Aviation Investigation Final Report

Location:	Carolina, Puerto Rico	**Accident Number:**	MIA02FA084
Date & Time:	April 15, 2002, 15:03 Local	**Registration:**	N45BS
Aircraft:	Mitsubishi MU-2B-35	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	2 Fatal, 2 Minor
Flight Conducted Under:	Part 91: General aviation - Positioning		

Analysis

The flight departed VFR, and when near the destination airport, was advised by air traffic control to hold VFR over the "plaza" and to make left 360 degree orbits. Several witnesses reported light rain was occurring at the time of the accident; there was no lightning or thunder. One witness located where the airplane came to rest reported observing the airplane emerge from the base of the clouds in a 45-degree left wing low and 20 degrees nose low attitude. He momentarily lost sight of the airplane but then noted it rolled to a wings level attitude. He also reported hearing the engine(s) "cutting in an out." Another witness located approximately 1/4 mile north of the accident site observed the airplane flying eastbound beneath the clouds in a right wing and nose low attitude, he also reported hearing the engine(s) sounding like they were "cutting in and out." A pilot-rated witness located an estimated 1,000 feet from where the airplane came to rest estimated that the ceiling was at 300 feet and there was light drizzle. He observed the airplane in a 45-degree angle of bank to the right and in a slight nose low attitude. He stated that the airplane continued in that attitude before he lost sight of the airplane at 250 feet. The airplane impacted trees then a concrete wall while in a nose and right wing low attitude. The airplane then traveled through automobile hoists/lifts which were coverered by corrugated metal, and came to rest adjacent to a building of an automobile facility. Impact and a postcrash fire destroyed the airplane, along with a building and several vehicles parked at the facility. Examination of the airplane revealed the flaps were symmetrically retracted and landing gears were retracted. No evidence of preimpact failure or malfunction was noted to the flight controls. Examination of the engines revealed no evidence of preimpact failure or malfunction; impact and fire damage precluded testing of several engine accessories from both engines. Examination of the propellers revealed no evidence of preimpact failure or malfunction. Parallel slash marks were noted in several of the corrugated metal panels that covered the hoists/lifts, the slashes were noted 25 and 21 inches between them. According to the airplane manufacturer, the 25 inch distance between the propeller slashes corresponds to an airspeed of 123 knots. Additionally, the power-off stall speed at the airplanes calculated weight with the flaps retracted and 48 degree angle of bank was calculated to be 122 knots.

Review of NTSB plotted radar data revealed that the pilot performed one 360-degree orbit to the left with varying angles of left bank and while flying initially at 1,300 feet, climbing to near 1,500 feet, then descending to approximately 800 feet. The airplane continued in the left turn and between 1502:10 and 1502:27, the calibrated airspeed decreased from 160 to 100 knots. At 1502:27, the bank angle was 48 degrees, and the angle of attack was 26 degrees. Between 1502:30 and 1502:35, the true heading changed indicating a bank to the right. The last plotted altitude was 200 feet, which occurred at 1502:35. A NTSB weather study indicated that at the area and altitude the airplane was operating, NWS VIP level 1 to 2 echoes (light to moderate intensity) were noted. Additionally, the terminal aerodrome forecast (TAF) for the destination airport indicated that temporarily between 1400 and 1800 (the flight departed at approximately 1436 and the accident occurred at approximately 1503), visibility 5 miles with moderate rain showers, scattered clouds at 1,500 feet, and a broken ceiling at 3,000 feet.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of the pilot to maintain airspeed (Vs) while maneuvering following inadvertent encounter with clouds resulting in an inadvertent stall and uncontrolled descent and subsequent in-flight collision with trees, a wall, and a building.

Findings

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

Findings
1. WEATHER CONDITION - CLOUDS

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

Findings
2. (C) AIRSPEED(VS) - NOT MAINTAINED - PILOT IN COMMAND
3. STALL - INADVERTENT - PILOT IN COMMAND

Occurrence #3: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: DESCENT - UNCONTROLLED

Findings
4. OBJECT - TREE(S)
5. OBJECT - WALL/BARRICADE
6. OBJECT - BUILDING(NONRESIDENTIAL)

Factual Information

HISTORY OF FLIGHT

On April 15, 2002, about 1503 Atlantic standard time, a Mitsubishi MU-2B-35, N45BS, registered to Maxfly Aviation, Inc., operated by Crucian International Airlines, experienced a loss of control while orbiting and crashed at an automobile parts and service facility near Carolina, Puerto Rico. Instrument meteorological conditions prevailed in the area at the time of the accident and no flight plan was filed for the 14 CFR Part 91 positioning flight from Henry E. Rohlsen Airport (TISX), St. Croix, U.S.V.I., to Luis Munoz Marin International Airport (TJSJ), San Juan, Puerto Rico. The airplane was destroyed by impact and a post crash fire and the airline transport-rated pilot, the sole occupant, was fatally injured. One individual on the ground at the automobile facility was fatally injured and two individuals at the facility sustained minor injuries. The flight originated from St. Croix, about 1436.

On the day of the accident at 1345, the pilot phoned the San Juan Automated Flight Service Station (SJU AFSS), and filed two flight plans, neither of which involve the accident flight. The pilot did not obtain a preflight weather briefing during the phone call. According to a transcription of communications with the San Juan Combined En Route Approach Control facility, at 1437:47, the pilot contacted the facility and advised that the flight had departed from TISX, climbing through 2,500 to 8,500 en route to TJSJ. The pilot was provided a discrete transponder code and the flight was radar identified. The flight continued and at 1454:07, air traffic control communications were transferred to San Juan Approach Control. The pilot established initial contact with that facility and advised the controller that the flight was, "...out a eight point five." The controller acknowledged and provided an altimeter setting, which the pilot acknowledged. At 1459:16, the controller advised the pilot, "...hold [visual flight rules] over plaza please make left [360's]." The pilot responded with the last two letters of the call sign of the airplane and at 1502:31, the controller advised the pilot to hold south of Plaza Carolina, to continue south and hold south of the plaza. There was no response from the pilot. At 1505:02, the controller advised on the frequency that the airplane was lost from radar.

Several witnesses reported that the weather conditions near the crash site at the time of the accident consisted of light rain; there was no lightning or thunder. One witness located where the airplane came to rest reported observing the airplane emerge from the base of the clouds in a 45-degree left wing low and 20 degrees nose low attitude. He momentarily lost sight of the airplane but then noted it rolled to a wings level attitude. He also reported hearing the engine(s) "cutting in an out." Another witness located approximately 1/4 mile north of the accident site observed the airplane flying eastbound beneath the clouds in a right wing and nose low attitude, he also reported hearing the engine(s) sounding like they were "cutting in and out." A pilot-rated witness located an estimated 1,000 feet from where the airplane came to rest estimated that the ceiling was at 300 feet and there was light drizzle. He observed the

airplane in a 45-degree angle of bank to the right and in a slight nose low attitude. He stated that the airplane continued in that attitude before he lost sight of the airplane at 250 feet. The pilot-rated individual did not witness the accident but traveled to the accident site and observed a postcrash fire.

PERSONNEL INFORMATION

The pilot was the holder of an airline transport pilot certificate with ratings airplane multi-engine land and sea. He was also the holder of a commercial pilot certificate with the rating airplane single engine land. He was issued a first class medical certificate on January 3, 2002, with the limitation, "Holder shall carry glasses for near vision while exercising the privileges of his airman certificate."

His last check ride in accordance with 14 CFR Part 135.297 occurred on February 15, 2002, during a 1.5 hour flight in the accident airplane. The result was listed as "approved."

Review of his pilot logbook that begins with an entry dated January 2, 1994, and ends with an entry dated April 8, 2002, revealed he logged a total time of approximately 768 hours in Mitsubishi model MU2 airplanes. Further review of his pilot logbook revealed that between January 28, 2000, and April 8, 2002 (the last logged entry), he logged a total time of 586.3 hours all in the accident airplane. Between January 4, 2002, and April 8, 2002 (the last logged entry), he logged a total time of 117.1 hours; all in the accident airplane. He logged a total time of 10,583.2 hours, of which approximately 9,413 hours were as pilot-in-command. His total logged time for multi-engine land and sea was approximately 10,243 hours.

AIRCRAFT INFORMATION

The airplane received type certification on May 28, 1971, and was manufactured in 1972, as a Mitsubishi MU-2B-35, serial number 558. The airplane was initially certified and equipped with two Air Research TPE-331-6-251M engines rated at 665 shaft horsepower. The engines were modified in accordance with Service Bulletin TPE331-72-0120, which changed the engine model to TPE331-6-252M; the shaft horsepower remained unchanged. The airplane was also equipped with two hydraulically operated Hartzell model HC-B3TN-5C constant speed propellers which are full manual feathering and reversing.

The airplane was last inspected on February 13, 2002, in accordance with a 50/150 hour inspection using the airline's maintenance manual and checklist. The airplane had accumulated approximately 60 flight hours since the inspection as of the last logged flight in the pilot's pilot logbook (April 8, 2002). Review of the airplane maintenance records revealed that the last recorded altimeter system and transponder checks performed in accordance with Title 14 Code of Federal Regulations (CFR) Part 43, Appendix's E and F, occurred on January 22, 1999. A computerized printout for the airplane dated July 10, 2001, indicates that the "static", "[altimeter]" and "transponder" checks due every 24 months, were due on January 1, 2003.

A review of the aircraft log sheets revealed that between January 16, 2002, and April 5, 2002, the airplane had been operated 71.6 hours on 95 flights; there were only two pilot-reported discrepancies recorded in the log between these dates. Both discrepancies were related to the right engine and were corrected. The first dealt with the starter/generator, and the second dealt with the bleed valve.

METEOROLOGICAL INFORMATION

According to an NTSB Meteorological Factual Report (NTSB Weather Report), a special weather observation taken at the Luis Munoz Marin International Airport, San Juan, Puerto Rico, at 1456 (approximately 7 minutes before the accident), indicates the wind was from 080 degrees at 9 knots, the visibility was 10 statute miles, scattered clouds existed at 900 feet, a broken ceiling existed at 2,100 feet, overcast clouds existed at 4,500 feet, the temperature and dew point were 24 and 23 degrees Celsius, respectively, and the altimeter setting was 30.01 inHg. The remarks section indicates the rain ended at 1444, the sea level pressure was 1016.1 mb, and rain showers were noted in the vicinity southeast through south and north through northeast. Another special weather observation taken from the same airport at 1511 (approximately 8 minutes after the accident), indicates the wind was from 070 degrees at 12 knots gusting to 17 knots, the visibility was 10 statute miles, a broken ceiling existed at 800 feet, a second broken layer existed at 1,200 feet, overcast clouds existed at 3,500 feet, the temperature, dew point and altimeter remained the same from the previous special observation.

The NTSB Weather Report further indicated that doppler weather radar indicated that at 1508 in the area and altitude the airplane was flying, a band of echoes with reflectivities in the range of 15 to 35 dBZ or NWS VIP Level 1 to 2 (very light to light to moderate) intensities were noted over the accident site. The Geostationary Operations Environmental Satellite number 8 (GOES-8) data infrared and visible imagery indicated no significant convective activity depicted along the route from the Virgin Islands to Puerto Rico; and none in the general vicinity of the accident site. A large band of low and middle altitude clouds cover the area and obscures the accident site. The Area Forecast (FA) for the San Juan Flight Information Region (FIR) issued at 1115 on April 15, 2002, valid from 1400Z through 0200 on April 16, 2002, for the San Juan FIR south of 20 degrees North latitude was for scattered clouds at 2,500 feet, scattered to broken clouds at 5,000 feet, with layered clouds tops above 24,000 feet. Widely scattered rain showers and occasional broken ceilings at 2,500 feet through 2200 were forecast. The Luis Munoz Marin International Airport (TJSJ) Terminal Aerodrome Forecast (TAF) issued on the day of the accident at 1330 (approximately 15 minutes before the pilot phoned the SJU AFSS and 1 hour 46 minutes before the flight departed), valid from 1400, to 1400 the following day indicates in part that beginning at 1400 (approximately 36 minutes before the flight departed), the wind from 080 degrees at 15 knots gusting to 20 knots, visibility greater than 6 miles, a few clouds at 1,500 feet, ceiling broken at 3,500 feet, overcast clouds at 7,000 feet. Temporary condition between 1400 and 1800, wind from 080 degrees at 15 knots gusting to 25 knots, visibility 5 miles in moderate rain showers, scattered clouds at 1,500 feet, ceiling broken at 3,000 feet,

overcast clouds at 7,000 feet.

COMMUNICATIONS

The pilot was last in contact with the San Juan Combined En Route Approach Control facility (CERAP). The controller who was moderately busy working combined East and West positions reported marginal VFR conditions existed at TJSJ.

WRECKAGE AND IMPACT INFORMATION

Examination of the accident site area revealed damage to a palm tree approximately 40 feet above ground level; the palm tree was located near a residence. Additional damage to another tree located 17 feet from the palm tree was noted. An approximately 10-feet high concrete block wall oriented east/west located approximately 15 feet past the second tree was damaged; the outer right wing panel was lodged in the broken wall section. The straight line magnetic heading from the damaged palm tree to the damaged concrete block wall was approximately 096 degrees. the right fuel tip tank was located on the north side of the wall, adjacent to it. A smell of jet fuel was noted in the area where the right tip tank was found. Automobile bays covered by corrugated metal panels were located on the south side of the concrete wall; some of the bays contained automobile lifts/hoists associated with the automobile service facility. Parallel slashes measuring 21 and 25 inches between the two were noted in several of the panels, respectively. The airplane came to rest upright on a magnetic heading of approximately 160 degrees, adjacent to a building of the automobile facility. The center of the fuselage was located 50 feet from the damaged concrete wall section, and approximately 82 feet from the first damaged tree. The aft section of the left fuel tip tank was found in one of the rooms of the second floor of the building. Fire and impact damage was noted to the building. A total of seven cars were damaged; two of which were destroyed by the postcrash fire.

Examination of the airplane revealed the wing box section and the outer sections of both wings were separated; sections of both wings were located in the main wreckage area. Both engines remained secured to wing structure; however, both engines/wing structure were separated. The left horizontal stabilizer and elevator remained attached, while only 1/3 span of the right horizontal stabilizer and elevator remained attached. The outboard tip of the right elevator was found adjacent to the main wreckage. A semi-circular indentation was noted on the leading edge of the right horizontal stabilizer near the fracture surface. The vertical stabilizer and rudder remained attached. Both main fuel shutoff valves were in the open position; slight debris was noted in the left valve. Both propellers were separated from the engines and were found in close proximity to the main wreckage area. The left propeller by serial number was noted to have all three propeller blades secured by clamps, while the right propeller by serial number was noted to have two of the three propeller blades secured by clamps. The remaining blade of the right propeller was separated but found in close proximity to the main wreckage. The cockpit was impact and fire damaged and the cabin interior was consumed by the post crash fire. Both elevator trim tab actuators were symmetrically extended 1 7/8 inches

which corresponds to 15 degrees nose up. The rudder trim actuator measured 7.0 inches extended with equates to a neutral position. The left and right aileron trim tab actuators measured 2.625 and 3.00 inches extended respectively, which equates to neutral and 1 degree, respectively. The inboard, main, and outboard left and right flap actuators were all retracted, as were all landing gear actuators. Continuity of both elevator flight control cables was confirmed from the front to rear bellcranks, and both rudder flight control cables were continuous from the rear bellcrank to approximately 6 feet forward of the main landing gear location where both cables exhibited evidence of tension overload. Both spoiler flight control cables were connected at the spoiler mixer; one cable exhibited tension overload approximately 12 feet from the spoiler mixer while the second cable was pinched in the wreckage and molten aluminum. Both cables were cut approximately 6 feet forward of the main landing gear location. The roll, pitch, and yaw autopilot servos were all free to rotate; the roll servo capstain was separated from the control head. Both engines and propellers were recovered for further examination.

Examination of the left engine was performed at the manufacturer's facility with NTSB oversight. Impact and heat damage was noted externally. The examination revealed the propeller shaft rotated freely in the nose cone housing, the propeller mount flange was bent aft. The hub and ring gears inside the nose cone housing appeared undamaged. The mounting studs of the planetary gears were bent in the direction of engine rotation. Binding preventing 360 degrees of rotation was noted to several of the gears, propeller governor drive gearshaft, and high speed pinion of the intermediate gearbox (diaphragm) assembly. The gears of the planet gear assembly were noted to rotate freely; no evidence of preimpact failure or malfunction was noted to the intermediate gearbox assembly. The accessory drive housing (gearcase) assembly, torque sensor system and direct drive fuel control (DDFC) gears did not exhibit evidence of preimpact failure or malfunction. The shouldered (main) shaft was not fractured while the torsion shaft was fractured approximately 1 inch forward of the aft end; the fracture surface was consistent with shear. The first stage compressor shroud exhibited approximately 180 degrees of rotational scoring, and the leading edges of 7 of blades of the first stage compressor impeller were bent opposite the direction of rotation. The aft impeller hub of the first stage impeller exhibited 360 degrees of rotational scoring, with corresponding rotational scoring noted on the first stage compressor diffuser assembly air seal area. The aft flange of the second stage compressor shroud housing was fractured nearly 360 degrees; 360 degrees of rotational scoring was noted on the second stage compressor shroud surface. Rotational scoring on the shroud line edges of all blades of the second stage impeller was noted. The forward bolt flange of the combustor plenum was buckled and a 1-inch fracture in the case was noted; no burn through was noted. The leading and trailing edges of all vanes of the first stage turbine stator and the leading edges of all blades of the first stage turbine rotor exhibited damage/erosion. Rotational scoring was noted on nearly all blade tips of the first stage turbine rotor, with corresponding rotational scoring damage to the first stage turbine tips shroud segments. The second stage turbine stator exhibited damage to the leading edge of all vanes with significant damage to the trailing edges of 8 consecutive vanes. Additionally, metal spray deposits were noted on the suction side of the vanes of the second stage turbine stator. Rotational scoring was noted on the forward blade platforms and all blade tips of the second

stage turbine rotor; metal spray deposits were noted on the suction side of the blades. The third stage turbine stator exhibited rotational scoring on approximately 270 degrees of the turbine tip shroud; metal spray deposits were noted on the suction side of the vanes. Rotational scoring was noted to the blade tips and forward blade platforms of the third stage turbine rotor. The oil pressure pump was noted to rotate freely, and no damage was noted to the gearbox and turbine oil scavenge pumps. Damage to the fuel pump, fuel control, and fuel shutoff valve precluded operational testing. Impact damage was noted to the ignition exciter; no functional testing was performed.

Examination of the right engine was also performed at the manufacturer's facility with NTSB oversight. Impact and heat damage was noted externally. The examination revealed the propeller mount flange was bent aft, the nose cone housing was fractured. No failure of the hub and ring gears inside the nose cone housing were noted. The mounting studs of the planetary gears were bent in the direction of engine rotation. Several gears of the intermediate gearbox (diaphragm) assembly could not be rotated. The aft gear of the "tach/generator drive shaft" was fractured and deformed. The "starter/generator gearshaft" aft splines were damaged. Five of the mount flanges for the planet gear assembly were fractured; the gears of the planet gear assembly rotated freely. The inlet and aft flange of the accessory drive housing (gearcase) assembly were damaged; impact damage was noted to the torque sensor and DDFC housings, and to the second DDFC gear. The shouldered (main) shaft was not fractured while the torsion shaft was fractured approximately 1 inch forward of the aft end; the fracture surface was consistent with shear. The first stage compressor shroud exhibited 360 degrees of rotational scoring, and the leading edge of one of the first stage compressor impeller blades was bent opposite the direction of rotation. Damage to the leading edge of two of the first stage compressor diffuser assembly vanes was noted. The second stage compressor shroud exhibited 360 degree rotational scoring, with corresponding rotational scoring to the leading edges of all blades of the second stage compressor impeller. A white colored residue was noted in the flow path between the blades of the second stage compressor impeller, and on the pressure side of the vanes of the second stage compressor diffuser vane assembly. Impact damage and a fracture was noted to the combustor plenum near the aft turbine engine mount. Impact damage was noted to the outer wall, inner transition liner, and outer transition liner of the combustor section; no burn through was noted. The leading and trailing edges of all vanes of the first stage turbine stator exhibited damage/erosion, and the outer vane support of the first stage turbine stator was fractured in four locations. The first stage turbine rotor exhibited damage to the leading edges of all blades; 360-degree rotational scoring was noted on the forward blade platforms. The tips of all turbine blades were damaged. The second stage turbine stator exhibited damage to the leadings edges of all blades and trailing edge separation damage to seven consecutive blades. Metal spray deposits were noted on the suction side of the vanes. Nearly 360-degree rotational scoring was noted to the second stage turbine shroud. The second stage turbine rotor exhibited rotational scoring on the blade tips, and metal spray deposits on the suction side of the blades. The third stage turbine stator exhibited damage to the leading edges of nearly all blades; metal spray deposits were noted to the suction sides of the vanes. Rotational scoring was noted on approximately 20 degrees of the third stage turbine shroud,

while rotational scoring was noted to the leading and trailing edges of the blades of the third stage rotor near the tips. The fuel pump was separated from the gearcase at the gearcase flange; the fuel pump internal drive shaft was fractured through the spline area. Impact damage and fire damage to the fuel pump and fuel control units respectively, precluded operational testing. The ignition exciter was not located.

Examination of the left propeller was performed with NTSB oversight at a FAA certified repair station with a representative of the propeller manufacturer present. Extensive fire damage was noted to two of the three propeller blades. The cylinder was dislodged from the hub, and the Nos. 1 and 2 propeller blades were found in "extreme reverse" based on the as found position of the counterweights. The as found position of the counterweight of the No. 3 propeller blade indicated that blade was about 60 degrees from the plane of rotation. The No. 1 propeller blade had rotated in its clamp approximately 20 degrees towards the high pitch position while the No. 2 propeller blade also rotated in its clamp approximately 10 degrees towards the high pitch position. The No. 3 propeller blade was not rotated in its clamp. The "Feather Stops" was, "intact and unremarkable." Impact marks on the piston and cylinder correlate to a propeller blade angle of approximately 35 degrees. Propeller blade No. 1 was bent forward approximately 45 degrees and was not twisted; a semi-circular gouge was noted on the leading edge of the blade approximately 12 inches from the blade tip. The remaining two propeller blades had only approximately 1/4 of the nominal length remaining; fire damage was noted to the ends of the remaining portions of both blades.

Examination of the right propeller was performed with NTSB oversight at a FAA certified repair station with a representative of the propeller manufacturer present. The spring and cylinder assembly had separated from the propeller hub. Two of the three propeller blades (blade Nos. 1 and 2) remained secured to the propeller hub. The No. 3 propeller blade exhibited a fractured clamp and pilot tube. Propeller blade No. 3 which had been recovered from the accident site had a section of clamp secured to the propeller blade. The propeller hub at the No. 3 propeller blade position also had a clamp secured to it. Propeller blades Nos. 1 and 3 were bent forward approximately 45 degrees at mid-blade; no twisting was noted. Damage to the leading edge of propeller blade No. 3 was noted. Impact marks on the propeller hub by the pitch change link arms indicate that the Nos. 1 and 3 propeller blades were at a blade angle slightly less than 48.5 degrees and the No. 2 propeller blade was at a blade angle of slightly less than 38.5 degrees. Additionally, an impact mark made by the butt end of propeller blade No. 2 on the propeller hub indicates the blade was in an extreme reverse blade angle when the mark was created. The pilot tubes for propeller blades Nos. 2 and 3 were fractured.

MEDICAL AND PATHOLOGICAL INFORMATION

A postmortem examination of the pilot was performed by Javier G. Serrano, M.D., Patologo Forense of the Instituto de Ciencias Forenses, San Juan, Puerto Rico. The cause of death was listed as severe body trauma with 4th degree burns.

Toxicological testing of specimens of the pilot was performed by the FAA Toxicology and

Accident Research Laboratory (CAMI) and the Instituto de Ciencias Forenses de Puerto Rico. The results of analysis by CAMI was negative for carbon monoxide, cyanide, ethanol, and tested drugs. The results of analysis by Ciencias Forenses de Puerto Rico was negative for volatiles, cocaine, and opiates.

TESTS AND RESEARCH

National Transportation Safety Board personnel from the Vehicle Performance Division located in Washington, D.C., obtained radar data for the accident flight and prepared several radar plots depicting the flight path of the airplane, altitude (feet), airspeed (true, calibrated, ground speed, ground speed based on raw radar returns), rate of climb, heading (true, magnetic, and true track angle), angle of bank, and angle of attack. The plots depicting altitude, airspeed, rate of climb, heading, angle of bank, and angle of attack begin at 1458:00, and end at 1503:00. Review of one of the radar plots titled "N45BS Position Relative to Crash Site" revealed the airplane was noted to complete one 360-degree turn to the left, and continue in the left turn with the last radar return located over the plotted accident site location. As previously noted, the pilot was advised by the controller at 1459:16, to hold VFR over the plaza and make left 360 degree orbits. Review of the altitude plot revealed that between 1459:35 and 1502:27, the airplane climbed from 1,300 to approximately 1,500 feet, then descended to approximately 800 feet which occurred at approximately 1502:27. Between 1502:27 and 1502:35 (the last plotted altitude), the airplane descended from 800 to 200 feet, which calculated to an average rate of descent of 4,500 feet per minute. Review of the bank angle plot revealed that between 1459:35 and 1502:27, the airplane was banked to the left with varying degrees of bank; the maximum left bank angle (approximately 48 degrees), occurred at 1502:27. Review of the airspeed plot revealed that between 1459:35 and 1502:27, the calibrated airspeed decreased and increased in several cycles. From 1502:10 to 1502:27, the calibrated airspeed decreased from 160 to 100 knots. Review of the "angle, degrees" plot depicting angle of attack revealed between 1459:35 and 1502:27, the angle of attack remained positive and moved inverse to the calibrated airspeed; between 1502:22 and 1502:27, the angle of attack increased from 12 to 26 degrees. Between 1502:30 and 1502:35, the true heading changed indicating a bank to the right.

According to personnel from the airplane manufacturer, based on the calculated weight at the time of the accident, the flaps being retracted, and the bank angle as depicted in the NTSB plots (48 degrees), the power-off stall speed was calculated to be 122 knots calibrated airspeed. The airplane flight manual indicates the velocity minimum control speed (Vmc) with 5 and 20 degrees flaps extended are 99 and 90 knots calibrated airspeed, respectively.

As previously noted in the wreckage and impact section of this report, a corrugated metal roof section covering the automobile lift/hoist contained parallel slash marks measured to be 25 inches apart. According to personnel from the airplane manufacturer, the measured distance between the slashes corresponds to an airspeed of approximately 123 knots.

On the day of the accident before departure, all five fuel tanks of the airplane were topped off;

a total of 115 gallons of Jet A were added. Personnel of the facility that fueled the airplane reported that after being notified of the accident, they immediately checked the two fuel truck tank sumps and the filter drain; no contaminants or water were detected. They also checked a sample of fuel under pressure from the nozzle for contaminants; none were reported. In addition, the "API Test" was performed from a sample of fuel; there were no discrepancies, and there were no reports of discrepancies from personnel of airplanes fueled from the same source.

ADDITIONAL INFORMATION

The wreckage minus the retained engines and propellers was released to Luis A. Irizarry, of L.A. Irizarry & Associates on April 26, 2002. The retained engines and propellers were also released to Mr. Irizarry on March 15, 2004.

Pilot Information

Certificate:	Airline transport; Commercial	**Age:**	60,Male
Airplane Rating(s):	Single-engine land; Multi-engine land; Multi-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 1 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	January 3, 2002
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	February 15, 2002
Flight Time:	10583 hours (Total, all aircraft), 768 hours (Total, this make and model), 9413 hours (Pilot In Command, all aircraft), 97 hours (Last 90 days, all aircraft), 43 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Mitsubishi	**Registration:**	N45BS
Model/Series:	MU-2B-35	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	558
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	February 13, 2002 Continuous airworthiness	**Certified Max Gross Wt.:**	10800 lbs
Time Since Last Inspection:	60 Hrs	**Engines:**	2 Turbo prop
Airframe Total Time:	7236 Hrs as of last inspection	**Engine Manufacturer:**	Airesearch
ELT:	Installed	**Engine Model/Series:**	TPE331-6-252M
Registered Owner:	Maxfly Aviation, Inc.	**Rated Power:**	665 Horsepower
Operator:	Crucian International Airlines	**Operating Certificate(s) Held:**	On-demand air taxi (135)
Operator Does Business As:		**Operator Designator Code:**	X21A

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	TJSJ,9 ft msl	**Distance from Accident Site:**	
Observation Time:	14:56 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Scattered / 900 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Broken / 2100 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	9 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	80°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.01 inches Hg	**Temperature/Dew Point:**	24°C / 23°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Christiansted (TISX)	**Type of Flight Plan Filed:**	None
Destination:	San Juan, PR (TJSJ)	**Type of Clearance:**	VFR
Departure Time:	14:36 Local	**Type of Airspace:**	Class C

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	1 Fatal, 2 Minor	**Aircraft Explosion:**	On-ground
Total Injuries:	2 Fatal, 2 Minor	**Latitude, Longitude:**	18.393888,-65.983055

Administrative Information

Investigator In Charge (IIC):	Monville, Timothy
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