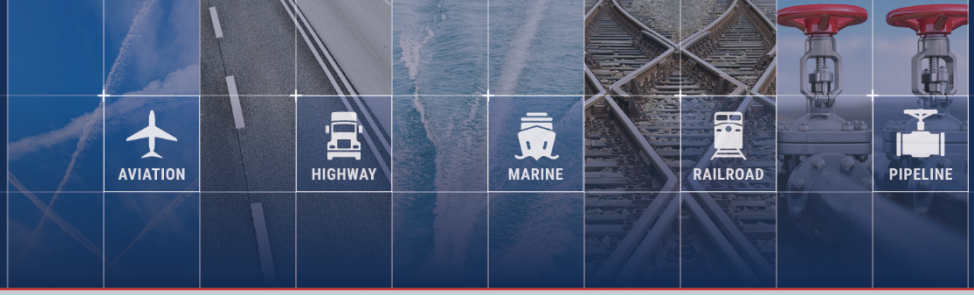

Aviation Investigation Final Report

Location:	Brownwood, Texas	**Accident Number:**	DFW05FA059
Date & Time:	January 22, 2005, 06:49 Local	**Registration:**	N1750A
Aircraft:	Beech BE-36	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The 785-hour instrument rated private pilot was on a night visual approach to the runway without a visual approach glide slope indicator lights when the airplane collided with electrical wires, trees, and the ground . A witness, who was located 2.82 miles south of the accident site, stated that it was dark, the wind was calm, and the sky was clear. He observed the airplane in-flight overhead flying at a "high speed" at an altitude of about 500 feet above the ground (agl). He further reported that he saw the airplane's navigational lights illuminated, and that the airplane's engine sounded "normal" and was "loud." One of the residents went outside, saw flames shooting in the air, and called "911." Local authorities reported that electrical service to nearby residences was interrupted coincident with the accident time. Evidence at the accident site revealed that the airplane initially struck two 40-foot high electrical lines that were perpendicular to the flight path. The electrical lines were found separated and lying on the ground near their support poles. No mechanical anomalies were found that would have contributed to the accident. The NTSB IIC conducted a test to see whether or not the pilot would have been able to see the runway from the point of where the airplane impacted the wires. Several days after the accident, in similar dark night light conditions that prevailed at the time of the accident, a fire ladder truck was utilized to elevate a fireman to the height of the airplane's initial impact with wires. At a height of 40 feet, the runway was found to be clearly visible in the dark night. Several firemen climbed the ladder and stated that when looking straight out toward the runway, they "thought they where about 150-200 feet above the ground." There were no lights between the accident site and the runway, and the terrain sloped down, and then back up to the runway threshold. The sensation was that there appeared to be a "black hole" type of effect when looking straight out from the accident site toward the runway threshold. There was no discernable horizon. A review of the pilot's logbook revealed that the pilot had never been to the accident airport.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilots failure to maintain proper altitude and clearance while on final approach to land. Contributing factors were the pilot's lack of familiarity with the geographic area, the dark night light conditions, the non-availability of a visual approach glide slope light system, and spatial disorientation.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: APPROACH

Findings
1. OBJECT - GUY WIRE
2. OBJECT - TREE(S)
3. (C) ALTITUDE/CLEARANCE - NOT MAINTAINED - PILOT IN COMMAND
4. (F) SPATIAL DISORIENTATION - PILOT IN COMMAND
5. (F) LIGHT CONDITION - DARK NIGHT
6. (F) APPROACH AIDS - NOT AVAILABLE
7. (F) LACK OF FAMILIARITY WITH GEOGRAPHIC AREA - PILOT IN COMMAND

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

Findings
8. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On January 22, 2005, approximately 0649 central standard time, a Beech BE-36 single-engine airplane, N1750A, registered to and operated by the pilot, was destroyed after impact with electrical wires, trees, and the ground while on a night visual approach to runway 35 at the Brownwood Regional Airport (BWD), near Brownwood, Texas. The instrument-rated private pilot and one passenger sustained fatal injuries. Dark night visual meteorological conditions prevailed and an instrument flight rules (IFR) flight plan was filed for the 14 Code of Federal Regulations Part 91 personal flight. The cross-country flight originated at 0600 from the Dallas Executive Airport (RBD), near Dallas, Texas, with BWD as its intended destination.

According to recorded information obtained from air traffic control (ATC) facilities, the airplane departed from Dallas at 0600. All communications between ATC and the pilot were normal, and after an uneventful en route flight from Dallas, the pilot was cleared for a visual approach to runway 35 at 0642.

In an interview with the NTSB investigator-in-charge (IIC), a witness, who was located 2.82 miles south of the accident site, and standing outside in his driveway at 0645 in the morning, stated that it was dark, the wind was calm, and the sky was clear. He observed the airplane flying overhead at "high speed," at an altitude of about 500 feet above the ground (agl), heading north. He further reported that the airplane's navigational lights were illuminated, and the engine sounded "normal" and "loud."

Residents, who were in their homes near the accident site, reported that they heard the airplane overhead, followed by a "loud" explosion. One of the residents went outside, saw flames shooting in the air, and called "911" at 0649.

PERSONNEL INFORMATION

On July 5, 1995, the pilot was issued his initial private pilot certificate with a single-engine land rating. On August 31, 1995, the pilot first logged flight time in N1750A, and all of the pilot's subsequent flight time was in N1750A. The pilot's most recent private pilot certificate was issued on April 30, 1997, at which time he added an instrument airplane rating. The pilot held a valid third class medical certificate with no limitations, no waivers and no restrictions, dated June 10, 2003.

According to entries in the pilot's logbook, the pilot's total accumulated flight time was 785.9 hours as of January 15, 2005. Since August 8, 1995, the pilot's total time in the accident airplane was approximately 636 hours. The pilot's most recent biennial flight review was

completed on May 17, 2003. The pilot accrued 94.1 hours of night flight time in the past 11 years. Five of the 94.1 hours were flown within a year of the accident, and three of these five hours were on the morning of the accident.

According to entries in the pilot's logbook, he had not previously flown into BWD.

AIRCRAFT INFORMATION

The 1969-model Beech 36 was an all-metal, low-wing airplane with retractable tricycle landing gear and conventional horizontal and vertical stabilizers. Flight control surfaces were operated through push-pull rods and conventional cable systems terminating in bellcranks. It had a throw-over type control column for elevator and aileron control that could be positioned in front of either front seat.

According to entries in the aircraft's logbooks, on May 15, 1999, a Continental model IO-550-B(4) engine, serial number (S/N) 297031R, was installed as part of a "Colemill Starfire" conversion. During the conversion, a Hartzell model HC-C4YF-1E 4-blade constant speed propeller & hub assembly, S/N GK-75, was installed along with the engine. The propeller assembly had 4 model FC7063Q blades installed, S/N's H96372, H96371, H96373, H96370.

A review of the airplane logbooks revealed the last annual inspection was completed on April 26, 2004, at a tachometer time of 309.27 hours. The engine had accrued a total time of 352.9 hours total time since new. The airframe had accrued 3,543.3 hours total time since new.

WRECKAGE AND IMPACT INFORMATION

The accident site was located approximately 4,850 feet south of the approach end of runway 35 in a rural area, sparsely populated by small houses, cow pastures, and 20 to 30-foot high mesquite trees. Global Positioning System (GPS) coordinates at the accident site were latitude 31 degrees 46.424 minutes North and longitude 98 degrees 57.280 minutes West, at a GPS elevation of 1,370 feet mean sea level (msl).

Local authorities reported that electrical service to nearby residences was interrupted coincident with the accident time. Evidence at the accident site revealed that the airplane initially struck two 40-foot high electrical lines that were perpendicular to the flight path. The electrical lines were found separated and lying on the ground near their support poles. From the initial wire strike, fragments of airplane debris, along with broken tree limbs, were found along a 246-foot linear energy path bearing 350 degrees magnetic.

The first broken tree branches along the energy path were found 25 feet above ground level, about 130 feet north of the separated wires. A section of the right outboard wing panel was found lying on the ground below the broken tree branches. This section of wing had an impact deformation on its leading edge that was consistent with the diameter of the broken trees limbs. Further along the debris path about 200 feet north of the wires, a 12-inch diameter, 15-

foot long, uprooted tree trunk was found lying on top of the left horizontal stabilizer and elevator. The left horizontal stabilizer and elevator had impact deformation consistent with the diameter of the uprooted tree. The separated left wing was found lying on the ground adjacent to the horizontal stabilizer, along with the separated nose landing gear tire/wheel assembly and the left main landing gear assembly. A 3-foot wide gouge in the ground, which contained three parallel impressions, was found about 5 feet east of the left wing and about 10 feet north of the uprooted tree.

Plenary evidence at the accident site was consistent with the airplane striking the electrical wires, in a wings level attitude, about 40 feet above the ground, traveling about 130 feet before striking trees 25 feet above the ground, then traveling another 83 feet before striking a tree about 15 feet above the ground. The airplane then impacted the ground and slid about 30 feet, before coming to rest about 246 feet north of the electrical line.

The left wing was consumed by post impact fire. The main wreckage, consisting of the cockpit, cabin section, and inboard section of the right wing, were consumed by post impact fire. The right horizontal stabilizer and elevator and vertical stabilizer w/rudder remained attached to the rear fuselage. The leading edge of the vertical stabilizer had impact deformation consistent with the size of broken tree branches found along the debris path.

The main wreckage was consumed by post impact fire. Flight control cable continuities from the cockpit to the ailerons, elevators, and rudder flight control surfaces were confirmed. The right flap was in a retracted position. The left flap actuator was consumed by the post impact fire. The flap drive from each actuator was observed to be intact and attached to the flap motor assembly. The landing gear actuator was found in a position consistent with landing gear "extended." The right main landing gear was found in the extended position and attached to the right wing landing gear support structure. The cabin door upper latch bolt was found separated. The fuselage utility door latch handle was found in the closed position.

The left wingtip tank was consumed by the post impact fire and was found partially covered by left wing debris. The right wingtip fuel tank separated from the right wing at its wing attachment screws and was found 34 feet north of the main wreckage. The right wingtip fuel tank structure was collapsed and partially consumed by post impact fire. Each of the fuel tanks located in each wing leading edge had a 40-gallon capacity. Both wing fuel tank fuel caps were found latched in place. The cockpit combination fuel selector and fuel strained was found selected to route fuel from the left wing tank to the engine.

The engine control panel was consumed by post impact fire. The throttle position was estimated to be above idle power, the propeller control position was estimated to be commanding high propeller RPM, and the mixture control position was estimated to be commanding a full rich position. The engine (air) intake manifold throttle plate was found about in a "half-open" position. The electric fuel boost pump switch sustained impact damage, and a selected position could not be obtained.

The entire instrument panel exhibited severe thermal damage due to post impact fire. The altimeter instrument exhibited severe damage and its "Kollsman" window appeared to be set at "30.10" inches Hg.

TESTS AND RESEARCH

The NTSB IIC, with the assistance of the Brownwood Fire Department, conducted a test to see whether or not the pilot would have been able to see the runway from the point of where the airplane impacted the wires. Several days after the accident, in similar dark night light conditions that prevailed at the time of the accident, a fire ladder truck was utilized elevate a fireman to the height of the airplane's initial impact with wires. At a height of 40 feet, the runway was found to be clearly visible in the dark night. Several firemen climbed the ladder and stated that when looking straight out toward the runway, they "thought they where about 150-200 feet above the ground." There were no lights between the accident site and the runway, and the terrain sloped down, and then back up to the runway threshold. The sensation was that there appeared to be a "black hole" type of effect when looking straight out from the accident site toward the runway threshold. There was no discernable horizon.

According to the FAA Advisory Circular (AC) 61-21A, "The flight attitude of an airplane is generally determined by reference to the natural horizon. When the natural horizon is obscured, attitude can sometimes be maintained by reference to the surface below. If neither horizon nor surface references exist, the airplane's attitude must be determined by artificial means - an attitude indicator or other flight instruments. Sight, supported by other senses such as the inner ear and muscle sense, is used to maintain spatial orientation."

"However, during periods of low visibility, the supporting senses sometimes conflict with what is seen. When this happens, a pilot is particularly vulnerable to spatial disorientation. Spatial disorientation to a pilot means simply the inability to tell "which way is up."

The FAA AC 61-27C (Section II, "Instrument Flying: Coping with Illusions in Flight") states that spatial disorientation cannot be completely prevented, but it be ignored or sufficiently suppressed by pilots' developing an "absolute" reliance upon what the flight instruments are reporting about the attitude of their aircraft.

An engine and propeller assembly examination was conducted at Air Salvage of Dallas, Lancaster, Texas, on January 25, 2005.

The engine was mostly intact with thermal damage on the exterior. The starter and rear of the vacuum pump were separated, and the rear exhaust pipes were separated on the right side. Valve cover numbers three and four were crushed, and the ignition harness was charred. The throttle, mixture, and propeller governor controls were attached but their respective positions were not readable due to impact, charring and thermal damage. The bottom spark plugs and valve covers were removed and the crankshaft was rotated. Continuity was confirmed to all of the cylinders and to the rear of the engine. Hand compression was obtained on all cylinders.

Sparks plugs, Champion RHB-32E, were examined and not damaged. When compared to the Champion Check-a-Plug card, they exhibited normal wear, with light gray deposits in their electrode areas, and plugs two, four, and six had oil in the electrode area. The magnetos, TCM model S6RN-1225, P/N 10-349350-4, S/N I059712FR (left), S/N 299703FR (right), were both in place and exhibited thermal damage with some melting. Both were bench tested and no spark was observed on either. Both magnetos were then opened and melting was observed on the cam followers for the points.

Thermal damage on the vacuum pump housing was observed with the rear portion of the case missing, and the drive coupling was melted. Disassembly of the pump did revealed normal vane wear, and no internal damage.

The fuel pump, P/N 646766-4 S/N L29721BR, and its drive coupling, P/N 653359A, were found intact, and exhibited melting on the aneroid with heat damage in all areas. When removed, the drive shaft would not rotate by hand. Safety wire was in place and the lead seal was melted on the rear of the pump. Disassembly of the pump showed no internal damage, and the interior was dry and exhibited thermal discoloration. The fuel manifold, P/N646508-14A2 S/N L29711CR, was intact and exhibited thermal damage, and safety wire was in place. Disassembly of the manifold revealed that the spring and diaphragm were not damaged. When removed, the fuel screen was partly coated with some type of unidentified material. The fuel metering unit, P/N649468-2 S/N L129711AR, main fuel screen was found clean, clear, dry, and no fuel was present. Thermal damage was found on their exteriors of the fuel nozzles, and all of the nozzles were clean and clear in their interiors.

The oil filter exhibited exterior thermal damage. When opened, the element was found with extreme thermal damage. No metal particles were observed in the element.

The propeller assembly remained attached to the crankshaft and the spinner exhibited inward crushing and buckling. All four blades remained attached to their respective hubs. Two blades (A & C opposite) were found to be loose within their respective hub mounts. The two other blades (B & D opposite) were attached and secure in their respective mounts.

Blade A, S/N H96370, exhibited a 90-degree bend aft about 15 inches from the hub. Outboard of the 90-degree bend, about 14 inches along the span of the blade exhibited twisting and bending across the chord. The blade tip was intact.

Blade B, S/N H96372, exhibited forward bending about 13 inches from the hub. At 20 inches from the hub, the blade span exhibited reverse bending and was twisted across the chord. The trailing edge exhibited scalloped deformations from about 20 inches from the hub, outboard along the span toward the tip. About one inch of blade tip material was missing.

Blade C, S/N H96371, exhibited aft bending about nine inches from the hub. Outboard of the bend, the blade exhibited some twisting across the chord. The last four to five inches of the

blade was deformed and melted.

Blade D, S/N H96373, exhibited bending aft greater than 90-degrees, about 13 inches from the hub. At 24 inches from the hub, the blade exhibited forward bending along the span and some twisting across the chord. Some blade tip material was missing.

METEOROLOGICAL INFORMATION

At 0645, the automated surface observing system at BWD reported wind from 360 degrees at 9 knots, visibility 10 statute miles, a clear sky, temperature 57 degrees Fahrenheit, dew point 45 degrees Fahrenheit, and an altimeter setting of 30.08 inches of Mercury. Additionally, several residents near the accident site reported that the sky was "clear" and the wind was "calm" at the time of the accident.

According to data from the U.S Naval Observatory, the following information was provided for Brownwood, Brown County, Texas, on January 22, 2005.

Begin Civil Twilight:	0708
Sunrise:	0734
Moonrise:	1535
Moonset:	0637

AIRPORT / NAVAIDS INFORMATION

The published elevation for the approach end of runway 35 was 1,370.1 feet msl. The published elevation at BWD (mid-field) was 1,387 feet mean sea level. Runway 35 was 5,599 feet long by 150 feet wide and was not equipped (nor was it required by FAA regulation to have) with visual slope indicator lights, PAPI, or approach lights. All available airport lighting was found to be functional at the time of the accident.

MEDICAL AND PATHOLOGICAL

An autopsy was performed on the pilot by the Fort Worth Medical Examiner's Office. The pilot's cause of death was determined to be "thermal burns and smoke inhalation due to light aircraft crash."

Toxicological tests were performed at the FAA's Civil Aeromedical Institute (CAMI), Oklahoma City, Oklahoma. 24 percent carbon monoxide and .64 ug/ml of cyanide were detected in the pilot's blood sample. The test was negative for ethanol. Cotinine, which, according to the Center for Disease Control and Prevention, is one of the chemicals found in tobacco smoke and chewing tobacco, was detected in the pilot's urine sample.

ADDITIONAL INFORMATION

The wreckage was released to the owners representative.

Pilot Information

Certificate:	Private	**Age:**	50,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--no waivers/lim.	**Last FAA Medical Exam:**	June 10, 2003
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	May 17, 2003
Flight Time:	786 hours (Total, all aircraft), 636 hours (Total, this make and model), 4 hours (Last 90 days, all aircraft), 4 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N1750A
Model/Series:	BE-36	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	E-180
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	April 26, 2004 Annual	**Certified Max Gross Wt.:**	3612 lbs
Time Since Last Inspection:	42 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	3543.3 Hrs at time of accident	**Engine Manufacturer:**	Continental
ELT:	Installed, not activated	**Engine Model/Series:**	IO-550-B
Registered Owner:	On file	**Rated Power:**	300 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:	BWD,1387 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	06:45 Local	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	9 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	360°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.07 inches Hg	**Temperature/Dew Point:**	14°C / 7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Dallas, TX (RBD)	**Type of Flight Plan Filed:**	IFR
Destination:	Brownwood, TX (BWD)	**Type of Clearance:**	IFR
Departure Time:	06:00 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	Brownwood Regional Airport BWD	**Runway Surface Type:**	Asphalt
Airport Elevation:	1387 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	35	**IFR Approach:**	Visual
Runway Length/Width:	5599 ft / 150 ft	**VFR Approach/Landing:**	Straight-in

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	2 Fatal	**Latitude, Longitude:**	31.778333,-98.957778

Administrative Information

Investigator In Charge (IIC):	Lemishko, Alexander
Additional Participating Persons:	Arnold Thornmeyer; Federal Aviation Administration; Fort Worth, TX
Original Publish Date:	July 7, 2005
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=60914