Aviation Investigation Final Report

Location:	SAN LEON, Texas	**Accident Number:**	FTW97FA032
Date & Time:	November 1, 1996, 16:50 Local	**Registration:**	N25LS
Aircraft:	Mooney M20J	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

A witness observed the airplane in a 3 to 4 turn (360 degree) spin to the right with the engine pointing downward before the airplane impacted the water and a fire erupted. The pilot received a 2.1 hour check out including stalls. He wanted to fly the airplane solo before beginning his commercial pilot training and rented the airplane for the local flight. Numerous entries for stalls were entered in the pilot's logbook; however, there were no entries for spin training (not required by FAR's). The pilot logged 6.4 hours of simulated instrument flight and 0.8 hour in actual instrument conditions during the 90 days prior to the accident. Radar summary charts indicated precipitation intensity levels throughout the area with tops to 30,600 feet. Weather stations reported wind gusts to 25 knots. Cumulus and towering cumulus clouds with multiple cloud layers associated with a front prevailed throughout the area. Convective sigmet and Airmets were in effect for thunderstorm activity, IFR ceilings and visibility. VFR flight was not recommended away from the local airport. There was no evidence of an inflight fire. Examination of the airplane did not reveal any pre-impact discrepancies.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's inadvertent stall and spin of the airplane. Factors were the pilot's lack of total experience in the make and model of airplane and the weather conditions.

Findings

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

Findings
1. (C) STALL/SPIN - INADVERTENT - PILOT IN COMMAND
2. (F) LACK OF TOTAL EXPERIENCE IN TYPE OF AIRCRAFT - PILOT IN COMMAND
3. (F) WEATHER CONDITION - RAIN
4. (F) WEATHER CONDITION - GUSTS

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

Factual Information

HISTORY OF FLIGHT:

On November 1, 1996, at 1650 central standard time, a Mooney M20J, N25LS, registered to H and L Air Services, Inc., of Houston, Texas, and operated by the Ellington Field Aero Club, Inc., as a Title 14 CFR Part 91 flight, impacted the water following a loss of control near San Leon, Texas. The instrument rated private pilot was fatally injured and the airplane sustained substantial damage. Visual meteorological conditions prevailed; however, frontal passage with a wind shift and gusts was occurring. A flight plan was not filed for the personal flight. The local flight originated from Houston, Texas, 30 minutes before the accident.

During personal interviews, conducted by the investigator-in-charge and the FAA inspector, the following information was gleaned from local authorities, witnesses, and the operator. A certificated pilot observed the airplane in a 3 to 4 turn (360 degree) spin to the right with the engine pointing downward before the airplane impacted the water and exploded with flames and black smoke erupting for 200 to 300 feet into the air. Another witness observed the airplane flying in the light rain, while 2 other witnesses observed the airplane in level flight beneath the base of the clouds. One witness observed the airplane descending and another witness reported observing the airplane circle toward the bay. Witnesses reported that following the airplane's impact with the water, the fire continued to burn on the water for several minutes and witnesses described the fire as the type associated with a pipeline rupture. Local authorities responded to the scene.

PERSONNEL INFORMATION:

During interviews, conducted by the investigator-in-charge, Ellington Aero Club personnel, reported the following information. On October 15, 1996, the pilot received an aero club flight check in the airplane, and rented the airplane for 2 hours on November 1, 1996, for a local flight. The instrument rated private pilot had not flown this make and model of airplane prior to October 15, 1997. On that date, the pilot received a 2.1 hour flight check in the airplane from an aero club flight instructor. The flight check, conducted in the area of San Leon at 2,500 feet MLS, included slow flight maneuvers, stalls, steep turns, and simulated emergency procedures. The flight instructor stated that "following the check out, the pilot wanted to fly the airplane solo before beginning his commercial pilot flight training." Due to a previously scheduled cross country trip at the aero club, the airplane was not available for local flight until November 1, 1996. The flight instructor further reported that the pilot had scheduled his commercial flight training for the first 15 days in November 1996 with the certification practical test planned for November 16, 1996.

The pilot logbook and the FAA records reviewed by the investigator-in-charge, showed that the

pilot began flight training in May 1983 and obtained the private pilot certificate on April 29, 1991. Total aircraft flight time in a low wing fixed gear aircraft with a constant speed propeller was 71.8 hours from November 1995 through August 1996 in a Piper PA28-151. Total aircraft flight time in a low wing airplane with retractable landing gear, flaps, and a controllable pitch propeller was 18.9 hours in a Beech BE24R from August through October 1992 and the 2.1 hour flight check out in N25LS in October 1996. Numerous entries for stalls, steep turns, slow flight, and emergency procedures were entered in the pilot logbook; however, there were no entries for spin training. Spin training is not required by Title 14 CFR Part 61 for private pilot certification or the instrument rating.

In February 1992, the pilot began flight training for the commercial pilot with an instrument rating under a Title 14 CFR Part 141 curriculum. He obtained the instrument rating on March 9, 1996, with 56. 7 hours of simulated instrument flight and 14.3 hours of flight in actual instrument conditions. During the 90 days previous to the accident, the pilot logged 6.4 hours of simulated instrument flight and 0.8 hour in actual instrument conditions.

AIRCRAFT INFORMATION:

The aircraft was manufactured in 1977 and a standard airworthiness certificate was issued for N201WX. On January 1,1989, the registration number was changed to N25LS. The FAA aircraft registration records revealed that the airplane was registered to the current owner on August 3, 1994. A review of the aircraft maintenance records, by the investigator-in-charge, revealed that the last annual inspection was performed and the airplane returned to service on March 8, 1996.

The Airplane Flight Manual (copies of portion enclosed) emergency procedures for the M20J states that intentional spins are prohibited. In the event of an inadvertent spin, recovery techniques are listed in the manual. A spin warning published in the manual states: Up to 2,000 feet of altitude may be lost in a one-turn spin and recovery; therefore stalls at low altitude are extremely critical.

METEOROLOGICAL INFORMATION:

Thunderstorms and rain associated with a frontal passage, moved through the Dickinson Bay area near San Leon between 1530 and 1600 with winds from the north at 10 to 12 mph and overcast skies. The front moved to the south and light rain showers and overcast skies estimated at 2,000 to 3,000 feet were reported by witnesses at the time of the accident.

Weather reports were reviewed by the investigator-in-charge. Radar summary charts indicated strong precipitation intensity levels throughout the area with tops to 30,600 feet. Local weather stations in the vicinity reported a visibility of 5 statute miles and winds from the west with gusts to 25 knots in drizzle, mist, and rain showers. Cumulus and towering cumulus clouds with multiple broken and overcast cloud layers beginning from 1,000 feet AGL associated with a front prevailed throughout the area.

Convective Sigmet 28C was in effect for widely scattered thunderstorm activity across southeast Texas. Airmet Sierra and Tango were valid for occasional ceilings below 1,000 feet AGL and visibility below 3 statute miles in clouds and precipitation mist.

COMMUNICATIONS:

A review of air traffic control data, transcripts, and statements revealed the following summary information. All times are converted to central standard time unless otherwise indicated.

1518:50 The pilot requested and received a standard weather briefing for a local VFR flight departing from Ellington Field at 1645.

1520:19 The pilot was briefed on the flight precautions for occasional IFR 1,500 to 2,000 overcast with widely scattered rainshowers and thunderstorms associated with a line of weather in the immediate vicinity of Ellington. The briefer stated "if you are going to stay close to the airport or just stay in the pattern I think it is going to be alright but if you are going to try and go anywhere."

1521:10 The briefing was interrupted as the pilot transmitted "Oh I'm gonna yeah I'm not going very far at all no more than ah about fifteen minutes away."

1521:15 The pilot was advised to watch out for the "trong northerly wind."

1608:45 The pilot requested and was cleared to taxi aircraft N25LS to runway 35 via Taxiway ECHO.

1619:29 The pilot requested a takeoff clearance from Taxiway ECHO.

1619:30 The pilot accepted the controller clearance for takeoff on runway 04 and was cleared for the takeoff and a right turn out of traffic. The was the last ATC contact with the aircraft.

WRECKAGE AND IMPACT INFORMATION:

The airplane came to rest at North 29 degrees 28.81 minutes, West 094 degrees 55.56 minutes, in 5 feet of water, approximately 1,000 yards from the shores of April Fools Point. The upper portion of the empennage protruded above the water with the airplane sitting right wing down with the cockpit door open and the wing tip buried in the mud about a foot. The left wing was found separated from the fuselage at the aft attachment point. The engine remained attached at the firewall motor mounts. Divers from the Texas Department of Public Safety (DPS), under the surveillance of the investigator-in-charge, recovered the airplane from Dickenson Bay. See the enclosed DPS report for additional details.

MEDICAL AND PATHOLOGICAL INFORMATION:

The autopsy was performed by The County of Galveston, Medical Examiner's Office, at Texas City, Texas. Aviation toxicological testing for the pilot was performed by the FAA Civil Aero Medical Institute (CAMI) at Oklahoma City, Oklahoma. Toxicological findings were negative.

FIRE:

There was no evidence of fire in the cockpit or cabin areas of the airplane. Portions of one of the rear cabin windows exhibited heat deformation and fire and soot patterns progressed along the right wing leading edge, the inboard area of the right aileron, outboard area of right flap, right side of the upper fuselage aft of the cabin door, and aft to the inboard area of the right horizontal stabilizer and elevator. Sooting and fire damage was found along the left side of the fuselage aft and above the left cabin window. No physical evidence of an inflight fire was found during the investigation. Arcing was found at an electrical relay on the right forward side of the firewall; however, impact damage prevented any determination of the relay as the ignition source of the post-impact fire. Wiring in the right wing was intact outboard of the fuel tank; however wiring inboard of the right wing fuel tank was destroyed.

TEST AND RESEARCH:

The airframe and engine were examined in November 1996 at Houston, Texas, under the surveillance of the investigator-in-charge. Flight control continuity was confirmed from the cockpit to the ailerons and from the aft cabin area to the elevator and rudder attachment points. The left rudder pedal at the cockpit was found at the full forward position and the control yoke deflected full travel to the right. Elevator trim was at a neutral position and the elevator push rod Airworthiness Directive (AD 79-06-04) had been complied with according to the FAA inspector on scene. Flaps and gear were in their retracted positions. The fuel selector was found in the right main fuel tank position. The integrity of all the fuel tanks was compromised. The right auxiliary fuel tank screen and the left main fuel tank screens were not recovered. The right wing fuel tank screens were clear of debris. The electrical filaments of the rotating beacon were shattered. The right wing leading edge was crushed aft approximately 10 inches and the outboard left wing was crushed aft approximately 1 inch. The lower skin of the left wing was crushed upward with the wing separated at the left inboard attachment bolt which exhibited surface deformation and courseness consistent with overstress. The top of the cockpit airframe structure was deformed downward and aft. The cabin door components were linked together and were functional. The bolt attachment point for the door was bent aft and downward, and the door latch holes in the airframe were deformed outward with the cabin door post deformed inward and aft. No evidence of an inflight door opening was found. Personnel from the airframe manufacturer reported that the cabin door is custom fitted to the door frame at the time of manufacture of the aircraft.

Engine model IO-360-A1B6D, serial number L-17767-51A, and accessories were examined. Fuel was found in the fuel pump and the fuel boost pump. Fuel injector nozzle #2 had the shield missing; however, fuel flowed through all the fuel injector nozzles (#1 @ 20 gph, #2 @

24 gph, #3 @ 19 gph, #4 @ 20 gph) when flow tested under 6 psi. The vacuum pump rotated and the internal components were intact. During rotation of the crankshaft, all the cylinders except #1 had compression. Cylinder #1 was removed and sand was found on the valves and valve seats. Oil and fuel filters were clear. The electric fuel boost pump that was full of sand did not operate during a functional test; however, the inlet and outlet were not restricted. Fuel was found in the engine driven fuel pump and the fuel flow divider. The magneto did not produce a spark on the test stand. The propeller governor screen and the oil filter screen were free of debris. The vacuum pump rotated and the vanes were intact. The cylinder bottom spark plug #1 was broken, #2 spark plug insulator was broken, and the #3 and #4 cylinder spark plugs were mud fouled and all the cylinder top plugs sparked at 100 psi. All intake and exhaust pipes were pulled away at the cylinders and were crushed.

One propeller blade was bent aft approximately 35 degrees and the second blade was twisted forward; however, both propeller blades were loose in the hub. The propeller was removed for inspection at Vandalia, Ohio. On December 13, 1996, the propeller was inspected under the surveillance of the FAA inspector and the manufacturer representative stated that "there were no indications of any type of propeller failure prior to impact." He further stated that the "propeller was being operated under conditions of low power at impact."

All autopilot components were removed for further examination at Mineral Wells, Texas, and on November 22, 1996, the autopilot components were functionally tested on a Century Flight System 66D1000 test console under the surveillance of the investigator-in-charge. All components exhibited water, dirt, and impact damage that inhibited functional checks for all the components. See the enclosed report for details. There were no discrepancies noted that would preclude operation of the autopilot system components and the electrical trim switch. Scoring was not found on the gyro rotor for the attitude indicator or the heading indicator.

The FAA inspector and the investigator-in-charge examined the magneto and found corrosion throughout the magneto assembly. The magneto had been immersed in salt water for approximately 24 hours prior to the recovery of the aircraft. During the teardown of the magneto "no discrepancies were noted."

ADDITIONAL INFORMATION:

In 1991 Mooney Aircraft Corporation conducted the two part series spin test program for the M20J aircraft. Part I looked at normal spin entries over the entire aircraft C.G. range. Part II was conducted to evaluate abnormal entries and recoveries throughout the C.G. range. The spin test was conducted at gross weight of 2,900 pounds and there were no significant changes in spins or spin recovery characteristics over the 2,740 pound aircraft. All recoveries were initiated with a brisk opposite rudder at the one turn point, followed by brisk forward movement of the wheel to about the mid travel point. Spin recoveries varied from 1/8 turn to 5/8 turn and the altitude losses ranged from 600 feet to 1,000 feet. See the enclosed report for additional details.

The airplane was released to the owner's representative.

Pilot Information

Certificate:	Private	**Age:**	31,Male
Airplane Rating(s):	Single-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--no waivers/lim.	**Last FAA Medical Exam:**	June 13, 1996
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	303 hours (Total, all aircraft), 2 hours (Total, this make and model), 228 hours (Pilot In Command, all aircraft), 18 hours (Last 90 days, all aircraft), 2 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Mooney	**Registration:**	N25LS
Model/Series:	M20J M20J	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	24-0296
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	June 9, 1996 100 hour	**Certified Max Gross Wt.:**	2740 lbs
Time Since Last Inspection:	71 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2447 Hrs	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	10-360-A1B6D
Registered Owner:	H AND L AIR SERVICES, INC	**Rated Power:**	200 Horsepower
Operator:	ELLINGTON FIELD AERO CLUB, INC	**Operating Certificate(s) Held:**	None
Operator Does Business As:	ELLINGTON FIELD AERO CLUB	**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	GLS ,7 ft msl	**Distance from Accident Site:**	342 Nautical Miles
Observation Time:	16:55 Local	**Direction from Accident Site:**	11°
Lowest Cloud Condition:	Scattered / 2000 ft AGL	**Visibility**	8 miles
Lowest Ceiling:	Broken / 3800 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	14 knots / 20 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	320°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	26°C / 23°C
Precipitation and Obscuration:	Heavy - None - Rain		
Departure Point:	HOUSTON , TX (EFD)	**Type of Flight Plan Filed:**	None
Destination:	GALVESTON , TX (GLS)	**Type of Clearance:**	VFR
Departure Time:	00:00 Local	**Type of Airspace:**	Class E

Airport Information

Airport:		**Runway Surface Type:**	
Airport Elevation:		**Runway Surface Condition:**	
Runway Used:	0	**IFR Approach:**	
Runway Length/Width:		**VFR Approach/Landing:**	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	1 Fatal	**Latitude, Longitude:**	29.450441,-95.059555(est)

Administrative Information

Investigator In Charge (IIC):	Smith, Joyce
Additional Participating Persons:	JOHN KOPPENHAVER; HOUSTON , TX GERALD R JAMES; WILLIAMSPORT , PA WILLIAM S COLLINS; WEATHERFORD , TX
Original Publish Date:	March 31, 1998
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=20010