Aviation Investigation Final Report

Location:	CHACON, New Mexico	**Accident Number:**	FTW97FA067
Date & Time:	December 21, 1996, 13:00 Local	**Registration:**	N3869A
Aircraft:	Beech A36	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	6 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airplane collided with rugged, mountainous terrain while on a VFR cross country flight. According to all available information, the airplane was en route at an altitude between 9,000 and 13,000 feet MSL. Mountain peaks along the route of flight were in the 9,000 to 13,000 foot range. Area Pilot Reports (PIREPS) 16 for light airplanes, and weather observations confirmed that the airplane had flown into about 50-55 knot upper level headwinds, and through moderate to severe turbulence. One PIREP indicated that 'up' and 'down' drafts exceeded 1,000 feet per minute. Another PIREP indicated that 'stacked lenticular clouds were observed at a magnitude that he had not seen before.' According to the NTSB Meteorology Factual Report, the airplane was in severe to extreme turbulent air, and that mountain wave conditions may have been present at the time of the accident. The 8,200 hour pilot was familiar with the route of flight, and no condition of incapacitation was found during the autopsy. Examination of the airframe, engine, and propeller did not reveal any evidence of pre-impact failure(s).

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 altitude and clearance from the high, mountainous terrain. Factors were; high wind, turbulence, and mountain wave conditions.

Findings

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

Findings
1. (C) ALTITUDE/CLEARANCE - NOT MAINTAINED - PILOT IN COMMAND
2. (F) WEATHER CONDITION - HIGH WIND
3. (F) WEATHER CONDITION - TURBULENCE
4. (F) WEATHER CONDITION - MOUNTAIN WAVE
5. TERRAIN CONDITION - HIGH TERRAIN
6. TERRAIN CONDITION - MOUNTAINOUS/HILLY

Factual Information

HISTORY OF FLIGHT

On December 21, 1996, approximately 1300 mountain standard time, a Beech A36 single engine airplane, N3869A, was destroyed upon impact with terrain and a post impact fire near Chacon, New Mexico. The instrument rated private pilot and 5 passengers (one of which was pilot rated) were fatally injured. Visual meteorological conditions prevailed, and a flight plan was not filed for the Title 14 CFR Part 91 personal cross country flight. After departing from the Raton Municipal Airport, Raton, New Mexico, approximately 1200, the airplane was en route on a 427 nautical mile flight to the Glendale Municipal Airport, Glendale, Arizona. The airplane was owned and operated by the pilot.

According to family members, the pilot flew the airplane from Glendale to Raton earlier in the day to pick up 5 family members for a return flight back to Glendale for the holidays. An airport worker at the Raton Airport reported that when the pilot arrived at Raton, he checked the weather for the return flight to Glendale. He also reported that the pilot commented that the flight from Glendale was "rough", and said that if it was that bad going back, he was going to "head south along I-25", then cut back to the west to avoid going directly over the mountains. The airport worker did not have any further contact with the pilot other than this brief conversation, and to the best of his recollection, the airplane departed Raton about 1200 for the return flight to Glendale.

The pilot's wife reported that the airplane was overdue on the afternoon of December 21st, and a search was initiated. That same afternoon (approximately 1330), a local resident reported that he saw "smoke" coming from a remote area in the Sangre de Cristo mountain range [this person reported this information after the wreckage had been located]. The wreckage was located in heavily wooded, steep terrain (elevation: approximately 9,200 feet MSL) by search and rescue aircraft from Kirkland Air Force Base, Albuquerque, New Mexico, in the early morning hours of December 22nd. A law enforcement officer from the New Mexico State Police, aided by an ELT signal, was able to reach the site by helicopter to attempt a rescue; however, no survivors were found.

Heavy snowfall in the early morning hours of December 22nd covered the mountain and adjacent valleys. Local mountain rescue authorities and the NTSB investigation team reached the accident site by foot about 1200 on December 22nd.

PERSONNEL INFORMATION

The 72 year old, 8,200 hour pilot held a private pilot certificate with a single engine land rating, originally issued on June 19, 1956. He added an instrument rating on April 30, 1971.

According to all available records, the pilot had about 2,300 hours of flight time in the "V" tail Beech Bonanza (V35B), and about 5,800 hours in the Beech A36. He had completed Phase II of the FAA Professional Pilot Program, and according to family members, flew the accident airplane on a "regular" basis, and that he always was "safe and careful" about flying.

AIRCRAFT INFORMATION

The Beech model A36 airplane, serial number E-1853, was manufactured in 1981 and had a valid normal category airworthiness certificate. According to all available records, the airplane's total time was about 3,739 hours. The last annual inspection on the airplane was accomplished on August 8, 1996, at a time of 3,689 hours.

The fuel injected engine, a Continental model IO-520-BB, serial number 274506-R, was taken out of service for overhaul on March 11, 1996. According to a copy of the original work order [No. 5879] for the overhaul, the engine had a tachometer time of 3,609.7 hours at the time of overhaul. After the overhaul work was completed the engine was reinstalled in the airplane, and was returned to service on April 30, 1996.

According to annotations on the aforementioned work order No. 5879, the following engine accessories were also overhauled at the time of the engine overhaul:

[1] Starter, part number 646275, serial number Z1886233 [2] Alternator, part number 646843, serial number C058716 [3] Magneto-Left, part number 10-349350-4, serial number 646958 [4] Magneto-Right, part number 10349350-5, serial number 646957

METEOROLOGICAL INFORMATION

The following information is a summary of findings in the NTSB's Meteorology Group Chairman's Factual Report, dated April 15, 1997. The full detailed report is attached to this document.

The nearest surface weather reporting facility to the accident area was Las Vegas, New Mexico, elevation 6,873 feet MSL, located about 34 miles southwest of the accident site. The observations from this facility at 1250 were:

Wind, 280 degrees at 23 knots gusting to 30 knots, wind variable from 240 degrees to 320 degrees; Visibility-35 miles; Present Weather, none; Sky Condition, few 7,000 feet, overcast 15,000 feet; Temperature 46 degrees F; Dew Point 10 degrees F; Altimeter Setting, 29.72 inches hg; Remarks, peak wind 290 degrees at 38 knots, breaks in overcast.

A resident of Mora County, New Mexico, who was located about five miles from the accident site, stated his local weather observations of December 21, 1996, in a letter to the NTSB. The following is an excerpt of the letter: "The weather all day had been mostly clear to scattered clouds, with very strong winds [of] 40 to 60 knots or higher, a few showers of light snow in the

late afternoon, visibility 1/4 to 1/2 miles in [the] showers."

Another local resident, a rancher on whose property the accident occurred, stated that "heavy winds were shaking" their family's mobile home [located in the valley directly below the mountain peak where the accident occurred] during the afternoon of the accident. The rancher further stated that strong winds were typical for that time of year, "but the wind on this particular day was more than usual." The rancher's wife also added that their screen porch door was caught by the wind "and torn off."

A pilot, who was flying a Piper Warrior on the west side of the Sangre De Cristo mountain range at about 1400 on December 21st, reported that he observed "stacked lenticular clouds of a magnitude that he had never seen before." The reported clouds were oriented northeast-southwest along the eastern edge of the Sangre De Cristo range. He reported that the cloud bases were approximately 15,000 feet. In addition, the pilot said that "it was very difficult to maintain altitude, with up and down drafts of 1,000 feet, and wing rolls of 45 to 60 degrees." After experiencing the turbulence, he elected to not cross over the range directly, and re-planned his route to go around the range. He further stated that he had been flying in mountainous areas for "many" years and had about 4,000 hours of flight time in light airplanes.

Sixteen (16) light airplane pilot reports (PIREPS) were referenced in the Meteorology Factual Report. These PIREPS indicated that moderate to severe turbulence was being encountered in New Mexico and Colorado on December 21st, between 8,000 and 13,000 feet MSL.

Winds and temperatures aloft, numerical model forecasts, upper wind observations, and PIREPS showed evidence that the 9,000 to 12,000 foot MSL winds (mountain top) in the accident area were generally from the west at 50-55 knots. In addition, surrounding radiosonde soundings showed either isothermal or temperature inversion layers in the range from around 9,000 to 13,000 feet MSL. The accident occurred just downwind from a mountain range with peaks exceeding 10,000-11,000 feet MSL.

In summary, data that was compiled in the Meteorology Factual Report showed evidence that meteorological conditions could have been present for the airplane to have encountered severe to extreme turbulence at the time of the accident. Also, the data show evidence that low level wind shear could have been present in the range of altitudes (9,000 to 13,000 feet MSL) that the airplane was likely to have been flying.

AIDS TO NAVIGATION

Albuquerque, New Mexico, where the nearest Air Route Traffic Control Center (ARTCC) was located, approximately 88 nautical miles from the accident area, was unable to positively identify a primary or secondary radar target for N3869A. When plotted on an aeronautical map, the accident location showed that the airplane's apparent route of flight was a direct line from Raton, New Mexico toward Albuquerque, New Mexico. Mountain peaks ranging from 9,000 to 13,100 feet MSL were along this route of flight between the accident site and

Albuquerque.

COMMUNICATIONS

No distress calls were reported from the aircraft.

WRECKAGE AND IMPACT INFORMATION

The wreckage was located at coordinates, N 36 degrees 07.643 minutes W 105 degrees 24.772 minutes, in heavily wooded, steeply rising terrain near the crest of a 9,800 foot ridge line that was generally oriented east/west. Geographically, the accident site was about 75 nautical miles southwest of Raton, New Mexico (the departure point), and was about 1 mile northwest of a straight line bearing [about 205 degrees magnetic] from Raton to Albuquerque, New Mexico. Ten to twelve inches of snow had fallen since the accident occurred (about 24 hours prior to the investigation team's arrival at the site) and mostly all of the wreckage was buried beneath the snow. Tree strikes, cut bushes, ground impressions, main wreckage, and debris encompassed an area about 90 feet long and 40 feet wide. The general magnetic bearing of the debris/energy path was 080 degrees and was oriented cross slope [the slope was about 25-30 degrees].

The first evidence(s) of the airplane contacting terrain was an 18 foot long swath of cut bushes. The maximum height of the bushes at the beginning of the cuts was about 7 feet, narrowing down to about 2 feet. The approximate downward angle of the topped bushes was about 19 degrees. Approximately 25 feet along the energy path from the initial cut bushes was a large scalloped ground impression about 5 feet long and 5 feet wide. This impression had several pieces of engine cowling embedded within it and was about 24 inches deep at its greatest depth. The total distance from the first cut bushes to the center of the ground impression was about 23 feet. The next piece of wreckage along the path was the empennage section. It was found lying on its right side and partially wrapped around the base of a 10 inch diameter tree. The forward portion of the structure was completely torn away from the fuselage. The vertical fin and rudder were essentially intact and attached. The left horizontal stabilizer was essentially intact and attached, with the exception of the elevator counter weight bent up and rearward. The elevator trim tab position was found to be deflected about 10 degrees up from the plane of the elevator control surface. The elevator trim tab actuator was measured to be in the 4 degree "up" position. The right horizontal stabilizer was attached and bent upward along its span about 80 degrees. The elevator(s) push rods were intact and not damaged, and the elevator and rudder stop bolts did not show evidence of impact marks on their heads. No soot was found on the vertical fin or the horizontal stabilizer(s), however, the forward portion of the empennage, near the separation point from the fuselage, had some post impact fire damage.

Just adjacent to, and about 5 feet left of the empennage section, was the left wing laying flat [right side up] and parallel to the wreckage path. The wing to box beam support structure was mostly intact and all 4 attachment bolts and nuts were in place. The wing was oriented in-situ

with the remainder of the airplane with its root area completely burned through to the fuselage box beam attachment point. The wing was crushed and buckled across its span and its skin was peeled back from the fore and aft spars. The wing fuel bladder was fractured [fuel appeared to have been blown forward and ignited during the impact]. The bottom of the wing had some fire damage and the top was discolored. The leading edge, about 3 feet inboard from the tip had an indentation that corresponded to the approximate diameter of the local trees. The left wing's flap actuator ball screw measurement was 1.75 inches, which according to the manufacturer, indicates a "retracted" flap setting. Control cable continuity from the cockpit to the left wing control surfaces could not be established due to crushing and fire damage, however, the aileron bell crank and push rod appeared to be intact and functional. The pitot head was torn away but was still attached to the wing by its hose.

The propeller and hub assembly was found lying under the trailing edge flap of the left wing, completely separated from the engine. The spinner dome and spinner bulkhead were crushed and deformed in a general rearward direction. Two of the four mount bolts were sheared at the flange face and remained with the hub. The other four (adjacent mount bolts were stripped from the hub and remained attached to the engine propeller flange. The two dowel pins remained attached to the hub. Other than some minor surface scratches, the cylinder and piston assembly housing was intact, with the pitch change rod bent slightly aft.

All three propeller blades [no de-ice boots installed] were complete and still attached to the hub assembly. The #1 blade pitch change knob was sheared at the butt face, and the #2 and #3 blade pitch change knobs were bent toward low pitch, but not broken. The following damage was found on the three propeller blades:

BLADE #1, Serial Number E88726: Bent sharply rearward (toward the face side) about 90 degrees. Leading edge dents and gouges across the entire span from the blade tip to the origin of the 90 degree bend. Chordwise scratches on the camber side of the blade.

BLADE #2, Serial Number E90088: Uniformly bent rearward about 30 degrees. Tip bent slightly forward. Some minor leading edge scratches along the span.

BLADE #3, Serial Number E88747: Bent about 30 degrees in a leading edge to trailing edge direction. Tip bent rearward about 90 degrees toward the face side of the blade. Twisted toward low pitch about 45 degrees at the mid-blade. Heavy leading edge damage and chordwise abrasions on the camber side from the mid-blade location to the tip. The shank end of the blade (near the blade grip) was indented on the trailing edge side of the blade.

Just forward of the left wing was the fuselage [cockpit and cabin section], the right wing, and the engine. All of these components were oriented generally in-situ of their respective positions on the airplane and severely fire damaged.

The right wing was found severely fragmented and burned, with the front spar area almost completely consumed by the post-impact fire. Most of the rear spar area, and aileron and flap

flight control surfaces were present, but deformed and fire damaged. Flight control cable/rod continuity to the cockpit could not be established due to the severe impact and fire damage. Flap position settings on the right wing could not be determined due to the destruction of the flap actuator and jackscrew assembly.

The fuselage [cockpit and cabin] was completely consumed by the post-impact fire.

The engine was found lying amidst the most severely fire damaged area of the fuselage embedded in aluminum slag, essentially on top of the forward wing box beam area. The entire engine was severely fire damaged. The exhaust was crushed flat and downward adjacent to the induction tubing on the right underside of the engine (below the #'s 1,3, and 5 cylinders). The oil sump was completely separated and the bottom front of the case was fractured, exposing the propeller governor gear drive. The #'s 1,3,and 5 cylinder barrels were all attached with the #5 rocker box cover separated. The #'s 2,4 and 6 cylinder barrels were all attached with all of the exhaust and induction tubing sheared from the bottom of the cylinder heads. All push rods were fractured. Upon rolling the engine over, the case was found entirely melted away in the area of the #2 cylinder. Both the exhaust and intake valve assemblies were not in the cylinder head [they were later discovered, along with one rocker arm, embedded in the slag near the front box beam area where the engine was lying].

The magneto mount areas were consumed by fire, and the magnetos were not found. The fuel manifold valve, the fuel injection lines, and the ignition wires were broken and severely fire damaged.

Instrument readings from the discernable cockpit gauges are as follows:

Vacuum Pressure Gauge: Needle position was pegged off the scale on the "high" end.

Airspeed Indicator: Needle on "Zero"

Tachometer: Needle on about "2,400" RPM. Note; The face of the tachometer gauge had impact damage. The impact/dent on the gauge bent both the face of the gauge and the needle pointer back simultaneously. The face of the gauge showed a slap mark at 2,400 RPM, which corresponded, to the needle position.

MEDICAL AND PATHOLOGICAL INFORMATION

The pilot held a valid third class medical certificate, approved by the FAA Exemption Medical Advisory Panel, dated November 8, 1996. This medical certificate had 2 restrictions annotated:

[1] "NOT VALID AFTER 5-31-97" [2] "MUST HAVE AVAILABLE GLASSES FOR NEAR VISION"

Item [1] above was explained in a letter to the pilot from the Manager of the FAA Aeromedical

Certification Division, Civil Aeromedical Institute, dated December 16, 1996. This letter summarized that the pilot had a history of complete heart block, cardiac arrest, and atrial fibrillation that has required treatment (pacemaker implantation); lymphoma that has required treatment (chemotherapy); and bronchospastic airway disease. Thus, the pilot's valid medical certificate was limited to 6 months, after which, consideration for a new certificate would be contingent upon re-evaluation of the pilot's medical condition(s). A copy of the aforementioned letter, which addresses the pilot's medical certification criteria in detail, is attached to this report.

An autopsy was performed on the pilot at the Office of the Medical Investigator, Albuquerque, New Mexico, on December 24, 1996. The cause of death was ascertained as "Multiple Blunt Force Injuries Sustained." According to a memo from the FAA Regional Flight Surgeon, the autopsy also revealed focal moderate coronary artery atherosclerosis (hardening of an artery of the heart) with microscopic scarring of the heart indicating insufficient oxygenation of areas of the heart. However, an acute process in the heart was not present. Pacemaker leads were found to be appropriately located in the heart.

Toxicological tests for the pilot were negative for alcohol. A carbon monoxide analysis could not be performed due to a lack of suitable specimens. Tests for drugs revealed the presence of 0.104 (ug/ml, ug/g) of Diphenhydramine detected in liver fluid. According to a memo attached to the toxicology report by the FAA's Aeromedical Institute (CAMI), the Diphenhydramine (Benadryl, antihistamine) detected in the liver fluid was at therapeutic level. According to CAMI, the FAA does not generally approve the use of antihistamines for use while flying. In addition, the underlying medical condition for which the medication was being taken may have caused discomfort or distraction. No other drugs were identified in the specimens received.

According to family members, they were not aware of any recent illness that the pilot may have been taking medication to relieve.

FIRE

A post-impact fire consumed most of fuselage structure and severely damaged the engine. No evidence of an in-flight fire was observed.

TESTS AND RESEARCH

Due to the accident being covered in deep snow when the NTSB investigation team examined the wreckage at the accident site, a decision was made for the wreckage to be recovered and examined at a facility located in Phoenix, Arizona. The wreckage was recovered on December 30, 1996, via a helicopter and transported by truck to the facility. At the time of the recovery, all the snow had melted at the accident site. A summary of the examination in Phoenix (attended by the NTSB investigator-in-charge, and representatives from Raytheon, Teledyne Continental Engine Co., and Hartzell Propeller Co.) follows:

Engine and accessory disassembly and examination did not show evidence of failure(s) prior to impact.

Disassembly and inspection of the propeller and hub assembly revealed evidence that the propeller was rotating and absorbing power at the time of impact. According to the propeller manufacturer, the average blade angle at the time of impact was about 16 degrees, and all propeller damage noted is consistent with powered rotation at the time ground contact.

No pre-impact airframe anomalies were noted during the examination. Detailed examination of the retractable landing gear assembly showed that the gear (nose, left main, right main) were in the retracted position at the time of impact.

ADDITIONAL INFORMATION

According to records from the Glendale Airport, the airplane departed with "full" tanks on the initial flight from Glendale, Arizona, to Raton, New Mexico. The airplane was equipped with two main wing fuel tanks and wing tip tanks. According to the airplane manufacturer, the usable fuel in the wing tanks is 74 gallons, and the usable fuel in the tip tanks is 30 gallons. At a fuel consumption rate of 13 gallons per hour, the 427-mile flight from Glendale to Raton would have left the airplane with about 78 gallons of usable fuel when it departed Raton for the return trip to Glendale.

According to the airplane manufacturer's specifications for the airplane, the maximum gross weight was 3,600 pounds. Calculations, using estimated weights of the occupants from a family member, equipment on board, and the aforementioned fuel estimation, would have put the aircraft's weight at the time of the accident at approximately 3,615 pounds (plus or minus 25 pounds).

The pilot rated passenger's body was found in-situ of the front right seat, and it is presumed that he occupied that seat during the flight.

Pilot Information

Certificate:	Private	**Age:**	72,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	November 8, 1996
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	8200 hours (Total, all aircraft), 5800 hours (Total, this make and model), 62 hours (Last 90 days, all aircraft), 20 hours (Last 30 days, all aircraft), 5 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N3869A
Model/Series:	A36 A36	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	E-1853
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	August 27, 1996 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:	50 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	3739 Hrs	**Engine Manufacturer:**	Continental
ELT:	Installed, activated, aided in locating accident	**Engine Model/Series:**	IO-520-BB
Registered Owner:	SEWALL M. OSGOOD	**Rated Power:**	280 Horsepower
Operator:		**Operating Certificate(s) Held:**	None
Operator Does Business As:		**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	LVS ,6873 ft msl	**Distance from Accident Site:**	34 Nautical Miles
Observation Time:	12:50 Local	**Direction from Accident Site:**	110°
Lowest Cloud Condition:	Scattered / 7000 ft AGL	**Visibility**	35 miles
Lowest Ceiling:	Overcast / 15000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	23 knots / 38 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	290°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	8°C / -12°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	RATON (RTN)	**Type of Flight Plan Filed:**	None
Destination:	GLENDALE (GEU)	**Type of Clearance:**	None
Departure Time:	12:00 Local	**Type of Airspace:**	Class E

Airport Information

Airport:		**Runway Surface Type:**	
Airport Elevation:		**Runway Surface Condition:**	
Runway Used:	0	**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	5 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	6 Fatal	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	Lemishko, Alexander
Additional Participating Persons:	TERRY MARTIN; ALBUQUERQUE , NM R S BOYLE; MOBILE , AL JOHN WARD; WICHITA , KS ROGER W STALLCAMP; PIQUA , OH
Original Publish Date:	July 23, 1999
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=20017