National Transportation Safety Board
Aviation Accident Final Report

Location:	Ferndale, MD	**Accident Number:**	IAD04FA021
Date & Time:	05/14/2004, 0724 EDT	**Registration:**	N755AF
Aircraft:	Mitsubishi MU-2B-60	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 135: Air Taxi & Commuter - Non-scheduled		

Analysis

The pilot was finishing his third round-trip, Part 135 cargo flight. The first round trip began the previous evening, about 2150, and the approach back to the origination airport resulted in a landing on runway 15R at 2305. The second approach back to the origination airport resulted in a landing on runway 28 at 0230. Prior to the third approach back to the airport, the pilot was cleared for, and acknowledged a visual approach to runway 33R twice, at 0720, and at 0721. However, instead of proceeding to the runway, the airplane flew north of it, on a westerly track consistent with a modified downwind to runway 15L. During the westerly track, the airplane descended to 700 feet. Just prior to an abeam position for runway 15L, the airplane made a "sharp" left turn back toward the southeast, and descended into the ground. Witnesses reported the airplane's movements as "swaying motions as if it were going to bank left, then right, and back left again," and "the nose...pointing up more than anything...but doing a corkscrew motion." Other witnesses reported the "wings straight up and down," and "wings vertical." Tower controllers also noted the airplane to be "low and tight," and "in an unusually nose high attitude close to the ground. It then "banked left and appeared to stall and then crashed." A post-flight examination of the wreckage revealed no evidence of mechanical malfunction. The pilot, who reported 6,800 hours of flight time, had also flown multiple round trips the previous two evenings. He had checked into a hotel at 0745, the morning prior to the accident flight, checked out at 1956, the same day, and reported for work about 1 hour before the first flight began.

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 a sharp turn, which resulted in an inadvertent stall and subsequent impact with terrain. Factors included the pilot's failure to fly to the intended point of landing, and his abrupt course reversal back towards it.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: APPROACH - VFR PATTERN - BASE TURN

Findings
1. (C) AIRSPEED - NOT MAINTAINED - PILOT IN COMMAND
2. STALL/SPIN - INADVERTENT - PILOT IN COMMAND
3. (F) ATC CLEARANCE - NOT FOLLOWED - PILOT IN COMMAND
4. (F) REMEDIAL ACTION - ABRUPT - PILOT IN COMMAND

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

Findings
5. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On May 14, 2004, at 0724 eastern daylight time, a Mitsubishi MU-2B-60, N755AF, operating as Epps Air Service flight 101, was destroyed when it impacted trees and terrain in Ferndale, Maryland, while approaching Baltimore-Washington International Airport (BWI), Baltimore, Maryland. The certificated airline transport pilot was fatally injured. Visual metrological conditions prevailed for the flight that had been operating on an instrument flight rules flight plan from Philadelphia International Airport (PHL), Philadelphia, Pennsylvania. The non-scheduled cargo flight was operating under 14 CFR Part 135.

A review of the Federal Aviation Administration (FAA) Air Traffic Control accident package revealed that the airplane departed Philadelphia International Airport, runway 08, at 0658, and the pilot contacted the Philadelphia South Departure controller at 0659. At 0702, the pilot was told to contact a Philadelphia South Arrival controller, and at 0711, he was told to contact a Potomac Approach Control controller. The controller accepted the airplane 47 miles northeast of Baltimore-Washington, at 8,000 feet. On initial contact, the pilot advised that he had ATIS information x-ray. The controller issued the current Baltimore altimeter setting, and told the pilot to expect a visual approach to runway 33R.

At 0713, the pilot was cleared to descend to and maintain 4,000 feet, and at 0714, he was cleared to proceed direct to the airport.

At 0717, the pilot was instructed to change to a Baltimore-Washington International Final South radio frequency, and 4 seconds later, he did so.

At 0718, the pilot reported the airport in sight, and the controller cleared him to descend to and maintain 2,500 feet.

At 0720, the pilot was advised of traffic at 12 o'clock, 2 1/2 miles, at 2,000 feet. The pilot reported the traffic in sight, and was instructed to maintain visual separation, then cleared for a visual approach to runway 33R.

At 0721, the pilot acknowledged the clearance and read back the assigned runway, then was advised to contact Baltimore Tower.

At 0721:37, the pilot stated: "baltimore tower epps one oh one with you three three right."

At 0721:43, the tower (local) controller responded: "epps one oh one runway three three right, cleared to land, wind calm."

At 0721:47, the pilot responded: "cleared to land three three right one oh one."

At 0723:22, the controller stated: "epps one oh one, traffic's a dash eight to depart," and the pilot responded, "one oh one."

At 0724:09, the controller stated: "epps, epps one oh one."

There were no further transmissions from the pilot.

Radar returns revealed that the airplane was on a westerly track, north of the airport, that bypassed the approach end of runway 33R, consistent with a modified downwind for runway 15L. Along that track, the airplane descended to 700 feet. Just prior to an abeam position for runway 15L, the airplane began a left turn back toward the southeast. The last radar return

occurred in the approximate position of the wreckage site, with the airplane at an indicated altitude of 200 feet.

Several witnesses noticed the airplane just prior to the accident. One stated that it was "flying abnormally," and initially thought it was a stunt plane. He noticed it making "swaying motions as if it were going to bank left, then right, and back left again." As the airplane neared a tree line, its "nose flipped up and back."

Another witness was standing outside when he noticed the airplane flying "very low" near a high school. It "all of a sudden made a very sharp bank to the left," then "began tilting right, then left, and finally completely back to left over a 180-degree bank, and directly into the ground."

A third witness, who recognized the airplane, saw it "banking hard to the left, then the right, then the left, back and forth. It was never inverted or level, but always out of control. The nose was pointing up more than anything, but it was, however, doing a corkscrew motion. I lost it behind a row of trees with the nose way up, maybe 60 degrees, and the wings vertical."

A fourth witness reported seeing the wings "straight up and down," while other witnesses reported the airplane "at about a 45-degree angle, then rolled to the opposite angle," "pitch and roll violently," "falling tail over nose," "wings were straight up and down," and "seemed to tip to the left with a sharp turn."

Four controllers in the tower provided written statements. The tower supervisor stated that he saw the airplane enter a "midfield downwind" for runway 33R. The airplane appeared to be "low and tight." As the supervisor "questioned his approach, [the airplane] banked left and appeared to stall and then crashed."

The local controller stated that she cleared the airplane to land on runway 33R. She then called the pilot about a DH-8 to depart before his arrival, and the pilot acknowledged the transmission. The local controller was next alerted to the airplane when the tower supervisor "showed concern over the erratic handling of the aircraft." She then saw the airplane close to the ground.

Another controller wrote that he was alerted to the airplane by the tower supervisor's "concern over the unusual approach of [the] aircraft. Looking toward the location, I observed an aircraft in an unusually nose high attitude close to the ground."

The fourth controller, who was working the clearance delivery position, heard the tower supervisor say, "What's this guy doing?" He looked out, and saw "an aircraft in an unusual attitude. The aircraft seemed to spiral to the ground and then I saw a plume of smoke."

The accident occurred during daylight hours, in the vicinity of 39 degrees, 11.205 minutes north latitude, 76 degrees, 39.026 minutes west longitude.

PILOT INFORMATION

The pilot held an airplane transport pilot certificate with a CL-600 type rating. On his latest application for an FAA first class medical certificate, issued May 7, 2004, the pilot reported 6,800 hours of total flight time.

According to company records, the pilot's latest FAR Part 135 proficiency check was completed

on February 9, 2004.

Company records also revealed that the pilot had flown the accident airplane the evenings of May 11th-12th, and May 12th-13th, as well as the evening of May13th-14th.

The pilot's duty time, starting on the evening of May 11th, was from 2000 until 0500, when he logged 3.1 hours of flight time from PHL-BWI-PHL-BWI-PHL-BWI-PHL.

The pilot's duty time, starting on the evening of May 12th, was from 2330 until 0800, when he logged 2.1 hours, including 1.6 hours of night time, from BWI-PHL-BWI-PHL-BWI.

The pilot's intended routing, starting on the evening of May 13th, was BWI-PHL-BWI-PHL-BWI-PHL-BWI.

A Safety Board air traffic control specialist reviewed the pilot's earlier arrivals at BWI. According to the specialist, during the first arrival, the pilot contacted the tower controller about 20 nautical miles east of the airport, and was cleared to land on runway 15R. The pilot asked the controller when the "short runway" was expected to open, and the controller indicated it would be about 0600. The pilot then landed on runway 15R at 2305.

During the second arrival, the pilot also contacted the tower controller about 20 nautical miles east of the airport, "with you for runway one zero and is two eight available?" The pilot was subsequently cleared to, and landed on runway 28 at 0230.

A receipt from a hotel close to Baltimore-Washington Airport revealed that the pilot checked in on May 13th, at 0745, and checked out that same day at 1956.

According to the company's director of operations, the pilot would have normally arrived at work about 1 hour prior to his first flight, and his first reported taxi-out time was about 2150.

AIRPLANE INFORMATION

According to aircraft logbook information, the right engine had been reinstalled on the airplane on May 11, 2004, after undergoing a foreign object debris (FOD) inspection. Total airplane hours at the time were 6,942.8 and the hour meter indicated 2,313.4 hours.

AIRPORT INFORMATION

BWI Airport runway 15L/33R was 5,000 feet long and 100 feet wide. The approach end of runway 33R was at an elevation of 115 feet.

METEOROLOGICAL INFORMATION

Weather, reported at BWI at 0733, included calm winds, 6 statute miles visibility, a few clouds at 15,000 feet, temperature 70 degrees F, dew point 64 degrees F, and a barometric pressure of 30.19 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The wreckage site was located in a residential area. The wreckage path began with tree strikes about 60 feet up a 120-foot tree, at a ground elevation of approximately 200 feet. The approach end of runway 15L was about 285 degrees magnetic, 3,600 feet from the initial tree strikes, while the approach end of runway 33R was about 200 degrees magnetic, 3,900 feet from the initial tree strikes. The main wreckage path continued for about 330 feet, at a down angle of about 10 degrees, along a track of 200 degrees magnetic. Tree cuts, which included 45-degree angled cuts to tree branches, correlated to about 30 degrees' right wing down.

The left wing tip tank was found near the initial tree strikes, followed by the right wing tip and tip tank about 200 feet beyond the initial tree strikes. The left wing and right engine were co-located about 300 feet from the initial tree strikes. The left engine came to rest on a boat trailer, and the main wreckage, consisting of the fuselage and empennage, came to rest on its side, about 330 feet from the initial tree strikes. The fuselage was pointing toward 005 degrees magnetic, and the empennage was twisted 50 degrees downward. A major portion of the right wing was found about another 150 feet beyond the main wreckage.

All flight control surfaces were accounted for at the scene, and control continuity was confirmed from the cockpit to the tail surfaces, and from the cockpit to the wing separation points. The landing gear and flaps were up.

Both engines exhibited signatures consistent with power being produced at the time of impact, including the burnishing of all leading edge impeller vanes, at least one impeller vane bent backwards on each engine, metal spattering on the suction side of the third stage turbine blades, and organic material, including dirt and debris, on the igniters.

The spline shafts of both fuel pumps, from the fuel pump to the fuel control units, were intact.

The right engine propeller had one blade sheared off about 10 inches from the hub, and another blade with the tip sheared off. The leading edge of a third blade was twisted aft, toward the engine, and the leading edge of the fourth blade was twisted to an aft, intermediate pitch position.

All of the left engine propeller blades were loose in the hub. The leading edge of one blade was twisted into a position opposite the direction of rotation, one blade was in a "feathered" position, and two blades had leading edges twisted aft, toward the engine.

All blades on both propellers exhibited some degree of bending or waviness, and nicks were found in the leading edges of some blades, trailing edges of other blades, and both edges on others.

There was no evidence of mechanical failure.

The hour meter indicated 2,321.7 hours.

MEDICAL AND PATHOLOGICAL INFORMATION

On May 15, 2004, an autopsy was performed on the pilot's remains by the State of Maryland, Office of the Chief Medical Examiner, Baltimore, Maryland. Toxicological testing was subsequently performed at the FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma.

ADDITIONAL INFORMATION

On May 16, 2004, the wreckage was released, and acknowledged by a representative of the operator's insurance company.

Pilot Information

Certificate:	Airline Transport	**Age:**	34, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	10/06/2003
Occupational Pilot:		**Last Flight Review or Equivalent:**	02/09/2004
Flight Time:	6800 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Mitsubishi	**Registration:**	N755AF
Model/Series:	MU-2B-60	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	755SA
Landing Gear Type:	Retractable - Tricycle	**Seats:**	2
Date/Type of Last Inspection:	03/08/2004, AAIP	**Certified Max Gross Wt.:**	11575 lbs
Time Since Last Inspection:	63 Hours	**Engines:**	2 Turbo Prop
Airframe Total Time:	6951 Hours at time of accident	**Engine Manufacturer:**	Garrett
ELT:	Installed, not activated	**Engine Model/Series:**	TPE331-10
Registered Owner:	EPPS AIR SERVICE INC	**Rated Power:**	778 hp
Operator:	EPPS AIR SERVICE INC	**Operating Certificate(s) Held:**	Air Cargo
Operator Does Business As:		**Operator Designator Code:**	ESMR

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	BWI, 150 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	0733 EDT	**Direction from Accident Site:**	240°
Lowest Cloud Condition:	Few / 150 ft agl	**Visibility**	6 Miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	Calm /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.19 inches Hg	**Temperature/Dew Point:**	21°C / 18°C
Precipitation and Obscuration:			
Departure Point:	Philadelphia, PA (PHL)	**Type of Flight Plan Filed:**	IFR
Destination:	Baltimore, MD (BWI)	**Type of Clearance:**	IFR
Departure Time:	0700 EDT	**Type of Airspace:**	Class B

Airport Information

Airport:	Baltimore-Washington Intl (BWI)	**Runway Surface Type:**	Asphalt
Airport Elevation:	146 ft	**Runway Surface Condition:**	Dry
Runway Used:	33R	**IFR Approach:**	None
Runway Length/Width:	5000 ft / 100 ft	**VFR Approach/Landing:**	Full Stop; Traffic Pattern

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	N/A	**Aircraft Fire:**	On-Ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	39.186667, -76.650556

Administrative Information

Investigator In Charge (IIC):	Paul R Cox	**Report Date:**	06/08/2005
Additional Participating Persons:	John A Cumberpatch; FAA/FSDO; Baltimore, MD Anton Coy; Epps Aviation; Atlanta, GA Ralph Sorrells; Mitsubishi Heavy Industries of America, Inc.; Addison, TX James Allen; Honeywell; Phoenix, AZ		
Publish Date:			
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