Aviation Investigation Preliminary Report

Location:	St. Augustine, FL	**Accident Number:**	ERA24FA154
Date & Time:	March 25, 2024, 11:54 Local	**Registration:**	N4387W
Aircraft:	Mooney M20K	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

On March 25, 2024, about 1154 eastern daylight time, a Mooney M20K, N4387W, was substantially damaged when it was involved in an accident in St. Augustine, Florida. The commercial pilot and passenger were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The flight departed Northeast Florida Regional Airport (SGJ), St. Augustine, Florida, destined for Miami Homestead General Aviation Airport (X51), Homestead, Florida.

According to preliminary air traffic control audio communications provided by the Federal Aviation Administration (FAA), prior to the accident the pilot was in contact with an air traffic controller in the control tower at SGJ and had been cleared for takeoff on runway 13.

Shortly after becoming airborne, the pilot reported that a door had come open. The air traffic controller asked if he was declaring an emergency and the pilot responded no, and that he just wanted to land and close the door. The air traffic controller then gave instructions for him to enter either a right or left downwind leg of the airport traffic pattern and cleared the airplane to land on runway 13. The pilot stated that he would enter a left downwind and acknowledged the landing clearance. No further communications occurred between pilot and the air traffic controller, and when the air traffic controller could not reestablish communications with the pilot, he stopped all departures and asked for aircraft in the vicinity to search for N4387W. The wreckage was identified on the approach path to runway 13 by one of the aircraft conducting the search.

According to preliminary automatic dependent surveillance - broadcast (ADS-B) data provided by the FAA:

At 1152:01, during the return to the airport, while on the left downwind leg of the traffic pattern the airplane's ground speed peaked at 109 knots, at an altitude of 750 ft above mean sea level (msl).
At 1152:22, while still on the left downwind leg of the traffic pattern, the airplane had climbed to 825 ft msl, and ground speed had decreased to 95 knots.
At 1152:40, while still on the left downwind leg of the traffic pattern, the airplane had descended to 725 ft msl, and ground speed had decreased to 84 knots.
At 1152:55, after turning on to the left base leg of the traffic pattern, the airplane had descended to 525 ft msl, and ground speed had increased to 94 knots.
At 1153:07, while on the left base leg of the traffic pattern, the airplane had descended to 475 ft msl, and ground speed had decreased to 83 knots.
At 1153:20, while on the left base leg of the traffic pattern, the airplane had descended to 375 ft msl, and ground speed had decreased to 73 knots. This was the last ADS-B return from the airplane.

Review of the ADS-B data and video images of the airplane captured by a security camera around the time of the last ADS-B return indicated that the airplane pitched nose down and entered a descending, left roll prior to impact.

The airplane impacted in a wooded area about 1.24 nautical miles northwest of the approach end of runway 13. The airplane first impacted a tree and then terrain in a steep, nose down attitude. There was no indication of a fire.

The airframe sustained substantial damage to the fuselage and to both wings. Approximately 4 feet of the outboard left wing had separated from the rest of the wing and was located at the accident site. The right wing displayed aft crushing damage. The empennage had partially separated from the rest of the fuselage.

Flight control continuity was established between the rudder, elevator, and both ailerons from their respective flight controls to the cockpit. Multiple push/pull rods were fractured; all the breaks were consistent with impact damage.

The throttle, propeller, and mixture controls were all found in the full forward position and the magneto switch was found in the "BOTH" position. The emergency locator transmitter (ELT) remained attached to the airframe and to its antenna. The ELT switch was found in the "OFF" position.

The airplane was equipped with four fuel tanks, two fuel tanks in each wing. All four fuel tanks were breached and were devoid of fuel. All four fuel caps remained secured to their respective filler ports. The fuel caps were removed and examined; the fuel caps displayed normal operating signatures. The fuel strainer bowl was disassembled and visually examined. The fuel strainer screen contained debris in the screen; however, the screen was not obstructed. The fuel selector valve was not observed.

Access to the cabin was provided by the main cabin door located on the right side of the fuselage. The door had inside and outside operating handles. The door had two latching mechanisms one located on top of the door, and on at the aft, center of the door. The main cabin door remained attached to the fuselage by the forward hinge, the cabin door hold-open arm had separated from the door. The upper door cam latch and cabin door pin were found in the retracted position. The door trim was removed, and the door latch assembly was examined. The aft door pin actuating rod was bent, and the door latch handle assembly was fractured consistent with impact damage to the door. The upper door latch assembly was undamaged and operated normally. The aft door latch pin was capable of normal movement when operated manually. The upper door latch pin remained attached to the fuselage and was undamaged, there were no signs of tearing or gouging of the latch pin. The aft door latch striker plate remained attached to the fuselage and was undamaged. There were no signs of the aft door pin being forced past the door pin striker plate hole.

The baggage door was found in the open position and remained attached to the fuselage by its door hinge and hold open arm. The door latch was found in the latched position and the door lock was in the locked position. Both baggage door latch pins were in the extended position. Both baggage door latch striker plates remained attached to the fuselage and both striker plates displayed gouging in the direction of the baggage door opening position. The baggage door was placed in the closed position, and it was observed that a crease consistent with impact deformation in the fuselage skin also continued into the baggage door when the door was in the closed position.

The engine remained partially attached to the airframe through one engine mount, cables, wires, and hoses. The engine and all the engine components displayed impact damage. The propeller flange had separated from the rest of the crankshaft and multiple 45° cracks were noted along the remaining portion of the crankshaft and the fracture surface was about a 45° angle. Most of the crankshaft and camshaft were visible through the broken oil sump. The visible portions of the crankshaft, camshaft, connecting rods, and lifters displayed normal operating and lubrication signatures. The cylinders were inspected using a lighted borescope. The pistons, exhaust valves, intake valves, and cylinder walls displayed normal operating and combustion signatures. All the rocker arms, valve springs, and valve stems displayed normal operating and lubrication signatures. The oil filter was cut open and there was no metallic debris noted inside the filter pleats.

The fuel pump was removed, and the drive shaft coupling was noted to be intact. The fuel pump was disassembled, and the internal components displayed normal operating signatures. The throttle and fuel metering assembly were disassembled, and the internal components displayed normal operating signatures. The fuel manifold valve was disassembled and examined. The manifold valve screen contained fibrous debris in the screen; however, the screen was not blocked. The rest of the components displayed normal operating signatures. There was a small amount of fuel consistent with 100LL aviation gasoline in the fuel manifold

valve. The fuel was tested using water finding paste; there was no water detected in the fuel sample. All the fuel nozzles were removed and were noted to be clear of obstructions.

Both magnetos were removed from the engine and the drive shafts were noted to be capable of rotation. Both magnetos produced a spark on all their posts in the correct firing order. The top spark plugs were removed for examination and the bottom spark plugs were examined using a lighted borescope. All the spark plug electrodes displayed normal wear and operating signatures.

The turbocharger remained attached to the exhaust and intake system. There was a significant amount of impacted dirt in the turbocharger compressor section. The dirt was removed, and it was observed that most of the compressor blades were broken, and the compressor nut was found loose. The turbine displayed normal operating signatures and was capable of normal rotation. The wastegate displayed impact damage signatures, and the wastegate actuator had broken free. The wastegate valve was found in the closed position and the wastegate actuating arm displayed impact damage. The turbocharger controller displayed impact damage signatures and the oil lines were secured to the controller.

The three blade, constant-speed propeller remained attached to the crankshaft propeller flange; however, the propeller flange had separated from the rest of the crankshaft. All three of the propeller blades remained secured in the hub and the blades displayed impact damage. Propeller blade “A” displayed aft bending and twisting deformation and the cambered side displayed polishing and chordwise scratches. Propeller blade “B” displayed minor aft bending deformation and polishing of the leading edge and cambered side of the propeller blade. Propeller blade “C” displayed aft bending deformation and some chordwise scratches.

The propeller governor remained attached to the engine and displayed impact damage signatures. The governor was removed, and the oil screen gasket was noted to be clear of debris.

According to FAA and airplane maintenance records, the airplane was manufactured in 1987. The airplane's most recent annual inspection was completed on September 8, 2023. At the time of the inspection, the airplane had accrued approximately 3,782 total hours of operation, and the engine had accrued approximately 1,637 hours of operation since major overhaul.

According to FAA records, the pilot held a commercial pilot certificate with ratings for airplane single-engine land, and instrument airplane. His most recent third-class medical certificate was issued on September 30, 2022. He reported on that date that he had accrued about 774 hours of total flight experience.

The wreckage was retained for further examination.

Aircraft and Owner/Operator Information

Aircraft Make:	Mooney	**Registration:**	N4387W
Model/Series:	M20K	**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:	VMC	**Condition of Light:**	Day
Observation Facility, Elevation:	SGJ,10 ft msl	**Observation Time:**	12:16 Local
Distance from Accident Site:	0 Nautical Miles	**Temperature/Dew Point:**	21°C /16°C
Lowest Cloud Condition:		**Wind Speed/Gusts, Direction:**	9 knots / None, 80°
Lowest Ceiling:	Broken / 4700 ft AGL	**Visibility:**	10 miles
Altimeter Setting:	30.12 inches Hg	**Type of Flight Plan Filed:**	IFR
Departure Point:	St. Augustine, FL (SGJ)	**Destination:**	Homestead, FL (X51)

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	29.95925,-81.339729

Administrative Information

Investigator In Charge (IIC):	Gunther, Todd
Additional Participating Persons:	Mike Loehlein; FAA FSDO; Orlando, FL
Investigation Class:	Class 3
Note:	