Aviation Investigation Final Report

Location:	DULUTH, Minnesota	**Accident Number:**	CHI00FA185
Date & Time:	July 8, 2000, 13:33 Local	**Registration:**	N7213Y
Aircraft:	Piper PA-30	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	3 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The personal flight departed from the Duluth International Airport (DLH), Duluth, Minnesota. en route to the Thunder Bay Airport, Ontario Canada. A ceiling of 100 feet agl and a visibility of 1/4 sm in fog were reported at the time of the accident. The airplane took off from runway 09, turned to a heading of 005 degrees, and climbed to an altitude of 2,700 feet msl. Approximately two minutes after issuing the takeoff clearance, the tower controller instructed the pilot to contact departure control. Four seconds later, "13Y contacting departure" was transmitted on the departure frequency. Four seconds after that, "13Y" was transmitted. Departure control attempted several times to contact the airplane, but there was no response. DLH radar showed that approximately forty seconds into the flight, the airplane turned to a heading of 065 degrees and began a gradual descent to 2,500 feet msl. Twenty seconds later, the airplane climbed to 3,400 feet msl and then began a left descending turn which continued until radar contact was lost at 3,000 feet msl. Examination of the wreckage revealed no anomalies. The pilot logged 6.4 hours of instrument time since his receipt of a multi-engine instrument rating on March 24, 1999. The pilot received a third class medical certificate under a special issuance for a history of myocardial infarction. Federal Aviation Administration toxicology testing revealed the presence of verapamil, a prescription blood pressure medication.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: loss of control in flight for undetermined reason(s).

Findings

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

Findings
1. (C) REASON FOR OCCURRENCE UNDETERMINED
2. LACK OF TOTAL INSTRUMENT TIME - PILOT IN COMMAND
3. WEATHER CONDITION - FOG
4. WEATHER CONDITION - LOW CEILING
5. USE OF INAPPROPRIATE MEDICATION/DRUG - PILOT IN COMMAND

Occurrence #2: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: DESCENT - UNCONTROLLED

Findings
6. (F) OBJECT - TREE(S)

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

Factual Information

HISTORY OF FLIGHT

On July 8, 2000, at 1333 central daylight time, a Piper PA-30, N7213Y, operated by a private pilot, was destroyed when it impacted into a wooded area, 1.8 miles north-northeast of the Duluth International Airport (DLH), Duluth, Minnesota. A post-crash fire ensued. Instrument meteorological conditions prevailed at the time of the accident. The personal flight was being conducted under 14 CFR Part 91. An instrument flight rules (IFR) flight plan was on file. The pilot and 2 passengers on board the airplane were fatally injured. The cross-country flight originated at Duluth, Minnesota, at 1330, and was en route to the Thunder Bay Airport (YQT), Thunder Bay, Ontario, Canada.

At 1213, a weather briefing was given to a caller for N7213Y by the Princeton, Minnesota, Flight Service Station (AFSS) for a flight from DLH to YQT.

At 1240, the pilot filed an IFR flight plan from DLH to YQT, with a proposed departure time of 1340.

At 1321, the pilot contacted the Duluth Air Traffic Control Tower (DLH ATCT) and requested his IFR clearance to Thunder Bay. The tower told him that N7213Y was cleared to Thunder Bay as filed, climb to 6,000 feet mean sea level (msl), expect 7,000 feet msl 10 minutes after take off, contact departure control on frequency 125.45 megahertz, and to set his transponder code to 6303.

At 1323, the pilot called DLH ATCT for taxi clearance. The tower told N7213Y to taxi to runway 09 (10,152 feet by 150 feet, dry concrete), report when he was at the hold line, and advise that he had the Automated Terminal Information System (ATIS) information "papa". The pilot said they had "papa". The tower then asked the pilot if he was familiar with convective sigmet (significant meteorological conditions report) two charlie? The pilot said, "Ah, affirmative."

At 1330:12, the pilot called for takeoff clearance. DLH ATCT told N7213Y to taxi into position. The pilot responded, "taxiing position and hold one three yankee."

At 1330:53, DLH ATCT cleared N7213Y for takeoff, and told him that after takeoff to make a left turn to a 050-degree heading. The pilot responded, "Cleared for takeoff left turn zero five zero."

DLH radar showed N7213Y lifted off approximately 4,000 feet down runway 09. The airplane initiated a left turn to a heading of approximately 005 degrees and climbed to an altitude of 2,700 feet msl (1,272 feet agl). Approximately 40 seconds into the flight, N7213Y turned to a

heading of 065 degrees and began a descent to 2,500 feet msl.

At 1332:56, DLH ATCT told N7213Y to contact departure. There was no response.

At 1333:00, N7213Y transmitted on the departure frequency, "13Y contacting departure." At 1333:04, the pilot said, "13Y." At 1333:11, there was a two-second long sound consistent with a keyed microphone. At 1333:16, DLH departure control tried to contact N7213Y several times.

Approximately 1 minute into the flight, DLH radar showed N7213Y climb to 3,400 feet msl and then initiate a left descending turn that continued until radar contact was lost, approximately 8 seconds later. At the time radar contact was lost, the airplane was at 3,000 feet msl and had reached a heading of approximately 320 degrees.

A witness, whose farm was located just west of the accident site, said he was in his house when he heard the airplane's engines. He said that he could hear the airplane as if it were right on top of him. The witness said the engine sound was loud. "There were no wavering sounds. It was constant, steady." The witness said that 2-3 seconds later, he heard an explosion. "It (the explosion) was so large that it shook the whole house."

At approximately 1342, DLH ATCT received a call from the local 9-1-1 dispatcher stating that a resident north of the airport reported a "loud crash or boom." The tower passed the information to an airport rescue vehicle and told the vehicle to respond to that location, and "possibly that might be a crash site."

PERSONNEL INFORMATION

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

According to his logbook, the pilot obtained his multi-engine airplane instrument rating on March 24, 1999, in a PA-30 airplane. He successfully completed an instrument proficiency check on May 21, 2000. The logbook showed that from the time the pilot received his multi-engine instrument rating, to the time of the accident, he had logged 6.3 hours of simulated instrument time, 1.8 hours of which was during his instrument proficiency check. During the same time period, the logbook showed that the pilot logged 0.1 hours of actual instrument time.

At the time of the accident, it was estimated that the pilot had logged approximately 317.9 total flying hours. This figure is based on his accumulated time through, July 4, 2000, and the estimated time en route from Schaumburg, Illinois, to Duluth. The pilot had logged approximately 88 hours in the PA-30 airplane. In the 90 days preceding the accident, the pilot had logged approximately 10.7 flying hours, all in the PA-30 airplane.

The pilot held a third class medical certificate, dated January 11, 2000. The limitations section of the certificate showed the statement, "Valid for 12 months".

AIRCRAFT INFORMATION

The airplane was owned and operated by the pilot and was used for pleasure. The current registration certificate, showing the pilot as the owner, was dated December 3, 1997.

The airplane underwent an annual inspection on May 20, 2000. According to the airframe logbooks, the total airframe time recorded at the annual inspection was 3,786.5 hours.

The airframe time at the time of the accident was determined to be approximately 3,796.4 hours.

METEOROLOGICAL INFORMATION

At 1255, the DLH automated surface observation system (ASOS) reported a vertical visibility of 100 feet agl, a measured visibility of 1/4 statute mile with fog, temperature 56 degrees F, dew point 56 degrees F, winds 120 degrees at 6 knots, and an altimeter of 29.92 inches of Mercury (Hg).

DLH ATIS information "papa" at 1255, reported a visibility of less than 1/4 mile and fog, an indefinite ceiling of 100 feet agl, and remarks of "pressure rising rapidly" and two convective sigmets in effect, one for the area beginning northeast of Grand Forks, North Dakota, running southeast to Brainerd, Minnesota; a line of thunderstorms moving west to east, and the other for a line of thunderstorms east to south of Duluth, moving west to east.

At 1330, the DLH aviation routine weather report (METAR) reported a vertical visibility 100 feet agl, a measured visibility of 1/4 mile with fog, temperature 60 degrees F, dew point 60 degrees F, winds 140 degrees at 5 knots, and an altimeter of 29.93 inches Hg.

The witness, who heard the airplane's engines and the explosion, said the weather at his house, at the time of the accident, was foggy. The fog was at tree top level. The witness said he could see clearly along the ground. "It was calm. There was no wind at all."

WRECKAGE AND IMPACT INFORMATION

The Safety Board's on scene investigation began on July 9, 2000, at 1030.

The accident site was located in a wooded area 1.8 miles north-northeast of the Duluth International Airport on a 030-degree magnetic heading. The extent of the accident site encompassed an area approximately 494 feet long and 75 feet wide. The wreckage was scattered predominately along a 240 degree magnetic heading.

The first observed indication of the accident site was a damaged 120-foot tall, 16-inch diameter elm tree. Several of the top branches were severed and broken. A few of the severed branches were found resting on the ground, approximately 5 feet west of the base of the elm tree.

Also approximately 5 feet west of the elm tree was a 5-foot long section of the airplane's right wing, which included the wing tip, aileron and aileron bellcrank. The section was broken longitudinally along a rivet line. The front leading edge of the wing tip was broken out. Approximately 8 inches outboard of the fracture, running laterally across the leading edge, were several parallel scratches. The scratches ran inboard until reaching the fracture.

Approximately 140 feet from the elm tree, on a 341-degree magnetic heading, was a 38-foot tall, 6-inch diameter poplar tree. The tree was severed through the trunk approximately 25 feet up from its base. The top 13-foot long section was resting on the ground 13 feet from the tree's base on a 200-degree magnetic heading. The place on the poplar tree trunk where it was severed showed several pieces of broken wood bent over and pointing on a 235-degree magnetic heading.

Approximately 51 feet from the poplar tree, on a 240-degree magnetic heading, was a stand of 30-35 small birch tree saplings. Each tree sapling showed an average diameter of one to two inches. The stand covered an area approximately 18 feet long, along a 235-degree magnetic heading, and 10 feet wide. The birch saplings were severed through their trunks at progressively lower heights from their bases when moving along the stand from east to west, so that the fractures aligned formed a down angle of 30 degrees until finally reaching the ground. The stand of tree saplings were also severed at progressively lower heights from their bases, beginning at the south edge of the stand, and moving laterally towards the west edge, so as to form a 40 degree down angle.

At the west end of the stand, where the saplings were severed and bent forward near the ground, was a ground scar. The ground scar began 69 feet west of the first severed poplar tree. The ground scar was 33 feet long, 17 feet wide, and 4 feet at its deepest point near the center, 5 feet from the east edge. The ground scar ran along a 240-degree magnetic heading. Several fallen birch trees lay along the east to west line of the ground scar. Several pieces of severed tree trunks and branches also lay along the ground scar. Additionally, several pieces of clear Plexiglas, pieces of bent and twisted aluminum, and small pieces of broken fiberglass were found in the ground scar.

Approximately 85 feet from the severed poplar tree, on a 242 degree magnetic heading, and partially buried in the north edge of the ground scar, 16 feet from its beginning, was the airplane's right propeller. The propeller was broken off of the engine crankshaft at the flange, so that the flange remained with the propeller. The spinner was crushed inward and aft. Both propeller blades showed torsional bending and chordwise scratches. The outer 6 inches of one of the propeller blade tips was broken off longitudinally. The other blade tip showed several deep nicks in the leading edge.

Over the 30 feet of terrain beginning at the west edge of the ground scar and running along a 235-degree heading were several small fallen birch and poplar trees. The trees were broken near their bases and pushed over so as to lie along a 235-degree line. The top (east facing) surface of the trees trunks was covered with beads of oil. Several pieces of Plexiglas, airplane insulation, planning charts, and instrument operating manuals were found scattered in this area.

The airplane's left outboard flap section was located approximately 130 feet from the severed poplar tree on a 233-degree magnetic heading. The section was broken longitudinally, approximately 4 feet inboard of the flap's outer edge. The section was crushed aft along the span of the leading edge. The upper and lower skins were bent and buckled.

The left propeller was located in the brush approximately 170 feet from the first severed poplar tree on a 236-degree magnetic heading. The propeller was broken outward at the flange. The spinner was crushed inward and aft. Both propeller blades showed torsional bending, chordwise scratches, and tip curling. The outer 7 inches of one propeller blade tip was broken off longitudinally. The other propeller blade showed several deep nicks in the leading edge, at mid-span, and near the blade tip.

Approximately 186 feet west of the first severed poplar tree, on a 236-degree magnetic heading was the airplane's main cabin door. The door was broken out at the hinges and showed charring. The window was broken out. The door window frame was bent inward and aft.

At 172 feet west of the poplar tree, on a 233 degree magnetic heading was the right horizontal stabilator and trim tab. The stabilator was broken out at the torque tube. The outboard 13 inches of the stabilator was bent upward and aft 130 degrees, and broken. The trim tab was buckled and positioned 30 degrees down from neutral.

Approximately 208 feet from the first poplar tree, a 10-inch diameter poplar tree, and five 2 to 4 inch diameter birch trees, were pushed over on a 235-degree magnetic heading. The trees were charred along their trunks. A 5-foot diameter area of brush preceding the trees was burned.

The airplane's remaining empennage was resting 244 feet west of the first severed poplar tree on a 235-degree magnetic heading. The empennage was severed laterally at the leading edge base of the vertical stabilizer. The vertical stabilizer was crushed inward and aft at the base of the leading edge. The remainder of the vertical stabilizer base, aft to the main spar was bent forward and pulled away from the tail cone. The upper left side of the vertical stabilizer was charred. The right side was charred and melted. The rotating beacon was broken out of the top of the stabilizer. The rudder remained attached to the vertical stabilizer and showed charring and paint blistering on the top left side. The right side of the rudder showed heat damage near the hinge line. Control continuity to the rudder was confirmed.

The left stabilator and trim tab showed heat damage and paint blisters. The stabilator leading edge was bent inward at mid-span. The trim tab was flush with the stabilator. Control continuity to the stabilator and elevator trim was confirmed.

Just beyond the empennage, and 250 feet west of the first severed poplar tree, was a 40-foot long, 10-inch diameter birch tree, lying on the ground with its roots exposed along a 234-degree magnetic heading, and across the top of the airplane main wreckage. The tree trunk was charred.

The airplane's main wreckage began approximately 263 feet west of the first severed poplar tree, on a 234-degree magnetic heading. The main wreckage consisted of the remainder of the airplane's right wing, the left engine, the airplane's left wing, the aft fuselage, the cabin, nose section, and the left flap and aileron. The main wreckage rested mostly inverted. The cabin and fuselage sections were oriented so that the nose of the airplane would be facing a 294-degree heading. The main wreckage rested on top of an area of charred brush and burned, fallen trees, approximately 30 feet long and 22 feet wide.

The main wreckage started with the airplane's left engine and nacelle. The nacelle was crushed aft and twisted, charred and melted. The left main landing gear was charred and consumed by fire. The airplane's forward fuselage and instrument panel were 274 feet west of the first severed poplar tree. The forward fuselage was broken open, crushed aft and bent upward, charred, melted, and consumed by fire. The forward cabin bulkhead was broken out, crushed upward and charred. The instrument panel and glare shield were broken out, charred, and melted. All of the airplane's radios, navigation instruments, and control instruments were broken out of the instrument panel, charred and melted, and consumed by fire.

The outboard 5 feet of the airplane's left wing, and wing tip rested at 280 feet. It was crushed inward and broken longitudinally. The front 8 inches of left wing tip, containing the strobe and position lights, was broken out. The left aileron was broken out at the middle and outboard hinges.

The inboard section of the right wing, and right main landing gear rested inverted. The wing section was crushed aft along the span of the leading edge, bent downward, and charred. The main landing gear was pushed upward into the upper wing skin.

The inboard right wing section at the wing root, the carry-through spar, and cabin floor, were crushed aft, bent downward, charred, and consumed by fire.

The airplane's left inboard wing section was crushed aft along the leading edges. The upper and lower skin surfaces were bent and buckled, charred, and melted. The left flap was broken aft, bent upward at mid-span, and charred.

The airplane's cabin was broken open and found resting on its ceiling and left side. The cabin

ceiling was crushed inward, charred, melted, and consumed by fire. The left side cabin wall was broken out, charred, melted and consumed. The side windows were broken out. The cockpit window frames were broken out, twisted, melted and consumed by fire. The right side cabin wall was broken outward, melted, and consumed by fire. The airplane's fuselage, beginning at the baggage compartment and running aft to where the empennage fractured, was bent and buckled inward, crushed upward and aft, twisted clockwise, and charred and melted.

At a point approximately 288 feet west of the first severed poplar tree rested the airplane's heater. It was broken out, crushed inward and charred.

Approximately 290 feet west of the first poplar tree was the left aileron and flap. The aileron was broken out at the bellcrank, and broken at mid-span, bent and buckled. The left flap was crushed aft and broken at mid-span. Control continuity to the left aileron was confirmed.

Beginning at the west edge of the main wreckage, 290 feet from the first severed poplar tree, was a debris field extending 40 feet along a 235-degree magnetic heading. The debris field held pieces of severed and broken trees and branches, instruments, personal effects, personal floatation devices, charts, checklist, logbooks, the fuel selector, and auxiliary fuel pump, and pieces of cabin interior walls and insulation.

At approximately 330 feet from the first severed poplar tree on a 235-degree heading, was a wing fuel tank. The tank was broken out and bent around the east side of a poplar tree at its base. The tank was crushed inward, broken open, charred and melted. Preceding the fuel tank was an area of burned brush, approximately 5 feet in diameter, leading up to the base of the poplar tree. The bottom trunk of the poplar tree was charred.

The airplane's right engine and right engine cowling, rested inverted approximately 335 feet from the first severed poplar tree. The cowling was broken open and separated into two pieces. The aft right cowling was broken open, charred, melted, and consumed by fire. The right front cowling and right engine rested in a stand of three trees. The cowling was broken open, crushed in, bent aft, charred and melted. The brush and tree saplings in the area, immediately surrounding the engine, were burned.

Personal effects from the pilot and right front seat passenger extended out to 354 feet west of the first severed poplar tree.

Examination of the engines, power controls, and airplane systems revealed no anomalies. The airplane's propellers were retained for further testing.

MEDICAL AND PATHOLOGICAL INFORMATION

The St. Louis County, Minnesota, Medical Examiner, at the University of Minnesota, School of Medicine, Duluth, Minnesota, conducted an autopsy of the pilot on July 9, 2000.

FAA toxicology testing of samples taken from the pilot was negative for all tests conducted with the exception of finding verapamil in kidney and liver. Verapamil is a prescription blood pressure medication. Norveraparmil, found in liver and kidney samples taken from the pilot, is verapamil's major metabolite.

The pilot's wife said that her husband had been taking medication that was heart-related. She said that in 1988, the pilot had experienced an event that was not a heart attack. FAA aeromedical records from 1992 forward, show the pilot applied and was approved for third class medical certificates under special issuance and valid for 12-months, related to his "history of myocardial infarction."

FIRE

At 1455, St. Louis County Sheriff's deputies located "smoke in a wooded area, south of Rice Lake." On arrival, the deputies found the wreckage smoldering. Some small isolated fires, associated with several airplane components, which separated during the impact, were still burning west of the main wreckage. A first responders unit from the Canosia Township, Minnesota, Fire Department arrived shortly after and extinguished the fires.

TESTS AND RESEARCH

The two propellers, and their respective spinners and propeller governors, were examined at Duluth, Minnesota, on August 24, 2000. The propeller manufacturer's teardown report is attached as an addendum to this report.

ADDITIONAL INFORMATION

Parties to the investigation were the FAA, the New Piper Aircraft Company, Incorporated, Textron, Lycoming, and Hartzell Propeller, Incorporated.

All of the airplane wreckage was released and returned to United States Aviation Insurance Group, Chicago, Illinois.

Pilot Information

Certificate:	Private	**Age:**	Male
Airplane Rating(s):	Single-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 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	January 11, 2000
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	318 hours (Total, all aircraft), 88 hours (Total, this make and model), 228 hours (Pilot In Command, all aircraft), 11 hours (Last 90 days, all aircraft), 4 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N7213Y
Model/Series:	PA-30 PA-30	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	30-239
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	May 20, 2000 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:	8 Hrs	**Engines:**	2 Reciprocating
Airframe Total Time:	3796 Hrs	**Engine Manufacturer:**	Lycoming
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-320-B1A
Registered Owner:	LAWRENCE C. GARNER	**Rated Power:**	150 Horsepower
Operator:		**Operating Certificate(s) Held:**	None
Operator Does Business As:		**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	DLH ,1428 ft msl	**Distance from Accident Site:**	2 Nautical Miles
Observation Time:	12:55 Local	**Direction from Accident Site:**	210°
Lowest Cloud Condition:	Unknown	**Visibility**	0.25 miles
Lowest Ceiling:	Overcast / 100 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	120°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	56°C / 56°C
Precipitation and Obscuration:	N/A - None - Fog		
Departure Point:	(DLH)	**Type of Flight Plan Filed:**	IFR
Destination:	(YQT)	**Type of Clearance:**	IFR
Departure Time:	13:30 Local	**Type of Airspace:**	Class C

Airport Information

Airport:	DULUTH INTERNATIONAL ARPT DLH	**Runway Surface Type:**	Concrete
Airport Elevation:	1428 ft msl	**Runway Surface Condition:**	Wet
Runway Used:	9	**IFR Approach:**	None
Runway Length/Width:	10152 ft / 150 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	2 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	3 Fatal	**Latitude, Longitude:**	46.84077,-92.219238(est)

Administrative Information

Investigator In Charge (IIC):	Bowling, David
Additional Participating Persons:	TOM HAGGER; MINNEAPOLIS , MN ROBERT MARTELLOTTI; BURKE , VA DAVID C MOORE; ARDSLEY , PA TOM MCCREARY; PIQUA , OH
Original Publish Date:	September 19, 2001
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=49636