Aviation Investigation Final Report

Location:	Spring Branch, Texas	**Accident Number:**	CEN15FA232
Date & Time:	May 16, 2015, 12:31 Local	**Registration:**	N9032P
Aircraft:	Piper PA 24-260	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of control in flight	**Injuries:**	4 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The private pilot was departing on a local flight with three passengers in the complex, high-performance airplane. Shortly after takeoff, the airplane descended and impacted terrain near a store parking lot. Postaccident examination of the airplane did not reveal any anomalies that would have precluded normal operation. Toxicological testing of the pilot revealed the presence of marijuana and its metabolite (THC and THC-COOH). THC is a psychoactive drug with potential effects such as decreased ability to concentrate and maintain attention, and impaired hand-eye coordination; these effects can present with blood levels of THC as low as 1 ng/ml. Due to postmortem redistribution, the exact level of THC and THC-COOH at the time of the accident could not be determined; however, the pilot's minimum THC level was likely about 5-11 ng/ml, and his THC-COOH level was likely about 3-4 ng/ml. His actual levels could have been higher at the time of the accident, and would likely have been higher during the time of preflight decision-making. The accident was consistent with a loss of control after takeoff due to the pilot's impairment by the effects of marijuana.

Probable Cause and Findings

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

The pilot's failure to maintain control during takeoff due to his impairment from marijuana. Contributing to the accident was the pilot's impaired decision to fly after using a disqualifying drug.

Findings

Personnel issues	Illicit drug - Pilot
Personnel issues	Decision making/judgment - Pilot
Personnel issues	Incorrect action performance - Pilot
Aircraft	Airspeed - Not attained/maintained

Factual Information

History of Flight

Prior to flight	Miscellaneous/other
Takeoff	Loss of control in flight (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On May 16, 2015, about 1231 central daylight time, a Piper PA-24-260 airplane, N9032P, impacted terrain near Spring Branch, Texas. The pilot and three passengers sustained fatal injuries. The airplane was destroyed during the impact and subsequent ground fire. The airplane was registered to an individual and was operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as personal flight. Day visual flight rules conditions prevailed for the flight, which did not operate on a flight plan. The local flight was originating from the Kestrel Airpark (1T7), near Spring Branch, Texas, at the time of the accident.

A witness at 1T7 saw the accident airplane taxi from the common area/hangars on the north taxiway and saw it headed to runway 12. There was a strong quartering headwind for runway 12. The witness estimated the wind was 20 knots sustained, gusting 25-30 knots. He watched the accident airplane's takeoff roll. The aircraft climbed and was about 20-30 feet in the air when it was abeam the witness. The aircraft's nose dropped for a couple seconds after it passed him. It then started climbing out and the witness saw and heard the landing gear retracting. The airplane was about 100 feet above the ground. The aircraft then looked like it weathervaned into the wind and continued climbing to about 200-300 feet above the ground. At that point, the witness stopped watching the airplane. He stated that he did not notice anything fall off the airplane or anything unusual about the appearance of sound of the airplane during its taxi by and its takeoff.

The airplane banked left during the takeoff, descended, and impacted terrain nose down near a store parking lot.

Pilot Information

Certificate:	Private	**Age:**	38,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	March 29, 2010
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 122 hours (Total, all aircraft)		

The 38-year-old pilot held a Federal Aviation Administration (FAA) private pilot certificate with airplane single-engine land and multi engine land ratings. He held a FAA airframe and powerplant mechanic certificate. A review of FAA records show that the pilot's last medical examination was completed on March 29, 2010, when he was issued a first-class medical certificate with no limitations. On the application for that medical certificate, the pilot reported that he had accumulated 96 hours of total flight time.

According to reviewed FAA records, the pilot first applied for a private pilot certificate with an airplane single-engine rating on January 5, 2007, and received a disapproval notice for airport and seaplane base operations, emergency operations. He reapplied on January 10, 2007, and he was issued a private pilot certificate with an airplane single-engine land rating. On May 21, 2014, he applied for a private pilot certificate with an airplane multiengine rating and he received a disapproval notice for not properly identifying the failed engine during a simulated emergency first. The pilot reapplied on November 6, 2014, and he was issued a private pilot certificate with an airplane multiengine land rating. On that reapplication, he indicated that he had accumulated 122.1 hours of total flight time in airplanes of which 44.6 hours was pilot in command flight time and 10.6 hours was instrument flight time.

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N9032P
Model/Series:	PA 24-260	**Aircraft Category:**	Airplane
Year of Manufacture:	1966	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	24-4494
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	September 3, 2012 Annual	**Certified Max Gross Wt.:**	3100 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	8690.9 Hrs as of last inspection	**Engine Manufacturer:**	LYCOMING
ELT:	Not installed	**Engine Model/Series:**	IO-540-D4A5
Registered Owner:	On file	**Rated Power:**	260 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

N9032P, a 1966 model Piper PA-24-260, Comanche, serial number 24-4494, was an all-metal airplane with semimonocoque fuselage and empennage construction. The airplane's type certificate data indicated that it seated four and had a maximum gross weight of 3,100 pounds. The airplane was powered by a 260-horsepower, six-cylinder, horizontally opposed, air cooled, fuel injected engine, normally aspirated engine, with a data plate marked as Lycoming IO-540-D4A5, serial number L-3449-48. The engine left half's serial number was stamped as L-10556-40. The left case match number was not discernable and the right case match number was stamped as 51154-3. The airplane was equipped with wing flaps, a two-bladed constant speed Hartzell propeller, and retractable tricycle landing gear. The propeller was a HC-C2YK-1BF/F8467-7R model with serial number CH23698, which propeller manufacturer records show was originally built on November 6, 1978, for Piper.

A receipt showed that the airplane was serviced at 1T7 with 49.7 gallons of aviation gasoline (avgas) on May 16, 2015 at 1059.

N9032P was involved in a ground accident in November of 2013. The airplane's left wing impacted a hangar and it sustained damage. The airplane was salvaged, bought by several parties, and was subsequently sold to the pilot.

Available accident airplane's logbooks were reviewed at the pilot's hangar. Endorsements showed that an annual inspection was completed on September 3, 2012. According to these records, the serial number of the engine installed at that time was L-3447-48. The airplane had accumulated a total time of 8,690.9 hours at that time and the indicated engine accumulated 1,917.7 hours of time since a major overhaul.

According to engine manufacturer's safety representative, the IO-540-D4A5 engine with serial number L-3449-48 was returned to Lycoming Engines Facilities in July of 2012. That engine was overhauled and it was converted to an IO-540-C4B5. That overhauled engine was sent to the field and it was

installed on a Piper Aztec.

An undated FAA 8050-2 Aircraft Bill of Sale form along with an unstamped envelope addressed to the FAA Aircraft Registration Branch were also observed in the hangar. That form contained a former owner's name and the pilot's name along with both their signatures. Additionally, invoices for airplane parts and mechanic's notes that indicated parts and maintenance manual references were found in the hangar. These items were consistent with a structural wing repair, engine overhaul, and routine maintenance. However, recent airplane logbooks were not found within the hangar that documented the airplane's repair, inspections since the ground accident, and flight time since the ground accident.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KSAT,789 ft msl	**Distance from Accident Site:**	16 Nautical Miles
Observation Time:	17:51 Local	**Direction from Accident Site:**	192°
Lowest Cloud Condition:	Scattered / 2300 ft AGL	**Visibility**	9 miles
Lowest Ceiling:	Broken / 3700 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	13 knots / 22 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	160°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.86 inches Hg	**Temperature/Dew Point:**	28°C / 22°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Spring Branch, TX (1T7)	**Type of Flight Plan Filed:**	None
Destination:	Spring Branch, TX (1T7)	**Type of Clearance:**	None
Departure Time:	12:31 Local	**Type of Airspace:**	

At 1206, the recorded weather at the San Antonio International Airport (SAT), near San Antonio, Texas, was: Wind 150 degrees at 13 knots; visibility 10 statute miles; sky condition scattered clouds at 2,200 feet, broken clouds at 3,000 feet, broken clouds at 4,300 feet; temperature 27 degrees C; dew point 22 degrees; altimeter 29.88 inches of mercury.

At 1251, the recorded weather at SAT was: Wind 160 degrees at 13 knots, gusting to 22 knots; visibility 9 statute miles; sky condition scattered clouds at 2,300 feet, broken clouds at 3,700 feet, broken clouds at 4,800 feet; temperature 28 degrees C; dew point 22 degrees; altimeter 29.86 inches of mercury.

Airport Information

Airport:	KESTREL AIRPARK 1T7	**Runway Surface Type:**	
Airport Elevation:	1261 ft msl	**Runway Surface Condition:**	Unknown
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

1T7, located about 26 miles north of San Antonio, Texas, was a non-towered airport, which was

privately owned and operated by the Kestrel Airpark Runway Association. The airport is a public use airport. Its field elevation was 1,261 feet above mean sea level. The airport listed 122.975 megahertz as its common traffic advisory frequency. The airport is serviced by one runway: runway 12/30. The runway is listed as a 3,000-foot by 40-foot asphalt runway. The runway has an operational restriction listed, which indicated that runway 30 rises rapidly at its north end.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	3 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	4 Fatal	**Latitude, Longitude:**	29.8125,-98.416389(est)

A postaccident on-scene investigation was conducted. All major components of the airplane were accounted for at the accident site. The airplane came to rest on terrain and on top of a retaining wall adjacent to a store parking lot about 1/4 mile and 22 degrees magnetic from the intersection of US Highway 281 North and Flightline Drive. The airplane's left wing separated from its fuselage and it was found resting on the retaining wall. The left wing exhibited an outboard skin section that was not painted. This section was consistent with a wing skin replacement. The unpainted section was intact and it remained attached to its wing. Wing separation surfaces exhibited features consistent with overload.

The airplane's fuselage and empennage was found resting on terrain at the top of the retaining wall. The cockpit was deformed, discolored, and sections consumed consistent with a ground fire. The right wing was also deformed, discolored, and an inboard section of it was consumed by fire. The empennage was deformed forward into the fuselage in an accordion like fashion. An outboard section of the left horizontal stabilizer was deformed and discolored. The nylock nuts that held the horizontal stabilizer were in-place and could be removed by fingertip pressure. Flight control cables were traced from the cockpit to each control surface. All observed separations in the flight control system were consistent with overload. The flaps and landing gear were found in their retracted positions.

The engine and propeller were found forward of the fuselage near the base of a tree that was discolored consistent with a coating of soot. One propeller blade was separated near its hub and the other propeller blade's tip was separated. The separated tip exhibited chordwise gouges on its flat face. Charred pieces of paper were found nearby that contained notes consistent with flight training for an instrument rating. The engine was intact and displayed no signs of catastrophic failure. The engine's accessory case was discolored and deformed. The right magneto and the aft section of the engine driven fuel pump were not in place on the accessory case. The top spark plugs and accessory case were removed. The engine's crankshaft was rotated by hand. Crankshaft continuity was confirmed from the propeller flange to each of the cylinders and to the accessory drive gears. A compression check was performed and all cylinders

exhibited suction and a thumb compression. The left magneto exhibited thermal deformation and discoloration. The fuel manifold was intact and its disassembly revealed a trapped liquid that contained water as detected by water disclosing paste. The fuel servo was deformed and discolored. Engine control cables were traced from the cockpit to their respective engine controls. All separations in the engine controls were consistent with overload. The components did not display any anomalies that could not be attributed to the post accident fire.

Medical and Pathological Information

The Comal County Coroner was asked to arrange for an autopsy to be completed on the pilot to include taking samples for toxicological testing. The autopsy, conducted by Central Texas Autopsy, PLLC, indicated the pilot's cause of death was multiple blunt force injuries.

The FAA Civil Aerospace Medical Institute prepared a Final Forensic Toxicology Accident Report on the toxicological samples taken during the autopsy. The report, in part, indicated:

0.0143 (ug/ml, ug/g) Tetrahydrocannabinol (Marihuana) detected in Blood
0.013 (ug/ml, ug/g) Tetrahydrocannabinol (Marihuana) detected in Lung
0.0037 (ug/ml, ug/g) Tetrahydrocannabinol (Marihuana) detected in Brain
0.1946 (ug/ml, ug/g) Tetrahydrocannabinol Carboxylic Acid (Marihuana) detected in Lung
0.0179 (ug/ml, ug/g) Tetrahydrocannabinol Carboxylic Acid (Marihuana) detected in Brain
0.0119 (ug/ml, ug/g) Tetrahydrocannabinol Carboxylic Acid (Marihuana) detected in Blood

The National Transportation Safety Board Chief Medical Officer reviewed the CAMI findings, FAA documents, and the pilot's autopsy and produced a Medical Factual Report. The report indicated that according to these reviewed items, the pilot initially applied for an aviation medical certificate in 2006. Because he marked "yes" to question 18.w regarding non-traffic convictions for misdemeanors or felonies, the aviation medical examiner deferred the pilot's certificate. The FAA requested additional information, which the pilot provided regarding a conviction for driving with a suspended license; once this had been received and reviewed, the FAA awarded the pilot his medical certificate.

On the pilot's last application for a medical certificate, he reported no medications or chronic medical conditions. He was issued a first class medical certificate without limitations. This certificate would have been no longer valid for any class on March 31, 2015, six weeks before the accident.

The autopsy indicated the cause of death was multiple blunt force injuries due to light plane crash and the manner of death was accident. There was significant damage to the body including multiple lacerations of the heart. No significant natural disease was identified.

In addition to CAMI's testing, toxicology testing performed by NMS Laboratories at the request of the forensic pathologist identified 0.034 ug/ml of tetrahydrocannabinol (delta-9 THC, the active component of marijuana) and 0.0084 ug/ml of tetrahydrocannabinol carboxylic acid (THC-COOH, the primary metabolite of THC) in the pilot's cardiac blood specimen.

Toxicology testing performed by CAMI identified 0.0143 ug/ml of tetrahydrocannabinol (delta-9 THC, the active component of marijuana) and 0.0119 ug/ml of tetrahydrocannabinol carboxylic acid (THC-COOH, the primary metabolite of THC) in the specimen of cardiac blood sent to them. In addition, THC was identified in the pilot's lung (0.013 ug/ml) and brain (0.0037 ug/ml). Finally, THC-COOH was also found in lung (0.1946 ug/ml) and brain (0.0179 ug/ml).

According to details in the CAMI description of Marijuana and in a National Highway Traffic Safety Administration technical report titled Drugs and Human Performance Fact Sheets, THC is described as a psychoactive drug with therapeutic levels as low as 0.001ug/ml. THC has mood-altering effects including euphoria, relaxed inhibitions, disorientation, image distortion, and psychosis. Significant performance impairments are usually observed for at least one to two hours following marijuana use, and residual effects have been reported up to 24 hours.

Tetrahydrocannabinol concentrations typically peak during the act of smoking, while peak tetrahydrocannabinol carboxylic acid concentrations occur approximately 9-23 minutes after the start of smoking. Concentrations of both analytes decline rapidly and are often < 0.005 ug/mL at 3 hours. Significant tetrahydrocannabinol concentrations (0.007 to 0.018 ug/mL) are noted following even a single puff or hit of a marijuana cigarette. Chronic users can have mean plasma levels of tetrahydrocannabinol carboxylic acid of 0.045 ug/ml 12 hours after use; corresponding tetrahydrocannabinol levels are, however, less than 0.001 ug/ml. Interpreting post mortem blood and tissue results for marijuana is complex for several reasons. The drug is lipophilic and gets stored in fatty tissues; it may leech back into blood from liver, lung, and brain after death. According to a Journal of Analytical Toxicology article titled Cannabinoids in Postmortem Toxicology, post mortem redistribution may double or triple peripheral levels.

Fire

A video from that store parking lot camera was reviewed at the store. The video showed the airplane descending in a nose down attitude and that a flame, consistent with a ground fire, started at 1231.

Administrative Information

Investigator In Charge (IIC):	Malinowski, Edward
Additional Participating Persons:	Frank G Fortmann; Federal Aviation Administration; San Antonio, TX Michael C McClure; Piper Aircraft Inc.; Vero Beach, FL John Butler; Lycoming Engines; Williamsport, PA Leslie A Doud; Hartzell Propeller Inc.; Piqua, OH
Original Publish Date:	March 6, 2017
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=91179