Aviation Investigation Final Report

Location:	Broadus, Montana	**Accident Number:**	WPR16FA182
Date & Time:	September 17, 2016, 12:36 Local	**Registration:**	N413D
Aircraft:	Beech 95 B55 (T42A)	**Aircraft Damage:**	Substantial
Defining Event:	Unknown or undetermined	**Injuries:**	3 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airline transport pilot and his passengers departed on a personal cross-country flight and flew southeast toward their destination. Radar tracking indicated that after departure, the airplane attained an altitude of about 5,600 ft mean sea level (msl) in about 13 minutes. Radar data became intermittent; however, when radar contact was reestablished several minutes later, the airplane tracking was consistent with the course and altitude of the flight. The last data tracks identified the airplane at 5,800 ft msl.

The wreckage was located on flat open land at an elevation of 3,751 ft about 58 miles southeast from the last radar return. There were no witnesses to the accident, and no significant weather was in the area at the time of the accident.

Ground signatures and an examination of the airframe revealed evidence that the airplane collided with the ground in a nose-low near vertical attitude. Damage signatures and a teardown examination revealed that the propeller damage for both the left and right-side propeller assemblies was similar with the physical damage indicating rotation with power on at the time of impact.

Postaccident examinations of the airframe, engine, and propellers revealed no discrepancies that would have precluded normal operation.

The reason for the departure from cruise flight and the loss of control could not be determined from the available evidence.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:
The airplane's departure from cruise flight for reasons that could not be determined based on the available information.

Findings

Not determined	(general) - Unknown/Not determined

Factual Information

History of Flight

Enroute-cruise	Unknown or undetermined (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On September 17, 2016, about 1236 mountain daylight time, a Beech 95-B55 airplane, N413D, impacted terrain about 30 miles southeast of Broadus, Montana. The airline transport pilot and two passengers were fatally injured. The airplane was substantially damaged. The airplane was owned and operated by the pilot under the provisions of Title 14 *Code of Federal Regulations* Part 91 as a personal cross-country flight. The flight departed from the Billings Logan International Airport (BIL), Billings, Montana, about noon, and was destined for Rapid City Regional Airport (RAP), Rapid City, South Dakota.

The airplane wreckage was found by a ranch caretaker as he was returning to work from lunch, about 1300. The caretaker reported hearing an airplane during lunch (between 1130-1200), but he did not go outside to look for it nor did he hear the airplane impact the ground.

Figure 1 - OpsVue flight track of the accident airplane.

Track data for the flight was obtained from Harris OpsVue, which uses Federal Aviation Administration (FAA) radar data and applies an altimeter correction to estimate altitude. The altitude data may have an error of +/-300 ft.

The OpsVue data indicated the airplane departed BIL, about noon, squawking a transponder code of

0456, and made a right turn toward the southeast. About 6 minutes later, the airplane had climbed to an altitude of 5,500 to 5,600 ft. and began squawking a transponder code of 1200. Track data consistent with the accident airplane continued for about 13 minutes.

No data was available between 1213:13 and 1225:03; data consistent with the airplane's course then resumed at an altitude of about 5,800 ft and continued on the southeast course for about 36.5 nautical miles (nm). No data was available between 1233:04 and 1235:28; another track then began at an altitude of 5,800 ft, still heading southeast and about 7.3 nm from where the track stopped. At 1235: 57, the track started a left turn with data ending at 1236:04 at an altitude of 5,800 ft. The last data point was located about 43.35 nautical miles southwest of Broadus, Montana.

The accident site was located about 58 miles southeast from the last identified radar track at an elevation of 3,751 ft. (about 30 miles southeast of Broadus).

Pilot Information

Certificate:	Airline transport	**Age:**	64,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):	None	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane single-engine	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	March 3, 2016
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 4116 hours (Total, all aircraft), 0 hours (Total, this make and model)		

Passenger Information

Certificate:		**Age:**	45
Airplane Rating(s):		**Seat Occupied:**	Rear
Other Aircraft Rating(s):		**Restraint Used:**	None
Instrument Rating(s):		**Second Pilot Present:**	No
Instructor Rating(s):		**Toxicology Performed:**	No
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:			

Passenger Information

Certificate:		**Age:**	13,Male
Airplane Rating(s):		**Seat Occupied:**	Right
Other Aircraft Rating(s):		**Restraint Used:**	None
Instrument Rating(s):		**Second Pilot Present:**	No
Instructor Rating(s):		**Toxicology Performed:**	No
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:			

The 64-year-old pilot held an airline transport pilot certificate with ratings for airplane single- and multi-engine land. He also held a flight instructor certificate with ratings for airplane single-engine. On the pilot's most recent FAA medical application dated March 3, 2016, he left the total flight time question box blank. However, on his FAA medical application dated March 4, 2014, the pilot reported 4,116 total flight hours. The pilot held a third-class medical certificate with the limitation that he must wear corrective lenses.

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N413D
Model/Series:	95 B55 (T42A) A	**Aircraft Category:**	Airplane
Year of Manufacture:	1974	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	TC-1726
Landing Gear Type:	Retractable - Tricycle	**Seats:**	
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	
Airframe Total Time:		**Engine Manufacturer:**	
ELT:		**Engine Model/Series:**	
Registered Owner:	On file	**Rated Power:**	
Operator:	On file	**Operating Certificate(s) Held:**	None

The 1974 twin-engine Beech 95-B55 (T42A), serial number TC-1726 airplane, was powered by two Continental Motors, Inc., IO-470-L21A engines (left: serial number 454399; right: serial number 454385). The engines were equipped with Hartzell Propeller, Inc., model BHC-C2YF-2CHUF propeller assemblies.

According to logbook entries dated May 25, 2016, annual inspections had been completed and signed off for the airframe, engines, and propellers. Total airframe and left engine time in service was 4,337.5 hours; the left engine had 653.2 hours since overhaul and 16 hours since the last annual inspection. The right engine had 4,326.3 total hours, and 1,410.3 hours since overhaul and 16 hours since the annual inspection. During the annual inspection, an overhauled cylinder was installed at the No. 2 cylinder position on the right engine. The propeller logbook entry reported 80.5 hours since overhaul.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KBIL,3581 ft msl	**Distance from Accident Site:**	154 Nautical Miles
Observation Time:	17:53 Local	**Direction from Accident Site:**	287°
Lowest Cloud Condition:	Few / 10000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	13 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	250°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.92 inches Hg	**Temperature/Dew Point:**	23°C / 3°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Billings, MT (BIL)	**Type of Flight Plan Filed:**	Unknown
Destination:	Rapid City, SD (RAP)	**Type of Clearance:**	Unknown
Departure Time:	12:00 Local	**Type of Airspace:**	

A National Transportation Safety Board Meteorologist reviewed the weather for the area at the time of the accident. The accident site was in a warm air sector of a front with westerly wind of 15 to 20 knots over the region, with clear skies. A review of the National Weather System national weather radar composite for the period depicted no weather echoes over the region at the time of the accident.

The closest official weather observation was located at Dawson community Airport (GDV), Glendive, Montana, located about 9 miles east of the accident site at an elevation of 2,458 ft. The observation reported wind from 220^{o} at 13 knots, visibility 10 statute miles, sky clear below 12,000 ft above ground level (agl), temperature 26^{o} Celsius (C), dew point 7^{o} C, altimeter 29.77 inches of mercury.

No specific turbulence was reported near the accident site below 12,000 ft.

Airport Information

Airport:	BROADUS 00F	**Runway Surface Type:**	
Airport Elevation:	3282 ft msl	**Runway Surface Condition:**	Unknown
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	2 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 Fatal	**Latitude, Longitude:**	45.119167,-105.035835

A National Transportation Safety Board (NTSB) investigator, an FAA inspector, and a representative from Textron Aviation, the airplane manufacturer, responded to the accident site. The airplane came to rest on flat open land covered with tall grass on a 143° magnetic heading. The main wreckage was confined to the impact area, with all major components identified at the accident site. Flight control continuity was established from the cockpit controls to all primary flight control surfaces.

Both the left- and right-wing bladder fuel tanks had been breached; however, the smell of 100 low-lead fuel was evident. The nose landing gear was retracted and pushed up and aft into the cockpit where it impacted the front carry-through spar.

The left wing was canted forward and had leading-to-trailing edge crush damage the length of the wing. The ground scar was consistent with the width and length of the left-wing leading edge. The left engine was canted down and partially separated from the wing, and the propeller assembly separated from the engine and was located about 10 to 15 ft forward of the main wreckage. The propeller blades had light chord-wise scratches. One blade was bent aft mid-blade but remained attached at the hub; the other blade was loose in the hub. The propeller spring was buried vertically in the ground aft of the left wing leading edge ground scar.

The right wing was canted forward and sustained damage from the wing root to the engine nacelle; the outboard portion of the wing remained intact. The right engine remained partially attached to the wing. The engine case was cracked forward of cylinders Nos. 5 and 6. The propeller assembly separated from the engine and was located underneath the right-side cabin fuselage. One blade was bent aft at the hub and slightly curved and was loose in the hub; the other blade had minimal damage and remained in the hub.

Ground scar signatures indicated that both the left-side and right-side propellers impacted the ground in a near-vertical attitude and separated from their respective engines.

The airframe, engine, and propellers were examined on October 25-27, 2016, at Osterman's Auto Service in Belgrade, Montana.

Visual examination of the left engine revealed that the bottom of the crankcase had been fractured due to impact damage. Crankshaft and camshaft continuity were established during a compression check, with thumb compression obtained at all cylinders. The cylinders were borescoped with no foreign debris observed. Both magnetos were manually rotated and produced spark at their respective ignition systems. The engine-driven fuel pump, throttle body/metering unit, and the fuel manifold valve were disassembled and examined with no discrepancies noted.

Visual examination of the right engine revealed that the crankcase, camshaft, and No. 6 connecting rod had been fractured; however, the fracture surfaces did not display any signs of lubrication or operational distress and were consistent with impact forces. The oil pan was crushed and removed to facilitate examination of the internal components of the engine. Because of the damage, a compression check was not performed; however, borescope examination of the cylinders revealed no preimpact anomalies. Both magnetos separated from the engine but remained attached to their respective ignition harness. The magnetos were manually rotated and produced spark through their respective ignition systems. The engine-driven fuel pump, throttle body/metering unit and fuel manifold valve were disassembled and examined with no discrepancies noted.

The damage to all propeller blades were similar. One blade from each propeller denoted as L2 and R1 exhibited chordwise/rotational abrasion; the majority of the striations were on the camber side of the propeller blades. The hydraulic unit on each propeller had fractured and separated from the propeller assembly and the pitch change rods were bent. The preload plate opposite to the L2 and R1 blades were marked near the high end of the normal operating range. The L2 and R1 propeller blades had fractured pitch change knobs. The R1 propeller blade bearings were fractured on the camber side of the blade with ball imprints visible on the blade.

The physical damage to both the left and right propeller assemblies were consistent with the development of power from each engine at the time of impact. The propeller manufacturer stated that the damage and blade angle impact marks suggested a low-power range of operation and sudden stoppage (less than one revolution) during the impact sequence. There were no discrepancies noted that would have prevented normal operation.

There were no discrepancies with the engines or propellers noted that would have precluded normal operation.

Medical and Pathological Information

The Department of Justice Forensic Science Division, Missoula, Montana, performed an autopsy of the pilot. The cause of death was listed as multiple blunt force injuries due to a light [air]plane crash, with the manner of death as an accident.

The FAA Bioaeronautical Sciences Research Laboratory in Oklahoma City, Oklahoma, performed forensic toxicology testing on specimens of the pilot. Cyanide testing was not performed; carbon monoxide, volatiles, and tested-for-drugs were not detected.

Administrative Information

Investigator In Charge (IIC):	Cornejo, Tealeye
Additional Participating Persons:	Troy McClanahan; Federal Aviation Administration; Helena, MT Ernest Hall; Textron Aviation; Wichita, KS Nicole Chanon; Continental Motors Inc.; Mobile, AL
Original Publish Date:	October 1, 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=94024