Aviation Investigation Final Report

Location:	Deltona, Florida	**Accident Number:**	ERA09FA169
Date & Time:	February 17, 2009, 14:18 Local	**Registration:**	N493DA
Aircraft:	CIRRUS DESIGN CORP SR20	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The commercial pilot flight instructor and a commercial pilot receiving instruction departed from Orlando Sanford International Airport on an instructional flight. Approximately 30-40 minutes later witnesses reported seeing the nose of the airplane pitch down vertically and the airplane start to spin. The witnesses added that, just before the airplane disappeared below a tree line, a parachute deployed but did not inflate. Even though the airframe manufacturer did not set a minimum altitude for deployment of the Cirrus Airframe Parachute System (CAPS), data suggests that a successful deployment of the system below 900 feet above ground level while an airplane is in a spin is improbable. Review of data downloaded from the multifunction and primary flight displays revealed that prior to the initiation of the accident sequence, the airplane was maneuvering between 3,257 feet and 3,131 feet, heading between 078 degrees to 064 degrees. The engine rpm varied between 2,440 rpm to 1,050 rpm. The indicated airspeed varied between 50 to 75 knots. About 31 seconds before the accident, the engine rpm increased to 2,500 rpm and the airplane's indicated airspeed was 54 knots. The Pilot's Operating Handbook states the airplane will stall at an indicated airspeed of 61 knots with a 0 degree angle of bank and flaps at 50 percent. Examination of the wreckage revealed the flaps were 50 percent at impact. In addition, no anomalies were noted with the airframe, flight controls, CAPS, engine assembly, or engine accessories.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot receiving instruction's failure to maintain adequate airspeed while maneuvering, which resulted in an aerodynamic stall and subsequent loss of control. Contributing to the accident was the flight instructor's inadequate supervision and both pilots' failure to deploy the ballistic parachute at a higher altitude.

Findings

Aircraft	Parachute - Not used/operated
Aircraft	Airspeed - Not attained/maintained
Personnel issues	Aircraft control - Flight crew
Personnel issues	Lack of action - Instructor/check pilot

Factual Information

History of Flight

Maneuvering	Loss of control in flight (Defining event)
Maneuvering	Aerodynamic stall/spin
Uncontrolled descent	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On February 17, 2009, at 1418 eastern standard time, a Cirrus SR20, N493DA, call sign Connection 424, registered to Boston Aviation Leasing II LLC, and operated by Delta Connection Academy (DCA) as a 14 Code of Federal Regulations Part 91 instructional flight, was substantially damaged when it collided with trees and terrain in Deltona, Florida. Visual meteorological conditions prevailed and no flight plan was filed. The commercial pilot flight instructor and commercial pilot receiving instruction were killed. The flight originated from Orlando Sanford International Airport (SFB), Sanford, Florida, at 1408.

Two witnesses in the same neighborhood stated they were checking their mail between 1430 and 1500, when they heard an airplane flying overhead. They observed the airplane flying eastbound between 225 to 250 feet above the trees. Both witnesses stated, "the engine was heard to quit and the airplane made a sharp turn to the right." The nose of the airplane pitched down vertically and the airplane started spinning. Just before the airplane disappeared below the tree line, the witnesses observed an orange or red parachute deploy, but the parachute did not inflate. A short time later they heard the sound of an impact. One witness stated he called a local television station and the Volusia County Sheriff Department non-emergency 911 operators and inquired if anyone had reported an aircraft accident. Both the television station and the sheriff department informed the witness that no accidents had been reported.

Delta Connection personnel notified the on duty Delta Academy Manager at 1930 that the airplane was overdue. The Federal Aviation Administration (FAA) issued an alert aircraft notification at 2153. The airplane was subsequently located at 0315 on February 18, 2009, by the Volusia County Sheriff Department.

Review of data downloaded from the multi-function display (MFD) and primary flight display (PFD) confirmed the pilots departed SFB at 1408. At 1413:30, the maximum-recorded airspeed was 115 knots with a ground speed of 124 knots. The engine rpm was reduced from 2,440 rpm to 1,840 rpm at 1413:34. At 1417:10, the airplane was at 3,257 feet, heading 078 degrees. The airplane began to pitch down with an indicated airspeed of 60 knots and a ground speed of 57 knots. At 1417:19, the airplane had descended down to 3,138 feet on a heading of 082 degrees with an indicated airspeed of 75 knots and a ground speed of 63 knots. The engine rpm decreased to 1,050 rpm at 1417:28, and the airplane was heading 081 degrees at 50 knots

indicated airspeed and ground speed. At 1417:29, the airplane began a 13-degree left wing down roll before it reversed its direction to the right. The right roll reached 28 degrees before it reversed its direction back to the left. At 1417:34, the airplane was at 3,131 feet heading 064 degrees, the engine rpm had increased to 2,500 rpm, the indicated airspeed was 54 knots, and the ground speed was 52 knots. The airplane entered a left hand spin at 1417:35, and the recorded primary flight display data ends at 1418:02.

PERSONNEL INFORMATION

The commercial pilot flight instructor, age 23, held a commercial pilot certificate issued on June 9, 2004, with ratings for airplane single-engine land, airplane multiengine land, and instrument airplane. In addition, the pilot held a flight instructor certificate issued on January 3, 2008, with ratings for airplane single-engine, airplane multiengine, and instrument airplane. The pilot's last flight review was on June 13, 2008. The pilot held a first-class medical certificate issued on May 7, 2008, with no limitations. The pilot's initial DCA instructor pilot check ride in the SR20 was on August 9, 2007. Review of the pilot's logbook No. 2 revealed he had 1,625 total hours; 482.2 hours were in the Cirrus SR20 as pilot-in-command. The pilot had 1,299.1 hours as a flight instructor, of which 473.4 hours are in the SR20.The pilot had flown 182.1 hours in the last 90 days, of which 92.9 hours were in the SR20. The pilot had flown 65.3 hours in the last 30 days, of which 31.7 hours were in the SR20. The pilot had flown 7.4 hours in the last 24 hours, of which 2.5 hours were in the SR20.

The commercial pilot receiving instruction, age 30, held a commercial pilot certificate issued on February 13, 2009, with ratings for airplane multiengine land and instrument airplane. He also held a private pilot certificate, with a rating for airplane single-engine land. The pilot's last flight review was on February 13, 2009. The pilot held a first-class medical certificate issued on June 3, 2008, with no limitations. Review of the pilot's logbook revealed he had 175.6 total hours; 132.2 hours were in the Cirrus SR20, of which 35.8 hours were as pilot-in-command. The pilot had flown 84.1 hours in the last 90 days, of which 38.1 hours were in the SR20. The pilot had flown 26.3 hours in the last 30 days.

The commercial pilot receiving instruction was attending a DCA training course to obtain the commercial pilot single-engine land add on rating. The pilot was on his second dual local flight with his flight instructor. The flight was scheduled from 1330 to 1530. According to information provided by DCA, the flight was extended until 1930 at an undetermined time. The training syllabus for the flight included takeoff and climb procedures, traffic pattern operations, operations of systems in flight, and upper air work, including slow flight, stalls, emergency, and abnormal procedures.

AIRCRAFT INFORMATION

The Cirrus SR20 is a four-place airplane with a fixed tricycle landing gear, serial number 1839, manufactured in 2007. A Continental IO-360-ES, 200-horsepower horizontally opposed six-cylinder engine powers the airplane. Review of the airplane logbooks revealed the last annual

inspection was conducted on January 5, 2009, and the airplane has flown 239.7 hours since the inspection. The last 100-hour inspection was conducted on February 2, 2009, and the airplane has flown 56.3 hours since the inspection. The HOBBS meter at the accident site indicated 1,643.7 hours and the Flight meter indicated 1589.4 hours.

The Manager of Safety and Security, at DCA, stated it is the Academy's policy for airplanes to be topped off with fuel before they depart on a flight. The daily fuel log indicates the airplane was refueled twice during the morning period on the day of the accident. The fuel log does not indicate how much fuel was added to the airplane. According to the DCA SR20 Takeoff Data Card for N490DA, located at the accident site, 56 gallons of fuel was on board the airplane at takeoff. A Takeoff Data Card for N493DA was not located at the accident site. The actual amount of fuel on board the airplane at the time of the accident could not be determined.

METEOROLOGICAL INFORMATION

The 1453 SFB surface weather observation was: wind 150 degrees at 6 knots, visibility 10 miles, clear, temperature 21 degrees Celsius, dew point temperature
5 degrees Celsius, and altimeter 30.20 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The wreckage of the airplane was located in a wooded area 13.24 nautical miles northeast of SFB. The airplane collided with treetops, between 30 to 35 feet in height, in a nose down, vertical descent. The airplane came to rest on a heading of 305 degrees magnetic, and there was no crash debris line.

The Cirrus Airframe Parachute System (CAPS) safety pin was not located. The CAPS had been activated and the activation handle was separated from the handle holder. The handle holder bracket was bent downward and the activation cable was separated from the cabin roof. CAPS activation cable continuity was confirmed from the handle to the firing pin actuator.

The upper and lower left and right engine cowlings were separated from the airframe. The engine remained attached to the firewall by all engine mounts except for the left aft side. All engine accessories remained attached to the engine except for the starter, left and right magneto, and secondary alternator. The primary alternator was partially attached to its mounting location. The nose landing gear leg remained attached to the engine mount. The nose landing gear wheel and tire separated from the leg.

The propeller assembly remained attached to the crankshaft propeller flange. The propeller spinner was crushed and did not exhibit any evidence of rotation. All propeller blades remained attached to the propeller hub. No leading or trailing edge damage was noted on each of the three propeller blades. No damage was noted to one propeller blade. Another propeller blade was bent aft 22 inches outboard of the propeller hub. Chordwise rubbing and polishing was present on the propeller blade extending from the leading to trailing edge. The remaining

propeller blade was bent aft 5 inches outboard of the propeller hub.

Examination of the airframe and flight controls revealed no anomalies. Continuity of the flight control surfaces was confirmed from the cabin area aft to all flight control surfaces. The flaps were extended 50 percent.

Examination of the engine revealed no anomalies. The upper spark plugs were removed. The electrodes were "normal" when compared to the Champion Aviation Check-A- Plug Comparison Chart (AV-27). Thumb compression and suction was obtained on all cylinders when the propeller flange was rotated by hand. Valve and gear train continuity was confirmed during the rotation of the crankshaft. The engine driven fuel pump and drive coupling were intact and not damaged. The fuel pump drive shaft rotated freely by hand. The propeller governor remained attached to the engine. The throttle plate was found half open. The mixture control was found at idle cutoff. Residual fuel was observed in the fuel pump un-metered fuel pressure line to the throttle body. No additional fuel was observed in the firewall mounted fuel lines. The gascolator was damaged.

The engine was sent to the manufacturer for an engine run on March 12, 2009, under the supervision of the NTSB investigator. The operation of the engine was normal and did not reveal any abnormalities that would have prevented normal operation and obtaining production rated horsepower.

MEDICAL AND PATHOLOGICAL INFORMATION

The District Seven Medical Examiner at Daytona Beach, Florida, conducted a postmortem examination of the commercial pilot flight instructor, on February 18, 2009. The cause of death was "multiple blunt force injuries." The Forensic Toxicology Research Section, FAA, Oklahoma City, Oklahoma performed postmortem toxicology of specimens from the pilot. The specimens were negative for carbon monoxide, cyanide, ethanol, basic, acidic, and neutral drugs.

The District Seven Medical Examiner at Daytona Beach, Florida, conducted a postmortem examination of the commercial receiving instruction on February 18, 2009. The cause of death was "multiple blunt force injuries." The Forensic Toxicology Research Section, FAA, Oklahoma City, Oklahoma performed postmortem toxicology of specimens from the pilot. The specimens were negative for carbon monoxide, cyanide, ethanol, basic, acidic, and neutral drugs.

ADDITIONAL INFORMATION

The DCA Manager of Safety and Security stated the Academy does not have a written procedure pertaining to flight following.

Review of the Cirrus Design SR20 Pilot's Operating Handbook states at a gross weight of 3,000 pounds, with the most forward center of gravity, the airplane will stall at an indicated airspeed of 61 knots, or 63 knots calibrated airspeed with a 0 degrees angle of bank and flaps at 50

percent. The airplane will stall at an indicated airspeed of 72 knots or 75 knots calibrated airspeed, in a 45-degree angle of bank, with 50 percent flaps.

Section 10 Safety Information, Deployment Altitude states, "No minimum altitude for deployment has been set. This is because the actual altitude loss during a particular deployment depends upon the airplane's airspeed, altitude, and attitude at deployment as well as other environmental factors. In all cases, however, the chances of a successful deployment increase with altitude. As a guideline, the demonstrated altitude loss from entry into a one-turn spin until under a stabilized parachute is 920 feet. Altitude loss from level flight deployments has been demonstrated at less than 400 feet. With these numbers in mind it might be useful to keep 2,000 feet AGL in mind as a cut-off decision altitude."

Review of the Cirrus SR20 Flight Standards Manual, Page 3A-17 states, "Minimum Altitudes, While conducting maneuvers other than those which are ground-based, flight crews will ensure that at no time the aircraft is operated at an altitude less than 3000 feet AGL. In the event of an inadvertent spin, this will allow the flight crew additional time to execute recovery or CAPS deployment procedures."

Review of ten additional MFD data files from other aircraft flown by the flight instructor, when compared to the data from the accident flight, showed no instances similar to the accident flight.

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	23,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	May 7, 2008
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	June 13, 2008
Flight Time:	1625 hours (Total, all aircraft), 484 hours (Total, this make and model), 1568 hours (Pilot In Command, all aircraft), 182 hours (Last 90 days, all aircraft), 65 hours (Last 30 days, all aircraft), 7 hours (Last 24 hours, all aircraft)		

Student pilot Information

Certificate:	Commercial; Private	**Age:**	30,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	June 3, 2008
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	February 13, 2009
Flight Time:	176 hours (Total, all aircraft), 132 hours (Total, this make and model), 36 hours (Pilot In Command, all aircraft), 84 hours (Last 90 days, all aircraft), 26 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	CIRRUS DESIGN CORP	**Registration:**	N493DA
Model/Series:	SR20	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	1839
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	February 2, 2009 100 hour	**Certified Max Gross Wt.:**	3000 lbs
Time Since Last Inspection:	56 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	1644 Hrs at time of accident	**Engine Manufacturer:**	CONT MOTOR
ELT:	C91A installed, activated, aided in locating accident	**Engine Model/Series:**	IO-360-ES
Registered Owner:	BOSTON AVIATION LEASING II LLC	**Rated Power:**	210 Horsepower
Operator:	Delta Connection Academy	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	SFB,55 ft msl	**Distance from Accident Site:**	13 Nautical Miles
Observation Time:	14:53 Local	**Direction from Accident Site:**	50°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	80°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.2 inches Hg	**Temperature/Dew Point:**	18°C / 6°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Sanford, FL (SFB)	**Type of Flight Plan Filed:**	None
Destination:	Sanford, FL (SFB)	**Type of Clearance:**	None
Departure Time:	14:08 Local	**Type of Airspace:**	Class E

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	28.961389,-81.154724

Administrative Information

Investigator In Charge (IIC):	Smith, Carrol
Additional Participating Persons:	Joseph W Gramzinski; FAA/FSDO; Orlando, FL Brannon D Mayer; Cirrus; Duluth, MN Jason Lukasik; Teledyne Continental; Mobile, AL
Original Publish Date:	November 9, 2009
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=73363