Aviation Investigation Final Report

Location:	Elko, Nevada	**Accident Number:**	WPR17FA024
Date & Time:	November 18, 2016, 19:20 Local	**Registration:**	N779MF
Aircraft:	Piper PA 31T	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of engine power (partial)	**Injuries:**	4 Fatal
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled - Air Medical (Medical emergency)		

Analysis

The airline transport pilot departed in the twin-engine, turbine-powered airplane on an air ambulance flight with two medical crewmembers and a patient on board in night visual meteorological conditions. According to a witness, during the initial climb, the airplane made a left turn of about 30° from the runway heading, then stopped climbing, made an abrupt left bank, and began to descend. The airplane impacted a parking lot and erupted into flames.

In the 2 months before the accident, pilots had notified maintenance personnel three times that the left engine was not producing the same power as the right engine. In response, mechanics had replaced the left engine's bleed valve three times with the final replacement taking place three days before the accident. In addition, about 1 month before the accident, the left engine's fuel control unit was replaced during trouble shooting of an oil leak.

Postaccident examination revealed that the right engine and propeller displayed more pronounced rotational signatures than the left engine and propeller. This is consistent with the left engine not producing power or being at a low power setting at impact. Further, the abrupt left bank and descent observed by the witness are consistent with a loss of left engine power during initial climb. The extensive fire and impact damage to the airplane precluded determination of the reason for the loss of left engine power.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A loss of engine power to the left engine for reasons that could not be determined due to the extensive fire and impact damage to the airplane.

Findings

Aircraft	(general) - Malfunction
Not determined	(general) - Unknown/Not determined

Factual Information

History of Flight

Initial climb	Loss of engine power (total)
Initial climb	Loss of engine power (partial) (Defining event)

On November 18, 2016, about 1920 Pacific standard time, a Piper PA-31T "Cheyenne II" airplane, N779MF, was destroyed when it impacted terrain following a loss of control during initial climb from the Elko Regional Airport (EKO), Elko, Nevada. The airline transport pilot, two medical crewmembers, and the patient sustained fatal injuries. The airplane was being operated as an instrument flight rules (IFR) air transport medical flight by American Med Flight, Inc., (AMF) under the provisions of Title 14 *Code of Federal Regulations* Part 135. Night visual meteorological conditions prevailed, and an instrument flight rules flight plan was filed but had not been activated for the intended flight to Salt Lake City, Utah.

During a telephone conversation with a National Transportation Safety Board (NTSB) investigator, a witness located at EKO reported that the airplane departed runway 05. He stated that during the initial climb, the airplane made a left turn of about 30° from the runway heading, then stopped climbing, made an abrupt left bank, and descended out of his line of sight. The airplane impacted a parking lot and erupted into flames.

According to the Federal Aviation Administration (FAA), there were no radio calls received from the pilot, and no radar data were available for the flight.

Pilot Information

Certificate:	Airline transport	**Age:**	63,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	April 20, 2016
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 7050 hours (Total, all aircraft)		

A review of the airmen records maintained by the FAA indicated that the pilot held an airline transport pilot certificate with ratings for single-engine and multi-engine land airplanes and a type rating for a CE-500. His most recent first-class medical certificate was issued in April 2016 with the limitation that he "must wear corrective lenses."

The pilot's personal flight records were not recovered. On his most recent application for a medical certificate, he reported his total flight experience to be 7,050 hours.

According to AMF records, the pilot's last 2 duty periods were from November 1 to 7, 2016, and then from November 15 to the accident, during which he flew 6.3 hours of which 1.8 hours were for AMF under their *CFR* Part 135 certificate. The type of flight for the remainder of the time is unknown.

Pilot training records provided by AMF revealed that he received his most recent annual 14 *CFR* 135.293 and 135.299 airman competency/proficiency check on April 5, 2016. All areas of the examination were graded as satisfactory, and no discrepancies were noted; the flight time was 1.8 hours.

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N779MF
Model/Series:	PA 31T	**Aircraft Category:**	Airplane
Year of Manufacture:	1979	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	31T-7920093
Landing Gear Type:	Retractable - Tricycle	**Seats:**	
Date/Type of Last Inspection:	September 16, 2016 Condition	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	2 Turbo prop
Airframe Total Time:	6600 Hrs as of last inspection	**Engine Manufacturer:**	P&W CANADA
ELT:	Installed	**Engine Model/Series:**	PT6A-28
Registered Owner:	AMERICAN MEDFLIGHT INC	**Rated Power:**	715 Horsepower
Operator:	AMERICAN MEDFLIGHT INC	**Operating Certificate(s) Held:**	On-demand air taxi (135)

The airplane, serial number 31T-7920093, was manufactured in 1979 and had been altered in accordance with a Lifeport Patient supplemental type certificate (STC) SA00528SE for medical transport that was installed in August 2014. The airplane was equipped with two Pratt and Whitney PT6A-28 engines and two Hartzell HC-B3TN-3B/T10178B-10Q propellers that were installed in accordance with Aero Air STC SA1787NM in November 2011.

According to the flight's load manifest, the pilot calculated the takeoff weight as 8,693 pounds with a center of gravity of 134.74 inches, which was within the normal flight envelope. The load manifest listed a beginning hour meter time for the flight of 1,421.1 hours, which has the same time showing on the hour meter at the accident site.

The most recent inspection of the airplane was an "Event 1" inspection that was completed September 16, 2016, at 6,614.1 hours total airframe time. During that inspection, in response to a pilot report that the left engine was "lagging behind" the right engine, a mechanic replaced the bleed valve. A review of the logbooks found no record of uncorrected discrepancies.

An AMF pilot reported that he had not flown the airplane for several weeks when he began his shift on October 10, 2016, and noted that the left engine did not appear to have oil in it when he checked the dipstick. He added oil and briefly ran both engines in an effort to get an accurate reading of the left engine's oil level. Thereafter, he noticed that the left landing gear strut and tire was coated with oil, and there was a small puddle of oil on the floor. Given this evidence of an oil leak, he notified maintenance personnel. An AFM mechanic reported that, in response to the report of the oil leak, he replaced the "garloc seal" on the fuel pump and performed an operational check of the left engine; however, the engine "would not go above idle." He then replaced the fuel control unit, and the engine operated normally.

Another AFM mechanic reported that on November 4, 2016, a pilot had reported that the left engine was not producing full power. In response, he replaced the bleed valve.

The last maintenance recorded was on November 15, 2016, when the bleed valve on the left engine was again removed and replaced. The record stated that the maintenance occurred because the left engine was "low on torque."

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night
Observation Facility, Elevation:	KEKO,5074 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	02:56 Local	**Direction from Accident Site:**	223°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots / None	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	110°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.11 inches Hg	**Temperature/Dew Point:**	1°C / -7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Elko, NV (EKO)	**Type of Flight Plan Filed:**	IFR
Destination:	Salt Lake City, UT (SLC)	**Type of Clearance:**	None
Departure Time:	19:20 Local	**Type of Airspace:**	Class E

At 1856, an aviation routine weather report at EKO reported wind 110° at 7 knots, visibility 10 statute miles, clear skies, temperature 33°F; dew point 19°F, and altimeter setting 30.11 inches of mercury.

According to the US Naval Observatory, on the day of the accident, the sunset and the end of civil twilight occurred at 1622 and 1652, respectively. The moon was waning gibbous with 76% of the visible disk illuminated.

Airport Information

Airport:	ELKO RGNL EKO	**Runway Surface Type:**	
Airport Elevation:	5139 ft msl	**Runway Surface Condition:**	Unknown
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	3 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	4 Fatal	**Latitude, Longitude:**	40.833889,-115.783058(est)

The accident site was located in a parking lot about 5,300 ft from the Elko Regional Airport on a heading of 39°. The wreckage debris was scattered over an estimated 450 ft linear area scattered among parked cars. The main wreckage, which consisted of the cabin, right wing, inboard left wing, both engines, empennage, and tail section came to rest on a heading of about 305°. Photographs of the wreckage location and distribution are contained in the public docket for this accident.

The majority of the wreckage was consumed by a postimpact fire. The landing gear and flaps were in the retracted positions. The left wing displayed substantial thermal damage from the postimpact fire. The wing was separated from the fuselage and pushed to the aft and away from the fuselage consistent with impact with an adjacent pick-up truck in the parking lot. The engine was separated from the wing and found in the back of the pickup truck. The tip of the wing displayed impact damage, and the wing tip tank was separated and found about 30 ft in front and to the left of the wing. The fuel tanks were consumed by the postimpact fire. The aileron was separated and found about 30 ft in front and to the left of the wing.

The right wing was found in position adjacent to the fuselage. The wing displayed substantial thermal damage from the postimpact fire. The forward, aft, and main wing attachment points were consumed. The fuel tanks were consumed. The tip tank was separated and found about 80 ft in front of the wing. The aileron was in place and secure at the inboard end. The right engine was in position in front of the wing, and most of the nacelle aft of the firewall had been consumed by the postimpact fire.

The empennage assembly was in place and secure. The vertical stabilizer and rudder were secure at all attach points. Both rudder cables were attached to the rudder bellcrank and were continuous to the rudder bar in the cockpit. The horizontal stabilizer was secure and in place. The elevator was secure at the remaining hinge point. Both trim tabs were secure. The elevator push-pull tube was secure at both ends. Both the upper and lower elevator cables were secured to the elevator bellcrank and continuous to the elevator sector on the control wheel shaft in the cockpit. The stability augmentation system cylinder

displayed the normal 8-inch actuator extension, and the servo arm was down.

The fuselage displayed substantial thermal damage, and the skin was mostly consumed down to the floorboards and aft to the aft fuselage bulkhead. The quadrant assembly displayed substantial impact damage and was bent over to the right side. The pedestal engine controls were buried under debris. All engine control cables were secured to the control levers. Both condition levers appeared to be near the forward position. The right propeller lever appeared to be in about the 3/4 forward position, and the left propeller lever was in about the 1/4 forward position. The right power lever was in about the 1/2 forward position, and the left power lever was in about the 3/4 forward position.

The left engine, serial number PC-E-52075, displayed substantial thermal damage, and no external indication of catastrophic failure was noted. The gas generator case was painted blue, and the paint was blistered and discolored in numerous areas. The fuel control unit (FCU) rod was still connected, and the fuel lever was sitting against the max fuel flow stop of the FCU. The compressor 1st, 2nd, and 3rd stage stators and shrouds exhibited vane tip rubbing and contact rubbing, respectively. The combustion chamber liner was deformed with no evidence of burning. Blue paint drips were visible on the outer portion of the liner, and some drips were also found on the liner itself and on the fuel nozzles sheath rings. The inner portion of the liner exhibited an accumulation of blue pigments as well as paint accumulation between the small exit duct seal rings. The paint was consistent with air flowing through the engine sometime after the engine was subjected to thermal exposure (paint on the outer casing).

Blue paint deposits were present on the downstream side of the airfoils on the turbine guide vane ring. All vanes were present with no evidence of burning. All blades were in place on the compressor turbine. Some blue paint deposits could be seen on the convex side of the blade airfoils. The downstream side of the disk showed circular rubbing on its complete face. The power turbine shroud had light rubbing but was otherwise intact. The power turbine blades had been pushed out consistent with contact with the power turbine vanes at impact. There was no evidence of significant rubbing of the blade tips. The upstream side of the disk showed no significant circular rubbing. The bleed valve was melted from thermal exposure.

The right engine, serial number PC-E-52069, displayed substantial thermal damage, and no external indication of catastrophic failure was noted. The propeller was separated aft of the engine propeller flange. The separation displayed sharp 45° edges and was consistent with torsional separation. No evidence was found of preimpact mechanical malfunction or failure with the engine.

The left propeller remained secured to the propeller flange. The propeller cylinder and feathering springs separated from the assembly and were found beneath the propeller. One of the three blades had separated. The separated blade showed impact damage to the tip but no significant rotational damage. The remaining two blades were mostly melted leaving about 12 inches of each blade remaining with the hub. The blades appeared to be in the normal operating range and were not feathered.

The right propeller had separated and was found along the debris path before the main wreckage. The cylinder was separated with the springs. One of the three blades had separated. All three blades displayed substantial rotational damage with chordwise scratches and leading edge nicks, cuts, and gouges.

The right engine and propeller displayed more pronounced rotational signatures than the left engine and propeller. According to the engine manufacturer, the difference in rotational signatures between the left and right engines could be attributed to the left engine not producing power or being at a very low power setting at impact.

Medical and Pathological Information

The Washoe County Regional Medical Examiner, Washoe County, Nevada, completed an autopsy on the pilot. The examiner determined that the pilot's cause of death was multiple blunt force injuries.

The FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed toxicological screenings on the pilot. The toxicological findings were negative for ethanol (alcohol) and drugs. Carbon monoxide testing was not conducted as no blood was available for testing.

Administrative Information

Investigator In Charge (IIC):	Shaver, Christopher
Additional Participating Persons:	Gerry Rose; Federal Aviation Administration; Reno, NV Marc Gratton; Pratt and Whitney Mike McClure; Piper Aircraft; Vero Beach, FL John Burrell; American Med Flight Inc.; UT
Original Publish Date:	September 4, 2018
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=94399