Aviation Investigation Final Report

Location:	Alabaster, Alabama	**Accident Number:**	ERA15FA330
Date & Time:	August 27, 2015, 19:05 Local	**Registration:**	N1116C
Aircraft:	CIRRUS DESIGN CORP SR22	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The private pilot was performing traffic pattern work at the airport before the accident, had completed four touch-and-go landings, and was flying the traffic pattern again to attempt a fifth landing. According to witnesses and the recorded flight data, the airplane was on the final leg of the traffic pattern when it pitched down in a near vertical attitude and impacted trees and the ground about 1,700 ft from the approach end of the runway. A postimpact fire ensued, which partially consumed the wreckage.

Although one witness reported that it sounded like the airplane was having "throttle issues" and another witness reported that the engine "cut out" three times before the airplane descended "straight down," examination of the wreckage revealed that there were no preimpact anomalies with the airframe or engine that would have precluded normal operation. The airplane's last recorded airspeed of 67 knots before it pitched down was well above its 50% flap extension stall speed of about 55 knots. The last two valid data points showed a pitch angle of about -40°. The reason for the abrupt, near vertical pitch down could not be determined.

According to a witness, the parachute deployed after the airplane impacted the ground, indicating that the pilot likely did not attempt to activate it during the accident sequence.

A review of the pilot's medical records indicated that he had a history of depression with a recent recurrence. The pilot stopped taking his antidepressant medication primarily so he could obtain a medical certificate and begin flying again. Subsequently, his physician reported that his depression had improved and that he was no longer using any antidepressants, and he was issued a medical certificate about 5 weeks before the accident.

The pilot's wife reported that he continued to be very stressed and anxious and that he had returned to his physician about 1 week before the accident. Toxicology testing indicated that the pilot was using two antidepressants, citalopram and trazodone. Exactly what symptoms or cognitive impairments the pilot might have been experiencing from his depression could not be determined. However, it was likely that he had been having sufficient symptoms for his physician to start him on two new antidepressants.

Antidepressants typically take several weeks to begin relieving the symptoms of depression. Although citalopram has not been shown to degrade performance in psychological testing experiments using healthy volunteers, at least 40% of outpatient users reported drowsiness or fatigue when using trazodone. It is likely that the pilot was cognitively impaired by a combination of significant recurrent depression and sedation from trazodone. This impairment may have contributed to the pilot's inability to control the airplane.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: An in-flight loss of airplane control for reasons that could not be determined because postaccident examination of the airframe and engine revealed no preimpact mechanical malfunctions or failures that would have precluded normal operation.

Findings

Not determined	(general) - Unknown/Not determined
Personnel issues	(general) - Pilot
Personnel issues	Use of medication/drugs - Pilot

Factual Information

History of Flight

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

HISTORY OF FLIGHT

On August 27, 2015, about 1905 central daylight time, a Cirrus SR22 airplane, N1116C, impacted trees and terrain while on the final leg of the traffic pattern at Shelby County Airport (EET), Alabaster, Alabama. The private pilot was fatally injured, and the airplane was destroyed. The airplane was owned by Hard Times LLC and was being operated by the private pilot as a 14 Code of Federal Regulations Part 91 personal flight. Visual meteorological conditions existed at EET about the time of the accident, and no flight plan had been filed.

According to a fuel receipt, the airplane was filled to the tabs prior to departure from Birmingham-Shuttlesworth International Airport (BHM), Birmingham, Alabama, which totaled about 47 gallons of fuel in the airplane.

According to data downloaded from the primary flight display (PFD), the airplane departed BHM at 1818, and flew to Bessemer Airport (EKY), Bessemer, Alabama, where the pilot conducted two touch-and-go landings before flying to EET. Once at EET, the pilot entered the traffic pattern and conducted four touch-and-go landings on runway 34. The airplane then flew its fifth traffic pattern circuit and impacted terrain on short final.

According to one witness, the airplane was flying "very low" on the final leg of the traffic pattern, and it then descended "straight down." The witness also reported that it sounded like the airplane was having "throttle issues" and that the engine noise "just stopped." Another witness reported seeing the airplane make a sharp left turn and hearing the engine "cut out" three times before the airplane descended "straight down." First responders reported that a postimpact fire ensued, and the ballistic parachute system rocket launched out of the wreckage a few minutes after the impact.

PERSONNEL INFORMATION

According to Federal Aviation Administration (FAA) records, the pilot held a private pilot certificate with airplane single-engine land and instrument airplane ratings. His most recent third-class class medical certificate was issued on July 15, 2015, with no limitations. At that time, he reported 1,400 hours of flight experience, of which 0 hours were accumulated in the previous 6 months. According to the pilot's electronic flight log, his most recent documented flight was on December 28, 2012. According to the pilot's family members, he had recently started flying again, about 3 to 4 weeks before the accident. His most recent flight review was on August 14, 2015.

AIRCRAFT INFORMATION

According to FAA records, the airplane was issued an airworthiness certificate on March 5, 2003, and registered to Hard Times LLC in 2012. It was equipped with a 310-horsepower Continental Motors IO-550-N engine. According to the airframe maintenance logbook, the most recent annual inspection was completed on April 10, 2015, at a total time of 2,289.9 hours.

METEOROLOGICAL INFORMATION

The 1853 recorded weather observation at EET included wind from 350° at 3 knots, visibility 10 miles, clear skies, temperature 28° C, dew point 18° C, and altimeter setting of 30.00 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The airplane impacted 40-ft-tall trees before impacting the ground about 1,700 ft from the approach end of runway 34. The airplane came to rest in a nose-down attitude about 10 ft from the initial tree strikes. A postimpact fire ensued, which partially consumed the wings, fuselage, and empennage. All components of the airplane were accounted for at the wreckage location.

Both doors were impact separated and located near the wreckage. The cockpit was consumed by fire. The right front seat remained attached to the fuselage. The left seat pan was located outside the cockpit area, aft of the left wing. The left front seat back was located outside the cockpit, forward of the engine. The instrument panel was partially consumed by fire.

The inboard section of the left wing remained attached to the fuselage. The outboard 6-ft section of the left wing was separated and located about 10 ft aft of the inboard section of the left wing. The left flap was impact separated and located about 15 ft forward of the main wreckage. The left aileron remained partially attached to the separated outboard section of the wing and was partially consumed by fire. The left main landing gear was impact separated and located under the inboard section of the left wing. The left tire was located about 40 ft forward of the main wreckage.

The fuselage was consumed by fire. Both aft seats were consumed by fire. The flap actuator exhibited thermal damage. It was measured to extend 1 inch, which corresponded to 50% flap extension.

The empennage remained attached to the fuselage but was consumed by fire. The left horizontal stabilizer remained attached to the empennage and was partially consumed by fire. The left elevator was separated and located just forward of the left horizontal stabilizer. The rudder and vertical stabilizer exhibited thermal and impact damage but remained attached to the empennage. The right horizontal stabilizer remained attached to the empennage and was partially consumed by fire. The right elevator remained attached to the right horizontal stabilizer and was partially consumed by fire.

The inboard section of the right wing remained attached to the fuselage. The right flap was consumed by fire. The right outboard 5-ft section of the right wing was separated but remained attached to the fuselage by cables. The right aileron was separated from the right wing and was partially consumed by fire. The right main landing gear remained attached to the wing and was thermally damaged.

Control continuity was established from all flight control surfaces to their respective flight controls in the cockpit through impact fractures and separations.

There were several pieces of molten/beaded metal located underneath the wreckage.

The propeller hub remained attached to the propeller flange; however, it was separated from the crankshaft. The crankshaft exhibited spiral cracking where the flange attached to the crankshaft. All three propeller blades remained attached to the hub and exhibited chordwise scratching. One of the blade tips was separated from the blades, and another blade exhibited leading edge gouging.

The parachute was located aft of the inboard section of the left wing inside its casing. It exhibited thermal damage. In addition, the rocket was located about 80 ft aft of the main wreckage.
The engine examination revealed that it was impact damaged and its rear section exhibited thermal damage. All cylinders remained attached to the engine. They were removed, and no anomalies were noted. Both magnetos were removed from the engine and produced spark on all towers. The spark plugs were removed and exhibited normal wear signatures. The fuel pump was removed from the engine, displayed thermal damage, and could not be rotated by hand. It was disassembled, and no preimpact anomalies were noted. The fuel manifold valve was removed from the engine and disassembled. The fuel screen had fibrous material in the screen; however, the screen was not blocked. All fuel injector nozzles were removed, and no preimpact anomalies were noted. The oil sump was impact damaged. It was removed, and the oil pick-up screen was examined with no debris noted. The propeller governor could be rotated by hand. It was removed and disassembled, and the propeller governor screen was free of debris.

AIRPORT INFORMATION

Shelby County Airport (EET) was located 4 miles southeast of Alabaster, Alabama, at an elevation of 586 feet msl. It had one runway designated as 16/34, which was 5,000 feet long by 75 feet wide.

MEDICAL AND PATHOLOGICAL INFROMATION

The Alabama Department of Forensic Sciences Medical Examiner's Office, Montgomery, Alabama, performed an autopsy on the pilot. The autopsy report indicated that the pilot died as a result of "multiple blunt force injuries."

The FAA's Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed toxicological testing of specimens from the pilot. The pilot tested negative for carbon monoxide and ethanol.

Citalopram, which is a selective serotonin reuptake inhibitor commonly marketed with the name Celexa, was detected in the pilot's urine; 0.037 (ug/ml, ug/g) of citalopram was detected in his blood; and its active metabolite, N-desmethylcitalopram, was detected in his urine and blood. Citalopram carries a Federal Drug Administration warning that it "may impair mental and/or physical ability required for the performance of potentially hazardous tasks (e.g., driving, operating heavy machinery." However, it has not been shown to degrade performance in psychological testing experiments using healthy volunteers. Trazodone, which is an older antidepressant medication commonly marketed with the name Oleptro, was detected in the pilot's blood and urine. Trazodone carries a warning that "antidepressants may impair the mental and/or physical ability required for the performance of potentially hazardous tasks, such as operating an automobile or machinery." At least 40% of outpatient users reported drowsiness or fatigue when using trazodone.

The pilot had reported a remote history of depression to the FAA and had a recurrent episode beginning in May 2014. The pilot was initially treated with sertraline but later switched to the antidepressant

vortioxetine. During the spring and early summer of 2015, the pilot was weaned off medication, apparently because he wanted to be able to fly, and the FAA would not issue a medical certificate while he was using vortioxetine. On July 15, 2015, following a report from the treating physician that the pilot's depression had improved and that he was no longer using any antidepressants, the FAA issued the pilot a medical certificate.

During an interview with the pilot's wife, she stated that the pilot had multiple ongoing stressors but that he stopped taking medication so that he could get his medical certificate and begin flying again. She noted that he continued to be very stressed and had revisited his physician about 1 week before the accident but that she did not know if the pilot had started any new medications at that time.

TESTS AND RESEARCH

The Avidyne PFD, multifunction display, and DFC 90 autopilot were retained and sent to the NTSB Recorders Laboratory for data download. The DFC 90 autopilot did not contain any recorded data, and the multifunction display stopped logging data about 5 minutes before the accident because of a software issue.

A review of the PFD data revealed that several parameters, including pitch angle and airspeed, were recorded during the accident flight. The data showed that, the airplane touched down at 1901:41 and began to fly the traffic pattern again. At 1905:17, as the airplane was on the final leg of the approach to the runway, about 80 ft agl, the recorded pitch was 1° nose-up, and the airspeed was 67 knots. At 1905:21 (when the last valid PFD data were recorded), the pitch angle changed to 40° nose-down, and the airspeed increased to 79 knots. During this time, the airplane rolled 10° to the left.

ADDITIONAL INFORMATION

The airframe manufacturer conducted performance calculations using the airplane's approximate weight and balance and the wind conditions at the time of the accident. Calculations revealed that, with 50% flap extension, the stall speed would have been 54.8 KCAS.

Pilot Information

Certificate:	Private	**Age:**	38,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Unknown
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	July 15, 2015
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	August 14, 2015
Flight Time:	1400 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	CIRRUS DESIGN CORP	**Registration:**	N1116C
Model/Series:	SR22	**Aircraft Category:**	Airplane
Year of Manufacture:	2003	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	0471
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	April 10, 2015 Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	2289.9 Hrs	**Engine Manufacturer:**	CONT MOTOR
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-550-N
Registered Owner:	HARD TIMES LLC	**Rated Power:**	310 Horsepower
Operator:	HARD TIMES LLC	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	EET,565 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	18:53 Local	**Direction from Accident Site:**	343°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	3 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	350°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	28°C / 18°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Alabaster, AL (EET)	**Type of Flight Plan Filed:**	None
Destination:	Alabaster, AL (EET)	**Type of Clearance:**	None
Departure Time:	19:01 Local	**Type of Airspace:**	

Airport Information

Airport:	SHELBY COUNTY EET	**Runway Surface Type:**	Asphalt
Airport Elevation:	586 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	34	**IFR Approach:**	None
Runway Length/Width:	5000 ft / 75 ft	**VFR Approach/Landing:**	Traffic pattern

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:**	33.166942,-86.778053

Administrative Information

Investigator In Charge (IIC):	Moats, Heidi
Additional Participating Persons:	Clay Perkins; FAA/FSDO; Birmingham, AL Brad Miller; Cirrus Aircraft; Duluth, MN Kurt Gibson; Continental Motors Inc.; Mobile, AL Frederic Barber; Avidyne Corporation; Melbourne, FL
Original Publish Date:	May 16, 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=91879