Aviation Investigation Final Report

Location:	Wagner, South Dakota	**Accident Number:**	CHI06LA078
Date & Time:	February 6, 2006, 13:24 Local	**Registration:**	N751CD
Aircraft:	Cirrus Design Corporation SR22	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airplane, piloted by an instrument rated private pilot, sustained substantial damage on impact with terrain following an in-flight loss of control during climb in instrument meteorological conditions. The pilot stated, "The flight plan was entered on the GPS [Global Positioning System] direct to function. Took off on runway 26 at about 1320 and a right turning climb was made to the east. When we were heading in the general direction and a climb was established, I place the plane on autopilot. I switched the frequency to 128.0 and immediately heard the frequency buzzing and saw the radio was in the RX mode and would not quit, my first distraction. I contacted Minneapolis center and reported a 3700 ft altitude and climbing, they replied to report back at 7000 or 9000 ft, I don't remember. I then noticed that the autopilot had me in a left hand standard rate turn, even though I was heading east at the time the autopilot was engaged, my next distraction. I then took over the controls to try to get up to the required altitude. In doing so I obviously misread the vertical speed indicator and eventually got the plane into a stall, then into a spin that I could not recover from. At that moment the parachute was engaged and we floated safely to the ground." An examination of the wreckage revealed no pre-impact anomalies.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot not maintaining airplane control and the inadvertent stall encountered during the climb. A factor was the instrument meteorological conditions.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: CLIMB

Findings
1. (F) WEATHER CONDITION - CLOUDS
2. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
3. AIRSPEED - NOT MAINTAINED - PILOT IN COMMAND
4. (C) STALL - INADVERTENT - PILOT IN COMMAND

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
5. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On February 6, 2006, about 1324 central standard time (CST), a Cirrus Design Corporation SR22, N751CD, piloted by an instrument-rated private pilot, sustained substantial damage on impact with terrain following a loss of control during climb in instrument meteorological conditions near Wagner, South Dakota. The personal flight was operating under 14 Code of Federal Regulations Part 91. Areas of visual and instrument meteorological conditions prevailed at the time of the accident. An instrument flight rules flight plan was on file and was activated. The pilot and passenger reported no injuries. The flight originated from the Wagner Municipal Airport, near Wagner, South Dakota, about 1315, and was en route to the Schaumburg Regional Airport, near Schaumburg, Illinois.

The pilot's accident report, in part, stated:

> Filed flight plan and received IFR clearance out of Wagner, SD (AGZ) to Schaumburg, IL (06C) at 1315 CST. ... The flight plan was entered on the GPS [Global Positioning System] direct to function. Took off on runway 26 at about 1320 and a right turning climb was made to the east. When we were heading in the general direction and a climb was established, I place the plane on autopilot. I switched the frequency to 128.0 and immediately heard the frequency buzzing and saw the radio was in the RX mode and would not quit, my first distraction. I contacted Minneapolis center and reported a 3700 ft altitude and climbing, they replied to report back at 7000 or 9000 ft, I don't remember. I then noticed that the autopilot had me in a left hand standard rate turn, even though I was heading east at the time the autopilot was engaged, my next distraction.
>
> I then took over the controls to try to get up to the required altitude. In doing so I obviously misread the vertical speed indicator and eventually got the plane into a stall, then into a spin that I could not recover from. At that moment the parachute was engaged and we floated safely to the ground. Neither passenger or pilot appear to have any injury. Everything seemed to happen so fast; I don't believe I shut the engine or fuel mixture off. I remember getting over the 4000 ft elevation. I also believe that the climbing turn with no outside reference may have caused some degree of vertigo.

PERSONNEL INFORMATION

The pilot held a private pilot certificate with an airplane single-engine land and instrument rating. The pilot was issued a third class medical certificate on March 30, 2004, with the limitation for corrective lenses. The pilot's most recent biennial flight review was completed on May 10, 2005. The pilot reported that he had accumulated approximately 804 hours total flight time, of which 166 hours were in the same make and model as the accident airplane. He reported that he had accumulated 5 hours of actual instrument flight time and 38 hours of simulated instrument flight.

The pilot reported that he had attended a three-day course on the SR22 taught by the University of North Dakota for Cirrus in April 2004. He obtained the training for his instrument rating from the fixed base operator located at Sioux Falls, South Dakota and received his instrument rating on May 10, 2005.

AIRCRAFT INFORMATION

N751CD, a 2001 Cirrus Design Corporation SR22, serial number 0044, was a low-wing, fixed tri-cycle landing gear, primarily composite, and monocoque design airplane. The airplane was reported to be powered by a six-cylinder, horizontally-opposed, air-cooled, fuel-injected Teledyne Continental Motors IO-550-N7 engine, serial number 685782, rated at 310 horsepower. The airplane was equipped with a three-blade Hartzell constant speed, aluminum alloy propeller. The airplane was configured to carry four occupants. The airplane was equipped for flight in instrument meteorological conditions.

At the time of the last inspection on April 15, 2005, the airplane was reported to have accumulated a total time of 935.5 hours.

According to the SR22 Pilot's Operating Handbook (POH), the airplane uses conventional flight controls for the ailerons, elevator and rudder. The control surfaces are pilot controlled through either of the two single-handed side control yokes. The flight control system contains a combination of push rods, cables, and bell cranks for the control of the surfaces.

According to the SR22 POH:

> The SR22 is not approved for spins, and has not been tested or certified for spin recovery characteristics. The only approved and demonstrated method of spin recovery is activation of the Cirrus Airframe Parachute System (CAPS) ... . Because of this, if the aircraft 'departs controlled flight,' the CAPS must be deployed.
>
> While the stall characteristics of the SR22 make accidental entry into a spin extremely unlikely, it is possible. Spin entry can be avoided by

using good airmanship: coordinated use of controls in turns, proper airspeed control following the recommendations of this Handbook, and never abusing the flight controls with accelerated inputs when close to the stall ... .

If, at the stall, the controls are misapplied and abused accelerated inputs are made to the elevator, rudder and/or ailerons, an abrupt wing drop may be felt and a spiral or spin may be entered. In some cases it may be difficult to determine if the aircraft has entered a spiral or the beginning of a spin.

If time and altitude permit, ... determine whether the aircraft is in a recoverable spiral/incipient spin or is unrecoverable and, therefore, has departed controlled flight.

WARNING

In all cases, if the aircraft enters an unusual attitude from which recovery is not expected before ground impact, immediate deployment of the CAPS is required. The minimum demonstrated altitude loss for a CAPS deployment from a one-turn spin is 920 feet. Activation at higher altitudes provides enhanced safety margins for parachute recoveries. Do not waste time and altitude trying to recover from a spiral/spin before activating CAPS.

According to the SR22 POH:

CAPS [is] designed to bring the aircraft and its occupants to the ground in the event of a life-threatening emergency. The system is intended to save the lives of the occupants but will most likely destroy the aircraft and may, in adverse circumstances, cause serious injury or death to the occupants. ...

The CAPS consists of a parachute, a solid-propellant rocket to deploy the parachute, a rocket activation handle, and a harness imbedded within the fuselage structure.

A composite box containing the parachute and solid-propellant rocket is mounted to the airplane structure immediately aft of the baggage compartment bulkhead. The box is covered and protected from the elements by a thin composite cover.

The parachute is enclosed within a deployment bag that stages the deployment and inflation sequence. The deployment bag creates an

orderly deployment process by allowing the canopy to inflate only after the rocket motor has pulled the parachute lines taut.

The parachute itself is a 2400-square-foot round canopy equipped with a slider, an annular-shaped fabric panel with a diameter significantly less than the open diameter of the canopy. A three-point harness connects the airplane fuselage structure to the parachute.

CAPS is initiated by pulling the activation T-handle installed in the cabin ceiling on the airplane centerline just above the pilot's right shoulder. A placarded cover, held in place with hook and loop fasteners, covers the T-handle and prevents tampering with the control. The cover is removed by pulling the black tab at the forward edge of the cover. Pulling the activation T-handle removes it from the o-ring seal that holds it in place and takes out the approximately six inches of slack in the cable connecting it to the rocket. Once this slack is removed, further motion of the handle arms and releases a firing pin, igniting the solid-propellant rocket in the parachute canister.

METEOROLOGICAL INFORMATION

At 1311, the recorded weather at The O'Neill Municipal Airport-John L Baker Field, near O'Neill, Nebraska, located about 40 nautical miles and 206 degrees from the accident site, was: Wind 330 degrees at 15 knots gusts to 18 knots; visibility 10 statute miles; sky condition scattered 1,400 feet above ground level (AGL) scattered 1,900 feet AGL overcast 2,500 feet AGL; temperature 1 degree C; dew point -2 degrees C; altimeter 30.23 inches of mercury.

At 1316, the recorded weather at Mitchell Municipal Airport, near Mitchell, South Dakota, located about 44 nautical miles and 015 degrees from the accident site, was: Wind 290 degrees at 7 knots; visibility 4 statute miles; present weather mist; sky condition broken 800 feet AGL overcast 1,400 feet AGL; temperature 0 degrees C; dew point -2 degrees C; altimeter 30.23 inches of mercury; remarks ceiling 600 feet AGL variable to 1,100 feet AGL.

At 1315, the recorded weather at Chan Gurney Municipal Airport, near Yankton, South Dakota, located about 41 nautical miles and 103 degrees from the accident site, was: Wind 280 degrees at 9 knots; visibility 8 statute miles; sky condition broken 2,100 feet AGL broken 2,600 feet AGL overcast 3,600 feet AGL; temperature 1 degree C; dew point -4 degrees C; altimeter 30.25 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The airplane came to rest upright in a field about three and one-quarter miles northeast of

AGZ. Federal Aviation Administration Inspectors and an airplane manufacturer's representative examined the wreckage. Ground scars showed that the airplane had been moved about 300 feet on about a 340-degree heading. The airplane had overturned. All flight control surfaces were attached and the control surfaces moved with respect to each control input. The seats and restraints were attached to their respective locations with no damage observed. The pitot-static system drain lines were removed and no moisture was observed. Recorded engine data was downloaded and reviewed. The engine and its components were attached to the engine mount. The three propeller blades were bent forward. No pre-impact anomalies were detected.

The CAPS system was deployed. The rocket and parachute enclosure cover were not located. The retaining strap was torn from the parachute enclosure and remained attached to the three-point link assembly. The parachute riser straps were cut to secure the parachute. One line cutter was found at the initial point of touchdown.

TESTS AND RESEARCH

The CAPS assembly was sent to its manufacturer for examination on March 1, 2006, under FAA supervision at the Ballistic Recovery Systems, Inc. (BRS) facility in South St. Paul, Minnesota. The airplane's riser attachment was examined at Wentworth Aircraft. The parachute assembly exhibited a small tear in its "C" panel. The parachute's slider and riser sustained no damage. The inspection also showed that the front harnesses and rear harness were reversed on the 3-point links. The retaining straps used to secure the packed parachute inside the airplane's fiberglass parachute box are routed through the 3-point links to help secure them in position. During extraction, the retaining straps slide out of the 3-point links and remain with the parachute box. The parachute box exhibited separations consistent with retaining straps tears.

ADDITIONAL INFORMATION

The parties to the investigation included the FAA and Cirrus Design Corporation.

The aircraft wreckage and retained item were released to a representative of the insurance company.

Pilot Information

Certificate:	Private	**Age:**	46,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:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	March 1, 2004
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	May 1, 2005
Flight Time:	804 hours (Total, all aircraft), 166 hours (Total, this make and model), 784 hours (Pilot In Command, all aircraft), 10 hours (Last 90 days, all aircraft), 1 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cirrus Design Corporation	**Registration:**	N751CD
Model/Series:	SR22	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	0044
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	April 1, 2005 Annual	**Certified Max Gross Wt.:**	3350 lbs
Time Since Last Inspection:	90 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	935.5 Hrs as of last inspection	**Engine Manufacturer:**	Teledyne Continental
ELT:	Installed, not activated	**Engine Model/Series:**	IO-550-N7
Registered Owner:	Scott E. Doom	**Rated Power:**	310 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	ONL,2031 ft msl	**Distance from Accident Site:**	40 Nautical Miles
Observation Time:	13:11 Local	**Direction from Accident Site:**	206°
Lowest Cloud Condition:	Scattered / 1400 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Overcast / 2500 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	15 knots / 18 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	330°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.22 inches Hg	**Temperature/Dew Point:**	1°C / -2°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Wagner, SD (AGZ)	**Type of Flight Plan Filed:**	IFR
Destination:	CHICAGO/SCHAUMB, IL (06C)	**Type of Clearance:**	IFR
Departure Time:	13:15 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	43.091667,-98.234725

Administrative Information

Investigator In Charge (IIC):	Malinowski, Edward
Additional Participating Persons:	Dan McKinney; Federal Aviation Administration; Rapid City, SD Mark Manning; Cirrus Design Corporation; Duluth, MN
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Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=63207