National Transportation Safety Board
Aviation Accident Final Report

Location:	Albuquerque, NM	**Accident Number:**	DEN03FA045
Date & Time:	03/07/2003, 1918 MST	**Registration:**	N522RF
Aircraft:	Piper PA-46-500TP	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	3 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The pilot was performing a night, VFR traffic pattern, to a full stop at a non-towered airport in a turboprop aircraft. He entered the traffic pattern (6,800 feet; 1,000 feet AGL) on an extended down wind; radar data indicated that his ground-speed was 205 knots. Over the next 3 nautical miles on down wind, radar data indicated that he slowed to a ground-speed of 171 knots, lost approximately 500 feet of altitude, and reduced his parallel distance from the runway from 4,775 feet to 2,775 feet. Witnesses said that his radio transmissions on CTAF appeared normal. The two witnesses observed a bright blue flash, followed by a loss of contact with the airplane. Rescue personnel found a broken and downed static wire from a system of three sets of power transmission wires. The dark night precluded ground rescue personnel from locating the downed aircraft; a police helicopter found the airplane approximately 2 hours after the accident. The pilot had recently completed his factory approved annual flight training. His flight instructor said that the pilot was taught to fly a VFR traffic pattern at 1,500 feet AGL (or 500 feet above piston powered aircraft), enter the down wind leg from a 45 degree leg, and fly parallel to the down wind approximately 1 to 1.5 nautical miles separation from it. His speed on downwind should have been 145 to 150 knots indicated, with 90 to 95 knots on final for a stabilized approach. The flight instructor said that the base turn should be at a maximum bank angle of 30 degrees. Radar data indicates that the pilot was in a maximum descent, while turning base to final, of 1,800 to 1,900 feet per minute with an airspeed on final of 145 to 150 knots. His maximum bank angle during this turn was calculated to have been more than 70 degrees. The separated static wire was located 8,266.5 feet from the runway threshold, and was approximately 30 feet higher than the threshold. Post-accident examinations of the airplane and its engine revealed no anomalies which would have precluded normal operations prior to impact.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's unstabilized approach and his failure to maintain obstacle clearance. Contributing factors were the dark night light condition, and the static wires.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: APPROACH - VFR PATTERN - BASE TURN
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Findings
1. (F) OBJECT - WIRE,TRANSMISSION
2. (F) LIGHT CONDITION - DARK NIGHT

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

Findings
3. TERRAIN CONDITION - OPEN FIELD

Factual Information

HISTORY OF FLIGHT

On March 7, 2003, at 1918 mountain standard time, a Piper PA-46-500TP, N522RF, was destroyed when it impacted terrain near Double Eagle II Airport (AEG), Albuquerque, New Mexico. The instrument rated private pilot and his two passengers were fatally injured. The pilot/owner was operating the airplane under the provisions of Title 14 CFR Part 91. Night, visual meteorological conditions prevailed for the personal, cross-country flight that originated from Scottsdale, Arizona, 1 hour, 12 minutes before the accident. The pilot canceled his IFR flight plan at 1911:31, and was flying a VFR traffic pattern for a full stop landing at a non-towered airport.

The pilot had his airplane topped-off with 120 gallons of Jet-A at Double Eagle II Airport, at 1400, on the day of the accident. His first flight plan indicated that he requested a departure time from Double Eagle II Airport, with a business associate, at 1615. He flew the 270 nautical miles (nm) to Scottsdale, Arizona, on an IFR flight plan; he had requested an altitude of 24,000 feet, and gave a time en route of 1 hour and 25 minutes. He picked up his son, and according to Scottsdale Airport Air Traffic Control (tower), he departed on his return trip at 1806.

Radar data from Albuquerque ARTCC (Air Route Traffic Control Center), indicates that the airplane began descending from 25,000 feet (cruise altitude) at 1900:18. At approximately 1911, the pilot canceled his IFR flight plan, and changed his transponder from a discrete code of 4271 to 1200, a non-discrete code. Witnesses said that they heard the pilot announce his position on CTAF (Common Traffic Advisory Frequency) as 8 miles south-west of the airport. He said that he was "entering an extended right downwind to runway 22, full stop at Double Eagle."

The two witnesses were in a Cessna 172, departing upwind from a touch-and-go landing. The witness who was flying radioed that he would extend his upwind to give the pilot pattern spacing. The pilot responded with, "that won't be necessary, I'm a lot faster." The witness-pilot said that the pilot told him to "go ahead and start your right crosswind." The witness-pilot said that as he leveled off on downwind, it appeared that the airplane was at the same pattern altitude, or 6,800 feet. He said that he continued on the downwind, and at about midfield, he heard the airplane call turning base leg, which was the last communication he heard from the pilot. Moments later, he observed a "bright blue flash." After that it was completely dark, no strobe light, and no fire.

The two witnesses and two maintenance men went to the accident scene to locate the missing airplane. One searcher said that he walked within 100 yards of the airplane's location, but could not see it. He said that it was a very dark night. A police helicopter came to assist in the search, and located the airplane at approximately 2115.

PERSONNEL INFORMATION

The pilot held a private pilot certificate with airplane single engine land and instrument rating. He was issued a third class airman's medical certificate on February 25, 2002. The medical contained no waivers or limitations. According to the pilot's logbook, he had received his complex airplane and high performance airplane endorsements on March 29, 2000. In December of 2001, he completed his factory approved Malibu/Meridian initial training, and

received his high altitude operations endorsement. On November 14, 2002, he successfully accomplished a flight review in the accident airplane.

In February 2003, the pilot requested that his factory approved Meridian annual review training, provided by Simcom International, Inc., be given to him at Double Eagle II Airport. The instructor came from Florida, and spent one day doing ground training and two days of flight training (approximately 5 hours). The flight instructor remarked that the pilot had good basic piloting skills, however, he had a tendency to push the envelope. He was also very resistant to guidance offered by the flight instructor and was not very "attentive to detail."

According to the pilot's logbook, he had logged approximately 1,221 hours total flight time when the accident occurred. He had logged approximately 142 of these hours during the previous six months.

AIRCRAFT INFORMATION

The airplane was a single engine, six seat, pressurized aircraft, which was manufactured by The New Piper Aircraft, Inc., in 2001. The airplane had a maximum takeoff gross weight of 4,850 pounds. A weight and balance data record, dated December 12, 2001, indicated that the airplane's basic empty weight was 3,445.4 pounds. With full fuel (1,139 pounds) the airplane had a useful load of 265.6 pounds. The airplane was powered by a Pratt & Whitney PT6A-42A, turboprop reverse-flow, annular engine with a four-bladed, constant-speed, full-feathering, reversible-pitch propeller, which was rated for 500 shaft horsepower. Maintenance records indicate an Event 1 Inspection was completed on December 31, 2002, and the airplane had flown 308.4 hours at that time. The pilot flew the airplane an additional 57 hours prior to the accident.

The airplane's six fuel tanks held 173 gallons of Jet A fuel, of which 170 gallons was usable. The airplane manufacturer's data sheet states it had 4.2 hours of endurance, if it was fully fueled, performed a full power climb to 30,000 feet, cruised at maximum power and descended, and it would have a 45 minute reserve remaining.

The airplane manufacturer's maintenance manual states, "the fuel system is designed to minimize complexities inherent to most aircraft fuel systems." The system is designed to draw fuel from both wings simultaneously, and keep each side balanced by weight. Each wing has an airframe mounted inline electric boost pump, to provide, in unison, emergency back up for the engine driven pump, boost pressure for starting, and vapor suppression at high altitudes. These pumps are controlled by a three-position switch located on the left overhead panel with selections: MAN, OFF, and AUTO. In cruise flight, the Pilot Operating Handbook indicates that the pumps should be in AUTO. A pressure switch would activate both pumps automatically if the fuel pressure from the engine driven pump drops below 9 psig, and they remain activated until the pressure increases to 12 psig. Additionally, the Pilot Operating Handbook indicates, in the BEFORE LANDING check list, that the fuel pump control switch should be put in the MAN position for landing. The airplane is equipped with a red "FUEL PRESSURE" enunciator light, which will illuminate and inform the pilot anytime fuel pressure drops below 9 psig.

The airplane's Pilot's Operating Handbook states that the airplane's Maximum Operating Speed [the speed limit that may not be exceeded at any time] was 187 knots calibrated airspeed.

METEOROLOGICAL INFORMATION

At 1905, the weather conditions at Double Eagle II Airport (elevation 5,837 feet), were as follow: wind 160 degrees, at 4 knots; visibility 10 statute miles; sky condition clear; temperature 4 degrees Celsius (C); dew point minus 7 degrees C; altimeter setting 29.91 inches. The official sunset on March 7, 2003, at Albuquerque, New Mexico, occurred at 1807, and the end of civil twilight occurred at 1832. The moon rose at 0855 on March 7th and set at 2233 the same day. It was a waxing crescent with 19% of the visible disk illuminated.

AIRPORT INFORMATION

The Double Eagle II Airport (elevation 5,837 feet), Albuquerque, New Mexico, is not serviced by a control tower. The airport has two runways: 22-04 which is 7,400 feet long, and 35-17 which is 5,999 feet long. Runway 22 has an Instrument Landing System (ILS; 110.1 MHz) with a Medium Intensity Approach Lighting System with Runway Alignment Indicator (MALSR). Runway 22 is not equipped with any visual glide slope indicators such as a Visual Approach Slope Indicator or a Precision Approach Path Indicator. The airport is serviced by a Unicom/CTAF (Common Traffic Advisory Frequency) of 122.8 MHz. The Double Eagle II Airport's manager said that local procedures recommend that airplanes fly a 1,000 foot above ground level (AGL) traffic pattern altitude and that large and turbine-powered airplanes should enter the traffic pattern at an altitude of 1,500 feet AGL.

The Double Eagle II Airport is located on flat, uninhabited, inactive volcano lava fields, approximately 4 miles west of Albuquerque, New Mexico, and 700 feet above it.

WRECKAGE AND IMPACT INFORMATION

The airplane was found in the National Park Service's Petroglyphs National Monument, on gently rising terrain, partially covered by dry grass and occasional brush (N35 degrees, 09.974'; W106 degrees, 46.250'; elevation 5,834 feet). There were three sets of transmission lines approximately perpendicular to the runway 22 approach path. One static line was found broken and laying on the ground; another had black marks on it (elevation 5,840.0 feet, or approximately 63 to 64 feet above the ground). The distance from the static lines to the first ground scar (with right wing tip electrical lighting assembly) was approximately 477 feet, and was on an orientation of approximately 155 degrees. A large one-foot deep crater was found at 539 feet, and the airplane's right wing was found at approximately 545 feet. The main wreckage came to rest at 622 feet, with no congruity in its orientation. The propeller assembly was found to the right of the main energy path, at approximately 582 feet.

All of the airplane's major components were accounted for at the accident site. The right wing was separated from the fuselage at its root, and displayed impact compression damage to the tip area and its leading edge. The landing gear was down and locked. The left wing was found upright and attached to the central portion of the fuselage. Its tip area was impact damaged. The left wing flap was in position; the landing gear was down and locked. The right horizontal stabilizer and its elevator were separated, and found near the right wing. The left side horizontal stabilizer and elevator remained attached to the aft bulkhead, which was impact separated and found attached to the main wreckage by a pitch control cable.

The vertical stabilizer and rudder were found in their respective positions. The forward vertical stabilizer fuselage attachment point was separated. The leading edge of the vertical stabilizer's deicing boot (black rubber) displayed areas of abrasion and missing material. There were deep scrape marks with foreign silver-gray colored [transfer material] striations. The top of the vertical stabilizer was bent over to the right with silver-gray colored transfer material

and scrape marks along the end cap. The structural deformity of the vertical stabilizer wedged the rudder past its full right deflected position.

The airplane manufacturer's representative said that the fuselage "incurred substantial impact damage." The pile of wreckage had three discernable orientations. The left wing, with a section of the fuselage, was oriented approximately 135 degrees; the empennage was laying on its left side and oriented approximately 315 degrees; the cockpit and engine were oriented approximately 215 degrees. All viable living space was compromised.

The power lever was found forward in its operating range, at approximately 80%. The physical evidence associated with the flap actuator suggest that it was extended 15 threads, which corresponds to 10 degrees of flaps.

The engine was shipped to Pratt & Whitney Canada Corp., and under the auspices of the Transportation Safety Board of Canada, it was torn-down and analyzed on April 30, 2003, and May 1, 2003. The manufacturer's report stated that the engine "displayed significant impact damage including separation of the accessory gearbox from the gas generator section." The report further states that the "1st and 2nd power turbine guide vanes, and power turbines displayed circumferential rubbing due to their making contact with their adjacent components under impact loads and external housing deformation. All the compressor blades and shrouds, and the impeller and shroud displayed circumferential rubbing due to their making contact with their adjacent components under impact loads." All the components of the compressor section were "heavily" FOD (foreign object deposit) damaged, and an accumulation of dirt was found throughout. The combustion chamber liner was contaminated with dirt, but was otherwise unremarkable. The report stated that "the propeller shaft was fractured in torsional overload," which a manufacturer's representative said indicated that the engine was at mid-power range at the time of impact.

The propeller assemble, with all four blades still attached, was found separated from the engine with approximately 40% of the engine's flange attached. The spinner was crushed aft on the propeller's cylinder in a spiraling manner. Each of the four propeller blades were bent and twisted. Two of the blades had part of their tips torn away. All four blades had leading edge gouges, with chord wise and span wise scratches. The propeller manufacturer's representative said "the propeller blades had significant impact damage with harsh twisting, bending, and tearing of the blades. This, plus the fractured engine flange, indicates that the propeller had significant rotational energy at the time of impact." He further stated that he identified no discrepancies that would have precluded normal operation of the propeller assemble.

No aircraft or engine anomalies were identified that would have precluded normal operations prior to impact.

TEST AND RESEARCH

The pilot received his factory approved flight training from Simcom/PAIFA training centers, Vero Beach, Florida. One of the flight instructors that worked with the pilot said that the school teaches a disciplined, standardized VFR pattern so as to achieve a stabilized approach on final. He said that when he worked with the pilot, in early February, 2003, he instructed the pilot to fly his VFR traffic patterns at 1,500 feet AGL (Above Ground Level), with a stabilized final approach of approximately 1.5 nm in length. He said that traffic pattern entry should be from a 45 degree leg to the downwind leg, at 145 to 150 knots. The downwind should be parallel to the runway, and between 1 to 1.5 nm from the runway. The base leg should be flown

at approximately 135 knots with a maximum bank angle of 30 degrees, and final at between 90 and 95 knots. The Federal Aviation Administration (FAA), Advisory Circular number 90-66A, dated August 8, 1993, makes the following recommendation: "Large and turbine-powered airplanes should enter the traffic pattern at an altitude of 1,500 feet AGL or 500 feet above the established pattern altitude."

Radar data [ASR-9; Airport Surveillance Radar, version 9] from Albuquerque International Airport ATC (tower) indicates that the airplane entered the traffic pattern from an extended downwind, at approximately 205 knots (ground speed; GS) and 6,800 feet (1,000 feet AGL). Over the next approximate 3 nm of downwind, the airplane slowed to 171 knots GS and had descended to 6,300 feet (500 feet AGL). The radar data also indicates that the airplane's ground track moved closer to the runway by approximately 2,000 feet, and was approximately 2,775 feet from runway when he started his base turn. The last radar return was at 35 degrees, 10', 04.5" N; 106 degrees, 46', 12" W, at 5,900 feet with a recorded airspeed of 180 knots.

An engineer with the National Transportation Safety Board performed an additional analysis, at the Investigator-In-Charge's request, of the radar data's raw information for the purpose of estimating the airplane's maximum bank angle during its turn to final. He analyzed the last 28 seconds of flight [base turn to final], and estimated that the maximum rate of decent was between 1,800 to 1,900 feet per minute with calibrated airspeeds between 145 and 150 knots. He estimated that the maximum bank angle was approximately 73 degrees.

There were three sets of transmission wires near the accident scene, and they were oriented 315-135 degrees. Each set had two poles with a zinc coated static wire (silver-gray in color) on top. One of the static wires in the middle set was found separated and laying on the ground, and another was found intact, with black transfer material on it. The Public Service Company of New Mexico (PNM), reported that a 345 KV line tripped-off at 1918:16 and a 230 KV line tripped-off at 1918:19. PNM surveyed the wires, and determined that the black transfer material, on the one static wire, had an elevation 5,840.0 feet and was 8,266.5 feet from the threshold of runway 22 (elevation 5,810.4 feet). Their study estimated that the vertical distance between the static wire with the black transfer material and the highest conductor (center wire) was approximately 17 to 20 feet. This distance is not exact, and is based on estimated sag and the assumption of a level ground span between the poles.

The engine was equipped with a Data Acquisition Unit (DAU). The DAU records Torque accidences, which are engine Torque events above a defined limit (101.29%, i.e., 1,329.93 LB-FT) which last for 5 seconds or more, remain within a range that is readable by the system, and subsequently returns back to normal limits. The DAU also records Torque faults, which are engine Torque events out of valid range (114.24%, i.e., 1,500 LB-FT). The airplane's DAU was sent to Meggitt Avionics S-Tec for extraction of any recorded data, which was accomplished on June 3, 2003. They found that on March 7, 2003, a fault condition was recorded without a time stamp. No corresponding accidence was recorded with this event. A representative from Meggitt said he believes this was because the fault event was less than 5 seconds in duration and did not remain within a range that was readable by the system. He further stated that this recorded fault was "most likely the moment when the propeller assembly separated from the engine."

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot by The University of New Mexico, Health Sciences

Center, Office of the Medical Investigator, on March 10, 2003. No evidence of physical incapacitation or impairment that would have been causal to the accident was found.

The toxicology was performed by the FAA's Civil Aeromedical Institute (CAMI), Oklahoma City, Oklahoma. According to CAMI's report (#200300073002), the blood was tested for carbon monoxide and cyanide, and the urine was tested for volatiles (ethanol) and drugs, all with negative results.

ADDITIONAL INFORMATION

The aircraft wreckage was released to a representative of the owner's insurance company on August 5, 2003.

Pilot Information

Certificate:	Private	**Age:**	43, Male
Airplane Rating(s):	Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	02/25/2002
Occupational Pilot:		**Last Flight Review or Equivalent:**	11/14/2002
Flight Time:	1200 hours (Total, all aircraft), 77 hours (Last 90 days, all aircraft), 27 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N522RF
Model/Series:	PA-46-500TP	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	4697119
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	12/31/2002, 100 Hour	**Certified Max Gross Wt.:**	4850 lbs
Time Since Last Inspection:	57 Hours	**Engines:**	1 Turbo Prop
Airframe Total Time:	365 Hours as of last inspection	**Engine Manufacturer:**	Pratt & Whitney Canada
ELT:	Installed, not activated	**Engine Model/Series:**	PT6A-42
Registered Owner:	On file	**Rated Power:**	500 hp
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Night
Observation Facility, Elevation:	AEG, 5837 ft msl	**Distance from Accident Site:**	2 Nautical Miles
Observation Time:	1905 MST	**Direction from Accident Site:**	220°
Lowest Cloud Condition:	Clear	**Visibility**	10 Miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	160°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.91 inches Hg	**Temperature/Dew Point:**	4°C / -7°C
Precipitation and Obscuration:			
Departure Point:	Scottsdale, AZ (SDL)	**Type of Flight Plan Filed:**	IFR
Destination:	Albuquerque, NM (AEG)	**Type of Clearance:**	None
Departure Time:	1806 MST	**Type of Airspace:**	Class E

Airport Information

Airport:	Double Eagle II (AEG)	**Runway Surface Type:**	Asphalt
Airport Elevation:	5837 ft	**Runway Surface Condition:**	Dry
Runway Used:	22	**IFR Approach:**	None
Runway Length/Width:	7400 ft / 100 ft	**VFR Approach/Landing:**	Full Stop; Traffic Pattern

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	2 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 Fatal	**Latitude, Longitude:**	35.166111, -106.770833

Administrative Information

Investigator In Charge (IIC):	James F Struhsaker	**Report Date:**	02/24/2005
Additional Participating Persons:	Tamara Bell; FAA FSDO; Albuquerque, NM Michael McClure; The New Piper Aircraft, Inc.; Vero Beach, FL		
Publish Date:			
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/.		