Aviation Investigation Final Report

Location:	Jacksonville, Florida	**Accident Number:**	ERA22FA095
Date & Time:	December 26, 2021, 11:04 Local	**Registration:**	N3707H
Aircraft:	Mooney M20J	**Aircraft Damage:**	Substantial
Defining Event:	Aerodynamic stall/spin	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot departed on a local 20-minute flight before returning to the airport traffic pattern. After performing a low approach to the runway, the airplane began to climb slowly from an altitude of about 50-100 ft. While over the runway, just as the landing gear were raised, the baggage door fully opened. A witness reported that after the door opened, the airplane stopped climbing and began a slight turn to the right. Another witness reported that as the airplane was at an altitude of 200-400 ft, along the runway extended centerline, the right wing "dropped" and the airplane appeared to enter a spin, which continued until it impacted the ground. The airplane came to rest upright in a field, with no debris path or ground scars in the vicinity of the wreckage. It was partially consumed by a postcrash fire. Examination of the airplane revealed no preimpact anomalies that would have precluded normal operation.

The witness descriptions as well as the lack of any lateral debris path or ground scars at the accident site were consistent with an aerodynamic stall/spin. Automatic dependent surveillance – broadcast (ADS-B) data indicated that as the airplane overflew the runway, its groundspeed varied between about 50 and 56 knots. The reported wind at the time of the accident was a headwind of 8-9 knots. These speeds are close to the airplane's published stall speeds, which vary from about 55 to 63 knots, depending on flap and landing gear configuration. Based on this information, it is likely that the opening of the baggage door startled and/or distracted the pilot, drawing his attention away from maintaining the airspeed. The airplane then likely slowed, which led to a stall and subsequent spin.

Toxicology results identified low levels of both amphetamine and diphenhydramine in the pilot's cavity blood. The reason for the pilot's use of amphetamine could not be determined from the available information; personal health records could not be obtained. Thus, whether he was at increased risk for distraction from an underlying attention deficit disorder is unknown and any effects from such a condition could not be determined. Given the low level

of diphenhydramine in postmortem cavity blood, it is unlikely that any effects from his use of diphenhydramine contributed to the accident.

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 airspeed during initial climb, which resulted in an aerodynamic stall/spin. Contributing was the pilot's likely distraction due to the opening of the baggage door.

Findings

Personnel issues	Aircraft control - Pilot
Aircraft	Airspeed - Not attained/maintained
Personnel issues	Attention - Pilot
Aircraft	Cargo/baggage doors - Unintentional use/operation

Factual Information

History of Flight

Initial climb	Aerodynamic stall/spin (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On December 26, 2021, at 1104 eastern standard time, a Mooney M20J, N3707H, was substantially damaged when it was involved in an accident in Jacksonville, Florida. The pilot and passenger were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations (CFR)* Part 91 personal flight.

According to ADS-B tracking data, the airplane departed the Herlong Recreational Airport (HEG), Jacksonville, Florida, about 1041 for a local flight to the north. The airplane returned to HEG and entered the left base leg of the traffic pattern for runway 25 about 1101. Review of an airport surveillance video recording revealed that the airplane entered a low approach to the runway about 50-100 ft above ground level (agl) with the landing gear extended but did not touch down. The groundspeeds recorded by the ADS-B data varied from about 50 to 56 knots during the low pass and departure until the recorded data ended. The airplane's altitude was not available in the ADS-B data. The runway's orientation was 245° true, and the wind reported near the time of the accident was from 260° true at 9 knots.

A witness located at the airport observed the airplane flying over the runway. When he first observed the airplane, it appeared to be flying "slowly" with a "very high angle of attack." The nose of the airplane then lowered, and the noise of the engine rpm decreased slightly and momentarily, before increasing back to the same noise level. The engine sounded "normal" and "did not sputter, pop or falter at any time"; however, the airplane appeared to be "barely climbing." When the airplane reached about ¾ of the way down the runway, the landing gear retracted, and the baggage door opened upward. The baggage door remained open and looked "like a sail" on top of the airplane. After the door opened, the airplane did not appear to climb any further. It "drifted or turned very slightly to the right" before the witness lost sight of it behind a tree line. The airplane was too far away from the airport surveillance video camera to see the condition of the baggage door.

A pilot in the HEG traffic pattern observed the airplane as it flew past the departure end of the runway. It appeared to be a "normal" departure along the extended runway centerline; however, when the airplane reached about 200-400 ft agl, the right wing dropped and the airplane "appeared to enter a spin." The "attitude was almost vertical at this point" and the airplane continued "in this spin or spiral" until it impacted the ground.

The pilot's logbook was not located. He reported a total of 422 hours of flight experience during his last aviation medical examination on June 15, 2021.

According to the airplane operating manual, the stall speeds were 55 knots with full flaps and landing gear extended, and 63 knots with the flaps and landing gear retracted. The conditions specified for these speeds were: maximum gross weight, forward center of gravity, power idle, and 0° bank angle. The baggage door was on the right side of the airplane, just aft of the wing trailing edge. It was hinged at its top and opened upward.

Examination of the accident scene revealed no debris path or ground scars in the vicinity of the wreckage. The airplane came to rest upright in a grass field, with the fuselage oriented on a heading of 287° true, about ½ nautical mile from the departure end of runway 25, and about 400 ft to the right of the extended runway centerline. The fuselage section from just forward of the horizontal stabilizer to the engine cowling was largely consumed by fire. Both wings remained largely intact, although both sustained leading edge crush damage and significant fire damage from the root area to about the outboard edge of the flaps. The flap actuator jackscrew position was consistent with flaps extended to the 15° (takeoff) flap setting. Both ailerons remained attached, and flight control continuity was confirmed from the left aileron to the left-wing root area. Continuity from the right-wing root area was confirmed though the impact-damaged bell crank and an overload fracture of the push pull tube leading to the control horn. Continuity was established from the elevator and rudder control surfaces to the area of the rear seats. The fractured pitch trim torque tube was found in a position consistent with the trim at or near the "takeoff" setting. Remnants of the three landing gear were found in the retracted positions.

The baggage door piano hinge remained mostly intact and remained partially attached to its mount. About 2" of aluminum structure remained on either side of the hinge along most of its length. The forward ends of the aluminum sections were partially melted. The latching mechanism was found largely intact but fire damaged, with none of the door structure attached. The lock cylinder and exterior latch handle were not found; however, silver/grey molten metal remained on the center section of the assembly. Both engagement rods remained intact and attached to the assembly. The fuselage fittings that engage with the rod ends were not found.

The propeller hub remained attached to the engine crankshaft flange with the hub and spinner partially buried in soft, sandy soil. One propeller blade remained attached to the hub, above ground and undamaged, except for loose snap rings and shims in the hub. The other blade was separated from the hub and buried in the impact crater. It was bent slightly forward and exhibited abrasion of the paint along the length of the leading edge. Radial score marks, consistent with starter ring gear rotation, were present on the forward section of starter drive housing.

The engine crankshaft was rotated by hand at the propeller hub. The crankshaft rotated smoothly with no binding. Valvetrain and crankshaft continuity to the accessory section were

confirmed, and thumb compression and suction was obtained on each cylinder. The oil suction screen was absent of debris. The oil filter was fire damaged, and the internal filter element was charred, with no metallic debris present. All spark plug electrodes were grey in color and appeared “worn – normal” when compared to a Champion Check-a-Plug chart. The single-drive dual magneto was found separated from the engine and fire damaged, which precluded testing. The engine-driven fuel pump was separated from the engine and partially melted, precluding testing. All four fuel injector nozzles were removed and found unobstructed. The turbocharger inlet and exhaust tubing were partially crushed; the shaft spun freely when rotated by hand, and no damage was found on the compressor or turbine blades.

The Office of the Medical Examiner, Jacksonville, Florida, performed an autopsy on the pilot. The cause of death was blunt impact trauma. Toxicology tests performed by NMS Labs at the request of the pathologist identified caffeine and amphetamine at 12 ng/ml in cavity blood. Toxicology testing performed by the Federal Aviation Administration’s Forensic Sciences Laboratory identified diphenhydramine at 21 ng/ml and amphetamine at 12 ng/ml in cavity blood and identified both in liver tissue.

Pilot Information

Certificate:	Private	**Age:**	56,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	June 15, 2021
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 442 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Mooney	**Registration:**	N3707H
Model/Series:	M20J NO SERIES	**Aircraft Category:**	Airplane
Year of Manufacture:	1979	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	24-0907
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	December 18, 2021 Annual	**Certified Max Gross Wt.:**	2740 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	2127 Hrs as of last inspection	**Engine Manufacturer:**	LYCOMING
ELT:	Installed	**Engine Model/Series:**	IO-360-A3B6D
Registered Owner:	STERLING SILVER FLYERS LLC	**Rated Power:**	200 Horsepower
Operator:	STERLING SILVER FLYERS LLC	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	HEG,87 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	11:15 Local	**Direction from Accident Site:**	74°
Lowest Cloud Condition:	Scattered / 1700 ft AGL	**Visibility**	
Lowest Ceiling:		**Visibility (RVR):**	
Wind Speed/Gusts:	9 knots / None	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	260°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30.13 inches Hg	**Temperature/Dew Point:**	22°C / 18°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Jacksonville, FL	**Type of Flight Plan Filed:**	None
Destination:	Jacksonville, FL	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Class G

Airport Information

Airport:	HERLONG RECREATIONAL HEG	**Runway Surface Type:**	Asphalt
Airport Elevation:	85 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	25	**IFR Approach:**	None
Runway Length/Width:	3999 ft / 100 ft	**VFR Approach/Landing:**	Go around

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	30.273452,-81.824965

Administrative Information

Investigator In Charge (IIC):	Brazy, Douglass
Additional Participating Persons:	Michael Corrigan; FAA/FSDO ; Orlando, FL Mike Childers; Lycoming; Williamsport, PA
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Last Revision Date:	
Investigation Class:	Class 3
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=104442