National Transportation Safety Board
Aviation Accident Final Report

Location:	Belgrade, MT	**Accident Number:**	SEA07FA051
Date & Time:	02/06/2007, 2104 MST	**Registration:**	N45MF
Aircraft:	Beech 200	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	3 Fatal
Flight Conducted Under:	Part 91: General Aviation - - Air Medical (Medical Emergency)		

Analysis

The cross-country flight was on an instrument flight rules (IFR) flight plan, approximately 42 nautical miles from the tower-controlled destination airport, when the pilot was cleared for the visual approach. Dark night visual meteorological conditions prevailed, and there was an overcast layer of clouds at 11,000 feet. After the en route radar service was terminated, the pilot contacted the local control tower and made a garbled and partially unintelligible transmission. Shortly after the time of the transmission, local law enforcement personnel received reports of a downed aircraft. The wreckage was located later that evening approximately 80 feet below the peak of a ridge that rose to an elevation of approximately 5,700 feet. From the initial point of contact with terrain, the debris path was scattered over the crest of the ridge and continued down the opposing side, in a south-southeast direction, toward the airport. The ridge was the highest obstruction between the accident location and the destination airport. The airport is located in a large valley and is surrounded by rising mountainous terrain. At night, clouds and terrain are difficult for pilots to see, and a gradual loss of visual cues can occur as flight is continued toward darker terrain. Additionally, the horizon is less visible and less distinct at night than during the day. Because the pilot was descending the airplane over rural, mountainous terrain that provided few visual ground reference cues, and because the overcast cloud layer would have prevented moonlight from illuminating the terrain, it is likely that the pilot did not see the rising terrain as the airplane continued toward it. The airplane was equipped with an Enhanced Ground Proximity Warning System; however, impact damage to the unit precluded post accident testing. It is not known how the unit was configured during the flight or what type of alerts the pilot received prior to impact. Post accident examination of the wreckage, to include both engines, did not disclose evidence of a mechanical malfunction prior to impact. Additionally, no evidence was found to suggest an in-flight structural failure.

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 an adequate altitude and descent rate during a night visual approach. Dark night conditions and mountainous terrain are factors in the accident.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT

Findings
1. (F) TERRAIN CONDITION - RISING
2. (C) ALTITUDE/CLEARANCE - NOT MAINTAINED - PILOT IN COMMAND
3. (F) TERRAIN CONDITION - MOUNTAINOUS/HILLY
4. (C) DESCENT - NOT MAINTAINED - PILOT IN COMMAND
5. (F) LIGHT CONDITION - DARK NIGHT

Factual Information

This report was modified on January 6, 2008.

HISTORY OF FLIGHT

On February 6, 2007, at 2104 mountain standard time, a Beech 200 King Air airplane, N45MF, registered to and operated by Metro Aviation, Inc., of Shreveport, Louisiana, collided with sparsely populated mountainous terrain approximately 13 nautical miles (nm) north-northwest of the Gallatin Field Airport (BZN), Belgrade, Montana. The Emergency Medical Services (EMS) positioning flight was operated under the provisions of 14 Code of Federal Regulations (CFR) Part 91, and an instrument flight rules (IFR) flight plan was in effect. The airplane sustained substantial damage and the three occupants, an airline transport pilot, flight paramedic and flight nurse, were killed. The air ambulance was under contract to Benefis Healthcare/Mercy Flight, Great Falls, Montana. The flight departed Great Falls International Airport, Great Falls, Montana, at 2040 with an intended destination of BZN (approximately 103 nm from the departure airport). Instrument meteorological conditions prevailed at the departure airport and dark night visual meteorological conditions prevailed at the destination airport.

A review of the Air Traffic Control (ATC) transcripts for the flight indicated that radio communications with the airplane was lost shortly after the pilot was cleared for the visual approach to runway 12 at BZN.

At 2108 the Gallatin County Sheriff's Office received reports of a downed aircraft.

The wreckage was located about 2230 that evening approximately 80 feet below the peak of a ridge that rose to an elevation of approximately 5,700 feet. From the first identified point of contact with terrain, the debris path tracked over the crest of the ridge and continued down the opposing side, in a south-southeast direction, for approximately 1,575 feet.

Satellite based flight-tracking data (OuterLink) provided by the Operator indicated the airplane started a descent, from 15,000 feet mean sea level (MSL), approximately 42 nm north of the airport. The last data transmission from the airplane was received approximately six minutes later in the general area where the wreckage was located.

PERSONNEL INFORMATION

Pilot-in-Command (PIC)

At the time of the accident, the PIC, age 59, held an airline transport pilot (ATP) certificate with a rating for airplane multiengine land, a commercial pilot certificate with a rating for airplane single-engine land and a type rating in the BE-300 King Air. The pilot's most recent Federal Aviation Administration (FAA) second-class airman medical certificate was issued on November 10, 2006, with the limitation that he must wear corrective lenses.

Personnel records maintained by the operator indicated that Metro Aviation hired the pilot in November of 1999. Preceding his employment with Metro Aviation, the pilot was employed by Lynch Flying Service (beginning in 1996) as an air ambulance pilot.

Company personnel records revealed that the pilot had accumulated 17,608 hours total flying time, which included 1,318 hours PIC in the King Air 200. The pilot had flown 66 hours in the previous 90 days, 45 hours in the previous 30 days and approximately 25 minutes (the accident

flight) in the previous 24 hours.

Training records indicated that the pilot successfully completed initial King Air (BE90 and 100) training in March of 1996, while employed by Lynch Flying Service of Billings, Montana.

On April 2, 2000, the pilot successfully completed King Air 200 initial/upgrade training with SimuFlite in Dallas, Texas. The completion of the course, which included ground and simulator training, qualified the pilot as PIC for the King Air 200. In conjunction with the King Air 200 curriculum at SimuFlite, the pilot completed King Air BE90 and A100 recurrent and differences training.

The pilot's most recent recurrent training for the King Air 200 was successfully completed with SimuFlite, in Dallas, Texas, on March 31, 2006. The recurrent training included ground and simulator training and fulfilled the recurrent Part 135 pilot testing requirements.

The pilot's most recent Part 135 line check and IFR proficiency check were successfully completed on October 12, 2006.

Flight and Duty Time

The accident date, February 6, 2007, was the pilot's fifth consecutive duty day of a seven day rotation cycle. His duty day began at 2100 hours and was scheduled to end at 0700 on February 7. The accident flight was the pilot's first flight of the shift. Flight and duty times for the 5 days preceding the accident were:

On February 5, the pilot's duty day began at 1900 and ended at 0700 the following morning. There were no flight operations during the pilot's duty day.

On February 4 the pilot's duty day began at 1900, and ended at 0700 the following morning. The pilot completed one flight (.8 hours) during the duty period.

On February 3, the pilot's duty day began at 1900, and ended at 0700 the following morning. There were no flight operations during the pilot's duty day.

On February 2, the pilot's duty day began at 1900, and ended at 0700 the following morning. There were no flight operations during the pilot's duty day.

On February 1, the pilot was not on duty.

In the six months preceding the accident, the pilot flew a total of 73.4 hours.

Review of pilot records, and subsequent conversations with the operator, indicated the pilot had flown this particular route of flight and was familiar with the terrain.

AIRPLANE INFORMATION

The accident airplane, a Beech King Air 200 (serial number BB-234) was manufactured in 1977 and, since the date of manufacture, had accumulated 5,992 total flight hours. The airplane was equipped with two Pratt & Whitney Canada turbo propeller PT6A-41 engines.

The airplane was being maintained in accordance with the manufacture's inspection program. Review of the aircraft logbooks revealed that the airplane's most recent inspection, a phase four inspection, was completed on September 21, 2006, at 5,827 total flight hours. There were no reported open maintenance discrepancies with the airplane at the time of the accident.

The airplane was equipped with a Bendix/King Enhanced Ground Proximity Warning System (EGPWS). The EGPWS is classified as a class B Terrain Awareness and Warning System (TAWS). The EGPWS is a terrain warning system that provides relevant real-time terrain information. The system evaluates the aircraft flight parameters and compares it with an onboard terrain, obstacle and airport database. When the system predicts potential conflicts between the aircraft and terrain it alerts the flight crew of the conflict(s) via audio caution. The system incorporates an inhibit switch in the cockpit. When engaged by the pilot, the switch will silence terrain alerts generated by the system. The airplane was not equipped with a TAWS graphic display.

Post accident data recovery from the component's non-volatile memory was unsuccessful due to the extent of damage sustained during the impact sequence.

METEOROLOGICAL INFORMATION

The closest weather observation facility to the accident site was the destination airport, Gallatin Field Airport, Belgrade, Montana, located approximately 13 nm from the accident site at an elevation of 4,471 feet msl. The airport is equipped with an Automated Surface Observing System (ASOS). The following weather observations (METAR format) were issued surrounding the time period of the accident:

On February 6, at 2056, the observation was, in part, wind from 300 degrees at 4 knots, visibility unrestricted at 10 miles, overcast ceiling at 11,000 feet, temperature 3 degrees Celsius (C), dew point minus 1 degrees C, altimeter 30.30 inches of Hg.

At 2145, the observation was, in part, wind from 260 degrees at 4 knots, visibility unrestricted at 10 miles, overcast ceiling at 11,000 feet, temperature 4 degrees C, dew point minus 1 degrees C, altimeter 30.01 inches of Hg.

The weather observation system at the Great Falls Airport reported the following weather observations:

At 1953, the observation was, in part, wind from 040 degrees at 7 knots, visibility 7 miles, overcast ceiling at 500 feet, temperature minus 8 degrees C, dew point minus 9 degrees C, altimeter 30.13 inches of Hg.

At 1900, Salt Lake Center (ZSLC) received a pilot weather report (PIREP) from the pilot of a Cessna single engine airplane that was 6 nm west of Great Falls at 6,000 feet. The pilot reported light to moderate clear icing with an outside air temperature of 1 degrees C.

According to the U.S. Naval Observatory, Department of Astronomical Applications, the phase of the moon was wanin gibbous (just past full) with 82% of the moons visible disk illuminated. Moonrise was at 2234.

COMMUNICATIONS

At 1959, the pilot contacted, by telephone, the Great Falls Automated Flight Service Station (AFSS) and obtained an abbreviated preflight briefing for an IFR flight from Great Falls to BZN. During the briefing, the pilot declined current weather synopsis information.

At 2010, the pilot contacted, by telephone, the Great Falls AFSS and filed two IFR flight plans, Great Falls to BZN and a return flight from BZN to Great Falls.

At 2039, Great Falls Air Traffic Control Tower (ATCT) cleared N45MF for takeoff, and at 2042 the aircraft was radar identified and cleared to 15,000 feet. At 2056 (16 minutes after takeoff) the pilot of N45MF stated to ATC that the BZN airport was "in sight." At 2057, the pilot was cleared to descend at his discretion from 15,000 feet to 13,000 feet. The pilot acknowledged the clearance and stated "...I've got the airport in sight at BZN requesting a visual approach." At 2100 the pilot was cleared for the visual approach to the BZN airport. At 2101:01 ATC radar services for the flight were terminated and the pilot was instructed by Center to contact BZN Tower. At 2101:21 the pilot contacted BZN Tower. The pilot stated "BZN tower lifeguard King Air four five mike foxtrot." The balance of the radio transmission was garbled and unintelligible. At 2101:38 a second radio transmission from the pilot was received, however, it was garbled and unreadable. Personnel at the BZN tower reported that communications from aircraft in the area where the accident airplane was were commonly garbled and unreadable.

FAA radar data indicated that at 2057 the airplane started the descent from 15,000 feet, approximately 42 nm north of the airport (approximately 30 nm north of the accident site). The last radar target (2101:40) associated with the airplane was approximately 13 nm north of the accident site at 11,300 feet.

Radar coverage in the area of the accident is limited to aircraft above 11,000 feet MSL due to mountainous terrain. The Minimum Obstruction Clearance Altitude (MOCA) for the area is 9,100 feet.

AIRPORT INFORMATION

The Gallatin Field Airport is owned and operated by the Gallatin Airport Authority, Belgrade, Montana, and serves as the primary airport for Bozeman (BZN). The airport is located in a valley at a reported elevation of 4,471 feet and is surrounded by rising mountainous terrain. The airport has four hard-surfaced asphalt runways, 12/30 and 03/21 magnetic. Runway 12/30 is 9,003 feet long and 150 feet wide. Runway 12 is equipped with medium intensity approach lighting system with runway alignment indicator lights (MALSR), high intensity runway edge lights and a 4-box visual approach slope indicator (VASI [3.00 degrees glide path]).

The airport is serviced by an air traffic control tower (ATCT) that was operational at the time of the accident. The control tower operates from 0600 - 2400 hours. Approach and departure services are provided by Salt Lake City Air Route Traffic Control Center (ARTCC) on a continuous basis.

ATC radar services were not available at the airport prior to April of 2007. On April 18, 2007, a surveillance radar system (Raytheon ATCB1) was put into service and local radar services began. The radar system enables ATC controllers to detect aircraft operating at lower altitudes within the valley area.

WRECKAGE AND IMPACT INFORMATION

Initial onsite investigation of the wreckage began on February 7, and was suspended on February 8 due to deteriorating weather conditions (snow). The onsite portion of the investigation recommenced on May 15, 2007.

The wreckage was located on the upslope (north) side of a ridge, which was the highest obstruction between the accident site and the airport. The GPS measured elevation of the ridge was 5,700 feet. The first identified point of contact (FIPC) with terrain was a conifer tree

approximately 80 feet below the ridgeline. Pieces of the left wing's leading edge were imbedded in the tree bark (north side) approximately 5 feet above the base of the tree. A second tree, located approximately 40 feet to the west of the FIPC, was observed with similar scaring (north facing) approximately 2 feet above the base of the tree. Pieces of the right wing's leading edge were imbedded in the tree. The distance from the first tree strike to the ground scar was about 10 feet.

The wreckage debris path continued upslope, from the two trees, to the top of the ridge. The slope angle varied from 30-45 degrees depending on the localized topography. A majority of the wreckage was distributed between the FIPC and the top of the ridge on a magnetic heading of about 170 degrees. The debris path, from initial impact to last known piece of debris, covered approximately 1,575 feet in length. The wreckage and ground along the wreckage path were sooted and burned. Numerous pieces of wreckage appeared to have rolled from the top of the ridgeline down the south side of the ridge.

The majority of the wreckage was distributed between the initial ground scar and the top of the ridge. The cockpit and cabin were located approximately 200 feet from the initial ground scar and were destroyed by impact forces and postaccident fire.

The right wing separated from the fuselage. The wing assembly was fragmented and scattered along the debris path. Pieces of the aileron were located along the left side of the debris path beginning approximately 150 feet from the initial tree strikes. Sections of the flap assembly and upper wing skin, to include the fuel cap, were located along the right side of the debris path approximately 75 feet from the initial tree strikes.

The left wing separated from the fuselage. The wing assembly was fragmented and scattered along the debris path. The left inboard flap was located on the right side of the debris path approximately 100 feet from the initial tree strikes. A section of the outboard flap was found on the left side of the debris path approximately 100 feet from the initial tree strike. The left aileron separated from the wing and was located on the left side of the debris path approximately 300 feet from the initial impact.

The empennage was still attached to the aft section of the fuselage and was located along the debris path approximately 100 feet from the initial tree impact. The vertical stabilizer remained attached to the aft fuselage. The rudder, with trim tab attached, was separated from the vertical stabilizer and located along the debris path approximately 20 feet beyond the empennage. The right horizontal stabilizer was attached to the vertical stabilizer. The associated elevator assembly had separated from the empennage. A section of the elevator (inboard) measuring approximately three feet in length was found, along the debris path, about 20 feet beyond the empennage. The inboard section, approximately three feet, of the left horizontal stabilizer was still attached to the empennage. The outboard section of the stabilizer had separated from the assembly and was located on the right side of the debris path approximately 30 feet from the empennage. The inboard section of the elevator and associated trim tab had separated from the horizontal stabilizer and was located in the immediate area of the empennage. The left and right elevator trim tab actuators remained attached to the stabilizer. Both sustained impact related damage.

The right engine separated from the wing and was found along the debris path. The engine was fragmented and the largest intact portion of the engine, the gas generator, was found beyond

the ridgeline of the hill approximately 1,200 feet from the FIPC. Multiple pieces of the right engine were found along the debris path starting on the upslope side of the hill and continuing down the backside of the ridge. The right propeller assembly separated from the engine assembly and was located along the debris path approximately 700 feet from the FIPC. Two of the four propeller blades remained attached to the propeller hub assembly. Leading edge gouging, bending and chordwise scratching was noted to the propeller blades. Multiple pieces of propeller blades were located along the debris path.

The left engine separated from the wing assembly and was located at the southern end of the debris path, approximately 1,575 feet from the FIPC. The engine was fragmented and the largest portion was found at the end of the debris field. Multiple pieces of the engine were found along the debris path starting on the upslope side of the hill and continuing down the backside of the ridge. Three of the four propeller blades remained attached to the propeller hub assembly. Leading edge gouging, bending and chordwise scratching was noted to the propeller blades. Multiple pieces of propeller blades were located along the debris path.

MEDICAL AND PATHOLOGICAL INFORMATION

Autopsies on the pilot and medical crew were performed under the direction of the Gallatin County Coroner. According to the autopsy report(s), the cause of death for all three crewmembers was multiple acute blunt traumatic injuries.

The FAA's Civil Aerospace Medical Institute, Oklahoma City, Oklahoma, performed forensic toxicology tests on specimens from the pilot and no drugs of abuse, to include alcohol, were detected. See attached toxicology report for specific test parameters and results.

TESTS AND RESEARCH

Postaccident examination of the wreckage, to include both engines, disclosed no evidence of a mechanical malfunction prior to impact.

ORGANIZATIONAL AND MANAGEMENT INFORMATION

Metro Aviation, Inc, is based in Shreveport, Louisiana, and operates both fixed wing and rotarywing aircraft throughout the United States. At the time of the accident, Metro Aviation had two aircraft based (under contract with Benefis Healthcare) in Great Falls, Montana; the accident airplane, a King Air 200 and an American Eurocopter AS350 B2 Helicopter.

The Baton Rouge, Louisiana, Flight Standards District Office is the assigned certificate holding district office (CHDO) for the operator. The principal operations inspector (POI) and principal maintenance inspector (PMI) for the operator are based in Baton Rouge.

ADDITIONAL INFORMATION

FAA Aeronautical Information Manual (AIM) chapter 5-1-2, "Follow IFR Procedures Even When Operating VFR," states the following: "When flying VFR at night, in addition to the altitude appropriate for the direction of flight, pilots should maintain an altitude which is at or above the minimum en route altitude as shown on the charts. This is especially true in mountainous terrain, where there is usually very little ground reference. Do not depend on your eyes alone to avoid rising unlighted terrain." Additionally, with respect to VFR night operations in mountainous terrain, chapter 7-5-6 of the AIM states, in part: "Continuous visual contact with the surface and obstructions is a major concern and flight operations under

an overcast or in the vicinity of clouds should be approached with extreme caution."

The FAA Airplane Flying Handbook, FAA-H-8083-3, chapter 10, states the following about night flying: "Distance may be deceptive at night due to limited lighting conditions. A lack of intervening references on the ground and the inability of the pilot to compare the size and location of different ground objects cause this. This also applies to the estimation of altitude and speed. Consequently, more dependence must be placed on flight instruments, particularly the altimeter and the airspeed indicator."

Pilot Information

Certificate:	Airline Transport; Flight Instructor	**Age:**	59, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	
Other Aircraft Rating(s):	Glider	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Glider; Instrument Airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 With Waivers/Limitations	**Last Medical Exam:**	11/01/2006
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	10/01/2006
Flight Time:	17608 hours (Total, all aircraft), 1318 hours (Total, this make and model), 17358 hours (Pilot In Command, all aircraft), 66 hours (Last 90 days, all aircraft), 45 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Beech	**Registration:**	N45MF
Model/Series:	200	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	BB234
Landing Gear Type:	Retractable - Tricycle	**Seats:**	8
Date/Type of Last Inspection:	09/01/2006, Continuous Airworthiness	**Certified Max Gross Wt.:**	12500 lbs
Time Since Last Inspection:	5827 Hours	**Engines:**	2 Turbo Shaft
Airframe Total Time:	5992 Hours	**Engine Manufacturer:**	Pratt & Whitney Canada
ELT:	Installed, not activated	**Engine Model/Series:**	PT6A-41
Registered Owner:	Metro Aviation, Inc	**Rated Power:**	850 hp
Operator:	Metro Aviation, Inc	**Air Carrier Operating Certificate:**	On-demand Air Taxi (135)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Night/Dark
Observation Facility, Elevation:	KBZN, 4471 ft msl	**Observation Time:**	2056 MST
Distance from Accident Site:	13 Nautical Miles	**Direction from Accident Site:**	180°
Lowest Cloud Condition:		**Temperature/Dew Point:**	3°C / -1°C
Lowest Ceiling:	Overcast / 11000 ft agl	**Visibility**	10 Miles
Wind Speed/Gusts, Direction:	4 knots, 300°	**Visibility (RVR):**	
Altimeter Setting:	30 inches Hg	**Visibility (RVV):**	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	GREAT FALLS, MT (GTF)	**Type of Flight Plan Filed:**	IFR
Destination:	Belgrade, MT (BZN)	**Type of Clearance:**	IFR
Departure Time:	2040 MST	**Type of Airspace:**	

Airport Information

Airport:	GALLATIN FIELD (BZN)	**Runway Surface Type:**	
Airport Elevation:	4471 ft	**Runway Surface Condition:**	
Runway Used:	N/A	**IFR Approach:**	Visual
Runway Length/Width:		**VFR Approach/Landing:**	Unknown

Wreckage and Impact Information

Crew Injuries:	3 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	On-Ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-Ground
Total Injuries:	3 Fatal	**Latitude, Longitude:**	45.993056, -111.236667

Administrative Information

Investigator In Charge (IIC):	Dennis J Hogenson	**Adopted Date:**	01/31/2008
Additional Participating Persons:	Chuck Clark; FAA FSDO; Helena, MT Dave Keenan; FAA; Washington, DC Jim Catlett; Metro Aviation; Shreveport, LA Thomas A Berthe; Pratt & Whitney Canada; Longueuil, Quebec, Russell Schrock; Hawker Beechcraft Corporation; Wichita, KS		
Publish Date:	01/06/2009		
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		

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