# Aviation Investigation Final Report

| | | | |
|---|---|---|---|
| **Location:** | Tower, Michigan | **Accident Number:** | CHI03FA080 |
| **Date & Time:** | March 9, 2003, 20:36 Local | **Registration:** | N201ZM |
| **Aircraft:** | Mooney M20J | **Aircraft Damage:** | Destroyed |
| **Defining Event:** | | **Injuries:** | 2 Fatal |
| **Flight Conducted Under:** | Part 91: General aviation - Personal | | |

## Analysis

The aircraft departed controlled flight during cruise flight and impacted terrain. The flight was operating at night in instrument meteorological conditions (IMC). While en route the pilot reported that the airplane was "in the soup" and he wanted to return to the departure airport. The controller cleared the pilot to climb to 7,000 feet msl and fly direct to the departure airport. The pilot confirmed the clearance and there were no additional radio transmissions received from the accident airplane. The aircraft impacted wooded terrain in a near vertical attitude. No pre-impact anomalies were found with the airframe, powerplant, propeller, or accessories.

## 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 during cruise flight. A factor to the accident was the clouds and night conditions.

### Findings

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

Findings
1. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
2. (F) WEATHER CONDITION - CLOUDS
3. (F) LIGHT CONDITION - NIGHT
---

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

Findings
4. TERRAIN CONDITION - GROUND

## Factual Information

HISTORY OF FLIGHT

On March 9, 2003, around 2036 eastern standard time, a Mooney M20J, N201ZM, piloted by a commercial pilot, was destroyed during an in-flight collision with terrain near Tower, Michigan. The airplane was operating at night in instrument meteorological conditions. The personal flight was operating under the provisions of 14 Code of Federal Regulations (CFR) Part 91 while on an instrument flight rules (IFR) flight plan. The pilot and his passenger were fatally injured. The flight departed the Oakland County International Airport (PTK), Pontiac, Michigan, at 1906.

The pilot contacted the Federal Aviation Administration (FAA) Lansing Automated Flight Service Station (AFSS) at 1713 to obtain a weather briefing and file an IFR flight plan from PTK to Cheboygan County Airport (SLH), Cheboygan, Michigan. The briefer asked the pilot if he was planning on a visual flight rules (VFR) flight. The pilot replied, "No, I would like to go IFR and have you guys kind of watching me." The subsequent weather briefing included a synopsis of the current conditions, the forecast for the planned destination and for the Detroit area, an advisory for moderate turbulence below 8,000 feet mean sea level (msl), and the operational status of a military operations area. After the weather briefing the pilot filed an IFR flight plan from PTK to SLH.

At 1956:32 (hhmm:ss), the pilot established radio communications with Minneapolis Air Route Traffic Control Center (ARTCC) and reported being level at 6,000 feet msl. At 2006:29, the pilot asked the controller, "yeah, um I can't see...the wingtip anymore. Do ah, you know where the tops are in this?" The controller replied, "no sir, I don't have any reports on the tops, would you like to try higher?" At 2006:43, the pilot responded, "I wonder if I should climb, uh um, maybe go up to eight?" The controller cleared the pilot to climb and maintain 8,000 feet msl. At 2012:58, the pilot reported being level at 8,000 feet msl.

At 2016:31, the pilot told the controller, "we were out of it for a little bit, but we're kind of back in some haze here at eight thousand, and uh although I do, I am able to pick up some lights uh, beneath me, so it's quite a light haze, ah go ahead and start bringing me down when, uh when it's time to start descending, I'm sixty-two nautical out of Cheboygan right now." The controller cleared the pilot to descend and maintain 5,000 feet msl.

At 2023:13, the controller asked the pilot if he had the current weather report for SLH. The pilot replied "negative" and the controller relayed the 2015 weather report:

Wind 330 degrees true at 10 knots, gusting to 18 knots; visibility 3 statute miles (sm) with light snow; scattered clouds at 1,400 feet above ground level (agl), broken ceiling at 2,000 feet agl,

overcast ceiling at 3,500 feet agl; temperature -14 degrees Celsius; dew point -18 degrees Celsius; altimeter setting 29.96 inches-of-mercury.

At 2027:00, the pilot reported being level at 5,000 feet msl and the controller cleared him to descend to maintain 4,000 feet msl.

At 2028:22, the controller asked the pilot, "are you going to try for the visual there at Cheboygan, or do you want to setup for the approach?" The pilot replied, "we'll try for a visual and if we do a missed then we'll uh, come in on the approach." At 2028:34, the controller replied "roger" and the pilot stated "but we might land Pellston." The pilot was referring to Pellston Regional Airport (PLN), Pellston, Michigan, about 12.7 nautical miles (nm) west-southwest of SLH.

At 2030:59, the pilot reported being level at 4,000 feet msl. At 2033:11, the controller cleared the pilot to descend to maintain 3,000 feet msl. According to FAA aircraft radar track data, radar contact was lost at 2033:46. At that time the airplane was at 3,800 feet msl and 22.7 nm south-southeast of SLH. The radar facility's lower altitude coverage in this area was about 4,000 feet msl, according to Minneapolis ARTCC. At 2035:04, the controller told the pilot "radar contact lost."

At 2035:10, the pilot stated, "we're in the soup, and really can't see much here at all here, and uh you know I might do a u-turn and head back to Pontiac, ah this isn't an emergency mission here tonight." At 2035:25, the controller confirmed that the pilot wanted to return to PTK. The pilot replied, "I think it'd be best." At 2035:29, the controller stated, "okay Mooney one zulu mike, you are cleared to the Pontiac airport via direct, climb and maintain seven thousand, let me know what you'd like as a final." At 2035:38, the pilot replied, "zero one zulu mike."

There were no additional radio transmissions received from the accident airplane. Radar contact was never reestablished with N201ZM. At 2043:55, the controller began trying to hail N201ZM on the radio without success.

The wreckage was located approximately 3.7 nm north-northeast of the last known radar position and 19.5 nm south-southeast of SLH.

PERSONNEL INFORMATION

The pilot, age 60, held a commercial pilot certificate with single-engine land, multi-engine land and instrument airplane ratings. The pilot also had a single-engine sea airplane rating that was limited to private pilot privileges. FAA records indicate his last airman medical examination was completed on April 29, 2002, when he was issued a second-class medical certificate with the following restriction: "Must wear corrective lenses."

According to the pilot's flight logbook, he had a total flight time of 731.1 hours, of which 624.2 hours were as pilot-in-command (PIC). The pilot had logged 638.4 hours in single-engine land

airplanes, 82.0 hours in single-engine sea airplanes, 10.2 hours in multi-engine land airplanes, and 0.5 hours in rotorcraft. He had accumulated 494.0 hours in the Mooney M20J airplane. The pilot's last flight review, as required by 14 CFR Part 61.56, was completed on October 31, 2001.

The following flight times were calculated from the pilot's flight logbooks:

The pilot had accumulated 15.1 flight hours in the past year, 13.9 hours during the prior 6 months, 4.0 hours during the past 90 days, and no hours during the previous 30 days. The pilot did not fly during the 24 hour period before the accident flight. The last flight logbook entry was dated January 8, 2003.

The pilot had accumulated 51.1 flight hours in actual IMC and 119.0 hours of simulated instrument conditions. He logged 1.8 hours in actual IMC and 2.8 hours of simulated time during the previous year. During the prior 6 months he accumulated 1.8 hours in actual IMC, 2.8 hours of simulated time, and logged 10 instrument approaches. The pilot completed an instrument proficiency check, as required by 14 CFR Part 61.57(d), on October 13, 2002.

The pilot had accumulated 147.1 flight hours during night conditions. During the previous 90 days he logged 0.6 hours at night and no hours during the prior 30 days.

AIRCRAFT INFORMATION

The accident airplane was a 1978 Mooney M20J, serial number 24-0522. The M20J is a low-wing airplane equipped with a retractable tricycle landing gear, electrically actuated wing flaps, and a single reciprocating engine. The fuselage and empennage are of an all-metal semimonocoque construction. The full-cantilever wings are of an all-metal construction. The airplane is equipped with dual controls and two cockpit seats. The airplane can accommodate four occupants and has a certified maximum takeoff weight of 2,740 lbs.

The airplane was issued a standard airworthiness certificate on April 24, 1978, and was certified as a normal category airplane. The last annual inspection was completed on August 15, 2002, at a total service time of 2,150.1 hours. According to the aircraft maintenance logbooks, all applicable FAA Airworthiness Directives were complied with as of the last annual inspection. The altimeter, static system, automatic pressure altitude reporting equipment and ATC transponder were last tested/certified on August 1, 2002.

The airplane was equipped with a 200 horsepower Textron Lycoming IO-360-A3B6D engine, serial number L-18382-51A. The IO-360-A3B6D is a four-cylinder, 360 cubic inch displacement, fuel-injected, horizontally-opposed reciprocating engine. The engine was factory overhauled on March 25, 1997, at 3,770.0 hours total time. At the last annual inspection, the engine had accumulated 561.3 hours since the last overhaul and had a total service time of 4,331.3 hours. A review of the engine maintenance records found no history of operational problems.

The propeller was a three-bladed Hartzell HC-C3YR-1BF, hub serial number DY4222A. At the last annual inspection, the propeller had accumulated 331.5 hours since new.

The total service time for the airframe, engine, and propeller could not be determined due to extensive damage sustained by the airplane's recording hour meter during the accident.

## METEOROLOGICAL INFORMATION

The closest weather reporting station to the accident site was located at the Cheboygan County Airport (SLH), about 19.5 nm north-northwest of the accident site. The airport was equipped with an Automated Surface Observing System (ASOS). The following weather conditions were recorded before and around the time of the accident:

At 2015: Wind 330 degrees true at 10 knots, gusting to 18 knots; visibility 3 statute miles sm with light snow; scattered clouds at 1,400 feet above ground level agl, broken ceiling at 2,000 feet agl, overcast ceiling at 3,500 feet agl; temperature -14 degrees Celsius; dew point -18 degrees Celsius; altimeter setting 29.96 inches-of-mercury.

At 2035: Wind 330 degrees true at 13 knots, gusting to 19 knots; visibility 4 sm with light snow; scattered clouds at 1,100 feet agl, broken ceiling at 2,300 feet agl, overcast ceiling at 4,500 feet agl; temperature -15 degrees Celsius; dew point -18 degrees Celsius; altimeter setting 29.97 inches-of-mercury.

At 2055: Wind 320 degrees true at 8 knots; visibility 4 sm with haze; scattered clouds at 1,100 feet agl, broken ceiling at 2,300 feet agl, overcast ceiling at 4,500 feet agl; temperature -16 degrees Celsius; dew point -19 degrees Celsius; altimeter setting 29.98 inches-of-mercury.

The National Weather Service (NWS) Area Forecast issued for northern Michigan expected scattered clouds to broken ceilings at 3,500 feet agl. The forecast further added that northeastern Michigan could have occasional broken ceilings at 2,000 feet agl, 3 to 5 miles visibility in light snow showers, and west-northwest winds with gusts of 28 knots.

According to data supplied by the U.S. Naval Observatory, the accident occurred at night with a waxing crescent moon with 35-percent of its visible disk illuminated.

## WRECKAGE AND IMPACT INFORMATION

The National Transportation Safety Board's (NTSB) on-scene investigation began on March 11, 2003.

A global positioning system (GSP) receiver recorded the position of the main wreckage as 45-degrees 21.16-minutes north latitude, 84-degrees 20.63-minutes west longitude. The main wreckage was found in a wooded area located about 1.8 nm west of Tower, Michigan.

The main wreckage consisted of the fuselage, wings, empennage, engine, and propeller. The main wreckage was surrounded by trees that had no observed damage. There was no evidence of the airplane traveling laterally through the trees prior to impact with the terrain. Aircraft debris was distributed around the main wreckage up to 75 feet. A two-dimensional reconstruction determined that all primary airframe structural components, flight control surfaces, powerplant components, and propeller blades were present. Flight control continuity could not be established from the control surfaces to their respective control inputs due to extensive damage to all components. Inspection of the recovered flight control components did not exhibit any evidence of pre-impact malfunction. The wing flaps and main landing gear were found in retracted positions.

The engine was found completely separated from its engine mounts and the firewall. Engine crankshaft continuity was established by rotating the crankshaft at the propeller flange. Rear accessory section and valve train continuity was established while the engine crankshaft was rotated. Internal inspection of the cylinders with a lighted boroscope revealed no discrepancies. The upper spark plugs were removed and normal wear signatures were noted. The fuel distributor valve contained fuel. The dual-magneto did not function due to damage consistent with impact. The engine driven vacuum pump was disassembled and no pre-impact anomalies were noted.

The propeller remained attached to the engine propeller flange. All three propeller blades had leading edge damage, chordwise scratching, burnishing of the blade backs, spanwise S-shape bends, and tip-curling.

The electric turn coordinator was disassembled and rotational score marks were observed on the inside surface of the gyro. The remote mounted directional gyro was disassembled and no anomalies were found. The attitude indicator was not recovered.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot and his passenger on March 12, 2003, at the Oakland County Medical Examiner Office, Pontiac, Michigan.

Toxicology samples for the pilot were submitted to the FAA Civil Aeromedical Institute, Oklahoma City, Oklahoma. Forensic Toxicology Fatal Accident Report was prepared and the results were as follows:

34 (mg/dL, mg/hg) ethanol detected in brain tissue.*
66 (mg/dL, mg/hg) methanol detected in brain tissue.
No Ethanol detected in muscle tissue.

*The ethanol found in the case is from postmortem ethanol formation and not from the ingestion of ethanol.

Toxicology samples for the passenger were submitted to the FAA Civil Aeromedical Institute and negative results were reported for all tests performed.

ADDITIONAL INFORMATION

The wreckage was released on March 11, 2003, and was acknowledged by a representative of the Cheboygan County Road Commission.

Parties to the investigation included the FAA and Textron Lycoming.

## Pilot Information

| | | | |
|---|---|---|---|
| **Certificate:** | Commercial | **Age:** | 60,Male |
| **Airplane Rating(s):** | Single-engine land; Single-engine sea; 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 2 Valid Medical--w/ waivers/lim | **Last FAA Medical Exam:** | April 29, 2002 |
| **Occupational Pilot:** | UNK | **Last Flight Review or Equivalent:** | October 31, 2001 |
| **Flight Time:** | 731 hours (Total, all aircraft), 494 hours (Total, this make and model), 624 hours (Pilot In Command, all aircraft), 4 hours (Last 90 days, all aircraft), 0 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft) | | |

## Aircraft and Owner/Operator Information

| | | | |
|---|---|---|---|
| **Aircraft Make:** | Mooney | **Registration:** | N201ZM |
| **Model/Series:** | M20J | **Aircraft Category:** | Airplane |
| **Year of Manufacture:** | | **Amateur Built:** | |
| **Airworthiness Certificate:** | Normal | **Serial Number:** | 24-0522 |
| **Landing Gear Type:** | Retractable - Tricycle | **Seats:** | 4 |
| **Date/Type of Last Inspection:** | August 15, 2002 Annual | **Certified Max Gross Wt.:** | 2740 lbs |
| **Time Since Last Inspection:** | | **Engines:** | 1 Reciprocating |
| **Airframe Total Time:** | 2150.1 Hrs at time of accident | **Engine Manufacturer:** | Textron Lycoming |
| **ELT:** | Installed, not activated | **Engine Model/Series:** | IO-360-A3B6D |
| **Registered Owner:** | Eagle Flight, Inc. | **Rated Power:** | 200 Horsepower |
| **Operator:** | | **Operating Certificate(s) Held:** | None |

## Meteorological Information and Flight Plan

| | | | |
|---|---|---|---|
| **Conditions at Accident Site:** | Instrument (IMC) | **Condition of Light:** | Night |
| **Observation Facility, Elevation:** | SLH,641 ft msl | **Distance from Accident Site:** | 20 Nautical Miles |
| **Observation Time:** | 20:35 Local | **Direction from Accident Site:** | 170° |
| **Lowest Cloud Condition:** | Scattered / 1100 ft AGL | **Visibility** | 4 miles |
| **Lowest Ceiling:** | Broken / 2300 ft AGL | **Visibility (RVR):** | |
| **Wind Speed/Gusts:** | 13 knots / 19 knots | **Turbulence Type Forecast/Actual:** | / |
| **Wind Direction:** | 330° | **Turbulence Severity Forecast/Actual:** | / |
| **Altimeter Setting:** | 29.96 inches Hg | **Temperature/Dew Point:** | -15°C / -18°C |
| **Precipitation and Obscuration:** | Light - None - Snow | | |
| **Departure Point:** | Pontiac, MI (PTK ) | **Type of Flight Plan Filed:** | IFR |
| **Destination:** | Cheboygan, MI (SLH ) | **Type of Clearance:** | IFR |
| **Departure Time:** | 19:06 Local | **Type of Airspace:** | Class E |

## Wreckage and Impact Information

| | | | |
|---|---|---|---|
| **Crew Injuries:** | 1 Fatal | **Aircraft Damage:** | Destroyed |
| **Passenger Injuries:** | 1 Fatal | **Aircraft Fire:** | None |
| **Ground Injuries:** | N/A | **Aircraft Explosion:** | None |
| **Total Injuries:** | 2 Fatal | **Latitude, Longitude:** | 45.352779,-84.343887 |

## Administrative Information

| | |
|---|---|
| **Investigator In Charge (IIC):** | Fox, Andrew |
| **Additional Participating Persons:** | John A Miller; Federal Aviation Administration: Grand Rapids FSDO; Grand Rapids, MI<br>Gregory Erikson; Textron Lycoming; Wayne, IL |
| **Original Publish Date:** | April 28, 2005 |
| **Last Revision Date:** | |
| **Investigation Class:** | Class |
| **Note:** | The NTSB traveled to the scene of this accident. |
| **Investigation Docket:** | https://data.ntsb.gov/Docket?ProjectID=56609 |