Aviation Investigation Final Report

Location:	Lexington, Kentucky	**Accident Number:**	NYC02LA071
Date & Time:	March 16, 2002, 12:40 Local	**Registration:**	N244CD
Aircraft:	Cirrus Design Corp. SR-20	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The instrument rated pilot and passenger departed into instrument meteorological conditions (IMC) and intended to practice some instrument approaches. Shortly after takeoff, the pilot reported a turn coordinator failure. The turn coordinator indicated a left bank regardless of control inputs and the pilot became disoriented. The airplane was equipped with a Cirrus Airplane Parachute System (CAPS). The pilot stated he pulled the CAPS activation handle repeatedly; however, the cable did not extend and "nothing seemed to happen." The airplane broke out of the cloud layer, and the pilot performed an emergency landing to a field. Witnesses near the accident site reported that the CAPS parachute deployed after ground contact. Post accident testing of the wreckage did not reveal any pre-impact instrumentation, or autopilot failures. The CAPS system also functioned normally; however, it was noted that the pull forces to activate the CAPS parachute varied significantly.

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 aircraft control. Factors in this accident were the undetermined failure of the turn coordinator, as reported by the pilot, and the instrument meteorological conditions.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: APPROACH

Findings
1. (F) FLIGHT/NAV INSTRUMENTS,TURN AND BANK INDICATOR - UNDETERMINED

Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: APPROACH

Findings
2. (F) WEATHER CONDITION - CLOUDS
3. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
4. SPATIAL DISORIENTATION - PILOT IN COMMAND

Occurrence #3: ON GROUND/WATER ENCOUNTER WITH TERRAIN/WATER
Phase of Operation: EMERGENCY LANDING

Findings
5. TERRAIN CONDITION - OPEN FIELD

Factual Information

On March 16, 2002, about 1240 eastern standard time, a Cirrus Design Corporation SR-20, N244CD, was substantially damaged during an emergency landing in Lexington, Kentucky. The certificated private pilot and a pilot rated passenger sustained minor injuries. Instrument meteorological conditions prevailed and an instrument flight rules flight plan had been filed for the flight that departed the Blue Grass Airport (LEX), Lexington, Kentucky. The personal flight was conducted under 14 CFR Part 91.

The instrument rated pilot stated he had intended to perform some practice instrument approaches in actual instrument meteorological conditions. The passenger was a friend of the pilot; and also held a private pilot certificate, with an instrument rating.

According to the pilot, after a normal preflight check, the airplane departed from runway 04, at LEX. The pilot maintained runway heading until 1,400 feet, then set the autopilot to fly the "heading bug," and the "VS" to climb. He then initiated a climbing right turn by setting the heading bug to 090 degrees, and entered the overcast layer about 1,600 feet. Air traffic control (ATC) then cleared the airplane to the initial approach fix for the "GPS RW 04" approach. The pilot was in the process of selecting the approach in the airplane's global positioning system (GPS), when he noticed that the turn coordinator was "pegged to the left, with no flag," and that the airplane was losing altitude rapidly. The pilot disengaged the autopilot and attempted to stabilize the airplane. In a written statement, he further added:

"...I let [the passenger] know I was disengaging the autopilot. By then we were in a steep dive. At this moment, I had no confidence in the instruments other than airspeed, altimeter and vertical speed indicator. The airspeed was high, perhaps in the yellow arch. When we broke out of the clouds, I pulled up hard and the plane responded. Our momentum carried us back into the clouds and somewhere near 3,000 feet, I had control of the altitude momentarily and thought for a minute we might be able to recover. I tried to fly straight and level, which I believe we did for a short time and then everything started to unravel again. The attitude indicator (AI) was now unreliable. I suspect the AI tumbled during recovery from the previous dive. Next we were climbing and probably turning and generally out of control...."

The airplane was equipped with a Cirrus Airplane Parachute System (CAPS). The pilot indicated he pulled the CAPS activation handle repeatedly; however, the cable did not extend and "nothing seemed to happen." He further stated:

"...Finally I decided that it must have already deployed, but still we were carrying 120-140 knots of airspeed and descending faster than I expected we would if the chute had deployed. After we broke out [of the cloud layer] we began to search for a suitable landing site. We were still uncertain as to whether or not we were under the canopy, but continued to fly as if we were

not..."

The airplane touched down in field and struck trees, about 3 miles northeast of LEX. Witnesses near the accident reported that the CAPS parachute deployed after ground contact.

With regards to the turn coordinator, the pilot rated passenger stated "... it was banked to the left, and regardless of control inputs, remained in a position indicating a left bank."

On site examination of the wreckage by a Federal Aviation Administration (FAA) inspector did not reveal any pre-impact instrumentation, or autopilot failures; however, the turn coordinator, autopilot control box, autopilot roll trim actuator, and the horizontal situation indicator (HSI) were removed from the airplane for further testing. The CAPS system also functioned normally; however, it was noted that the pull forces to activate the CAPS parachute varied significantly during post accident testing.

Additional testing conducted by the manufacturer on production line aircraft revealed that the manner in which the activation handle was pulled, made a difference in how easily the CAPS system could be activated.

According to the airplane manufacturer, the CAPS system was designed to bring the aircraft and its occupants safely to the ground in the event of a life-threatening emergency. The CAPS system consisted of a parachute, a solid-propellant rocket to deploy the parachute, a rocket activation handle, and a harness imbedded within the fuselage structure. The activation handle was located in the headliner of the cabin between the forward crew seats. The igniter system employed a 25-pound spring, to arm and trigger the igniter. The pilot was required to pull on the handle, and continue to pull for a short period of time to allow the spring to compress, arm and fire the charge. Yanking the handle in short strokes would not allow the spring to compress completely, and would fail to activate the igniter.

On February 25, 2002, Cirrus Design Corporation issued Service Bulletin (SB) 22-95-01. The SB was also the subject of FAA Airworthiness Directive (AD) 2002-05-05, which became effective on March 19, 2002. The service bulletin and subsequent AD, entailed the installation of a cable clamp external to the rocket cone adapter which would provide positive retention of the activation cable housing.

On February 28, 2002, Cirrus Design Corporation issued SB 20-95-02, after it was discovered that some production airplanes may exhibit a condition where the pull force required to activate the CAPS system may by greater than desired. The SB entailed the installation of a clamp to positively restrain the cable housing at the CAPS Handle Adapter, loosen and straighten the activation cable above the headliner, and to remove an Adel clamp securing the activation cable adjacent to the rocket cone adapter.

The accident airplane was purchased new by the pilot in April 2001, and had been operated for about 150 hours since new. On March 4, 2002, maintenance was performed on the airplane

which included compliance with SB 22-95-01/AD 2002-05-05. Service Bulletin 20-95-02, had not been complied with at the time of the accident.

The pilot reported he had experienced the exact same type of turn coordinator failure on a previous occasion. Maintenance records revealed a turn coordinator was replaced on the airplane on June 25, 2001, after 57 hours of operation.

On April 15, 2002, the retained components from the accident airplane were examined at Meggitt S-Tec, Mineral Wells, Texas, under the supervision of a Safety Board investigator. Functional checks of the components both individually and then as a combined system on an engineering test bench did not revealed any malfunctions.

The weather reported at LEX, at 1254, was: wind from 360 degrees at 7 knots, visibility 5 miles in mist, ceiling 600 feet overcast, temperature 6 degrees C, dew point 6 degrees C, altimeter 30.18 in/hg.

The pilot reported 371 hours of total flight experience, with 110 hours in make and model. He also reported 54 hours of simulated, and 24 hours of actual flight experience in instrument meteorological conditions.

As a result of this accident, and the subsequent testing, Cirrus Design Corporation issued SB 20-95-03, which required replacement of the CAPS handle access cover. The new cover incorporated an expanded description for the CAPS activation handle use. Additionally, on July 10, 2002, SB-20-95-05, was issued and required the replacement of the CAPS activation cable in order to further reduce the pull forces required to deploy the CAPS system. Cirrus Design Corporation also issued similar service bulletins for the SR-22 series airplanes, which were also equipped with a CAPS system.

Pilot Information

Certificate:	Private	**Age:**	55,Male
Airplane Rating(s):	Single-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:**	No
Medical Certification:	Class 3 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	March 15, 2001
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	February 3, 2001
Flight Time:	371 hours (Total, all aircraft), 110 hours (Total, this make and model), 254 hours (Pilot In Command, all aircraft), 20 hours (Last 90 days, all aircraft), 8 hours (Last 30 days, all aircraft)		

Other flight crew Information

Certificate:	Private	**Age:**	18,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	June 16, 1999
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	February 19, 2001
Flight Time:	257 hours (Total, all aircraft), 18 hours (Total, this make and model), 165 hours (Pilot In Command, all aircraft), 22 hours (Last 90 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cirrus Design Corp.	**Registration:**	N244CD
Model/Series:	SR-20	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	1140
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	April 6, 2001 Annual	**Certified Max Gross Wt.:**	2900 lbs
Time Since Last Inspection:	150 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	0 Hrs as of last inspection	**Engine Manufacturer:**	Teledyne Continental
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-360ES
Registered Owner:	P & S Products Inc.	**Rated Power:**	200 Horsepower
Operator:	Paul A. Heflin	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	LEX,979 ft msl	**Distance from Accident Site:**	3 Nautical Miles
Observation Time:	12:54 Local	**Direction from Accident Site:**	45°
Lowest Cloud Condition:		**Visibility**	5 miles
Lowest Ceiling:	Overcast / 600 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	360°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.18 inches Hg	**Temperature/Dew Point:**	6°C / 6°C
Precipitation and Obscuration:	Light - None - Rain		
Departure Point:	LEXINGTON, KY (LEX)	**Type of Flight Plan Filed:**	IFR
Destination:	KY (LEX)	**Type of Clearance:**	IFR
Departure Time:	12:35 Local	**Type of Airspace:**	Class C

Airport Information

Airport:	BLUE GRASS LEX	**Runway Surface Type:**	Asphalt
Airport Elevation:	979 ft msl	**Runway Surface Condition:**	Wet
Runway Used:	4	**IFR Approach:**	Global positioning system;Practice
Runway Length/Width:	7003 ft / 150 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	2 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Minor	**Latitude, Longitude:**	38.066665,-84.566665

Administrative Information

Investigator In Charge (IIC):	Schiada, Luke
Additional Participating Persons:	Philip C Messina; FAA FSDO-01; Louisville, KY Mike Busch; Duluth, MN Robert B Lundgren; Mineral Wells, TX
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Investigation Class:	Class
Note:	
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