National Transportation Safety Board
Aviation Accident Final Report

Location:	Pittsfield, MA	**Accident Number:**	NYC04FA093
Date & Time:	03/25/2004, 0533 EST	**Registration:**	N201UV
Aircraft:	Mitsubishi MU-2B-36	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 135: Air Taxi & Commuter - Non-scheduled		

Analysis

Approximately 3 minutes prior to the accident, the airplane was flying in a northeast direction, at 17,100 feet, and was instructed by air traffic controllers to contact Boston Center. He acknowledged the instruction, and no further transmissions were received from the pilot. Radar data indicated the airplane continued level at 17,100 feet on a northeasterly heading, and maintained a groundspeed of 255 knots, for approximately 2 minutes after the last transmission. The airplane then climbed 300 feet, and descended abruptly, loosing 10,700 feet during the next 46 seconds, while maintaining an approximate groundspeed of 255 knots. The airplane then initiated a climb from 6,700 feet to 7,600 feet, maintained an altitude of 7,600 feet for 4 seconds, and then entered a continuous descent until the last radar contact 17 seconds later, at an altitude of 2,400 feet. Several witnesses observed the airplane prior to it impacting the ground. All of the witness described the airplane in a "flat spin" with the engines running prior to impact. Examination of recorded weather data revealed several areas of light-to-moderate precipitation echoes in the vicinity of the accident site. The maximum echo tops were depicted ranging from 14,000 to 25,000 feet, with tops near 17,000 feet in the immediate vicinity of the accident site. Recorded radar images depicted the airplane traveling through an area of lower echoes for approximately 5-minutes immediately prior to the accident. AIRMET Zulu was current for icing conditions from the freezing level to 22,000 feet over the route of flight and the accident site. Four PIREPs were also issued indicating light-to-moderate rime to mixed icing in the clouds from the freezing level to 16,000 feet. Cloud tops were reported from 16,000 to 17,000 feet by two aircraft. Examination of the airplane and engines revealed no pre-impact mechanical anomalies. Additionally, examination of the cockpit overhead switch panel indicated propeller de-ice, engine intake heat, windshield anti-ice, and wing de-ice were all in the 'off' position. According to the pilot's toxicology test results, pseudoephedrine and diphenhydramine was detected in the pilot's urine. Diphenhydramine was not detected in the blood.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's loss of aircraft control for undetermined reasons, which resulted in an inadvertent stall/spin and subsequent impact with the ground.

Findings

Occurrence #1: IN FLIGHT ENCOUNTER WITH WEATHER
Phase of Operation: CRUISE

Findings
1. WEATHER CONDITION - ICING CONDITIONS
2. WEATHER CONDITION - CLOUDS

Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: CRUISE

Findings
3. LIGHT CONDITION - NIGHT
4. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
5. AIRSPEED - NOT MAINTAINED - PILOT IN COMMAND
6. STALL/SPIN - INADVERTENT - PILOT IN COMMAND

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
7. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On March 25, 2004, at 0533 eastern standard time, a Mitsubishi MU-2B-36, N201UV, operated by Royal Air Freight Inc., as flight RAX747, was substantially damaged when it impacted terrain in Pittsfield, Massachusetts. The certificated airline transport pilot was fatally injured. Visual meteorological conditions prevailed at the time of the accident, and an instrument flight rules (IFR) flight plan had been filed for the flight, which originated at the Hagerstown Regional Airport (HGR), Hagerstown, Maryland. The on-demand cargo flight was destined for the Bangor International Airport (BGR), Bangor, Maine, and conducted under 14 CFR Part 135.

The Director of Operations for Royal Air Freight reported that the accident trip originated at the Oakland County International Airport (PTK), Pontiac, Michigan, about 2330, on the evening of March 24, 2004. The pilot flew from PTK to the Greater Rockford Airport (RFD), Rockford, Illinois, picked up cargo, and then flew to Hagerstown. The pilot dropped off a portion of the cargo at Hagerstown, and was en route to Bangor, Maine, when the accident occurred.

According to recorded communications provided by the Federal Aviation Administration (FAA), the pilot contacted the Elkins Flight Service Station at 0353 on the day of the accident, and filed an IFR flight plan from Hagerstown to Bangor. The specialist filed the flight plan and then asked the pilot if he was aware of turbulence and icing advisories, and mountain obscurations in New England. The pilot responded, "yeah, I got all the weather."

A review of the pilot's flight log, which was located in the airplane, revealed the pilot departed Hagerstown at 0423.

According to FAA air traffic control (ATC) transmissions, just prior to the accident, the airplane was being handled by the New York Air Route Traffic Control Center (ARTCC), flying in a northeast direction, in the vicinity of the Pittsfield Airport. All transmissions from the pilot were routine, and he did not report any problems with the airplane.

At 0530, controllers instructed the pilot to "contact boston center on ah one two three point seven five." The pilot responded, "two three seven five seven four seven so long." No further transmissions were received from the pilot.

Radar data indicated the airplane continued level at 17,100 feet on a northeasterly heading, and maintained a groundspeed of 255 knots, for approximately 2 minutes after the last transmission. At 0532:34, the airplane climbed 300 feet, and then descended abruptly, loosing 3,000 feet over the following 14 seconds. During the airplane's climb and abrupt descent, a groundspeed of 255 knots was maintained. Over the following 33 seconds the airplane continued to descend from 14,400 feet to an altitude of 6,700 feet, during which time the groundspeed increased slightly to 260 knots and then decreased gradually to 176 knots.

At 0533:25 the airplane initiated a climb from 6,700 feet to 7,600 feet and its groundspeed decreased from 176 knots to 125 knots. The airplane maintained an altitude of 7,600 feet for 4 seconds, and then entered a continuous descent until the last radar contact 17 seconds later, at an altitude of 2,400 feet.

Several witnesses observed the airplane prior to it impacting the ground. One witness reported

that the sound of the airplane first drew her attention to it. She described a loud grinding sound coming from the airplane, similar to "a metal I-beam going through a grinder." This sound continued for about 5-7 seconds, stopped briefly, and started again. As the sound continued, she observed the airplane spinning in a nose-high, tail low attitude, almost as if it were "hovering." She stated that the airplane began to "veer to the right," as the metallic noise stopped again. She then heard a "whining" sound coming from the airplane, as it continued to spin. She lost sight of the airplane behind trees, and then heard the impact.

A second witness observed the airplane from his second-floor apartment about 1-1/2 miles from the accident site. He stated that he could hear the airplane before he could see it, due to an overcast cloud layer, at an altitude of about 1,500 feet. The witness described the sound as a loud "howling" sound, similar to a pair of motorcycles. The sound was synchronized and continuous, with no interruption. When the witness observed the airplane "break out of the clouds," it was spinning in a counter-clockwise direction, with about a 10-degree nose-down attitude. As the witness observed the airplane spin, he also heard the sound of the engines get louder and quieter with each rotation. The witness reported that the airplane continued to spin until it impacted the ground.

A third witness observed the airplane pass over his house in a south to north direction, in a "flat spin." According to the witness, as the airplane continued to travel to the north, he heard the sound of the engines "throttling up, then throttling down, as if the pilot were trying to recover."

A fourth witness reported hearing a loud noise overhead, and looked up to see the airplane in a "flat spin." The witness reported that the engines were "very loud," and the airplane continued to spin until it impacted the ground.

PILOT INFORMATION

The pilot held an airline transport pilot certificate, and was type-rated in the Learjet. He also held a flight instructor certificate, with ratings for airplane single and multi-engine land, instrument airplane. His most recent FAA first-class medical certificate was issued on January 29, 2004, at which time he reported 6,500 hours of total flight experience.

According to the Director of Operations at Royal Air Freight, the pilot was hired in April 1998, and began flying the MU-2 in May 1998. Since that time, he had accumulated more than 2,000 hours in the MU-2. He received his type rating in the Learjet on January 23, 2001, and at the time of the accident was routinely flying both the Learjet and the MU-2. In the 90 days prior to the accident, the pilot had accumulated 142 hours in the MU-2. In the week prior to the accident, the pilot logged about 4.4 hours in the MU-2, and 10.1 hours in the Learjet.

The pilot's total duty time during the week prior to the accident included: a 4.4 hour trip in the MU-2 on March 22, 2004, followed by a 10.1-hour trip in the Learjet, originating at 1330 on March 23, 2004, and ending at 0400 on March 24, 2004. The pilot was off-duty from 0400 until 2330 on March 24, 2004, at which time the accident trip commenced.

AIRCRAFT INFORMATION

Review of the airplane logbooks revealed the airplane was maintained in accordance with an FAA Approved Aircraft Inspection Program (AAIP). The last AAIP 125-hour inspection was performed on the airplane on February 12, 2004, at an aircraft time of 13,419.9 total flight hours. No mechanical anomalies were noted in the logbooks.

METEOROLOGICAL INFORMATION

A Safety Board meteorologist conducted a review of weather conditions at the time of the accident. According to the meteorologist's Factual Report, weather charts and recorded data indicated that a dissipating warm front was present in the vicinity of the accident site, and another defined warm front was moving across Ohio, West Virginia, and Maryland, into New England. The northeast section of the National Weather Service (NWS) Radar Summary Chart, issued at 0418 depicted an area of light-to-moderate intensity echoes in the vicinity of the accident site. No NWS Radar Summary Chart was available for 0500, and 0600; however, the radar summary chart issued at 0717, depicted several areas of echoes in the vicinity of the accident site. The maximum echo tops were depicted ranging from 14,000 to 25,000 feet, with tops near 17,000 feet in the immediate vicinity of the accident site.

Recorded radar images depicted the airplane traveling through an area of lower echoes for approximately 5-minutes immediately prior to the accident.

The National Weather Service (NWS) issued AIRMET Zulu, at 0332, valid until 1000, for icing conditions from the freezing level to 22,000 feet over the route of flight and the accident site. The advisory warned of occasional moderate rime or mixed icing in-clouds and in-precipitation.

Four pilot reports (PIREPs) issued across the area, in the time period surrounding the accident, indicated light-to-moderate rime to mixed icing in the clouds from the freezing level to 16,000 feet. Cloud tops were reported from 16,000 to 17,000 feet by two aircraft.

Surface conditions reported at the Pittsfield Municipal Airport, about 4 miles to the west, at 0454, included wind from 200 degrees at 7 knots, wind variable between 170 and 240 degrees, 10 miles visibility, ceiling overcast at 5,000 feet, temperature 06 degrees Celsius, dew point 01 degrees Celsius, and barometric pressure of 30.47 inches Hg.

WRECKAGE INFORMATION

The wreckage was examined at the accident site on March 25, 2004, and all major components of the airplane were accounted for at the scene. The airplane impacted a marshy field, upright, in a flat attitude, on a heading of 150 degrees. The fuselage section of the airplane was compressed to a height of about 4 feet, and indications of forward velocity on the wings or fuselage section were not observed.

Both wings remained attached to the fuselage with the right wing tilted slightly aft. Both fuel tip tanks were ruptured; however, a substantial amount of fuel was observed on the ground, in the area of both tip tanks. The outboard and inboard fuel tanks on each wing remained intact, and approximately 60 gallons of jet fuel were drained from the tanks. Both engines remained attached to their respective wings, and two out of three propeller blades on each engine were visible. All four of the visible blades displayed chordwise scratching and S-bending. One propeller blade on each engine was buried in the ground.

Flight control continuity was confirmed from the severely compressed floorboard area, to all flight control surfaces. The flap selector in the cockpit indicated that the flaps were set to 5 degrees; however, a measurement of the flap actuator revealed the flaps were in the retracted position. The elevator trim indicator in the cockpit displayed a trim setting of 5 degrees nose down, and a measurement of the elevator trim actuator indicated a setting of 18 degrees nose

up. The rudder trim indicator in the cockpit displayed a setting of 2 degrees nose left, and a measurement of the rudder trim actuator indicated a setting of 13 degrees nose right.

The empennage section was partially separated at the vertical stabilizer attachment point. The empennage skin displayed a tear, which encircled the empennage, and the vertical stabilizer was angled about 45-degrees to the right.

Examination of the cockpit revealed the right power lever was in the 'flight idle' detent and the left power lever was approximately half an inch forward of the 'flight idle' detent. Both right and left condition levers were positioned half-way between the 'takeoff' and 'taxi' detents. The left torque gauge indicated 112 percent torque, and the right torque gauge indicated 100 percent torque. Additionally, the cabin pressurization was set to 15,500 feet, and the number 1 communication frequency was set to 123.75.

Examination of the cockpit overhead switch panel indicated the right pitot/static heat was 'on' and the stall heat was 'on.' The remainder of the overhead switches, which included: propeller de-ice, engine intake heat, windshield anti-ice, and wing de-ice were all in the 'off' position.

As the airplane was recovered from the accident site, the underside of the fuselage was examined, and the landing gear was observed in the retracted position. Additionally, one propeller blade on each engine, which had been buried in the ground, was visible. These propeller blades contained slight chordwise scratching.

Examination of both engines revealed their compressor blades were bent opposite the direction of rotation, and the third stage turbine blades displayed evidence of metal splatter.

MEDICAL AND PATHOLOGICAL INFORMATION

The Commonwealth of Massachusetts, Office of the Chief Medical Examiner, performed an autopsy on the pilot on March 25, 2004.

The FAA Toxicology and Accident Research Laboratory, Oklahoma City, Oklahoma conducted toxicological testing on the pilot. According to the pilot's toxicology test results, pseudoephedrine and diphenhydramine was detected in the pilot's urine. Diphenhydramine was not detected in the blood.

ADDITIONAL INFORMATION

According to the Director of Operations, the airplane departed PTK with full fuel (approximately 366 gallons), on March 24, 2004. He stated the normal procedure for refueling at outstations is for the pilot to request "standard fuel," which equates to 60-65 gallons in the tip tanks, and full main tanks. This procedure is adapted depending on the amount of cargo onboard and other trip circumstances (distance to next airport, prevailing weather conditions, etc.).

Interviews with fixed base operator (FBO) personnel at RFD and HGR indicated the airplane was refueled at both airports. The pilot purchased 111 gallons of Jet A fuel at RFD at 0011, and also purchased 184 gallons of jet A fuel at HGR, about 0400.

Wreckage Release

The wreckage was released to a representative of the owner's insurance company on March 25, 2005.

Pilot Information

Certificate:	Airline Transport; Flight Instructor	**Age:**	33, 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):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim.	**Last FAA Medical Exam:**	01/29/2004
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	6500 hours (Total, all aircraft), 2000 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Mitsubishi	**Registration:**	N201UV
Model/Series:	MU-2B-36	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	680
Landing Gear Type:	Retractable - Tricycle	**Seats:**	2
Date/Type of Last Inspection:	02/12/2004, AAIP	**Certified Max Gross Wt.:**	11575 lbs
Time Since Last Inspection:		**Engines:**	2 Turbo Prop
Airframe Total Time:	13420 Hours as of last inspection	**Engine Manufacturer:**	Garrett-AiResearch
ELT:	Installed, not activated	**Engine Model/Series:**	TPE331-10-511
Registered Owner:	ROYAL AIR FREIGHT INC	**Rated Power:**	900 hp
Operator:	ROYAL AIR FREIGHT INC	**Operating Certificate(s) Held:**	On-demand Air Taxi (135)
Operator Does Business As:		**Operator Designator Code:**	BUHA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Night
Observation Facility, Elevation:	PSF	**Distance from Accident Site:**	
Observation Time:	0554 EST	**Direction from Accident Site:**	
Lowest Cloud Condition:		**Visibility**	10 Miles
Lowest Ceiling:	Overcast / 5000 ft agl	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	Variable	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.48 inches Hg	**Temperature/Dew Point:**	5°C / 1°C
Precipitation and Obscuration:			
Departure Point:	Hagerstown, MD (HGR)	**Type of Flight Plan Filed:**	IFR
Destination:	Bangor, ME (BGR)	**Type of Clearance:**	IFR
Departure Time:	0423 EST	**Type of Airspace:**	Class C

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	On-Ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	42.451389, -73.201111

Administrative Information

Investigator In Charge (IIC):	Jill M Andrews	**Report Date:**	07/07/2005
Additional Participating Persons:	Victoria Anderson; FAA/AAI-100; Washington, DC Ralph Sorrells; Mitsubishi Heavy Industries America, Inc.; Addison, TX Marlin Kruse; Honeywell Engines; Phoenix, AZ Richard Bunker; Massachusetts Aeronautics Commission; Boston, MA		
Publish Date:			
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