Aviation Investigation Final Report

Location:	Leesburg, Virginia	**Accident Number:**	IAD03FA039
Date & Time:	March 20, 2003, 19:45 Local	**Registration:**	N1005P
Aircraft:	Mooney M20R	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The instrument rated pilot flew the published instrument approach procedure and cancelled IFR services while on final approach. A review of radar data revealed that when the airplane was approximately 1 mile from the end of the runway, it began a left, 360-degree turn at an altitude of 1,600 feet msl, at a groundspeed of 98 knots. The turn was completed within a radius of approximately 0.2 nautical miles. Upon completion of the turn, the airplane was at an altitude of 1,000 feet msl, headed toward the airport. Twenty seconds later, the airplane began a left turn to the east, just before the data ended. The last radar target was at an altitude of 900 feet msl. Several witnesses observed the airplane, and described the weather as light drizzle, fog, and dark. A witness said he could easily identify the airplane's navigational lights, and saw the nose of the airplane straight up in the air, as it simultaneously rolled to the left, on to its back, as the nose dropped straight down toward the ground. The airplane continued to roll a full 360 degrees, then hit the ground nose first. The witness also described the maneuver as "very violent and not controlled." Examination of the airplane and engine revealed no mechanical deficiencies.

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 control of the airplane while on final approach for undetermined reasons.

Findings

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

Findings
1. (F) LIGHT CONDITION - DARK NIGHT
2. (C) AIRCRAFT CONTROL - NOT MAINTAINED

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

Findings
3. TERRAIN CONDITION - DIRT BANK/RISING EMBANKMENT

Factual Information

HISTORY OF FLIGHT

On March 20, 2003, about 1945 eastern standard time, a Mooney M20R single-engine airplane, N1005P, was destroyed when it collided with terrain while on final approach to Leesburg Executive Airport (JYO), Leesburg, Virginia. The certificated private pilot/owner was fatally injured. An instrument flight rules (IFR) flight plan was filed for the flight that originated at Youngstown-Warren Regional Airport (YNG), Youngstown-Warren, Ohio, about 1820. Visual meteorological conditions prevailed for the personal flight conducted under 14 Code of Federal Regulations Part 91.

Several witnesses observed and heard the airplane. According to one witness, a student pilot, he was in his truck, stopped at a traffic light, when he first observed the airplane above and to the left of his position.

The witness said the airplane appeared to be turning onto a 1-mile final, when it suddenly made a 60-degree right bank and started a right turn. The airplane stayed in the bank for about 5 seconds, then rolled into a 60-degree left bank. The airplane then rolled wings level, "suddenly" pitched over, and the nose of the airplane "went straight down" toward the ground. It did not spin.

The witness also said it was night, there was a light drizzle, and it was not windy. He did not see the airplane fly through any clouds or fog.

A second witness, who was standing in the backyard of a townhouse about a mile from the end of the runway, said that the airplane passed directly over his head about 25-30 feet above the townhouse. The airplane's engine was not operating, and all he heard was a "swoosh" of wind as it passed by. He could not see the airplane, but did observe its lights through the fog. Shortly after the witness lost sight of the airplane, he heard a "loud crashing noise."

The witness also noted that it was dark and foggy, and that it had stopped raining about 30 minutes prior to the accident.

A third witness, who lived across the street from the accident site, was in his home when he simultaneously heard a "strong wind sound" and a loud bang on the south side of his home, followed by a "dragging" noise, "similar to ice falling from [his] roof." He then heard a loud "crashing noise" outside. The witness also noted that he did not hear the airplane's engine operating prior to the accident.

The witness responded to the accident site and observed fuel leaking from the airplane. He

said it was not raining, it was not windy, and the sky was clearing. Subsequent examination of his home revealed no damage.

A fourth witness, a young boy, was in his home when he observed the airplane from a bathroom window. He said the airplane was headed directly toward him, with its lights on, when it suddenly nosed over and crashed into a pile of dirt in his backyard.

A fifth witness was in his home watching television when he heard a loud explosion, which shook his house. He thought a gas line had exploded. He went outside, smelled gas and called 911. The witness also said that it was "weird" that he did not hear the airplane prior to the crash. The witness also noted the weather conditions at the time of the accident were cloudy, but it was not raining or foggy.

A sixth witness, a private pilot and former naval aviator with over 30 years of aviation experience, said he was driving south toward the airport, when he saw the airplane directly in front of him, about 1-mile away. It was 1945.

With a model airplane in hand, the witness demonstrated what he observed. He pointed the nose of the model airplane straight up in the air, as it simultaneously rolled to the left. While the airplane was in this position, he started to drop the nose of the airplane straight down toward the ground. Momentarily, the airplane was on its back. The airplane continued to roll to the left, with the nose now pointing straight down toward the ground. The witness stopped the roll at 360 degrees, with the nose of the airplane pointed straight down toward the ground. He said that as soon as the airplane completed the 360 degree turn, the airplane hit the ground. The witness also described the maneuver as "very violent and not controlled."

The witness said there were clouds about 2,000 feet msl, and it wasn't raining. It was dark and he could easily identify the airplane's navigational lights.

A seventh witness, a police officer, was at the airport when the pilot-controlled runway lights turned on. He then scanned the horizon, and saw an airplane approaching the airport from the north. It's lights were on.

The witness stated that the airplane appeared to be on a normal approach path to the airport. The wingtip lights appeared to be parallel with the ground. Then, without warning, the airplane "spiral[ed]" in a clockwise direction and quickly lost altitude. The witness then lost sight of the airplane behind the tree line to the north of the airport.

A review of radar data revealed that an instrument flight rules target, with the same transponder code assigned to the accident airplane, approached Leesburg Airport from the north. Examination of the last 8 minutes of radar data revealed that the target was initially 16 nautical miles north from the end of runway 17. It then made 5-6 turns along and across the localizer course, left and right, as it proceeded toward the airport.

When the target was about 16 nautical miles north of the runway, it was at an altitude of 5,800 feet msl, at a groundspeed of 186 knots.

When the target was abeam STILL intersection, about 10 nautical miles north of the runway, it was at an altitude of 4,100 feet msl, at a groundspeed of 142 knots.

When the target crossed over WARDE intersection, it was at an altitude of 2,000 feet msl, at a groundspeed of 127 knots.

When the target was approximately 1 mile from the end of the runway, it began a left, 360-degree turn at an altitude of 1,600 feet msl, at a groundspeed of 98 knots. The turn was completed within a radius of approximately 0.2 nautical miles. Upon completion of the turn, the target was at an altitude of 1,000 feet msl.

The target then continued to track toward the airport. Approximately 20 seconds later, the target began a left turn to the east, just before the data ended at 1945. The last radar target was at an altitude of 900 feet msl at approximately 39 degrees, 05 minutes north latitude, and 77 degrees, 33 minutes west longitude.

The accident occurred during the hours of night approximately 39 degrees, 05 minutes north latitude, and 77 degrees, 33 minutes west longitude.

PERSONNEL INFORMATION

The pilot held a private pilot certificate with ratings for single engine land and sea, and instrument airplane. His most recent Federal Aviation Administration (FAA) third class medical certificate was issued on November 23, 2002.

Examination of the pilot's logbook revealed that he had accrued a total of 786 flight hours, of which, 42 hours were in make and model.

AIRCRAFT INFORMATION

A review of aircraft records revealed that the pilot had recently purchased the airplane from the factory, and it was registered with the FAA on February 10, 2003. The airplane and engine had accrued a total of 59 hours at the time of the accident.

METEOROLOGICAL INFORMATION

Weather reported at the airport, at 1942, included winds from 280 degrees at 3 knots, temperature 41 degrees F, dewpoint 39 degrees F, and barometric pressure of 29.80 inches Hg. The visibility was 10 statute miles with broken clouds at 3,400 feet, broken clouds at 4,100 feet, and overcast clouds at 5,500 feet.

AIDS TO NAVIGATION

The published inbound course for the LOC RWY 17 approach was 171 degrees magnetic, and the minimum descent altitude was 720 feet above mean sea level (msl). The crossing altitude at STILL intersection was 3,000 feet msl, and at WARDE intersection (the final approach fix), it was 1,800 feet msl. The distance between STILL and WARDE intersection was 6.2 nautical miles. The distance between WARDE and the missed approach point, which was located at the end of runway 17, was 3.9 nautical miles. The airport elevation was 389 feet msl.

COMMUNICATIONS

Review of air traffic control communications revealed that the pilot was instructed to proceed direct to STILL intersection, and intercept the localizer course for the LOC RWY 17 approach. The pilot acknowledged, and also reported that he had the current weather information at the airport.

At 1937, when the airplane was about 6 nautical miles from STILL intersection, the approach controller cleared the pilot for the approach, and instructed him to cross STILL intersection at or above 3,000 feet. The pilot acknowledged.

About 3 minutes later, the approach controller advised the pilot twice that he was about 1 mile east of the localizer course. The pilot acknowledged both advisories, and stated that he was "correcting" his course.

When the airplane was 2 nautical miles north of WARDE intersection, the approach controller informed the pilot that he appeared to be on the localizer course. The pilot acknowledged.

At 1942, when the airplane was 1 nautical mile north of WARDE intersection, the approach controller terminated radar services, approved a change in advisory frequency, and told the pilot to report when he cancelled IFR services. The pilot acknowledged, and cancelled IFR services with the controller. The controller then advised the pilot that IFR services were cancelled, and to maintain his current transponder beacon code until he was on the ground. The pilot acknowledged, and there were no further communications from him.

AERODROME INFORMATION

Leesburg Executive Airport runway 17 was a 5,500-foot-long and 100-foot-wide asphalt runway, which was equipped with a 4-light precision approach path indicator (PAPI) system, medium intensity runway lights (MIRL), a five-light omni-directional approach lighting system (ODALS), but no runway end identifier lights (REIL).

WRECKAGE AND IMPACT INFORMATION

The airplane wreckage was examined at the site on March 20-22, 2003. All major components

were accounted for at the scene. The airplane came to rest upright, with the nose pointed down, on the side of a large pile of dirt, which was located behind a row of private residences that were recently constructed.

The airplane came to rest on a heading of 080 degrees magnetic, at a ground elevation of approximately 347 feet msl, about 5,000 feet from the end of the runway and 2,000 feet left of course centerline.

Another large pile of dirt was located directly behind, and at a higher ground elevation than, the airplane. The estimated slope for each pile of dirt was approximately 35 degrees. Examination of the top sections of the dirt piles revealed no impact damage.

No visible ground scars were noted around the area of the wreckage.

Splatters of propeller oil and mud were found on the back wall of two residences. Half of a propeller ring had penetrated a cellar window, and was located in the basement of one of the homes.

One propeller blade, the top of the engine cowling, the alternator, Plexiglas, fractured sections of the propeller hub, propeller rings and associated ball bearings were located between one of the homes and the main wreckage.

The main fuselage exhibited impact damage, and a majority of the instrument panel was pushed forward and came to rest on top of the engine. The main cabin door had partially separated and remained attached by its upper hinge. The empennage was deflected downward at the point where it attached to the fuselage

Both wings remained attached at the wing root, but were pushed aft at an angle of about 30-35 degrees, and exhibited uniform leading edge impact damage.

The right wing exhibited a crescent-shaped impact mark near the tip.

The right aileron was intact, and the flap remained partially attached at the outboard hinge. Both surfaces sustained impact damage.

The left aileron and flap were intact, and exhibited impact damage.

Examination of the flap actuator revealed the flaps were in the up position.

The tail section was relatively intact. The vertical stabilizer exhibited some leading edge impact damage, and its base was partially separated from the top of the empennage. The top section of the empennage exhibited a long impact mark consistent with the length of the vertical stabilizer. Embedded in the impact mark were flakes of gray paint, consistent with the paint on the vertical stabilizer. The tail section of the airplane also exhibited extensive

wrinkling in the area below the vertical stabilizer.

The rudder, right horizontal stabilizer and elevator were intact.

The left horizontal stabilizer and elevator were intact, but the counterweight was partially attached to the elevator.

Flight control continuity was established for each flight control surface to the cockpit.

The landing gear was extended.

Examination of the altimeter revealed that it was set at 29.80 inches Hg.

The throttle was found near the idle position, the mixture control was found in the full rich position, and the propeller control was found in the full forward position.

Examination of the fuel system revealed that both wing tanks had ruptured, but each fuel finger screen was absent of debris.

The fuel selector handle and fuel selector arm were separated. The fuel lines from the left tank to the fuel selector valve were intact, but the lines from the right tank were twisted and separated. The fuel selector was removed and examined. Air was blown through each of the ports, and it was determined that it was set to the right tank.

The low point fuel sump was intact. The sump was disassembled, and approximately 2 tablespoons of blue-colored fuel were removed from the sump bowl. The fuel screen was absent of debris.

Blue-colored fuel was also removed from the fuel line between the fuel pump and throttle body. The fuel was absent of water and debris.

A review of fuel records revealed that the pilot had purchased 30.4 gallons of 100 LL fuel on the day of the accident, which filled the tanks to just below the tabs.

The engine remained attached to the airframe, but both propeller blades were separated from the hub assembly.

Examination of both propeller blades revealed that one blade exhibited a forward bend, chordwise scratches and scoring, and a slight twist. The blade also exhibited substantial leading edge and trailing edge gouging.

The second blade was straight, and exhibited some leading edge damage along the length of the blade.

Both blade shanks exhibited heavy gouging and scoring. Rotational scoring was also noted on the propeller flange.

The top spark plugs were removed, and appeared gray in color.

Both magnetos were intact, but each was separated from their respective housing.

The engine was examined at Teledyne Continental Motor's teardown facility, Mobile, Alabama, on October 23, 2003, under the supervision of the FAA. Examination of the engine and testing of several components revealed no mechanical deficiencies that would have prevented the engine from normal operation and production of power.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot, on March 21, 2003, by the Medical Examiners Office, Fairfax, Virginia.

Toxicological testing was performed by the FAA Toxicology Accident Research Laboratory, Oklahoma City, Oklahoma.

ADDITIONAL INFORMATION

In the past 6 years, there were 4 fatal airplane accidents in and around Leesburg, Virginia. Three of the accidents, including this accident, involved pilots who had been cleared by air traffic control (ATC) to execute the LOC RWY 17 non-precision instrument approach. The other accident involved a pilot who reported an engine problem. Three of the accidents occurred within 9 months of each other, and 2 of the accidents occurred within 3 weeks of each other.

Since the events of September 11, 2001, overall general aviation (GA) traffic has experienced a downturn of about 5-10 percent. However, Leesburg Airport's traffic has seen an increase relative to the overall GA industry, especially in the high-end categories of jet, turboprop, and high performance piston aircraft. Because of new security requirements around Washington, many of the operators who would have formerly used Reagan National airport now use Leesburg. According to airport authorities, based aircraft comprise about 5 percent jet aircraft, which is far more than the usual 1-2 percent ratio for airports with similar activity levels.

On April 21, 2003, the Safety Board Investigator-in-Charge presented a safety suggestion to the manager of the Leesburg Executive Airport to incorporate a vertical guidance system to the instrument landing approach at the airport. Such vertical guidance could have been provided by the installation of glide slope equipment with appropriate procedures, and/or by the incorporation of GPS (Global Positioning System) LNAV/VNAV (lateral/vertical navigation) and Wide Area Augmentation System (WAAS) enhanced GPS.

In December 2003, the President of the United States signed an appropriation bill, which allocated the FAA 1 million dollars to install an Instrument Landing System (ILS) at Leesburg Executive Airport. According to a representative of the airport, as of January 2004, the town was in negotiations to purchase the land needed for the installation of the ILS equipment shack. Once the land was acquired, the FAA would conduct an environmental assessment and have the system designed and installed.

The airplane wreckage was released on February 11, 2004, to a representative of the owner's insurance company.

Pilot Information

Certificate:	Private	**Age:**	49,Male
Airplane Rating(s):	Single-engine land; Single-engine sea	**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 3 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	November 23, 2002
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	November 30, 2002
Flight Time:	786 hours (Total, all aircraft), 42 hours (Total, this make and model), 719 hours (Pilot In Command, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Mooney	**Registration:**	N1005P
Model/Series:	M20R	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	29-0283
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	3368 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	59 Hrs at time of accident	**Engine Manufacturer:**	Continental
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-550
Registered Owner:	Franklin M Rizer	**Rated Power:**	300 Horsepower
Operator:		**Operating Certificate(s) Held:**	None
Operator Does Business As:	FMR Consulting LLC	**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night
Observation Facility, Elevation:	JYO,389 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	19:42 Local	**Direction from Accident Site:**	180°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Broken / 3400 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	3 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	280°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.79 inches Hg	**Temperature/Dew Point:**	5°C / 4°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Youngstown, OH (YNG)	**Type of Flight Plan Filed:**	IFR
Destination:	Leesburg, VA	**Type of Clearance:**	VFR
Departure Time:	18:20 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	Leesburg Executive Airport JYO	**Runway Surface Type:**	Asphalt
Airport Elevation:	389 ft msl	**Runway Surface Condition:**	Unknown
Runway Used:	17	**IFR Approach:**	Localizer only
Runway Length/Width:	5500 ft / 100 ft	**VFR Approach/Landing:**	Unknown

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	39.096668,-77.558891

Administrative Information

Investigator In Charge (IIC):	Yeager, Leah
Additional Participating Persons:	Dale L Nelson; FAA/FSDO; Dulles, VA Robert Collier; Mooney Airplane Company, Inc.; Kerville, TX R.K. "Kris" Whetherell; Teledyne COntinental Motors; Vernon, CT
Original Publish Date:	January 24, 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=56661