Aviation Investigation Final Report

Location:	Willard, Missouri	**Accident Number:**	CEN12FA633
Date & Time:	September 15, 2012, 00:21 Local	**Registration:**	N436KS
Aircraft:	CIRRUS DESIGN CORP SR22	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	5 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot was conducting an instrument landing system approach in night instrument meteorological conditions at the time of the accident. Radar track data indicated that the airplane crossed the final approach course near the initial approach fix, about 11 miles from the runway. The airplane drifted through the localizer about 0.25 mile before crossing the localizer again and drifting about 0.25 mile to the opposite side of the localizer. The airplane flightpath then paralleled the localizer briefly. The track data indicated that the airplane entered a left turn, which resulted in about a 90-degree course change. About that time, the pilot requested radar vectors to execute a second approach. The airplane entered a second left turn that continued until the final radar data point, which was located about 420 feet from the accident site. During the second left turn, about 9 seconds before the final radar data point, the pilot transmitted, "I need some help." The data indicated that the accident airplane descended at an average rate of 6,000 feet per minute during the final 10 seconds of data. No further transmissions were received from the pilot. The airplane impacted an open area of a lightly wooded pasture located about 6 miles north-northwest of the destination airport. A witness reported hearing an airplane engine surge to high power about four times, followed by what sounded like a high speed dive. She heard the initial impact followed by an explosion. The postaccident examination of the airframe and engine did not reveal any preimpact failures or malfunctions that would have precluded normal operation. The location and condition of the airframe parachute system were consistent with partial deployment at the time of ground impact. Based on the performance information depicted by the radar data, the pilot's request for assistance, and examination of the airplane at the accident scene, it is most likely the pilot became spatially disoriented in night meteorological conditions and subsequently lost 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 loss of airplane control as a result of spatial disorientation experienced in night instrument meteorological conditions.

Findings

Personnel issues	Spatial disorientation - Pilot
Personnel issues	Aircraft control - Pilot
Environmental issues	Clouds - Effect on operation
Environmental issues	Dark - Effect on operation

Factual Information

History of Flight

Approach-IFR initial approach	Loss of control in flight (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On September 15, 2012, at 0021 central daylight time, a Cirrus Design SR22 airplane, N436KS, was substantially damaged when it impacted terrain near Willard, Missouri. The pilot and four passengers were fatally injured. The aircraft was registered to and operated by JL2, LLC under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Instrument meteorological conditions prevailed for the flight, which was operated on an instrument flight rules (IFR) flight plan. The flight originated from Lee's Summit Municipal Airport (LXT) about 2330 on September 14, 2012. The intended destination was the Springfield-Branson National Airport (SGF), Springfield, Missouri.

At 2338, the pilot contacted the Kansas City Terminal Radar Approach Control (TRACON) facility and requested an IFR clearance to SGF. The pilot was subsequently issued an IFR clearance and the flight proceeded on course to SGF. A cruising altitude of 7,000 feet mean sea level (msl) was assigned.

About 0002, control of the flight was transferred to the Springfield TRACON. The flight was about 50 miles north of SGF at that time. At 0014, air traffic control instructed the pilot to cross the initial approach fix (BVRLY intersection) at or above 3,000 feet msl, and cleared the pilot for an Instrument Landing System (ILS) approach to runway 14 at SGF. The flight was about 18 miles north of SGF. The pilot was instructed to contact the control tower at that time.

At 0017, the pilot contacted the SGF air traffic control tower. At that time, the tower controller cleared the pilot to land at that time. At 0020:31 (hhmm:ss), the pilot requested radar vectors in order to execute a second approach. The controller instructed the pilot to maintain 3,000 feet msl and turn left to a heading of 360 degrees. The pilot subsequently acknowledged the clearance. At 0021:17, the pilot contacted the controller and the controller acknowledged. At 0021:21, the pilot transmitted, "I need some help." No further communications were received from the pilot.

Radar track data depicted the accident airplane approaching SGF from the north-northwest on an approximate magnetic course of 157 degrees. After an en route descent, the airplane leveled at an altitude of 2,900 feet msl about 16 miles north-northwest of SGF. About 0018:00, the airplane flight path crossed the ILS runway 14 localizer near the initial approach fix (BVRLY intersection). The airplane drifted about 0.25 miles southwest of the localizer before crossing the localizer again, and drifting about 0.25 miles northeast of the localizer. Beginning about 0019:44, he airplane flight path appeared to parallel the localizer, about 0.12 miles northeast, for about the next 40 seconds.

The track data indicated that, about 0020:09, the airplane entered a left turn to become established on an approximate 064-degree magnetic course. About 0020:38, the airplane entered a second left turn that continued until the final radar data point, which was recorded at 0021:28. The final radar data point was located about 420 feet west-northwest of the accident site. The data indicated that the accident airplane

descended from 2,800 feet msl at 0021:18 to 1,800 feet msl at 0021:28; an average descent rate of 6,000 feet per minute.

A witness reported hearing a low flying airplane prior to the accident. She noted the engine surged with high power about four times, followed by what sounded like a high speed dive. She stated that she heard the initial impact followed by an explosion. She observed the glow of the postimpact fire from her bedroom window. Her husband notified local authorities and they both responded to the accident site.

The airplane impacted an open area of a lightly wooded pasture located about 6 miles north-northwest of SGF. The elevation of the accident site was about 1,120 feet.

Pilot Information

Certificate:	Private	**Age:**	44,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
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:**	October 13, 2011
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	January 23, 2012
Flight Time:	(Estimated) 1000 hours (Total, all aircraft), 650 hours (Total, this make and model), 70 hours (Last 90 days, all aircraft), 14 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

The pilot held a private pilot certificate with single-engine land airplane and instrument airplane ratings. He was issued a third class airman medical certificate without limitations on October 7, 2011. On the application for that medical certificate, the pilot reported a total flight time of 731.9 hours, with 97.2 hours flown within the preceding 6 months. The pilot's logbook was not available to the NTSB for review.

According to the pilot's flight instructor, the accident pilot had completed a flight review on January 23, 2012. The flight instructor estimated the pilot's total flight time at 1,000 hours, with about 75 hours of actual instrument time and 650 hours in Cirrus airplanes.

Aircraft and Owner/Operator Information

Aircraft Make:	CIRRUS DESIGN CORP	**Registration:**	N436KS
Model/Series:	SR22	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	0202
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	September 1, 2011 Annual	**Certified Max Gross Wt.:**	3400 lbs
Time Since Last Inspection:	171 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2001 Hrs as of last inspection	**Engine Manufacturer:**	CONT MOTOR
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-550-N
Registered Owner:	JL2 LLC	**Rated Power:**	300 Horsepower
Operator:	JL2 LLC	**Operating Certificate(s) Held:**	None

The accident airplane was a 2002 Cirrus Design SR22, serial number 0202. It was a low wing, four place, single engine airplane, with a fixed tricycle landing gear configuration. The airplane was powered by a 310-horsepower Continental Motors IO-550-N reciprocating engine, serial number 686271. The accident airplane was issued a normal category, standard airworthiness certificate in April 2002.

The aircraft maintenance logbooks were not available to the NTSB for review. Maintenance work orders provided by a mechanic indicated that an annual inspection was completed on September 1, 2011, at 2,001 hours total airframe time. An engine oil change was accomplished on April 10, 2012 at 2,070 hours total airframe time.

A logbook that appeared to contain flights in the airplane was recovered at the accident site. The most recent entry was dated September 9, 2012. The entry included an ending airframe service time of 2,172.8 hours. The preceding entry, dated September 8, 2012, included a notation for a dual VHF Omni Range (VOR) equipment check that appeared to have been signed by the pilot. The log contained entries totaling 14.5 hours within the preceding 30 days, and about 70.3 hours within the preceding 90 days.

The airframe manufacturer stated that the accident airplane was equipped with four seats and four corresponding restraints (seatbelts/shoulder harnesses) at the time of manufacture. The manufacturer was not aware of any available modifications to increase the seating capacity of the airplane. The Federal Aviation Administration (FAA) Type Certificate Data Sheet applicable to the accident airplane noted a seating capacity of four. Aircraft records on file with the FAA did not include any modifications to the seating arrangement or occupant restraint systems.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:	SGF,1268 ft msl	**Distance from Accident Site:**	6 Nautical Miles
Observation Time:	00:41 Local	**Direction from Accident Site:**	140°
Lowest Cloud Condition:		**Visibility**	8 miles
Lowest Ceiling:	Overcast / 700 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	90°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.26 inches Hg	**Temperature/Dew Point:**	16°C / 14°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Lee's Summit, MO (LXT)	**Type of Flight Plan Filed:**	IFR
Destination:	Willard, MO (SGF)	**Type of Clearance:**	IFR
Departure Time:	23:30 Local	**Type of Airspace:**	

Weather conditions recorded by the SGF Automated Surface Observing System, at 0020, were: wind from 070 degrees at 6 knots, 8 miles visibility, overcast clouds at 700 feet above ground level (agl), temperature 16 degrees Celsius, dew point 14 degrees Celsius, dew point 30.27 inches of mercury.

The area forecast current at the time of the accident noted overcast ceilings at 3,000 feet with cloud tops to 15,000 feet, and visibilities of 3 to 5 mile in light rain and mist. The terminal forecast for SGF current at the time of the accident noted overcast clouds at 300 feet agl with 6 miles visibility in mist and rain showers in the vicinity of the airport. An airman's meteorological information (AIRMET) advisory noted that IFR conditions were expected over southwestern Missouri, which included the accident site, with ceilings below 1,000 feet agl and visibility below 3 miles. There were no significant meteorological information (SIGMET), convective SIGMET, or weather watches in effect for Missouri at the time of the accident.

Civil twilight ended at 1948, with the moon setting at 1818. The moon was more than 15 degrees below the horizon at the time of the accident. The subsequent moonrise occurred at 0627, with the beginning of civil twilight at 0630.

There was no record of the pilot obtaining an official weather briefing from a flight service briefer; nor was there any record of weather information being accessed via the Direct User Access Terminal Service (DUATS). However, two IFR flight plans were filed through DUATS. An IFR flight plan from SGF to LXT was filed at 1604, and an IFR flight plan for the return flight from LXT to SGF was filed at 2257.

Airport Information

Airport:	Springfield-Branson National SGF	**Runway Surface Type:**	Concrete
Airport Elevation:	1268 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	14	**IFR Approach:**	ILS
Runway Length/Width:	8000 ft / 150 ft	**VFR Approach/Landing:**	Full stop

The Springfield-Branson National Airport (SGF) was served by two paved runways. Runway 14 was 8,000 feet by 150 feet and constructed of grooved concrete. Approach and landing guidance to runway 14 consisted of an ILS approach procedure, a 4-light precision approach path indicator (PAPI), a medium intensity approach lighting system with runway alignment indicator lights (MALSR), and high intensity runway edge lights.

The ILS runway 14 approach procedure specified a minimum initial (glide slope intercept) altitude of 2,900 feet msl, with a 3.00-degree glide slope. The published decision height for a straight-in approach was 1,462 feet msl, with one-half mile visibility required for landing.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	4 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	5 Fatal	**Latitude, Longitude:**	37.341945,-93.466941

The accident site was located in an open area of a lightly wooded pasture about 6 miles north-northwest of SGF. Linear ground impact marks consistent with being formed by the wing leading edges emanated from the main impact crater. Based on the ground impact markings, the airplane was oriented on an approximate heading of 340 degrees at the time of impact. The debris field extended to approximately 110 feet east, 140 feet northeast, and 70 feet north of the main impact crater. Significant portions of the airframe were consumed or damaged by a postimpact fire. Isolated areas of the surrounding vegetation were also affected by the postimpact fire.

The entire airframe was fragmented. The main impact crater contained the propeller, engine, instrument panel, and portions of the fuselage. The airplane flight control surfaces and wing flaps were located within the debris field. The ailerons and flaps had separated from the wings and were deformed consistent with impact forces. The aileron control cables were frayed and separated consistent with impact forces.

The empennage was separated from the airframe. It came to rest inverted about 10 feet east of the main impact crater. The elevator remained attached to the stabilizer and both appeared to be otherwise intact. The left horizontal and vertical stabilizers, left elevator, and rudder were consumed by the postimpact fire. A portion of the rudder remained attached to the lower rudder hinge. Elevator and rudder control continuity was confirmed between the empennage and the cockpit area.

The engine was located in the impact crater. It remained partially attached to the engine mount and airframe firewall. Portions of the firewall were deformed into/around the engine accessory section. The crankcase, cylinders, induction system, and exhaust system exhibited damage consistent with impact forces. All of the cylinders remained attached to the crankcase. The magnetos had separated from the engine and the ignition harness was damaged.

The three-bladed propeller assembly, with the propeller flange attached, separated from the engine. The engine crankshaft was fractured aft of the propeller flange. The appearance of the fracture surface was consistent with an overstress failure. One propeller blade had separated at the hub and was recovered from the impact crater. The remaining two propeller blades remained attached to the hub. The propeller blades exhibited S-bending and chordwise scratches.

The Cirrus Airframe Parachute System (CAPS) components remained attached to the airframe. The activation cable was continuous from the cockpit activation handle to the igniter assembly. The safety pin was not located with the activation handle consistent with it being removed prior to flight. The packed parachute assembly was located about 40 feet from the main impact crater. The parachute risers and suspension lines extended from the main impact crater to the parachute assembly and were oriented approximately perpendicular to the linear impact marks emanating from the main impact crater.

The postaccident examination of the airframe and engine did not reveal any anomalies consistent with a preimpact failure or malfunction.

Medical and Pathological Information

An autopsy of the pilot was conducted at the Boone/Callaway County Medical Examiner's Office, on September 17, 2012. The pilot's death was attributed to blunt trauma injuries sustained in the accident.

The FAA Civil Aerospace Medical Institute toxicology report was negative for all drugs in the screening profile. The report stated that 10 (mg/dL, mg/hg) ethanol was detected in blood samples. The report also noted that the ethanol was likely due to sources other than ingestion.

Administrative Information

Investigator In Charge (IIC):	Sorensen, Timothy
Additional Participating Persons:	Steven B Davis; FAA – Kansas City Flight Standards; Kansas City, MO Bradley Miller; Cirrus Design Inc.; Duluth, MN Christopher Lang; Continental Motors Inc.; Mobile, AL
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Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=85037