

AIRPLANE AND ENGINE EXAMINATION

WPR17FA045

Payson, Arizona

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0937 MST

Cessna T210; N272EF

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HISTORY OF FLIGHT

According to the pilot's friend, he planned a flight to Colorado with his family for their annual vacation. Family members became concerned that afternoon as they had not heard from the flight and were unable to reach the occupants on their mobile phones. Around 2100, they notified local law enforcement who traced the flight's location using the pilot and his wife's mobile phones. An alert notice, or ALNOT, was issued at 2252 by Denver Center, and the wreckage was subsequently discovered the following morning at 0427 in a wooded area on the rising face of the Mogollon Rim, a cliff that extends across northern Arizona.

The onboard Electronics International MVP-50P electronic display device was forwarded to the National Transportation Safety Board (NTSB) Vehicle Recorders Laboratory for data recovery. The small battery used to power the unit's internal clock had become dislodged, and the unit reverted back to an unset time setting. As a result, the MVP-50P flight and engine data time stamps in this report have an approximate 20-minute difference from the actual time derived through the Federal Aviation Administration Air Traffic Control radar data time stamps. Global positioning system (GPS) and flight data retrieved from the unit showed the airplane's groundspeed rise from 0 knots and altitude increase from 1,437 ft, close to SDL's field elevation, consistent with a departure. The airplane then climbed to the northeast before turning left to a northerly heading for the remainder of the flight. At 0943:59 (HHMM:SS), the airplane reached a peak altitude of 8,029 ft and subsequently descended to about 7,850 ft. The airplane maintained this altitude within 30 ft for about 2 minutes and then climbed to 7,936 ft briefly before entering a descent and reaching about 6,651 ft at 0947:44. In the next minute, the airplane climbed to about 6,900 ft and then, at 0950:28, descended to and maintained about 6,200 ft., within 100 ft, for approximately 2 minutes 30 seconds. The data stopped while the airplane was in a climb about 10 seconds later at 0953:06 and a GPS altitude of 6,767 ft, about 0.22 nm from the accident site.

PERSONNEL INFORMATION

The pilot, age 44, held a private pilot certificate with a rating for single-engine land. The pilot's most recent third-class medical certificate was issued on April 10, 2015, which did not include any limitations. At the time of the exam, the pilot reported that he had accumulated 295 total flight hours; 14 hours of which were in the previous 6 months.

The last recorded flight in the pilot's logbook was dated August 28 with the remark "Flight Review", but the logbook did not indicate the year the flight took place. An entry in the back of the logbook showed that his most recent flight review was conducted on May 11, 2016. His previous flight review was dated August 27, 2014.

According to Federal Aviation Administration (FAA) records, the pilot purchased the airplane in 2011. In February 2014, the pilot sold 50% of the ownership to an individual who responded to an advertisement that he posted on an internet website. The individual, and other owner, stated that he developed a friendship with the accident pilot through their co-ownership of the airplane. He stated that the accident pilot sometimes flew with him as a safety pilot, but does not believe that the accident pilot had aspired to become instrument rated. The accident pilot made less than five total cross-country flights each year, and his local flying normally took place ahead of his cross-country flights and to maintain his currency to carry passengers.

The pilot's business partner flew with the pilot on three occasions and observed him using a moving map on an iPad during one of the flights.

AIRCRAFT INFORMATION

According to Federal Aviation Administration (FAA) records, the airplane was manufactured in 1970 and registered to N9402M Aviation, LLC on July 22, 2011. The airplane was powered by a Continental TSIO-520R, a turbo charged, direct drive, air cooled, 310 hp engine. Copies of the original aircraft logbooks were retrieved from the other owner of N272EF. A representative of the FAA collected the logbook copies and cross-checked them against the originals for validation. A review of the logbooks revealed that the airplane's most recent annual inspection was completed on October 21, 2016 at an accumulated flight time of 4,307 total hours. The airplane had accrued 311 hours since its most recent overhaul. The engine logbook indicated that a "100 hour inspection" was completed at the same time.

A fuel receipt recovered from Signature Flight Support showed that the pilot purchased 42 gallons of 100 LL aviation grade gasoline at 0845 on the day of the accident. The other owner of N272EF reported that he returned the airplane with about 44 gallons of fuel onboard approximately 4 days before the accident. He was the last person to fly the airplane prior to the accident.

The owners installed a Garmin 750 GPS that was equipped with a Terrain Awareness Warning System (TAWS) and an engine analyzer in April 2016. The other owner routinely updated the GPS databases and tested the TAWS system.

COMMUNICATIONS

A satori radar replay provided by the FAA from 0900 to 0945 did not return any radar targets for the accident airplane. However, a radar track for an airplane with a VFR transponder code that corresponded to the airplane's time and route, provided by the other owner, indicated that the airplane departed SDL at 0912. The final radar target was at 0937:39, 6,700 feet mean sea level and approximately 0.07 nautical miles east of the accident site. The latitude and longitude coordinates to the accident site were 34° 25.78 N, 111° 16.66 W. According to the FAA, the pilot did not receive VFR flight following or contact any of the low altitude sectors.

METEOROLOGICAL INFORMATION

An NTSB preliminary weather study showed clouds and the likelihood of moderate icing through 9,500 feet mean sea level. No icing AIRMETs were reported at the time for the accident area, which may have been too small to forecast moderate ice. Visible satellite imagery showed high and low cloud cover with mountain waves to the northwest and northeast of the accident site, in southern Nevada, eastern California, and Southern Utah/Colorado.

The 0935 recorded weather observation at Payson Airport (PAN), Payson, Arizona included wind variable at 04 knots, visibility 10 statute miles, overcast 300 feet, temperature 02 degrees C, dew point 01 degrees C, and an altimeter setting of 30.11 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The airplane came to rest on the rising face of a mountain rim approximately 11 nautical miles north of PAN. The initial impact point (IIP) was identified by an aluminum fragment embedded about midway in a 50 foot tall tree and several broken tree branches beyond the IIP. An initial ground scar was marked by airplane fragments, tree branches, and loose dirt approximately 40 feet forward of the IIP. Portions of the wings and elevators were found along the debris path from the IIP to the main wreckage, approximately 80 feet from the IIP. The main wreckage was comprised of the engine, fuselage, and tail section, which was displaced approximately 30 degrees upward from the ground. The vertical stabilizer and rudder had separated from the fuselage and were hanging by the airplane's rudder cables. An odor of fuel was detected near each wing fuel tank, which were both separated and breached. was marked by the main wreckage, which came to rest in fragments about 15 feet beyond the IIP.

COCKPIT/CABIN OBSERVATIONS

The passengers lab belts were recovered from the accident site and found in the clasped position, with the exception of the pilot's lab belt, which was not secured. Each of the passengers' belts separated at their airframe attachment points. Shoulder belts were not found.

The following table reflects the baggage weights from property found at the accident site that were presumed to have been onboard the airplane.

Item	Location	Weight
Blue duffle bag	Accident site	50 lbs

Small black bag	Accident site	Empty
Black ski bag	Accident site	33 lbs
Red duffle bag	Accident site	7 lbs
Blue ski bag	Accident site	27 lbs
Purse with laptop	Accident site	5 lbs
Orange bag	Sheriff's office	44 lbs
Red bag	Sheriff's office	15 lbs
Evidence no. 17-0027	Forensics lab	16.4 lbs
Evidence no. 17-0028	Forensics lab	4.4 lbs
Evidence no. 17-0029	Forensics lab	9 lbs
Evidence no. 17-0030	Forensics lab	7.8 lbs
	TOTAL	218 lbs

AIRFRAME

Postaccident Airframe Examination

Wings

In addition to a separation of the fuel tank, the left wing separated about midspan. Left aileron control continuity was traced from the left aileron to both control yoke pulleys at the right door post through a separation in both the direct and interconnect cables at the left wing root. The cable ends displayed broomstrawing consistent with overload separation. Right wing aileron control continuity was confirmed from the aileron to the right wing root; however, about 3 feet of aileron interconnect cable was missing from the cabin. The right flap cables were continuous to the bell crank and from the wing root to the cockpit. The left flap push pull tubes were broken; however, the control cable was continuous to the bell crank and the flap interconnect cables were traced through the cabin. The flap jackscrew measured approximately 4.4 inches, consistent with a flaps retracted position.

Rudder

The rudder cables were traced from the rudder pedals to the aft fuselage, where the rudder cables had been cut by recovery personnel. One cable was intact and the other had separated, but displayed broomstrawing signatures consistent with overload.

Elevator

The elevator control tube exhibited fracture signatures consistent with having failed in compression, but was traced to the elevator bell crank located in the aft fuselage. The right elevator separated from the empennage at the torque tube and the left elevator was torn at its root. Both elevator cables were traced to the cockpit from the aft bell crank. The elevator trim jackscrew was not found.

Fuel System

Both wing fuel tanks were breached and exhibited an odor that resembled 100 low lead aviation grade gasoline. The fuel strainer bowl was removed, which contained several ounces of uncontaminated liquid 0f a color and odor that resembled aviation grade gasoline. The fuel selector valve, which was positioned on the left fuel tank detent, was subsequently rotated to each of the three fuel tank ports, and no obstructions were observed.

Gascolator

The gascolator bowl was removed, which revealed several ounces of liquid that amounted to a full bowl. The odor and color of the liquid resembled 100 LL aviation grade gasoline. The fuel strainer screen as free of contamination.

ENGINE

The engine displayed a dent and several cracks on the rear left side of the crankcase consistent with impact damage. All six cylinders remained attached to their cylinder bays and two of the three propeller blades remained attached to the hub and engine crankcase. The throttle and metering assembly was partially separated from its mount. Multiple ignition leads from the ignition harness were severed from their respective spark plugs. The exhaust system remained attached to the engine and displayed crush damage. The cabin heat exhaust heat exchanger did not display any leaks.

Rotational continuity was established throughout the engine and valve train when the engine crankshaft was manually rotated through the use of a hand tool. Thumb compression and suction were obtained for all six cylinders. The cylinder combustion chambers and barrels were examined with a lighted borescope, and the cylinder bores, valve heads, and piston faces displayed normal operation and combustion signatures. The cylinder overhead components, comprised of the valves, springs, push rods, and rocker arms, exhibited normal operation and lubrication signatures.

An examination of the top and bottom spark plugs revealed varying degrees of impact damage, but signatures consistent with normal wear. The oil filter exhibited impact damage; however, the filter pleats were not contaminated with metallic debris. The oil sump pickup screen did not display any blockage, and the oil pump did not display any anomalies.

Disassembly of the fuel manifold revealed a fluid consistent with aviation grade gasoline inside the valve body. While the fuel screen did not display any obstructions, the unfiltered side of the valve displayed some contaminates. The fuel nozzles were not obstructed with the exception of nozzle nos. 3 and 5, which were impacted with mud and dirt. Fuel nozzle no. 2 was not recovered.

The throttle body metering unit was removed from its engine accessory housing, and the fuel metering portion of the unit was disassembled. The internal components displayed normal operation and the inlet fuel screen was free of debris with the exception of a trace amount of fibrous material.

The left magneto had separated from its mounting flange, and the magneto housing was cracked open exposing its internal components. A small amount of movement was achieved through the magneto drive, and the magneto did not produce a spark. The right magneto remained attached to the accessory case and was capable of normal rotation through the magneto drive. The impulse coupling operated normally and produced spark on all six posts in the correct order.

The three-blade variable pitch propeller was attached to the propeller flange. Two propeller blades were attached to the propeller hub, and the third blade was found in the debris path. One blade exhibited "S" bending at the blade tip and aft bending about mid-span. Another propeller blade displayed aft bending deformation, and the remaining propeller blade exhibited forward bending, leading edge polishing, and a gouge towards the blade root.

EMERGENCY LOCATOR TRANSMITTER (ELT)

The ELT was manufactured by Pointer, model no. 3000 and was a C91 type ELT.