



Aviation Investigation Preliminary Report

Location:	Watertown, WI	Accident Number:	CEN23FA239
Date & Time:	June 14, 2023, 09:03 Local	Registration:	N1025C
Aircraft:	Mooney M20R	Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

On June 14, 2023, about 0903 central daylight time, a Mooney M20R airplane, N1025C, was destroyed during an accident near Watertown, Wisconsin. The pilot and passenger were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* (CFR) Part 91 personal flight.

The pilot filed an instrument flight rules (IFR) flight plan from Watertown Municipal Airport (RYV), Watertown, Wisconsin, direct to Manitowish Waters Airport (D25), Manitowish Waters, Wisconsin, with an enroute cruise altitude of 8,000 ft mean sea level (msl). The RYV airport had a remote communications outlet monitored by an individual who relayed the instrument clearance from Madison Approach Control to the pilot before the flight departed RYV. At 0853, the pilot was cleared direct D25, climb and maintain 3,000 ft msl after takeoff, and to expect 6,000 ft msl about 10 minutes after departure.

According to automatic dependent surveillance-broadcast (ADS-B) data, at 0900:46, the airplane was on initial climb from runway 5 at RYV, as shown in Figure 1. An airport surveillance video camera at RYV captured the airplane climbing wings level into an overcast ceiling. The RYV weather station reported an overcast ceiling at 300 ft above ground level (agl). Based on several pilot reports, the reported cloud tops were about 3,000 ft mean sea level (msl).

At 0901:07, the airplane entered a climbing left turn toward west-northwest. At 0901:50, the airplane entered a descent from 1,734 ft msl while still in the left turn. At 0902:00, the airplane descended at 1,941 feet per minute (ft/min) with a 30° left-wing-down roll angle, as shown in Figure 2 and Figure 3. About 5 seconds later, at 0902:05, the airplane entered a climb from 1,481 ft msl while in a left turn toward west-northwest at 163 knots calibrated airspeed (KCAS).

At 0902:22, the airplane was flying west at 133 KCAS and climbing 3,394 ft/min. About 8 seconds later, at 0902:30, the airplane was in a left turn toward southwest at 111 KCAS and climbing about 1,986 ft/min.

At 0902:44, the airplane entered a climbing right turn toward north. At 0902:53, the airplane entered a descending right turn from a maximum altitude of 2,793 ft msl. About 15 seconds later, at 0903:08, the airplane's roll angle was about 80° right-wing-down as the airplane descended about 11,411 ft/min in a right turn toward northeast.

At 0903:10, the final recorded ADS-B data point, the airplane was flying at 211 KCAS as it descended 13,504 ft/min with a 56° right-wing-down roll angle. According to the Mooney M20R Pilot Operating Handbook, the airplane's never exceed airspeed (V_{NE}) was 196 KCAS. The final track point was at 1,166 ft msl and about 255 ft east-northeast of the initial impact with the ground.

A witness reported seeing the airplane descend "nose first" into a grass field and wooded area near the soccer fields in Brandt-Quirk Park. The witness also reported there was a large explosion after the airplane impacted the ground.

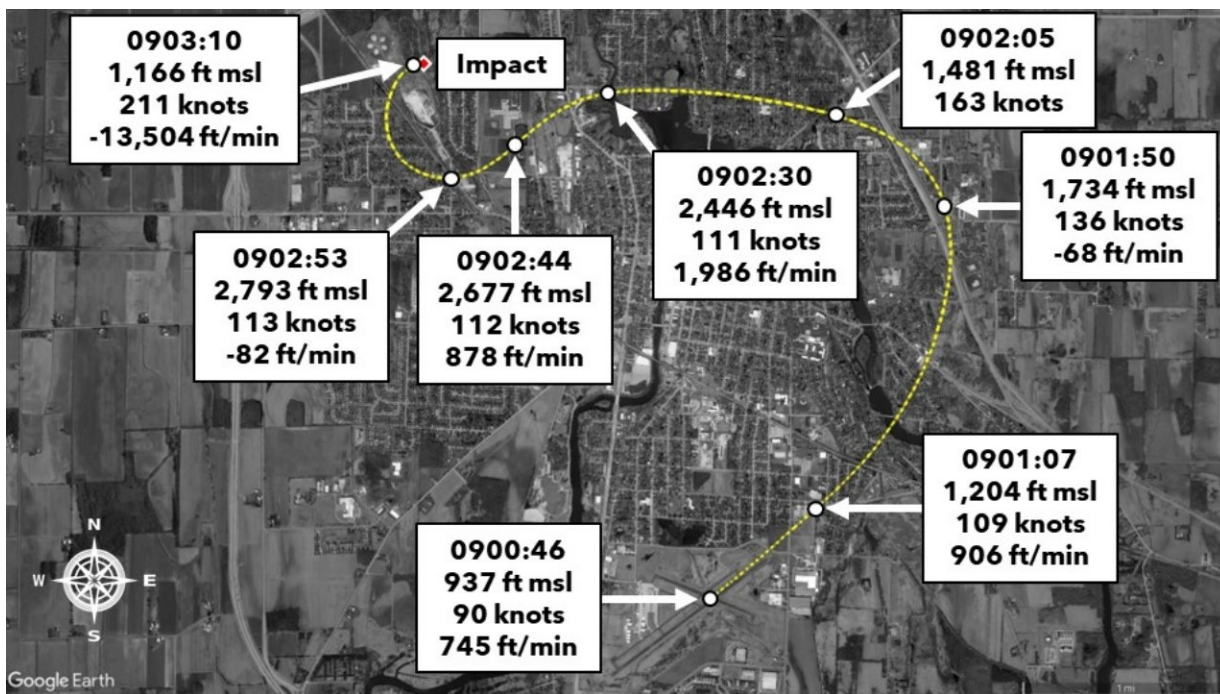


Figure 1 – Airplane Fight Track Data

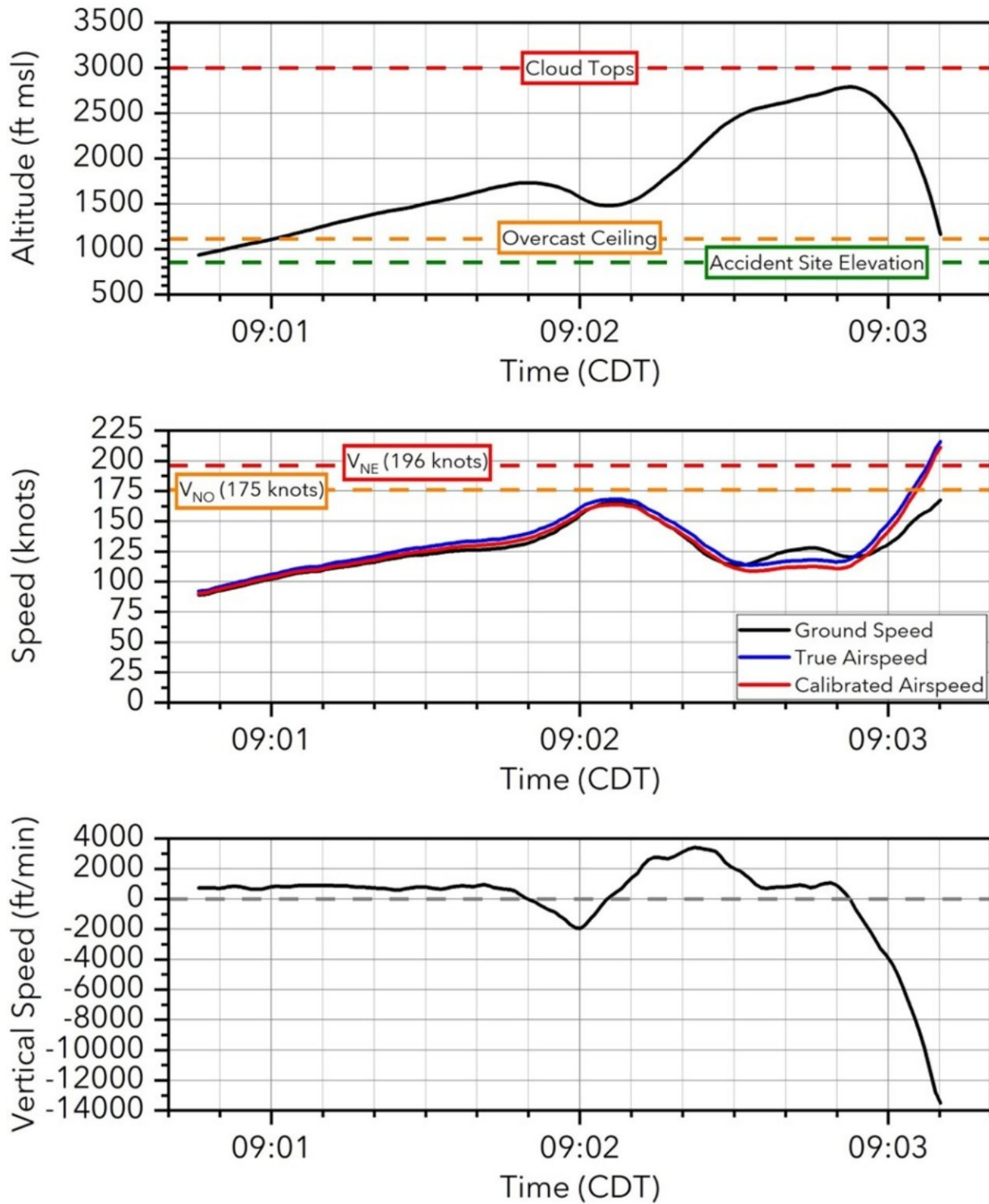


Figure 2 – Altitude, Speed, and Vertical Speed

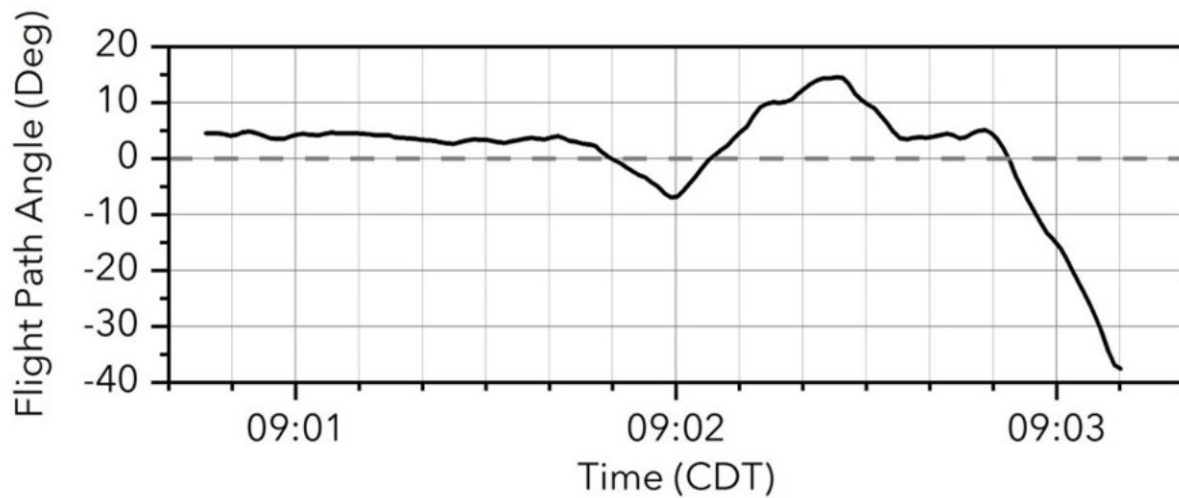
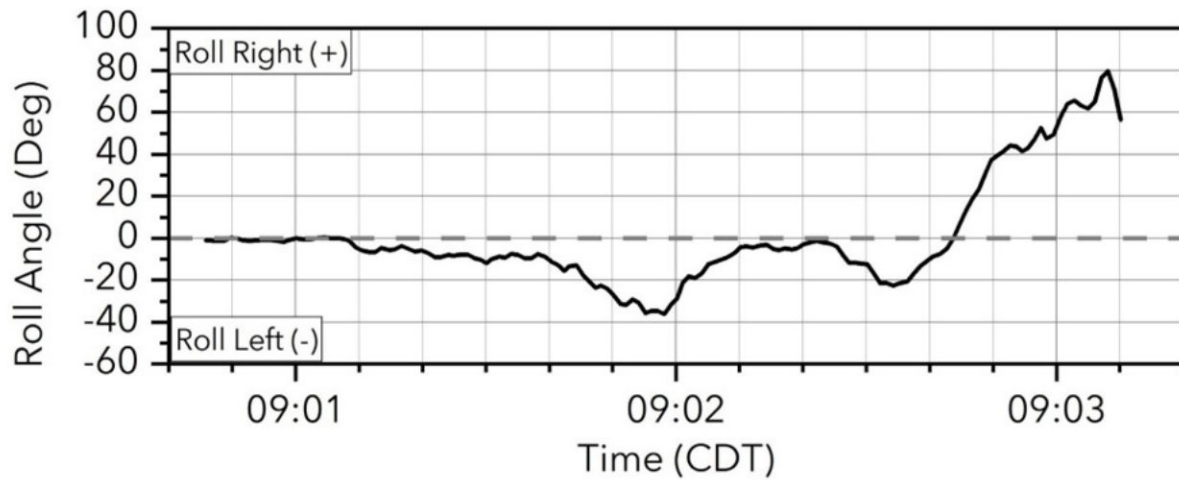
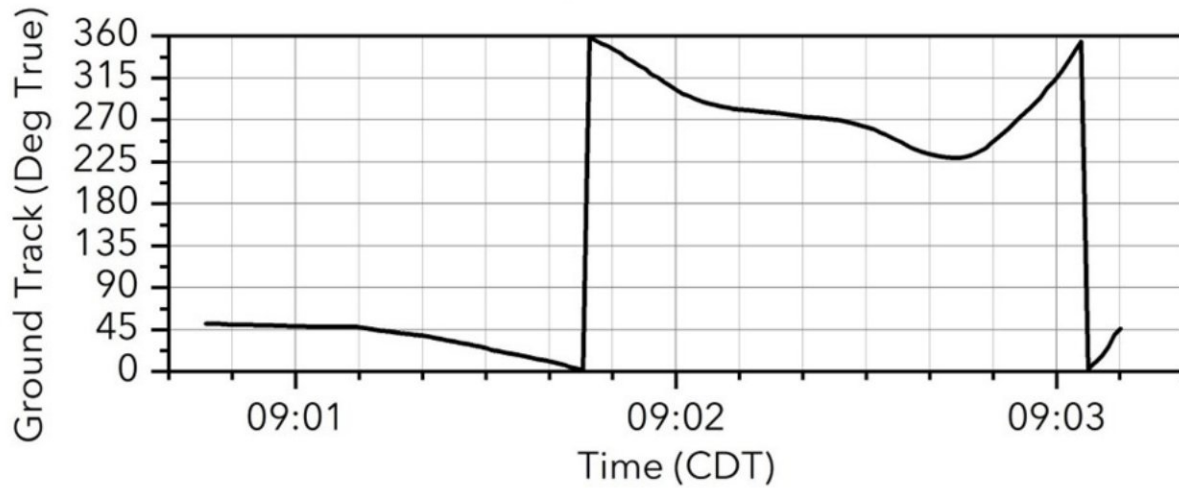


Figure 3 – Ground Track, Roll Angle, and Flight Path Angle

The initial impact point was a concrete curb and asphalt road in Brandt-Quirk Park. The wreckage energy/debris path was oriented to the east. The initial impact included multiple

propeller strike gouges and linear scratches in the asphalt road. The main wreckage was in a wooded area situated along a creek about 260 ft from the initial impact point.

There were multiple areas of turf and/or tree foliage that exhibited evidence of fuel blight and/or fire. The local fire department reported several small fires after the accident. The upper engine cowl was found suspended in a tree and the propeller hub with two blades was found in a wooded area to the southeast of the initial impact point. Both fiberglass wingtips were found between the initial impact point and the west side of the creek. The entire right flap was found wrapped around a tree trunk in the wooded area on the west side of the creek. The right aileron separated from the wing and found in two pieces along the debris path.

Most of the airplane wreckage was in a wooded area on the east side of the creek. The left wing separated from the fuselage near the wing root and was found relatively intact. The highly fragmented components of the cabin, cockpit, seats, aft fuselage, empennage, and right wing were found scattered throughout the wooded area on the east side of the creek.

The engine separated from the fuselage and was in a grass field about 333 ft east of the initial impact point. Both main landing gear wheels/tires/brake assemblies were also located in the grass field. The farthest component along the wreckage debris path was part of the engine starter motor assembly which was about 739 ft east of the initial impact point.

A wreckage layout confirmed that all major structural components were accounted for at the accident site. The airframe, cabin, cockpit, and right wing fragmented during impact. The ailerons, flaps, rudder, elevator, and speed brakes were identified. Flight control continuity could not be confirmed due to extensive impact-related damage. The left wing was intact and relatively undamaged. The left aileron remained attached to the left wing. The left flap was found in multiple pieces, but the entire span was identified. The entire right flap separated from the right wing. The right aileron separated from the wing and was found in two pieces. Both horizontal stabilizers exhibited impact-related damage with leading edge crushing. The left elevator remained attached to the left stabilizer. The right elevator separated from the right horizontal stabilizer and was found in two pieces. The vertical stabilizer and rudder were relatively undamaged. The rudder remained attached to the vertical stabilizer. The landing gear linear actuator jackscrew was fully exposed, consistent with a retracted landing gear position at impact.

The engine exhibited extensive impact-related damage that prevented the crankshaft being rotated. The upper crankcase exhibited a large crack between cylinder Nos 2 and 3. Three of the 6 cylinder heads separated during impact. The remaining 3 cylinder heads exhibited extensive impact-related damage. There were numerous cylinder head fragments recovered from the debris path. There were multiple intake and exhaust valves found separated from their respective cylinder heads. All six pistons remained in their respective cylinders. All engine accessories separated from the engine crankcase during impact. Portions of the left and right magnetos exhibited extensive impact-related damage and could not be tested. The engine-driven fuel pump and propeller governor exhibited impact-related damage and were not tested.

The fuel manifold and injector lines separated from the top of the engine crankcase. The oil filter separated from the engine. The engine oil sump separated from the crankcase. The rear of the engine crankcase was missing, exposing the aft accessory gears. The intake, exhaust, and muffler separated from the engine and was fragmented and/or crushed. The vacuum pump separated from the engine and exhibited impact-related damage; the vacuum pump rotor/vanes were not recovered.

The propeller hub with two blades separated from the engine crankshaft. The remaining propeller blade separated from the hub and was found in two pieces. All three propeller blades exhibited extensive impact-related damage, including spanwise bending, blade fractures, blade twisting, chordwise scratching, and leading-edge damage.

A sound spectrum analysis of recorded audio from a digital doorbell camera revealed that the engine was operating at 2,500 rpm as the airplane passed abeam the camera's location about 28 seconds before impact. The recorded audio was consistent with the engine operating until the airplane impacted terrain.

Aircraft and Owner/Operator Information

Aircraft Make:	Mooney	Registration:	N1025C
Model/Series:	M20R	Aircraft Category:	Airplane
Amateur Built:			
Operator:	On file	Operating Certificate(s) Held:	None
Operator Designator Code:			

Meteorological Information and Flight Plan

Conditions at Accident Site:	IMC	Condition of Light:	Day
Observation Facility, Elevation:	RYV, 815 ft msl	Observation Time:	09:05 Local
Distance from Accident Site:	2.5 Nautical Miles	Temperature/Dew Point:	
Lowest Cloud Condition:		Wind Speed/Gusts, Direction:	
Lowest Ceiling:	Overcast / 300 ft AGL	Visibility:	5 miles
Altimeter Setting:	29.69 inches Hg	Type of Flight Plan Filed:	IFR
Departure Point:	Watertown, WI (RYV)	Destination:	Manitowish Waters, WI (D25)

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:	43.208247,-88.748909

Administrative Information

Investigator In Charge (IIC):	Fox, Andrew
Additional Participating Persons:	Peter Hupfer; Federal Aviation Administration - Milwaukee FSDO; Milwaukee, WI Les Doud; Hartzell Propeller; Piqua, OH
Investigation Class:	Class 3
Note:	