Aviation Investigation Final Report

Location:	Canton, Georgia	**Accident Number:**	ERA17FA118
Date & Time:	March 4, 2017, 00:23 Local	**Registration:**	N421KL
Aircraft:	Cessna 421	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The 69-year-old commercial pilot was making a personal cross-country flight in the newly-purchased airplane. When the airplane was on final approach to the destination airport in night visual meteorological conditions, airport surveillance video showed it pitch up and roll to the right. The airplane then descended in a nose-down attitude to impact in a ravine on the right side of the runway. During the descent over the ravine the right wing came in contact with a powerline that briefly cut power to the airport. Postaccident examination of the airframe, engines, and their components revealed no evidence of mechanical anomalies or malfunctions that would have precluded normal operation.

The pilot's toxicology findings identified five different impairing medications: clonazepam, temazepam, hydrocodone, nortriptyline, and diphenhydramine. Although the results were from cavity blood and may not accurately reflect antemortem levels, the hydrocodone, temazepam, and diphenhydramine levels were high enough to likely have had some psychoactive effects. While the exact effects of these drugs in combination are not known, it is likely that the pilot was impaired to some degree by his use of this combination of medications, which likely contributed to his failure to maintain control of the airplane.

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 of the airplane during a night visual landing approach. Contributing to the accident was the pilot's impairment due to his use of a combination of medications.

Findings

Personnel issues	Aircraft control - Pilot
Aircraft	Pitch control - Not attained/maintained
Personnel issues	Prescription medication - Pilot
Personnel issues	OTC medication - Pilot
Environmental issues	Dark - Effect on operation

Factual Information

History of Flight

Approach-VFR pattern final	Loss of control in flight (Defining event)
Approach-VFR pattern final	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT
On March 4, 2017, about 0023 eastern standard time, a Cessna 421B, N421KL, was substantially damaged during an attempted go-around and subsequent collision with terrain at Cherokee County Airport (CNI), Canton, Georgia. The commercial pilot was fatally injured. The airplane was registered to and was being operated by the pilot under the provisions of Title 14 *Code of Federal Regulations* Part 91. Night visual meteorological conditions prevailed, and no flight plan was filed for the personal cross-country flight. The flight originated about 1930 on March 3, 2017, from Richard Lloyd Jones Jr Airport (RVS), Tulsa, Oklahoma, and was destined for CNI.

According to personnel at an aviation brokerage company in Oklahoma, the pilot purchased the airplane on March 2, 2017. A flight instructor reported that he and the pilot flew the airplane on March 1, 2017, for 1.5 hours to go over the various systems of the Cessna 421B. On March 2, 2017, the flight instructor flew with the pilot again for 45 minutes conducting pattern work. The flight instructor said that the pilot told him that he had previously owned two Cessna 421Cs, was a little "rusty," and had not flown that type of airplane since 1984. The instructor reported that, overall, the pilot was knowledgeable of the operation of airplane. He also reported that the pilot departed with enough fuel for the cross-country flight. A review of the pilot's logbook revealed that the flight instructor signed off a flight review on March 3, 2017.

Radar and audio data obtained from the Federal Aviation Administration (FAA) revealed that the pilot was in contact with air traffic control and receiving visual flight rules (VFR) flight following services while inbound to CNI. The pilot cancelled flight following when he had the airport in sight. Radar data continued to show the airplane on approach to CNI until 2,500 ft when the airplane descended below radar coverage.

A review of airport video surveillance footage revealed that the runway lights were illuminated during the airplane's approach to runway 05. The airplane's landing lights became visible as the airplane neared the runway. On short final, the airplane pitched up and rolled to the right. The airplane then descended in a nose-down attitude into a ravine on the right side of the runway. The video footage stopped for a second, and then a fire was seen in the ravine.
Witnesses observed the airplane flying extremely low before noticing a "ball of fire" erupt near the airport.

PERSONNEL INFORMATION

The 69-year-old pilot held a commercial pilot certificate with ratings for airplane single-engine land and instrument airplane. On his most recent FAA second-class medical certificate application, dated April 13, 2016, he reported a total flight experience of 4,000 hours with no hours flown during the last 6 months. The medical certificate indicated a limitation for glasses for near vision. A review of the pilot's current logbook, which was labeled logbook No. 3, revealed a total of 11.9 hours of flight experience since January 16, 2017.

AIRCRAFT INFORMATION

The multi-engine airplane was manufactured in 1970, and it was powered by two Continental GTSIO-520-series engines driving Hartzell PHC-C3YD-2UF controllable-pitch propellers. The most recent annual inspection was completed on March 1, 2017, at a recording hour meter time of 2,048.4 hours. The right engine was a GTSIO-520-D21CH engine, serial number 219483-R; it had a total time of 2,048.4 hours and a time since overhaul of 38.2 hours at the last inspection. The left engine was a GTSIO-520-H engine, serial number 218284-R; it had a total time of 2,048.4 hours and a time since overhaul of 430.9 hours.

METEOROLOGICAL INFORMATION

At 0010, the recorded weather at CNI included calm wind, 10 miles visibility, and clear skies. The temperature was 5°C; the dew point was -15°C; and the altimeter setting was 30.54 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

Examination of the accident site revealed that the airplane contacted a wire about 380 ft to the right of the runway and parallel the runway. The airplane came to rest in a retention pond about 420 ft on the right of the runway centerline and runway threshold. The nose of the airplane was crushed aft, and the wind screen on the left side was broken away from the fuselage. Examination of the cockpit revealed that the instrument panel was crushed toward the left side of the fuselage. The flap control was in the fully extended position. The left engine throttle control was full forward, and the right engine throttle control was at the halfway mark. The left mixture control was full rich, and the right mixture control was at the halfway mark. The left propeller control was at the halfway mark, and the right propeller control was full forward. The left fuel selector handle was in the left main tank position, and the right fuel selector handle was in the right main tank position. Examination of the flight controls revealed continuity from the cockpit to all the flight control surfaces.

The left wing from the engine nacelle outboard exhibited postimpact fire damage. Fire damage exposed the main fuel tank attachment and baffle, which were intact. The left engine nacelle also showed signs of fire damage. The wing flaps were observed in the extended position.

Examination of the right wing revealed that it remained intact with very little postimpact fire damage, which was confined to the area around the engine nacelle. Fuel was observed in the right main fuel tank, the right-wing auxiliary tank, and the right nacelle locker tank; about 25 gallons of fuel were drained from the tanks. The right main fuel tank exhibited striations and flattening to the upper surface of the tank, which were consistent with a contact with a wire. Leading edge damage to the right wing was observed, which was consistent with contact with a wire. A power wire was observed wrapped around the right main landing gear. The wing flaps were observed in the extended position. Examination of the

empennage revealed that the vertical stabilizer, horizontal stabilizer, rudder, and elevators remained attached. Both horizontal stabilizers were buckled.

All three landing gear were broken away from the airplane at the struts. The landing gear trunnions were observed in the down positions. The landing gear handle in the cockpit was observed in the down position.

Examination of the left engine revealed that it remained partially attached to the airframe by two engine mounts, hoses, wires, and cables. The engine displayed impact damage as well as some thermal damage to the rear of the engine. The crankcase remained intact and displayed impact damage. All the cylinders remained attached to their cylinder bays and displayed varying amounts of impact damage. The internal portions of the cylinders were inspected using a lighted borescope. The piston faces, valve heads, and cylinder bores did not display any anomalies. The crankshaft was rotated, and all six cylinders had thumb compression and suction. The overhead components (valves, springs, and rocker arms) were examined and did not display any anomalies. The external components of the engine (fuel pump, throttle, metering unit, and both magnetos) remained attached and displayed thermal damage. The ignition harness remained attached to both magnetos and displayed impact damage to the No. 2 and the No. 6 bottom ignition leads. All the spark plugs remained secured in their cylinders. The spark plugs were removed, and it was noted that all the electrodes displayed normal operating signatures when compared to Champion Aviation Service Manual AV6-R. The magnetos were removed, and both magneto drive shafts were rotated using an electric drill. The spark plugs were installed onto the ignition harness, and it was noted that all the spark plugs sparked between the ground and center electrodes.

The left turbocharger remained attached to the airframe and displayed minor impact damage. The wastegate remained attached to its installation point and was undamaged. The compressor and the turbine were undamaged and did not display any anomalies. The exhaust system displayed impact damage, and no signs of exhaust leaks were noted.

Examination of the right engine revealed that it remained partially attached to the airframe and displayed impact and thermal damage. All six cylinders remained attached to their cylinder bays and displayed varying amounts of impact damage. The internal portions of the cylinders were inspected using a lighted borescope; the cylinder bores, piston faces, and valve heads displayed normal operating and combustion signatures. The crankshaft was rotated, and all six cylinders had good thumb compression and suction. The overhead components (valves, springs, and rocker arms) were examined and did not display any anomalies. The external components of the engine (fuel pump, throttle, metering unit, and both magnetos) remained attached and displayed impact and thermal damage. The ignition harness displayed impact damage signatures to the No. 6 bottom ignition lead, which was partially severed. The magnetos were removed, and both magneto drive shafts were rotated using an electric drill. The magnetos produced spark on all six posts individually. The spark plugs were removed and visually inspected. All the spark plugs displayed normal operating and wear signatures when compared to Champion Aviation Service Manual AV6-R. The spark plugs were installed onto the ignition harness, and it was noted that all the spark plugs sparked between the ground and center electrodes.
The right turbocharger remained attached to the airframe and displayed minor impact damage. The wastegate remained attached to its installation point and was undamaged. The compressor and the turbine were undamaged and did not display any anomalies. Rotation and continuity were established between the two sections of the turbine and compressor. There were no signs of induction leaks noted.

The exhaust system displayed impact damage throughout the exhaust system. There were no signs of exhaust leaks noted.

An examination of the propellers revealed that the blades on both propellers exhibited chordwise/rotational scoring on the camber sides, leading edge gouging, bending aft, and twisting leading edge down. One blade on each propeller had a fractured tip. Two blades on each propeller had fractured pitch change knobs with damage indicating the blades were forcibly rotated towards low pitch. The preload plate impact marks on both propellers were similar, indicating operation at or near the low pitch stop angle. There were no discrepancies noted that would have prevented or degraded normal propeller operation before impact. All damage to the propellers was consistent with high impact forces.

A JPI FS-450 fuel monitoring device was recovered from the wreckage and sent to the NTSB Recorders Laboratory for data download. Upon arrival in the lab, an internal examination revealed thermal damage. The device was reassembled, and power was applied; however, the device would not power on, and no data was obtained from the device.

MEDICAL AND PATHOLOGICAL INFORMATION

The Division of Forensics Sciences, Georgia Bureau of Investigation, Decatur, Georgia, performed an autopsy on the pilot. The cause of death was noted as multiple blunt force trauma.
The FAA's Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed forensic toxicology on specimens from the pilot. Atorvastatin was identified in liver and cavity blood. Clonazepam and its metabolite 7-aminoclonazepam, hydrocodone and its active metabolite dihydrocodeine, diphenhydramine, nortriptyline, and temazepam were identified in liver. In addition, 0.031 ug/ml of 7-aminoclonazepam, 0.016 ug/ml of hydrocodone, an unquantified amount of dihydrocodeine, 0.129 ug/ml of diphenhydramine, an unquantified amount of nortriptyline, and 0.068 ug/ml of temazepam were identified in cavity blood. The toxicology testing identified the pilot had evidence of having used 5 different impairing medications.

Clonazepam is a sedating benzodiazepine often called Klonopin that is used to treat panic disorder and certain kinds of epilepsy. It is available by prescription as a Schedule IV substance. It impairs cognitive and physical performance and carries this warning, "Since clonazepam produces central nervous system (CNS) depression, patients receiving this drug should be cautioned against engaging in hazardous occupations requiring mental alertness, such as operating machinery or driving a motor vehicle. They should also be warned about the concomitant use of alcohol or other CNS- depressant drugs during clonazepam therapy.
Hydrocodone is an opioid pain medication available by prescription as a Schedule II controlled substance. Commonly available in combination with acetaminophen (commonly called Tylenol), tablets may also carry names such as Norco, Lorcet, and Vicodin. Hydrocodone "exposes users to the risks of addiction, abuse, and misuse" and "profound sedation, respiratory depression, coma, and death may result from the concomitant use of hydrocodone … with benzodiazepines or other CNS depressants (e.g., non-benzodiazepine sedatives/hypnotics, anxiolytics, tranquilizers, muscle relaxants, general anesthetics, antipsychotics, other opioids, alcohol)." The range of blood levels where hydrocodone is considered to have psychoactive effects is between 0.01 and 0.05 ug/ml.

Diphenhydramine is a sedating antihistamine used to treat allergy symptoms and as a sleep aid. It is available over the counter under the names Benadryl and Unisom. Diphenhydramine carries the

following warning: may impair mental and/or physical ability required for the performance of potentially hazardous tasks (e.g., driving, operating heavy machinery). Compared to other antihistamines, diphenhydramine causes marked sedation; it is also classed as a CNS depressant and this is the rationale for its use as a sleep aid. Altered mood and impaired cognitive and psychomotor performance may also be observed. In fact, in a driving simulator study, a single dose of diphenhydramine impaired driving ability more than a blood alcohol concentration of 0.100%. The therapeutic range of diphenhydramine is 0.0250 to 0.1120 ug/ml. Diphenhydramine is widely distributed throughout the body and brain after an oral dose. Typical blood levels within 2-3 hours after oral ingestion of 50-100 mg are about 0.100 ug/ml. However, diphenhydramine undergoes post mortem redistribution where after death, the drug can leech from storage sites back into blood. Central post mortem levels may be about two to three times her than peripheral levels.

Nortriptyline is a tricyclic antidepressant, often marketed with the name Pamelor. It carries this warning about performance: "may impair the mental and/or physical abilities required for the performance of hazardous tasks, such as operating machinery or driving a car."

Temazepam is a sedating benzodiazepine medication available by prescription as a Schedule IV controlled substance and often marketed with the name Restoril. It is indicated for the short-term treatment of insomnia (generally 7 to 10 days). It carries a black box warning (the strongest level) regarding prescribing in combination with opioids: "Concomitant use of benzodiazepines and opioids may result in profound sedation, respiratory depression, coma, and death." In addition, there is this precaution, "If temazepam is to be combined with other drugs having known hypnotic properties or CNS-depressant effects, consideration should be given to potential additive effects." Finally, there are warnings about the potential for bizarre behaviors and "there have been reports of people getting out of bed after taking a sedative-hypnotic and driving their cars while not fully awake, often with no memory of the event. If a patient experiences such an episode, it should be reported to his or her doctor immediately, since "sleep-driving" can be dangerous. This behavior is more likely to occur when temazepam is taken with alcohol or other central nervous system depressants." The range of blood levels where temazepam is considered to have psychoactive effects is between 0.017 and 0.132 ug/ml.

Pilot Information

Certificate:	Commercial	**Age:**	69,Male
Airplane Rating(s):	Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	April 13, 2016
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	March 3, 2017
Flight Time:	(Estimated) 11.8 hours (Total, all aircraft), 11.8 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N421KL
Model/Series:	421 B	**Aircraft Category:**	Airplane
Year of Manufacture:	1970	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	421B0015
Landing Gear Type:	Retractable - Tricycle	**Seats:**	7
Date/Type of Last Inspection:	March 1, 2017 Annual	**Certified Max Gross Wt.:**	7200 lbs
Time Since Last Inspection:	30 Hrs	**Engines:**	2 Reciprocating
Airframe Total Time:	7522.4 Hrs	**Engine Manufacturer:**	CONT MOTOR
ELT:	C126 installed, activated, did not aid in locating accident	**Engine Model/Series:**	GTSIO-520-D21
Registered Owner:	On file	**Rated Power:**	340 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night
Observation Facility, Elevation:	CNI,1219 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	05:10 Local	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.54 inches Hg	**Temperature/Dew Point:**	3°C / -15°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Tulsa, OK (RVS)	**Type of Flight Plan Filed:**	VFR
Destination:	Canton, GA (CNI)	**Type of Clearance:**	VFR
Departure Time:	20:30 Local	**Type of Airspace:**	Class D

Airport Information

Airport:	Cherokee County Airport CNI	**Runway Surface Type:**	Asphalt
Airport Elevation:	1219 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	05	**IFR Approach:**	None
Runway Length/Width:	5001 ft / 75 ft	**VFR Approach/Landing:**	Straight-in

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	34.546665,-84.800003

Administrative Information

Investigator In Charge (IIC):	Alleyne, Eric
Additional Participating Persons:	Edmundo Rolon; FAA/FSDO; Atlanta, GA Kurt Gibson; Continental Motors; Mobile, AL Andrew L Hall; Textron Aviation; Wichita, KS
Original Publish Date:	February 26, 2019
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=94808