



National Transportation Safety Board Aviation Accident Final Report

Location:	Hungry Horse, MT	Accident Number:	WPR09FA176
Date & Time:	04/01/2009, 1630 MDT	Registration:	N2007U
Aircraft:	MAULE M-4-220C	Aircraft Damage:	Destroyed
Defining Event:	VFR encounter with IMC	Injuries:	1 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The private pilot departed for a short local flight while visual meteorological conditions existed in the immediate vicinity of the departure airport. He proceeded to climb to the northeast, through a mountain pass, and then to the south, paralleling the shore of a frozen, snow-covered reservoir. The flight continued for about 20 miles. Analysis of radar and recorded GPS data showed that the airplane then experienced large fluctuations in ground speed while still on the same approximate track. Shortly thereafter, the airplane began a 180-degree left turn and collided with the reservoir surface. GPS data, airplane instrumentation, and ground scars indicated that the airplane was in a descending left turn when it struck the ground. All major sections of airplane were accounted for at the accident site, and post accident examination of the engine and airframe revealed no obvious anomalies that would have precluded normal operation. Mountain obscuration and occasional precipitation were forecast for the area of the accident flight. Additionally, weather observation stations and local pilot reports indicated that moderate snow showers were in the vicinity of the site at the time of the accident. The white surface of the frozen lake, in conjunction with the snow and limited visibility, would have provided the pilot limited external visual references, and as such could have resulted in him becoming spatially disoriented or affected by a visual illusion. The pilot's logbooks revealed that he had a history of flying in marginal weather conditions, and had performed multiple Special VFR takeoffs and landings. The pilot did not possess an instrument rating.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's improper decision to continue flight into an area of reduced visibility and snow showers during cruise flight, which resulted in the pilot's spatial disorientation and subsequent loss of aircraft control.

Findings

Aircraft	Performance/control parameters - Not attained/maintained (Cause)
Personnel issues	Decision making/judgment - Pilot (Cause) Spatial disorientation - Pilot (Cause) Total instrument experience - Pilot
Environmental issues	Snow - Decision related to condition (Cause)

Factual Information

HISTORY OF FLIGHT

On April 1, 2009, about 1630 mountain daylight time, a Maule M-4-220C, N2007U, impacted the frozen surface of a reservoir near Hungry Horse, Montana. The pilot was operating the airplane under the provisions of Title 14 Code of Federal Regulations Part 91. The certificated private pilot was killed; the airplane was destroyed by impact forces. The personal local flight departed Glacier Park International Airport (KGPI), Kalispell, Montana, at 1602. Visual meteorological conditions prevailed at the departure airport, and no flight plan had been filed.

Radar data provided by the Federal Aviation Administration (FAA) revealed that a target departed Kalispell at 1602:48 using a discreet transponder code of 1200. The target climbed on a northeast course to 4,500 feet mean sea level (msl) as reported by the mode C transponder. Three miles northeast of the departure airport the target made a 360-degree left turn before continuing on the original track. Over the course of the next 2 minutes the target continued climbing until 1608:36; this was the last radar return and was received at an altitude of 5,100 feet, about 2 miles west of the town of Hungry Horse.

A handheld global positioning systems (GPS) Garmin GPS III was recovered from the airplane. The unit was sent to the National Transportation Safety Board Office of Research and Engineering for data extraction. The data revealed a flight track that closely matched the radar data and did not contain altitude information. The airplane flew about 1 mile beyond the last radar return, and then changed course to the southeast. For the next 11 minutes the airplane followed the western shore of the reservoir, covering a distance of about 20 miles. Ground speeds for this portion of the flight fluctuated between 121 and 155 mph. Shortly thereafter, the airplane changed course to the south, and its ground speed increased to 161 mph. Six seconds later the ground speed slowed to 96 mph, and then back up to 132 mph, 8 seconds later. The airplane changed course back to the southeast and continued at a ground speed between 123 and 140 mph for the remaining 2 1/2 minutes. The airplane then began a left turn to the north. The final GPS recorded location occurred 14 seconds later, with the airplane traveling at a velocity of about 146 mph, on a heading of 10 degrees true.

The Air Force Rescue Coordination Center (AFRCC) received an indication of the activation of a 406 MHz Emergency Locator Transmitter (ELT) at 1629 in the vicinity of the Hungry Horse Reservoir. The airplane then became subject of an Alert Notice (ALNOT) after the pilot could not be reached by the AFRCC, and family members confirmed that he had not returned home.

A joint search was initiated by the Flathead County Sheriff's department and the Montana State Fish, Wildlife and Parks Division, and at 0020 the following morning the wreckage was located.

The wreckage was situated on the frozen surface of the 35-mile-long Hungry Horse Reservoir, 26 miles southeast of the town of Hungry Horse.

The sheriff's department rescue coordinator reported that snow and cloud obscuration prevented the search from being initiated from the air. Additionally, the airplane was covered with fresh snow when first responders arrived on scene.

Earlier in the day, the pilot reported to family members that the flight was to be a short sightseeing flight, and that he would return later in the evening.

PERSONNEL INFORMATION

A review of FAA airman records revealed that the 50-year-old pilot held a private pilot certificate for airplane single-engine land, issued June 19, 2004. He did not possess an instrument rating. He held a third-class airman medical certificate issued in February 2008, with the limitation that he must have glasses available for near vision. Review of the pilot's logbooks revealed that as of March 20, 2009, he had accumulated about 609 hours of total flight experience, about 496 of which were in the accident airplane. He reported 7.1 hours of simulated instrument time.

The pilot's logbook contained multiple references to flights in snow and marginal VFR conditions, in addition to Special VFR takeoffs and landings. Excerpts from the logbook entries include:

November 13, 2005 - "Fresh Annual. Snowing. Special VFR at GPI"

November 19, 2005 - "Deer Scouting Bad Fog. Special VFR to return (GPI)"

January 28, 2006 - "Snowing from Sealey back. Sp. VFR"

January 1, 2007 - "Cabin Creek, low ceilings"

January 17, 2007 - "Spotted bear (snowing)"

February 28, 2007 - "Snow squalls, actually turned back!"

May 25, 2007 - "Special VFR T.O."

July 18, 2007 - "T-Storm"

May 9, 2008 - "Special VFR into Glasgow snowing!"

August 26, 2008 - "MVFR into Schaffer"

December 12, 2008 - "Beat blizzard home!"

January 20, 2009 - "No angel flight. Landed Special VFR"

AIRPLANE INFORMATION

The four-seat, high-wing, fixed-gear airplane, was manufactured in 1967. It was powered by a six cylinder, normally aspirated Franklin, PZLF-6A-350C1R engine, and equipped with a two blade McCauley constant-speed propeller. The maintenance logbooks were not recovered for inspection, however, an invoice retained from Poorman Aviation of Bigfork Montana, revealed that the airplane last received an annual inspection on December 18, 2008, at a total airframe time of 2,161.6 flight hours. The engine tachometer at the accident site indicated 2174.98.

The airplane was equipped with attitude, direction, and navigation instruments required for flight in instrument meteorological conditions.

METEOROLOGICAL INFORMATION

The closest aviation weather observation station was located at Kalispell, 28 miles northwest of the accident site. The elevation of the weather observation station was 2,977 feet msl.

An aviation routine weather report (METAR) for Kalispell was issued at 1555. It stated:

Winds from 260 degrees at 12 knots; visibility 10 miles; skies clear; temperature 07 degrees Celsius; dew point -06 degrees Celsius; altimeter 29.79 inches of mercury.

At 1655, a METAR was issued at Kalispell. It stated:

Winds from 250 degrees at 12 knots, gusting to 20 knots; visibility 10 miles; skies scattered 4,000 feet; broken 6,500 feet; temperature 06 degrees Celsius; dew point -07 degrees Celsius; altimeter 29.79 inches of mercury.

The Montana Department of Transportation issued a series of surface observations for Essex, Montana, US-2 Mile Post 179.9. The observation station was located about 11 miles north of the accident site, at an elevation of 3,848 feet. It stated the following:

1616 MDT: Temperature 31.5 degrees F; dew point 24.2 degrees F; winds south-southeast at 5 miles per hour gusts to 6 miles per hour; moderate snow.

1626 MDT: Temperature 30.9 degrees F; dew point 24.6 degrees F; winds south-southwest at 1 mile per hour gusts to 2 miles per hour; moderate snow.

1635 MDT: Temperature 30.7 degrees F; dew point 24.7 degrees F; winds east at 2 miles per hour gusts to 2 miles per hour; moderate snow.

1637 MDT: Temperature 30.6 degrees F; dew point 24.6 degrees F; winds east-southeast at 2 miles per hour gusts to 2 miles per hour; moderate snow.

An Airmen's Meteorological Information (AIRMET) Sierra Update 4 for mountain obscuration and occasional precipitation was issued on the day of the accident at 1445 MDT, and valid until 2100 MDT. The accident site was located within the area covered by this advisory.

A pilot flying in the Kalispell area about the time of the accident reported that he was descending from 13,500 feet, and in the clouds, when he heard an ELT signal over his radio. He continued the descent, breaking out of the clouds at 6,000 feet. He stated that below this altitude the weather consisted of scattered clouds and intermittent snow showers. Additionally, he reported that the peaks of the Flathead Mountains, east of Kalispell, were obscured by clouds.

The FAA reported that Lockheed Martin Flight Services had provided no weather-related services to N2007U on day of the accident.

WRECKAGE AND IMPACT INFORMATION

The accident site was located in the center of a 1-mile-wide section of the reservoir, at an elevation of 3,564 feet msl. The site was flanked to the east and west by the peaks of the Flathead Mountain Range. The elevation of the peaks directly to the east and west was 8,396 and 7,542 feet, respectively.

The Safety Board investigator-in-charge (IIC) and representatives from the FAA examined the airplane at the accident site. The recovery and examination process was hampered by snowfall that had occurred since the accident, and the subsequent melting of the reservoir's ice surface.

The First Identified Point of Contact (FIPC) was characterized by a 10-inch-deep, 14-foot-long swath of excavated snow and ice. The ground excavation was oriented on a bearing of about 345 degrees magnetic. Outboard sections of the left leading edge wing skins, as well as the red wing tip navigation light were located 10 feet beyond the FIPC. A second ground scar was observed 16 feet east, and 14 feet beyond the FIPC. This scar was about 20 feet long, 6 feet wide, and 18 inches deep. A section of engine cowling and engine oil line hosing were located in the center of the ground scar. The propeller and vacuum pump were located about 100 feet

northeast of the ground scar, and five intermittent indentations were noted in the snow leading to the propeller.

The debris path continued on a bearing of 330 degrees. Outboard sections of the right leading edge wing skins, and the green wing tip navigation light were located 80 feet beyond the FIPC. The remainder of the debris path leading to the main wreckage contained various pieces of clear plastic, fuselage material, fragments of the engine intake manifold, and the left main landing gear structure.

The main wreckage came to rest 270 feet beyond the FIPC. The cabin area rested inverted and sustained crush damage from the firewall through to the rear passenger seat. The tail section was observed intact, upright, and folded back over the cabin area. The right horizontal stabilizer and elevator had folded forward. The engine came to rest inverted on a heading of 230 degrees, and was still attached to the firewall by its associated control cables and hoses. Oil was noted in the snow surrounding the engine.

The left and right wings were observed inverted, and partially attached to the main cabin area by their associated control cables. Both wings sustained similar leading edge crush damage beginning 4 feet inboard of the tip, and emanating at a 45-degree angle aft towards the trailing edge of the wing tip. Both wing spars were exposed and exhibited 15 degrees upward buckling at the wing strut. Both fuel tanks were breached, and the odor of fuel was present at the site.

The instrument panel sustained crush damage. The airspeed indicator displayed a speed of 128 mph; white transfer marks were noted on the instrument face, directly underneath the white indicator needle. The vertical speed indicator displayed a 500-foot per minute descent rate. The altimeter displayed a setting of 29.79 inches of mercury in the Kollsman window.

The magneto switch was observed in the both position; additionally, the carburetor heat, throttle, fuel mixture, and propeller governor controls were in the full forward position.

All major sections of airplane were accounted for at the accident site.

MEDICAL AND PATHOLOGICAL INFORMATION

A postmortem examination was conducted by the State of Montana Forensic Science Division. The cause of death was reported as the effect of blunt force injuries.

Toxicological tests on specimens from the pilot were performed by the FAA Civil Aeromedical Institute. Analysis revealed no findings for carbon monoxide, or cyanide. The results were negative for all screened drug substances and ingested alcohol.

TESTS AND RESEARCH

The airplane and engine were recovered from the accident site and examined at a storage facility in Kalispell.

The examination revealed no obvious anomalies that would have precluded normal operation. A full report of the examination is contained within the public docket for this accident.

ADDITIONAL INFORMATION

Fueling records indicated that the airplane had been serviced with the addition of 13 gallons of aviation gasoline on March 20, 2009, 0.4 flight hours prior to the accident. A notation in a fuel logbook located within the airplane stated that at the time of the last refueling, the tanks were filled to their maximum capacity.

The airplane was equipped with a Kannad 406 MHz ELT, model 406 AF-COMPACT. The ELT was not configured to provide a GPS location, however, the AFRCC was able to provide search and rescue personnel with coordinates that were about 800 feet from the accident site.

FAA Advisory Circular 60-4A states in part, "The attitude of an aircraft is generally determined by reference to the natural horizon or other visual references with the surface. If neither horizon nor surface references exist, the attitude of an aircraft must be determined by artificial means from the flight instruments. Sight, supported by other senses, allows the pilot to maintain orientation. However, during periods of low visibility, the supporting senses sometimes conflict with what is seen. When this happens, a pilot is particularly vulnerable to disorientation. The degree of orientation may vary considerably with individual pilots. Spatial disorientation to a pilot means simply the inability to tell which way is 'up.'...Surface references and the natural horizon may at times become obscured, although visibility may be above flight rule minimums. Lack of natural horizon or such reference is common on over water flights, at night, and especially at night in extremely sparsely populated areas, or in low visibility conditions.... The disoriented pilot may place the aircraft in a dangerous attitude... Therefore, the use of flight instruments is essential to maintain proper attitude when encountering any of the elements which may result in spatial disorientation."

History of Flight

Enroute	VFR encounter with IMC (Defining event) Loss of control in flight
Uncontrolled descent	Collision with terr/obj (non-CFIT)

Pilot Information

Certificate:	Private	Age:	50, Male
Airplane Rating(s):	Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3 With Waivers/Limitations	Last Medical Exam:	02/01/2008
Occupational Pilot:	No	Last Flight Review or Equivalent:	02/12/2008
Flight Time:	609 hours (Total, all aircraft), 496 hours (Total, this make and model), 559 hours (Pilot In Command, all aircraft), 14 hours (Last 90 days, all aircraft), 4 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	MAULE	Registration:	N2007U
Model/Series:	M-4-220C	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	2008C
Landing Gear Type:	Tailwheel	Seats:	4
Date/Type of Last Inspection:	12/18/2008, Annual	Certified Max Gross Wt.:	2300 lbs
Time Since Last Inspection:	14 Hours	Engines:	1 Reciprocating
Airframe Total Time:	2175 Hours	Engine Manufacturer:	Franklin
ELT:	C126 installed, activated, aided in locating accident	Engine Model/Series:	6A-350C1
Registered Owner:	Hugh A. Rogers	Rated Power:	220 hp
Operator:	Hugh A. Rogers	Air Carrier Operating Certificate:	None

Meteorological Information and Flight Plan

Observation Facility, Elevation:	GPI, 2977 ft msl	Observation Time:	1655 MDT
Distance from Accident Site:	28 Nautical Miles	Condition of Light:	Day
Direction from Accident Site:	300°	Conditions at Accident Site:	Visual Conditions
Lowest Cloud Condition:	Scattered / 4000 ft agl	Temperature/Dew Point:	6°C / -7°C
Lowest Ceiling:	Broken / 6500 ft agl	Visibility	10 Miles
Wind Speed/Gusts, Direction:	12 knots/ 20 knots, 250°	Visibility (RVR):	
Altimeter Setting:	29.97 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	Moderate - In the Vicinity - Showers - Snow		
Departure Point:	Kalispell, MT (GPI)	Type of Flight Plan Filed:	None
Destination:	Kalispell, MT (GPI)	Type of Clearance:	None
Departure Time:	1602 PDT	Type of Airspace:	

Airport Information

Airport:	Glacier Park International (GPI)	Runway Surface Type:	Asphalt
Airport Elevation:	2977 ft	Runway Surface Condition:	Unknown
Runway Used:	20	IFR Approach:	None
Runway Length/Width:	9007 ft / 150 ft	VFR Approach/Landing:	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Fatal		

Administrative Information

Investigator In Charge (IIC):	Elliott Simpson	Adopted Date:	03/03/2010
Additional Participating Persons:	Derek Amos; Federal Aviation Administration FSDO; Helena, MT		
Publish Date:	03/03/2010		
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.nts.gov/pubdms/ .		

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