER - INADVERTENT - PILOT IN COMMAND

Occurrence #2: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: UNKNOWN

Findings
3. DESIGN STRESS LIMITS OF AIRCRAFT - EXCEEDED

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
4. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On June 25, 2006, about 1250 eastern daylight time, a Piper PA-34-220T, N8371X, was destroyed when it impacted terrain, after an in-flight break up near Tafton, Pennsylvania. The certificated private pilot, a pilot rated passenger, and a second passenger were fatally injured. Instrument meteorological conditions prevailed and an instrument flight rules (IFR) flight plan was filed for the flight that departed Piedmont Triad International Airport (GSO), Greensboro, North Carolina, destined for the Sanford Regional Airport (SFM), Sanford, Maine. The personal flight was conducted under 14 CFR Part 91.

The pilot was flying to Maine with his father, a retired airline pilot, who was seated in the right front seat, and his sister seated in a rear seat.

According to information obtained from Lockheed Martin Services, Inc., at 0641, the pilot contacted the Miami automated international flight service station by telephone, to obtain an abbreviated briefing for the flight. At 0931, the pilot obtained an updated weather briefing from the Raleigh automated flight service station (AFSS). The pilot and the weather briefer discussed thunderstorm activity along the route of the flight, and the pilot subsequently filed an IFR flight plan.

According to information obtained from the FAA, the airplane departed GSO, about 1023, and progressed toward SFM without incident. The pilot made initial contact with Wilkes-Barre air traffic control (ATC), Avoca, Pennsylvania, about 1229, at an altitude of 7,000 feet, and a ground speed of 180 knots. At 1233, ATC informed the pilot of an area of severe weather located 6 miles ahead of the airplane's flight path, and asked if the pilot had weather radar available. The pilot replied that he had a global positioning system (GPS) receiver with weather radar, and observed weather at his one o'clock position. Air traffic control indicated that the weather was at the pilot's twelve-thirty to one o'clock position, 4 miles away. At 1238, the pilot asked ATC if he could fly direct to the Kingston VOR, and he was subsequently cleared to the RAGER intersection. There were no further communications from the airplane. At 1247:27, radar data indicated that the airplane was at an altitude of 6,900 feet, and a ground speed of 162 knots. At 1247:52, the airplane was at an altitude of 6,400 feet, and a ground speed of 137 knots. The airplane's last radar target was observed at 1248:06, at an altitude of 5,300 feet, and a ground speed of 137 knots.

A witness near the accident site stated that he heard the sound of an engine "revving up and down." He did not see the airplane; however, he heard a "muffled pop" and then no longer heard the engine noise. He then observed debris falling from the sky, well above the tree line. Another witness observed small debris, similar to insulation, falling from the sky for up to 5 to

10 minutes.

The accident occurred during the hours of daylight approximately 41 degrees, 24.9 minutes north latitude, and 75 degrees, 11.6 minutes west longitude.

PERSONNEL INFORMATION

The pilot held a private pilot certificate, with ratings for airplane single engine land and instrument airplane. He also held an airplane multiengine land rating, which he received on May 13, 2006.

According to the pilot's logbook, as of June 18, 2006, he had accumulated about 1,720 hours of total flight experience, which included 32.6 hours in multiengine airplanes; of which 26.8 hours were accumulated in the accident airplane. In addition, the pilot had logged about 140 and 68 hours of actual and simulated instrument flight experience; respectively. Except for 0.4 hours of simulated instrument flight experience logged during his multiengine rating checkride; the pilot had not logged any additional instrument flight experience in multiengine airplanes.

The pilot's most recent FAA third class medical certificate was issued July 29, 2004.

AIRCRAFT INFORMATION

The airplane was co-owned by the pilot, and according to Federal Aviation Administration (FAA) records, was purchased on April 12, 2006.

Review of the airplane's maintenance records revealed that it had been operated for about 100 hours since its most recent annual inspection, which was performed on May 15, 2006. At the time of the accident, the airplane had been operated for about 4,970 hours, and both engines had been operated about 1,300 hours since they were overhauled. The airplane's most recent pitot static system check was conducted on May 19, 2006.

METEOROLOGICAL INFORMATION

The National Weather Service surface analysis chart for 1100, revealed a low pressure system located in West Virginia, with a stationary front extending east-northeastward from the low across central and northern Pennsylvania, New Jersey, and into New York. The accident site was immediately north of this frontal boundary.

Weather observations taken at the Pocono Mountains Municipal Airport (MPO), Mount Pocono, Pennsylvania, which was located about 21 miles southwest of the accident site, reported:

At 1244: winds from 130 degrees at 10 knots; visibility 3/4 statue mile with heavy rain and mist; ceiling 500 feet broken, 1,200 feet overcast; temperature 66 degrees F; dew point 64 degrees F; altimeter 30.14 in\hg.

At 1253: winds from 130 degrees at 9 knots; visibility 2 statue miles with light rain and mist; ceiling 500 feet broken, 900 feet overcast; temperature 66 degrees F; dew point 64 degrees F; altimeter 30.14 in\hg.

Weather radar images obtained from Binghamton, New York, depicted echoes on the range of 30-35 dBZ or VIP level 2 moderate intensity over the accident site, with echoes of 40 dBZ or VIP level 3 "strong" intensity within 5 miles east of the accident site, and 45 dBZ or VIP 3/4 "strong-to-very strong" south and moving north.

There were no published Convective SIGMETs (significant meteorological information), SIGMETs, or Center Weather Advisories for thunderstorms, current at the time of the accident, for the area encompassing the accident site.

When the airplane's flight path was plotted onto the weather radar images, the flight path was observed entering into a developing area of 35 to 40 dBZ activity or moderate to heavy intensity echoes consistent with a convective cell or thunderstorm, about the time of the accident.

The co-owner of the airplane confirmed that the GPS receiver was able to display and obtain weather information through an XM Satellite weather subscription service. A representative from Garmin stated that the NEXRAD weather radar images updated automatically about every 5 minutes.

WRECKAGE AND IMPACT INFORMATION

The main wreckage came to rest upright, on a magnetic course of 230 degrees, about 28 miles east of the Wilkes-Barre/Scranton Airport (AVP), Avoca, Pennsylvania. The airplane was located in a wooded area within a housing development, surrounded by trees that were about 30 to 40 feet tall. No damage was noted to the trees that surrounded the wreckage. Both the left and right wings separated from the airframe outboard of their respective engine nacelles. Both wings were located about a 1/4 mile from the main wreckage. The right wing was on a 250 degree bearing from the main wreckage, and the left wing was on a 225 degree bearing from the main wreckage. Both wing tips were not located. Approximately 4 feet of the upper right wing spar cap was bent upward about 90 degrees. The rudder remained attached to the vertical stabilizer. The right horizontal stabilator was separated and not located. A portion of the right side of the horizontal stabilator spar, which remained with the empennage, was displaced rearward, and the upper spar cap was compressed downward.

Flight control continuity was confirmed from the forward cockpit area, to the rudder and horizontal stabilator, and from the forward cockpit area, to the point of the respective left and right wing separations. The top stabilator control stops remained attached and were bent. The bottom stabilator stops, and both rudder control stops were in-place.

Examination of the flap drive mechanism corresponded to a 0-degree flap setting, and the landing gear was observed in a retracted position.

The right engine remained attached to the firewall. The three-bladed propeller remained attached to its mounting flange and all blades were loose in the hub. One propeller blade was bent forward slightly. The second propeller blade was found rotated so that the trailing edge was forward. The blade contained leading edge gouges and chordwise scratches. The third propeller blade was twisted and the outboard 12 inches was curled. The blade also contained leading edge gouges and chordwise scratches. Both magnetos were separated from their respective mounting pads, and remained attached to the engine via ignition harness wires. The left magneto produced a spark from all towers when rotated by hand. The right magneto produced a spark from one tower, and impact damage was noted on the right magneto housing. The spark plugs were removed. Their electrodes were intact, and gray in color. The turbocharger turbine/compressor shaft rotated freely. The engine was rotated by hand, via the propeller, and crankshaft continuity was observed through the accessory section. In addition, valve train continuity and thumb compression was attained on all cylinders. A borescope inspection of all cylinders piston heads and valves also did not reveal any mechanical malfunctions. Examination of the engine driven fuel pump did not reveal any discrepancies. The vacuum pump was intact and disassembled. The rotor housing and vanes were intact.

The left engine remained attached to the firewall. The three-bladed propeller was separated from its mounting flange, and located forward of the left engine, partially buried in the ground. One blade contained "s" bending, a curled tip, and leading edge gouges. The other two blades did not contain any significant damage. The left magneto was separated from its mounting flange and produced a spark on all towers when rotated by hand. The right magneto housing was fractured and could not be rotated. The spark plugs were removed. Their electrodes were intact, and gray in color. The turbocharger turbine/compressor shaft was seized. The engine was rotated by hand, via an accessory drive gear, and crankshaft continuity was observed through the accessory section. In addition, valve train continuity and thumb compression was attained on all cylinders. A borescope inspection of all cylinders piston heads and valves also did not reveal any mechanical malfunctions. Examination of the engine driven fuel pump and vacuum pump did not reveal any discrepancies.

The fuel gascolators from the left and right engines were absent of contamination.

A yoke mounted Garmin 396 global positioning system (GPS) receiver was located with the main wreckage. In addition, the airplane was equipped with a JP Instruments EDM-760 engine monitoring unit. Both the Garmin 396 GPS, and the EDM-760 were retained, and examined.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot on June 26, 2006, by Forensic Pathology Associates, Allentown, Pennsylvania.

Toxicological testing was conducted by the FAA Toxicology Accident Research Laboratory, Oklahoma City, Oklahoma.

TESTS AND RESEARCH

The EDM-760 was examined and downloaded at its manufacturer, JP Instruments, Costa Mesa, California, under the supervision of a Safety Board investigator. Examination of the data revealed both engines were operating normally until about 1250, when a decrease in fuel flow and shock cooling was noted, consistent with the airplane in a descent and the throttles being retarded. All cylinder head and exhaust gas temperatures did not show any notable fluctuations, with the exception of the last 30 seconds of the data.

The Garmin 396 GPS receiver was examined and downloaded at the Safety Board's Vehicle Recorder Laboratory, Washington, D.C. According to a GPS Study prepared by a vehicle recorder specialist, the data indicated that the airplane took off from a southwest runway at GSO, at 10:22:45, and departed to the northwest. At 10:26:04, the airplane turned to the northeast. At 10:47:56, the airplane had climbed to a GPS altitude of 11,400 feet, and was at a groundspeed of about 200 mph. The flight proceeded in a general northeast heading. At 11:21:09, the airplane began a 350 fpm (foot-per-minute) descent for about 6 minutes, to an altitude of 9,300 feet. At 12:21:57, the airplane descended at an average rate of approximately 260 fpm, to an altitude of 7,200 feet. At 12:47:26, the airplane climbed 167 feet in 7 seconds (a 1,400 fpm ascent rate). The airplane descended back to 7,200 feet for approximately 40 seconds, descended 200 feet for approximately 15 to 20 seconds, and then climbed back up to 7,200 feet for another 20 seconds, before beginning a rapid descent. Six seconds before beginning the rapid descent, the airplane began a slow turn to the left, which continued through approximately 270 degrees.

Review of the airplane's ground speed revealed that the ground speed remained between 190 and 200 mph during most of the cruise portion of the flight. At approximately 12:47:30, the airplane gained 60 mph in ground speed over the course of the next 35 seconds. The airplane descended 1,200 feet during this time frame, for an average decent rate of approximately 2,100 fpm. The airplane's ground speed stabilized for the next 8 seconds, while the airplane descended at an average rate of 9,000 fpm. At 12:48:14, the airplane's ground speed began increasing rapidly to 471 mph. The last recorded GPS target was at 12:48:20, at an altitude of 4,123 feet, with an average descent rate of 6,000 fpm.

No weather data was recovered from the GPS receiver. According to the Garmin 396 Owner's Manual, " Note: Weather data is not saved between power cycles in the unit. If the GPSMAP 396 is turned off, the unit must reload the [weather] data."

ADDITIONAL INFORMATION

Wreckage Release

The airplane wreckage was released on July 6, 2006, to a representative of the owner's insurance company.

Pilot Information

Certificate:	Commercial; Private	**Age:**	56,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:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	July 1, 2004
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	May 1, 2006
Flight Time:	1718 hours (Total, all aircraft), 27 hours (Total, this make and model), 1606 hours (Pilot In Command, all aircraft), 42 hours (Last 90 days, all aircraft), 24 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N8371X
Model/Series:	PA-34-220T	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	34-8133063
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	May 1, 2006 Annual	**Certified Max Gross Wt.:**	4750 lbs
Time Since Last Inspection:	100 Hrs	**Engines:**	2 Reciprocating
Airframe Total Time:	4969 Hrs at time of accident	**Engine Manufacturer:**	Teledyne Continental
ELT:	Installed, not activated	**Engine Model/Series:**	TSIO-360
Registered Owner:	Double D Aviation	**Rated Power:**	220 Horsepower
Operator:	Walter M. Daggett	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	MPO,1916 ft msl	**Distance from Accident Site:**	21 Nautical Miles
Observation Time:	12:53 Local	**Direction from Accident Site:**	220°
Lowest Cloud Condition:		**Visibility**	2 miles
Lowest Ceiling:	Broken / 500 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	9 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	130°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.13 inches Hg	**Temperature/Dew Point:**	19°C / 18°C
Precipitation and Obscuration:	Light - None - Rain		
Departure Point:	Greensboro, NC (GSO)	**Type of Flight Plan Filed:**	IFR
Destination:	Sanford, ME (SFM)	**Type of Clearance:**	IFR
Departure Time:	10:23 Local	**Type of Airspace:**	

Airport Information

Airport:	NONE	**Runway Surface Type:**	
Airport Elevation:		**Runway Surface Condition:**	
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	2 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 Fatal	**Latitude, Longitude:**	41.415832,-75.193336

Administrative Information

Investigator In Charge (IIC):	Schiada, Luke
Additional Participating Persons:	Arnold J Roholt; FAA/FSDO; Allentown, PA Robert P Martellotti; Piper Aircraft; Vero Beach, FL Andrew Swick; Teledyne Continental Motors; Mobile, AL
Original Publish Date:	August 30, 2007
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=63969