



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	Fort Lauderdale, FL	<b>Accident Number:</b>	ERA15FA181
<b>Date &amp; Time:</b>	04/12/2015, 1625 EDT	<b>Registration:</b>	N119RL
<b>Aircraft:</b>	PIPER PA-31T1	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>	Fire/smoke (non-impact)	<b>Injuries:</b>	4 Fatal
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

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## Analysis

Following an uneventful personal flight, the pilot contacted the air traffic control tower controller and was immediately cleared to land. About 36 seconds later, the pilot reported "smoke in the cockpit." When asked to repeat, the pilot repeated "smoke in the cockpit." The tower controller cleared the pilot to land on any runway. About 47 seconds after the initial call of smoke, the pilot reported "mayday mayday mayday mayday mayday (unintelligible)." The airplane then crashed about ¼ mile short of the airport in a wooded area and burned.

Security video showed the airplane pitch nose-down suddenly just before impact. The video revealed no visible smoke or fire trailing the airplane before ground impact.

The pilot reported about 1,221 hours of total flight time on his Federal Aviation Administration first class medical certificate, issued about two months prior to the accident. He completed an initial training course for the airplane make and model 1 week before the accident. The airplane had recently undergone an annual inspection and extensive upgrades to its avionics.

Both the left and right engines displayed contact signatures to their internal components characteristic of engines developing significant power at the time of impact, likely in the mid-to-high power range. The engines displayed no indications of any pre-impact anomalies or distress that would have precluded normal engine operation. Both propeller assemblies broke free from the engine during the crash sequence and the blades on both engines revealed signatures consistent with the development of power at impact.

The center fuselage and cockpit areas were completely consumed in the postcrash fire. An examination of all remaining wires, wire bundles, switches, terminals, circuit breakers, electrical components, instruments, and avionics did not reveal evidence of precrash thermal distress. However, a small fire just before impact likely would not have had time to create thermal damage that would be discernable after an extensive postcrash fire.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

A rapid onset of smoke and/or fire inflight for reasons that could not be determined due to the postimpact fire and the condition of the wreckage.

### Findings

Aircraft	Aircraft systems - Malfunction (Cause)
Not determined	Not determined - Unknown/Not determined (Cause)

## Factual Information

### History of Flight

Approach-VFR pattern final	Fire/smoke (non-impact) (Defining event) Controlled flight into terr/obj (CFIT)
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On April 12, 2015, about 1625 eastern daylight time, a Piper PA-31T1, N119RL, collided with terrain on final approach to runway 13 at Fort Lauderdale Executive Airport (FXE), Fort Lauderdale, Florida. The private pilot and three passengers were fatally injured and the airplane was destroyed by impact forces and a postcrash fire. The airplane was registered to a private company and was operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Day, visual meteorological conditions prevailed for the flight, and an instrument flight rules flight plan was filed. The flight originated from Orlando Executive Airport (ORL), Orlando, Florida, about 1520.

According to information obtained from air traffic control, the pilot checked in with Miami approach control at 1618 and was advised to maintain 3,000 feet. The pilot was provided the most recent weather and runway information for FXE and he informed the controller that he would be executing a visual approach to runway 9. The controller then cleared the airplane to proceed direct to FXE with a descent to 2,000 feet. The pilot reported that he did not have FXE in sight, so the controller provided assistance and cleared the pilot to descend to 1,500 feet. At 1623, the pilot reported the field in sight and the controller cleared the pilot for the visual approach to runway 9 and handed him off to the FXE air traffic control tower. At 1623:49, the pilot checked in with FXE tower and was immediately cleared to land by the tower controller. At 1624:27, the pilot reported, "romeo lima smoke in the cockpit." When asked to repeat, the pilot responded, at 1624:30, "smoke in the cockpit." At 1624:38, the tower controller cleared the pilot to land on any runway and advised that he was aligned with runway 13. At 1624:48, the pilot stated that he would land on runway 13. At 1625:14, the pilot reported, "mayday mayday mayday mayday mayday (unintelligible)." This was the last transmission received from the pilot. The airplane then crashed about 1/4 mile short of runway 13 in a wooded area.

A witness was outside on a church sports field, about 1/4 mile from the crash site, at the time of the accident. He observed the airplane coming in from the northwest, diagonally toward the airport. He stated that the airplane was "too low." He thought that the airplane would pull up in time; however, it "...got worse, the closer it got to the ground the more the nose fell toward the ground." He then heard a loud explosion and observed a pillar of smoke and fire. He further stated that there was no smoke or fire coming from the airplane, and that the engines sounded normal prior to the crash.

Security camera video was provided to investigators that captured the airplane immediately prior to the crash. A review of the video revealed no visible smoke or fire trailing the airplane in flight. Immediately prior to impact, a noticeable pitch down was observed, consistent with the witness report.

## Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	51, Male
<b>Airplane Rating(s):</b>	Multi-engine Land; Single-engine Land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 1 With Waivers/Limitations	<b>Last FAA Medical Exam:</b>	02/18/2015
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	04/05/2015
<b>Flight Time:</b>	1221 hours (Total, all aircraft)		

The pilot, age 51, held a private pilot certificate with airplane single engine, multi-engine, and instrument airplane ratings. He reported 1,221 hours total flight time on his most recent Federal Aviation Administration (FAA) medical certificate, dated February 18, 2015. Records recovered from the wreckage indicated that he completed a PA-31 initial training course about 1 week prior to the accident. A pilot logbook was recovered from the wreckage; however, no total flight time information could be discerned due to the extensive fire damage.

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	PIPER	<b>Registration:</b>	N119RL
<b>Model/Series:</b>	PA-31T1	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1979	<b>Amateur Built:</b>	No
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	31T7904002
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	7
<b>Date/Type of Last Inspection:</b>	04/03/2015, Annual	<b>Certified Max Gross Wt.:</b>	8700 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	2 Turbo Prop
<b>Airframe Total Time:</b>	3267 Hours as of last inspection	<b>Engine Manufacturer:</b>	P&W Canada
<b>ELT:</b>	C126 installed, activated, did not aid in locating accident	<b>Engine Model/Series:</b>	PT6A-11
<b>Registered Owner:</b>	Aircraft Guaranty Corp Trustee	<b>Rated Power:</b>	528 hp
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

The seven-seat airplane, also known as the Cheyenne I, was manufactured in 1979 and was equipped with two Pratt and Whitney Canada PT6A-11 turboprop engines. The airplane maintenance records indicated that an annual inspection of the airframe, engines, and propellers was completed on April 3, 2015. At the last inspection, the total time recorded on the airframe and engines was 3,266.5 hours.

Concurrent with the last annual inspection, a Garmin GTN-650 GPS, communication and navigation system, a Garmin GA-35 GPS antenna, a Garmin GMA-340 audio panel, a Bendix King KN-53 navigation and glideslope receiver, and a Bendix King KI-204 VOR, localizer and glideslope indicator were installed and the old avionics were removed. A new aircraft battery was also installed.

### Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual Conditions	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	FXE, 12 ft msl	<b>Distance from Accident Site:</b>	1 Nautical Miles
<b>Observation Time:</b>	1553 EDT	<b>Direction from Accident Site:</b>	130°
<b>Lowest Cloud Condition:</b>	Scattered / 2500 ft agl	<b>Visibility</b>	10 Miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	13 knots /	<b>Turbulence Type Forecast/Actual:</b>	/ None
<b>Wind Direction:</b>	140°	<b>Turbulence Severity Forecast/Actual:</b>	/ N/A
<b>Altimeter Setting:</b>	30.06 inches Hg	<b>Temperature/Dew Point:</b>	30° C / 20° C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Orlando, FL (ORL)	<b>Type of Flight Plan Filed:</b>	IFR
<b>Destination:</b>	Fort Lauderdale, FL (FXE)	<b>Type of Clearance:</b>	IFR
<b>Departure Time:</b>	1520 EDT	<b>Type of Airspace:</b>	Class C

The FXE weather at 1553 included wind from 140 degrees at 13 knots, visibility at least 10 statute miles, scattered clouds at 2,500 feet above the ground, temperature 30 degrees C, dew point 20 degrees C, and altimeter setting 30.06 inches of mercury.

## Airport Information

<b>Airport:</b>	Fort Lauderdale Executive (FXE)	<b>Runway Surface Type:</b>	Asphalt
<b>Airport Elevation:</b>	13 ft	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	13	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	4000 ft / 100 ft	<b>VFR Approach/Landing:</b>	Full Stop; Traffic Pattern

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Destroyed
<b>Passenger Injuries:</b>	3 Fatal	<b>Aircraft Fire:</b>	In-Flight and On-Ground
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	On-Ground
<b>Total Injuries:</b>	4 Fatal	<b>Latitude, Longitude:</b>	26.201667, -80.177500 (est)

The wreckage was located inside a fenced nature preserve within the boundary of the airport. The main wreckage was located directly under the extended centerline for runway 13. The wreckage debris field was about 167 feet in length and about 50 feet wide, oriented on a heading of about 112 degrees. The fuselage came to rest upright, aligned on a heading of 020 degrees. All major structural components of the aircraft were found within the confines of the debris field. Several tree limbs were found along the wreckage path with smooth, angular cuts.

The fuselage was destroyed from the nose cone area aft to the forward pressure bulkhead from impact damage and the postcrash fire. All structure forward of the main wing spar was consumed by the postcrash fire. The aft fuselage, forward of the main cabin door leading edge, was segmented and destroyed by the postcrash fire. The fuselage wreckage surrounding the aft cabin door frame was impact-damaged and scorched. The main cabin door was found latched. The cabin enclosure windows and windshields were destroyed by ground impact and postcrash fire. The forward cabin seats were in place; however, they were bent and destroyed by impact forces and postcrash fire. The aft seats were found bent with fire damage noted. All seat restraints were damaged by postcrash fire. Two buckled remnants were located, and other seat restraint items were found; however, the seat belt webbing was burned away. The remaining buckles were not latched and were noted to be damaged from postcrash fire.

All avionics equipment and flight instruments were destroyed by the postcrash fire. The magnetic compass unit was located in the forward debris path. The switch and circuit breaker panels were fire-damaged. The engine power levers appeared to be in the "full forward" positions. The left and right control wheel shafts were noted to be bent from impact. The control wheels were destroyed by the postcrash fire. The aileron control chain was attached to the control wheel shaft sprockets. The rudder pedals were located. Their support shaft was impact-damaged and the pedals were not free to move.

The nose landing gear was found adjacent to the fuselage. It appeared to have been in the "extended and locked" position. The airplane's radar unit antenna was located adjacent to the fuselage, and its power supply and processor were located in nearby brush. The airplane's main battery was not located. The cabin heater was located, installed at its normal position. The flap and landing gear select switches were damaged from impact and postcrash fire. They offered no useful information as to their pre-impact positions. The flight control trim wheel console was destroyed by ground impact and postcrash fire. Their cables were intact and could be traced aft to their respective flight controls.

Both engines were separated from the airframe and both propeller assemblies were separated from the engines during the accident sequence.

The vertical fin remained mounted to the fuselage. It exhibited impact damage and some scorching signatures. The rudder was attached to the vertical fin and was free to move left and right. It appeared to have limited impact damage. The rudder trim tab and actuator rod were still attached and both were free to move. Rudder and rudder trim cable continuity were traced from their respective positions forward to the cabin area. Continuity was noted but control movement was limited due to cabin area compression and distortion. The primary rudder control stops indicated no bending or peening conditions. The autopilot servo control cable was intact.

The horizontal stabilizer assembly was noted to have tree and ground impact damage with some scorching noted. The left horizontal stabilizer was bent downward and appeared to have a "U" shape. Leading edge damage was noted to both sides.

The elevator was free to move. The control rod was attached and the control balance springs were in place. The autopilot pitch servo control cables were attached. The trim tab was free to move. Cable continuity was traced forward to the cabin area. Movement was limited due to cabin area compression and distortion. The elevator primary stops showed no evidence of a bending or peening condition.

The left wing inboard section was separated from the fuselage at the wing root and was destroyed by impact forces and the postcrash fire. The outboard section, engine nacelle, and wing tip tank areas were separated by tree impact and were found in the vicinity of the initial tree impact point. No fire damage was noted on the surfaces. The left flap was destroyed by ground impact and postcrash fire. It appeared to have been in the extended position. The left aileron was segmented and destroyed. Aileron control cable continuity was traced to the forward cabin area thru separations made by ground impact tension overload and retrieval personnel making cuts to facilitate wing wreckage retrieval. Control movement was limited due to postcrash fire and impact damage at the fuselage. All fuel tanks were breached and all fuel caps were in place and closed. The main landing gear was noted to be in the extended position and separated from the wing.

The right wing was partially attached to the fuselage at the main spar. The engine nacelle inboard wing section was partially attached. It exhibited severe ground impact and postcrash fire damage. All fuel bladder tanks were breached and destroyed. The fuel caps were in place

and locked. The tip tank was separated and located within the debris field. The main landing gear was attached to the wing and appeared to be in the extended position. It exhibited heat and impact damage. The inboard flap section was partially destroyed and segmented from the outboard section, which was attached to the wing panel. The aileron was attached at its hinges. The trim tab, control rod, and balance weight were still attached. The outboard wing section exhibited separation at the rivet line with aft crushing signatures evident. Aileron control cable continuity was established thru tension overload cable breaks and through-cuts made by the wreckage retrieval personnel. The autopilot roll servo control cables appeared to be damaged by postcrash fire damage and fuselage distortion. The flap appeared to be in the down position.

Following the on-scene documentation, the wreckage was moved to a storage facility at Fort Pierce, Florida for additional examination. All avionics units were removed and examined. All units were heavily damaged by fire, and there were no indications of pre-crash thermal damage or arcing. All aircraft wiring harnesses were removed and examined. All wires were heavily damaged by fire with the insulation burned away. There were no visible indications of pre-crash thermal damage or arcing noted. All switches, connections, and terminals were burned, and some were intact; no arcing damage was noted.

## Engines

The engines were partially disassembled for a visual examination. All positional references are in relation to view from aft looking forward. Upstream and downstream references are in relation to gas path flow from the compressor inlet to exhaust.

### Left Engine

The left engine was inverted, the exterior was thermally distressed, and the bottom of the exhaust duct was compressed. The propeller and the reduction gearbox were separated from the engine at the front and rear reduction gearbox mating flanges. The propeller and front reduction gearbox did not exhibit any thermal distress. The front and rear reduction gearbox mating flanges were fractured. The bottom of the exhaust duct was compressed towards the gas generator case flange. A tear was noted adjacent to the power turbine shroud.

The gas generator case was bent and compressed at the 6 o'clock position and the exterior was thermally discolored from the postcrash fire. The engine's gas path was filled with fluid from extinguishing the postcrash fire. The interior region of the gas generator case did not exhibit any evidence of any fire outside the combustion section. The airframe cabin bleed tube was removed and no abnormal staining was evident in the cabin bleed port.

The externally-mounted components of the accessory gearbox were in place and secure. The exterior of gearbox housing was thermally distressed from the postcrash fire.

The power control and reversing linkage were examined. The front linkage was in place and secure. The propeller reversing guide pin was bent and the wire rope was severed. The rear linkage was in place and secure.

The reduction gearbox chip detector was removed and no metal was noted on the magnetic

poles. Some organic debris was adhered to the detector in the residual oil. The oil filter was heat-distressed from the postcrash fire and separated into sections during removal.

The compressor's 1st, 2nd, and 3rd stage discs and blades were examined. The starter generator was removed from the accessory gearbox and the compressor was capable of some limited rotation. Mechanical continuity was established between the compressor and the accessory gearbox. The 1st stage compressor blades were viewed through the inlet and were unremarkable.

The combustion chamber liner was examined. The gas generator case was sectioned adjacent to the exhaust duct mating flange and the engine mounts to access the hot section components. The engine was filled with fluids from extinguishing the postcrash fire. The liner exhibited some compressional bending from contact with the exhaust duct and gas generator case. There was operational coking noted in the liner. There was no evidence of any fire external to the combustion chamber. The large exit duct exhibited localized oxidation but there was no evidence of any fire external to the combustion region. The small exit duct was in good condition.

The compressor turbine guide vane ring was examined. The vane airfoils were in good condition. The downstream face of the vane inner rim exhibited light rub marks from contact with the compressor turbine blades. The compressor turbine shroud exhibited a rub on one segment at the 7 o'clock position from contact with the compressor turbine blade tips.

The upstream side of the compressor turbine blade platforms had rubbed with the downstream face of the compressor turbine vane rim. The downstream face of the blade and disc fir tree region including the retention rivets were rubbed from contact with the upstream side of the power turbine vane and baffle. The outside diameter of the disc retention bolt bore exhibited rubs from contact with the center of the vane baffle. The blade tips exhibited some light rub marks from contact with their respective shroud.

The power turbine was examined. The power turbine housing was unremarkable. The power turbine guide vane ring and interstage baffle were examined. The upstream side of the inner rim of the vane and upstream face of the baffle exhibited rub marks from contact with the compressor turbine disc, rivets, and blades. The center of the baffle was rubbed and distorted from contact with the compressor turbine bolt bore diameter. The downstream side of the vane and baffle exhibited rub marks from contact with the upstream side of the power turbine blade. The center of the baffle exhibited rub marks, distortion and was fractured from contact with the outer diameter of the power turbine retention bolt bore. There were numerous gouge marks on the face of the baffle from contact with the power turbine disc. Several of the vane airfoils, the inner rim and the outer rim were fractured and displayed rub marks from contact with the power turbine disc and blades. The fractured vane airfoils were at the 12 o'clock position of the engine.

The power turbine shroud exhibited some rubs and was partially unseated. The power turbine and the center of the exhaust duct/power turbine shaft housing were displaced towards the 12 o'clock position. Approximately half of the blades were fractured at varying heights and had

migrated forward in the disc fixings. The outside diameter of the disc retention bolt bore exhibited rubs, gouges and was distorted from contact with the center of the vane baffle. Most of the blade platforms exhibited a rub on the downstream face from contact with the power turbine vane and baffle. The blade tips exhibited rub from contact with the shroud and the outer rim of the vane. The blade fracture surfaces exhibited a rough texture consistent with an overload fracture.

The ignition leads were thermally discolored from exposure to the postcrash fire. The leads and ignition plugs were in place and secure.

The fuel system was examined. The fuel pump was in place and secure. The fuel filter was not removed as the threads were seized, consistent with thermal damage. The thermal insulation was burned away from the braided line between the pump and fuel control unit. The fuel control unit was in place and secure. The exterior of the control was thermally discolored from exposure to the postcrash fire. The flow divider was in place and secure. The exterior of the divider was thermally discolored from exposure to the postcrash fire. The fuel nozzles were in place and secure. The exterior of the nozzles were thermally discolored from exposure to the postcrash fire. Several of the transfer tubes between the nozzles were melted from exposure to the postcrash fire.

## Right Engine

The right engine was inverted, the exterior was thermally distressed, and the bottom of the exhaust duct was compressed. The propeller and the reduction gearbox were separated from the engine at the front and rear reduction gearbox mating flanges. The front and rear reduction gearbox mating flanges were fractured. A section of the gearbox housing was consumed by the postcrash fire. The bottom of the exhaust duct was compressed towards the gas generator case flange.

The exterior of the gas generator case was thermally discolored from the postcrash fire. The interior region of the gas generator case did not exhibit any evidence of any fire outside the combustion section; however, there was a stain at the 3 o'clock position. The direction and location indicates the stain was from static oil leak, draining from the no. 2 bearing oil seals after impact with the engine positioned on its left side. The airframe cabin bleed tube was removed and no abnormal staining was evident in the cabin bleed port.

The externally mounted components of the accessory gearbox were in place and secure except for the starter-generator. The mounting bracket for the generator was fractured. The exterior of the gearbox housing was thermally distressed from the postcrash fire.

The power control and reversing linkage were examined. The front linkage was in place and secure. The propeller reversing guide pin was bent and the wire rope was severed. The front linkage was discolored from exposure to the postcrash fire. The rear linkage was in place and secure.

The reduction gearbox chip detector was missing and the oil filter was clean.

The compressor section was examined. The compressor was rotated and mechanical continuity was established between the compressor and the accessory gearbox. The 1st stage compressor blades were viewed through the inlet and were unremarkable.

The combustion chamber liner was examined. The gas generator case was sectioned adjacent to the exhaust duct mating flange to access the hot section components. The liner was unremarkable in appearance except for some sand that was ingested through the inlet case during impact with the terrain. There was operational coking noted within the liner. There was no evidence of any fire external to the combustion chamber. The large exit duct exhibited localized oxidation but there was no evidence of any fire external to the combustion region. The small exit duct was in good condition.

The compressor turbine guide vane ring was examined. The vane airfoils were in good condition. The downstream face of the vane inner rim exhibited light rub marks from contact with the compressor turbine blades. The compressor turbine shroud exhibited a rub from the 10 to 2 o'clock position from contact with the compressor turbine blade tips. Sand that was ingested through the inlet case during impact with the terrain was evident on and adjacent to the shroud.

The upstream side of the compressor turbine blade platforms had rubbed with the downstream face of the compressor turbine vane rim. The downstream face of the blade and disc fir tree region including the retention rivets were rubbed from contact with the upstream side of the power turbine vane and baffle. The outside diameter of the disc retention bolt bore exhibited rubs from contact with the center of the vane baffle. The blade tips exhibited some light rub marks from contact with their respective shroud.

The power turbine housing was unremarkable. The power turbine guide vane ring and interstage baffle were examined. The upstream side of the inner rim of the vane and upstream face of the baffle exhibited rub marks from contact with the compressor turbine disc, rivets, and blades. The center of the baffle was rubbed and distorted from contact with the compressor turbine bolt bore diameter. The downstream side of the vane and baffle exhibited rub marks from contact with the upstream side of the power turbine blade. Two vane airfoils and the outer rim were fractured. The outer rim also exhibited rub marks from contact with the power turbine blades. The center of the baffle exhibited rub marks, distortion and was fractured from contact with the outer diameter of the power turbine retention bolt bore. The baffle exhibited marks from contact with the power turbine disc.

The power turbine shroud exhibited rub marks on the lands and on the rear lip. The power turbine and the center of the exhaust duct/power turbine shaft housing were displaced towards the 1 to 2 o'clock position. Approximately half of the blades were fractured at varying heights. Most of the blade platforms exhibited a rub on the downstream face from contact with the power turbine vane and baffle. The outside diameter of the disc retention bolt bore exhibited rubs, gouges and was distorted from contact with the center of the vane baffle. The blade fracture surfaces exhibited a rough texture consistent with an overload fracture.

The ignition leads were thermally discolored from exposure to the postcrash fire. The leads were in place and secure. Visually, the ignition plugs were in good condition.

The fuel control unit was in place and secure. The exterior of the control was thermally discolored from exposure to the postcrash fire. The flow divider was in place and secure. The exterior of the divider was thermally discolored from exposure to the postcrash fire. The fuel nozzles were in place and secure. The nozzles were removed and were visually unremarkable. Some of the fuel transfer tubes between the nozzles were thermally distressed.

## Propellers

Both propeller assemblies separated from the engines during the crash sequence. The left propeller and reduction gearbox separated from the engine at the front and rear reduction gearbox mating flanges. The left propeller assembly was relatively free of post-impact fire damage and was found outside the main postcrash fire area. The propeller blades exhibited twisting and s-bending signatures. Leading edge gouges, chord-wise scratching, and surface polishing were also noted.

The right propeller and reduction gearbox separated from the engine at the front and rear reduction gearbox mating flanges. The right propeller assembly was damaged from impact and the postcrash fire. The propeller blades exhibited twisting and s-bending signatures. Leading edge gouges, chord-wise scratching, and surface polishing were also noted.

## Medical And Pathological Information

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A postmortem examination of the pilot was performed at the offices of the Broward County Medical Examiner, Fort Lauderdale, Florida.. The autopsy report noted the cause of death as "blunt force trauma of the chest" and the manner of death was "accident."

Forensic toxicology testing of the pilot was performed on specimens of the pilot by the FAA Bioaeronautical Sciences Research Laboratory (CAMI), Oklahoma City, Oklahoma. The CAMI toxicology report indicated negative for carbon monoxide (a 10 percent cutoff), ethanol, and drugs. Testing for cyanide was not performed. Local toxicology testing indicated 4 percent carbon monoxide in the blood. The autopsy report noted that there was "minimal soot" in the upper airway.

All three passengers, who were the pilot's wife and two daughters, died from inhalation of products of combustion and thermal injuries. All three passengers had elevated carbon monoxide in the blood, with levels of 17, 20, and 72 percent, respectively. The upper airway of all three passengers contained soot.

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Ralph E Hicks	<b>Report Date:</b>	10/04/2016
<b>Additional Participating Persons:</b>	Scott Ridlon; FAA/S FL FSDO; Miami, FL Ron Maynard; Piper Aircraft Co.; Vero Beach, FL Jeffery Davis; P&WC; Bridgeport, WV		
<b>Publish Date:</b>	10/04/2016		
<b>Note:</b>	The NTSB traveled to the scene of this accident.		
<b>Investigation Docket:</b>	<a href="http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=91012">http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=91012</a>		

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The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).