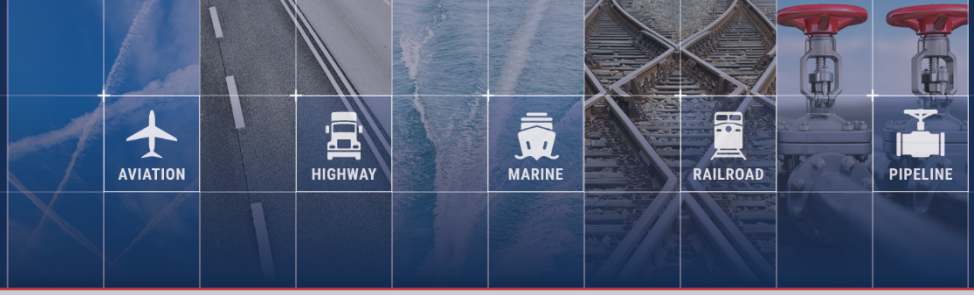

Aviation Investigation Final Report

Location:	Norden, California	**Accident Number:**	LAX05FA088
Date & Time:	February 6, 2005, 18:20 Local	**Registration:**	N286CD
Aircraft:	Cirrus Design Corp SR22 G2	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airplane, while operating under an instrument flight rules (IFR) flight plan, departed from controlled flight after encountering icing conditions, entered an uncontrolled descent, and collided with the ground. The airplane was equipped with an Ice Protection System that when activated supplied deicing fluid to the wings, tail, and propeller. The aircraft was not certified for flight into known icing and the Pilot Operating Handbook reads that, "Flight into known icing conditions is prohibited." The pilot received a preflight weather briefing, which advised that there were no pilot weather reports (PIREP) for the intended route of flight, and that the freezing level in the Reno area was 6,000 feet with no precipitation. There were no valid SIGMET's or AIRMET's for icing conditions along the pilot's route. The pilot filed his IFR flight plan for 12,000 feet, but indicated he might request 14,000 feet once airborne. After takeoff, at 1807:46, the pilot contacted Oakland Air Route Traffic Control Center (ARTCC) and requested to climb to 16,000 feet to try to get above the clouds. At 1813:40, the pilot reported that he was still in the clouds and asked about going lower. At 1815:00, the pilot advised ARTCC that if he could go up another 200 to 300 feet, he could get above the clouds. ARTCC requested clarification if the pilot wanted to go up or down. The pilot responded that he would like to go up first to build up some airspeed. The pilot was cleared for a block altitude between 16,000 to 17,000 feet. About 2 minutes later, the pilot transmitted that he was "coming down" and that he was "icing up." The last transmission from the pilot was at 1817:42, again indicating that he was icing up and coming down. According to investigators from Ballistic Recovery Systems (BRS), following the examination of the ballistic parachute system, they determined the system was deployed outside of the operating envelope of the system, which is 133 knots indicated airspeed. An examination of the airplane wreckage did not reveal any evidence of preimpact mechanical failures or malfunctions. Analysis of the actual weather conditions encountered revealed the likelihood that the pilot encountered severe icing related to super-cooled large water droplets as the aircraft achieved 16,000 feet and above. Review of the weather forecast products available at the time of the pilot's briefing disclosed that the AFSS briefing fully conformed to Federal Aviation Administration standards and adequately covered

the observed and forecast weather conditions. Although post accident analysis of the weather conditions showed the clear likelihood of severe icing conditions, the algorithms used by the NWS Aviation Weather Center to predict icing conditions showed only a low probability of icing in the area, and, in the absence of PIREPs to the contrary, an icing forecast was not triggered.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot's in-flight loss of control following an inadvertent encounter with unforecast severe icing conditions. A factor in the accident was the inaccurate icing forecast developed by the NWS Aviation Weather Center.

Findings

Occurrence #1: IN FLIGHT ENCOUNTER WITH WEATHER
Phase of Operation: CLIMB - TO CRUISE

Findings
1. (C) WEATHER CONDITION - ICING CONDITIONS
2. (F) WEATHER FORECAST - INACCURATE - NWS PERSONNEL

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

Findings
3. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
4. TERRAIN CONDITION - MOUNTAINOUS/HILLY

Factual Information

HISTORY OF FLIGHT

On February 6, 2005, about 1820 Pacific standard time, a Cirrus Design SR22 G2, N286CD, impacted mountainous terrain after encountering icing conditions near Norden, California. The owner/pilot was operating the airplane under the provisions of 14 CFR Part 91. The private pilot, the sole occupant, sustained fatal injuries; the airplane was destroyed. The personal cross-country flight departed Reno/Tahoe International Airport (RNO), Reno, Nevada, about 1750, en route to Oakland, California. Instrument meteorological conditions prevailed, and an instrument flight rules (IFR) flight plan had been filed. The primary wreckage was at 39 degrees 17 minutes north latitude and 120 degrees 20 minutes west longitude.

The National Transportation Safety Board investigator-in-charge (IIC) reviewed recorded radar data and noted a secondary 4271 discreet beacon code at a mode C reported altitude of 4,600 feet msl (mean sea level). Recorded radar data indicated that the airplane took off from RNO and executed the Mustang 6 departure (standard instrument departure procedure (SID)). The airplane climbed on a westerly course for about 18 minutes 30 seconds, and obtained a mode C reported altitude of 16,100 feet msl.

The radar data indicated the airplane leveled off and maintained 16,100 feet msl for about 3 minutes 40 seconds. Radar data showed the airplane initiated a climb and obtained a mode C reported altitude of 16,700 feet msl. The last 12 seconds of recorded radar data indicated the airplane was in a descent. Radar contact was lost at 18:17:29, at a mode C reported altitude of 15,700 feet msl.

During the flight, the pilot reported to air traffic controllers that he was in icing conditions and was not able to maintain altitude.

PERSONNEL INFORMATION

A review of Federal Aviation Administration (FAA) airman records revealed that the pilot held a private pilot certificate with ratings for airplane single engine land and instrument airplane.

The pilot held a third-class medical certificate issued on July 13, 2004, with a limitation that the pilot must possess corrective glasses for near vision.

An examination of the pilot's logbook indicated an estimated total flight time of 473.2 hours. He logged 100.4 hours in the last 90 days, and 38.9 hours in the last 30 days. He had an estimated 69 hours in the accident airplane make and model. He completed a biennial flight review on December 29, 2004.

AIRCRAFT INFORMATION

The airplane was a Cirrus Design SR22 G2, serial number 1235. A review of the airplane's logbooks revealed an entry for an annual inspection dated December 20, 2004. A total airframe time of 5.0 hours was reported at the last annual inspection. The Hobbs hour meter read 71.4 at the last maintenance, which was recorded in the logbook as January 23, 2005.

The engine was a Teledyne Continental Motors IO-550-N engine, serial number 917485. Total time on the engine at the last annual inspection was 5.0 hours.

Fueling records at Mercury Air Center, located at RNO, established that the airplane was last fueled on February 6, 2005. The airplane was refueled to capacity with the addition of 20.6 gallons of 100LL-octane aviation fuel. Examination of the maintenance records revealed no unresolved maintenance discrepancies against the airplane prior to departure.

The accident airplane was equipped with an Ice Protection System. This system was designed and certified for the Cirrus SR22 as a "No Hazard" to normal operations, allowing a pilot who inadvertently enters icing conditions to activate the system. Once the system is activated, deicing fluid flows along the wing, horizontal stabilizer, and propeller blades.

The Ice Protection System section of the Pilot Operating Handbook (POH) Supplements (Section 9) states in the Limitations Section that flight into known icing is prohibited. The POH further states, "no determination has been made as to the capability of this system to remove or prevent ice accumulation."

Section 3, titled Emergency Procedures, under the heading of "Inadvertent Icing Encounter" states: "Flight into known icing conditions is prohibited."

The Ice Protection System section of the POH Supplements (Section 9) also states in part: "Flight into known icing is prohibited. The Ice Protection System has not been evaluated in known icing conditions. At the first indication of icing, the most expeditious and safest course of exiting the icing conditions should be taken."

METEOROLOGICAL INFORMATION

The closest official weather observation station was Truckee-Tahoe Airport (TRK), Truckee, California, which was located 9.3 nautical miles (nm) northeast of the accident site. The elevation of the weather observation station was 5,900 feet msl. An aviation routine weather report (METAR) for TRK was issued at 1810. It read: Winds from 240 degrees at 6 knots; visibility 10 statute miles; skies 3,400 feet broken, 10,000 feet overcast; temperature 03 degrees Celsius; dew point -03 degrees Celsius; altimeter 29.87 inHg (inches of Mercury).

The Safety Board staff meteorologist prepared a factual report, which included the following

weather for the departure airport (RNO) and the nearest airport to the accident site (TRK):

Reno/Tahoe International Airport (RNO), Reno, field elevation 4,415 feet msl, located approximately 067 degrees at 29 nautical miles from the accident location, augmented Automated Surface Observation System (ASOS).

Time-1656; type-METAR; wind-calm; visibility 10 statute miles; present weather - none; sky condition - broken 11,000 feet; temperature 06 degrees Celsius; dew point -01 degree Celsius; altimeter setting 29.82 inHg; remarks - none.

Time-1756; type-METAR; wind 020 degrees at 6 knots; visibility 10 statute miles; present weather - none; sky condition - overcast 5,500 feet; temperature 06 degrees Celsius; dew point -01 degree Celsius; altimeter setting 29.83 inHg; remarks - none.

Time-1856; type-METAR; wind variable at 4 knots; visibility 10 statute miles; present weather - none; sky condition - broken 6,000 feet overcast 8,000 feet; temperature 06 degrees Celsius; dew point -03 degrees Celsius; altimeter setting 29.83 inHg; remarks-none.

COMMUNICATIONS

The pilot contacted Reno Flight Service Station (FSS) at 1620 on February 6, 2005. The pilot received a standard weather brief and filed an IFR flight plan.

The Safety Board IIC reviewed the recorded conversations between the FSS briefer and the accident pilot.

The pilot filed his IFR flight plan with a departure from RNO, via the Mustang VOR Very High Frequency Omni-directional Radio-range (FMG), airway Victor 200, to Truck intersection, airway Victor 392 to Sacramento VOR (SAC), then direct to Oakland. The pilot filed for an altitude of 12,000 feet.

The briefing included current and forecasted weather for the Reno area, the intended route of flight, and the destination. The briefer advised the pilot that there were no pilot weather reports (PIREP) for the intended route of flight. The freezing level in the Reno area was 6,000 feet with no precipitation. The pilot indicated he might request 14,000 feet once he was airborne.

The Safety Board IIC requested from the FAA transcripts of all communications between the accident pilot and any services provided by the FAA.

The FAA notified the IIC that the Digital Voice Recording System (DVRS) had malfunctioned at some point after February 3, 2005, and was not discovered until February 6, 2005. The malfunction affected the first eight channels of the DVRS, and its ability to record information on those eight channels. The eight channels included the following positions:

Channel 1 Local 1
Channel 2 Cab Coordinator
Channel 3 Ground Control
Channel 4 Local 2
Channel 5 Flight Data
Channel 6 Clearance Delivery
Channel 7 CIC
Channel 8 Final Radar

Due to this malfunction, the recordings involving the accident airplane and air traffic control (ATC) were limited to only the communications between the radar sectors and the accident airplane.

The Safety Board IIC reviewed the recordings between the pilot and Oakland Air Route Traffic Control Center (ARTCC), Sector 44. The communications between the pilot and ARTCC were on the frequency of 127.95 MHZ. All times were recorded in Coordinated Universal Time (UTC) and converted to Pacific standard time (PST).

The recording started at 1805:45, when the pilot of N286CD reported climbing out of 1,580 feet and climbing to 14,000 feet. ARTCC cleared him to continue the climb to 14,000 feet, which the pilot acknowledged.

At 1807:46, the pilot requested to continue his climb to 16,000 feet to "see if I can get above these clouds." ARTCC cleared him to 16,000 feet.

At 1812:24, N286CD was cleared to fly direct to Sacramento, which the pilot acknowledged.

At 1813:40, the pilot transmits, "Uh, I guess this isn't gonna work, I'm still in the clouds, any chance of lower?" ARTCC tells him to "stand by one."

At 1815:00, the pilot tells ARTCC that if he could go up another 200 or 300 hundred feet, he could get above the clouds. ARTCC asks the pilot, "Do you want to go up or down?" The pilot responds that he would like to go up first, "so I could build up some airspeed if that's okay."

ARTCC clears him to maintain a block altitude between 16,000 and 17,000 feet, and the pilot acknowledged.

About 2 minutes later the pilot transmits, "Uh, I'm coming down six Charlie delta (unintelligible). I'm icing up." The controller asked the pilot to repeat his transmission.

At 1817:42, the pilot makes his last transmission, stating, "I'm icing up. I'm coming down."

ARTCC then made numerous attempts to contact N286CD directly, and also requested that

other airborne aircraft attempt to contact N286CD.

WRECKAGE AND IMPACT INFORMATION

Investigators from the Safety Board, the FAA, Cirrus Design, Ballistic Recovery Systems (BRS), and Teledyne Continental Motors (TCM) were parties to the investigation and examined the wreckage after it was recovered from the accident scene.

Personnel from the Placer County Sheriff's Search and Rescue team responded to the accident site, documented the accident site, and coordinated the recovery of the wreckage.

The first identified point of contact (FIPC) was a scar on a steep rock face, which led to a scar at the base of the rock face. The debris path was along a magnetic bearing of 156 degrees. The debris field was approximately 175 feet long.

Investigators from BRS examined the parachute and associated components, which were recovered in the Sugar Bowl ski resort area about 4,000 feet north of the accident site.

The BRS investigators determined that the Cirrus Airframe Parachute System (CAPS) parachute assembly had separated from the airplane almost immediately after deployment.

Examination of the parachute revealed that the parachute separated from the airplane under extreme high loads. Both risers were separated from the parachute assembly. The parachute separated from the suspension lines. The ends of the suspension lines were broomstrawed.

The representatives from BRS concluded after the inspection of the BRS system that the extent of damage was consistent with a high-speed deployment. The deployment was outside of the operating envelope of the system. The placarded deployment speed on the Cirrus SR22 is 133 knots indicated airspeed.

MEDICAL AND PATHOLOGICAL INFORMATION

The Placer County Coroner conducted an autopsy on February 9, 2005. The FAA Toxicology and Accident Research Laboratory, Oklahoma City, Oklahoma, performed toxicological testing on specimens of the pilot. The results of analysis of the specimens were negative for cyanide and ethanol. The blood sample was unsuitable for analysis of carbon monoxide.

The report contained the following positive results; 25 (mg/dL, mg/hg) isopropanol detected in blood, 3 (mg/dL, mg/hg) isopropanol detected in muscle, 4 (mg/dL, mg/hg) isopropanol detected in heart.

TESTS AND RESEARCH

Investigators from the Safety Board, the FAA, Cirrus Design, Ballistic Recovery Systems (BRS),

and Teledyne Continental Motors (TCM) reconvened at Plain Parts, Pleasant Grove, California, to further examine the wreckage on February 10, 2005.

Investigators examined the engine and removed the top spark plugs. All spark plugs were clean with no mechanical deformation. The spark plug electrodes were gray in color, which corresponded to normal operation according to the Champion Aviation Check-A-Plug AV-27 Chart.

A borescope inspection revealed no mechanical deformation on the valves, cylinder walls, or internal cylinder head.

Investigators were unable to rotate the engine due to impact damage. The entire exterior of the engine exhibited impact damage. The alternator, propeller governor, throttle body, manifold valve, cylinder heads numbers 5 and 6, both magnetos, the number 3 intake port, and the number 4 rocker cover had been broken off during the impact sequence. The forward portion of the crankcase was fractured inward. The engine driven fuel pump and the portion of the crankcase that it attaches to both exhibited impact damage. The fuel pump was removed and the drive coupling was broken. All six pistons were intact. Little or no combustion deposits were present on the piston domes and all were light gray in color. The number 6 cylinder head and the right magneto were not recovered. The oil pickup tube screen was clean.

The crankshaft propeller flange was still attached to the aft of the hub. Blade number 1, S/N K12964, exhibited leading edge and trailing edge damage, 45-degree striations, and was bent aft at its root. Blade #2, S/N K12966, exhibited leading edge and trailing edge damage, 45-degree striations, and "S" bending. Blade #3, S/N K12957, exhibited leading edge damage and "S" bending.

ADDITIONAL INFORMATION

The IIC released the wreckage to the owner's representative on August 31, 2005.

Pilot Information

Certificate:	Private	**Age:**	56,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Unknown
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 With waivers/limitations	**Last FAA Medical Exam:**	July 1, 2004
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	December 1, 2004
Flight Time:	473 hours (Total, all aircraft), 69 hours (Total, this make and model), 347 hours (Pilot In Command, all aircraft), 100 hours (Last 90 days, all aircraft), 39 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cirrus Design Corp	**Registration:**	N286CD
Model/Series:	SR22 G2	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	1235
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	January 1, 2005 Continuous airworthiness	**Certified Max Gross Wt.:**	3400 lbs
Time Since Last Inspection:	47.7 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	100.1 Hrs	**Engine Manufacturer:**	Teledyne Continental
ELT:	Installed, not activated	**Engine Model/Series:**	IO-550-N
Registered Owner:	Charles W. McGrath	**Rated Power:**	310 Horsepower
Operator:		**Operating Certificate(s) Held:**	None
Operator Does Business As:	Alamar Construction, Inc.	**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Dusk
Observation Facility, Elevation:	TRK,5900 ft msl	**Distance from Accident Site:**	9 Nautical Miles
Observation Time:	18:10 Local	**Direction from Accident Site:**	45°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Overcast / 10000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	240°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.87 inches Hg	**Temperature/Dew Point:**	3°C / -2°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	RENO, NV (RNO)	**Type of Flight Plan Filed:**	IFR
Destination:	OAKLAND, CA (OAK)	**Type of Clearance:**	IFR
Departure Time:	17:53 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	39.283889,-120.333335

Administrative Information

Investigator In Charge (IIC):	Jones, Patrick
Additional Participating Persons:	Michael L Clark; Federal Aviation Administration; Reno, NV David Spangler; BRS, Inc.; St. Paul, MN Anthony Kasher; BRS, Inc.; St. Paul, MN Bradley Miller; Cirrus Design Corporation; Duluth, MN Paul Johnston; Cirrus Design Corporation; Duluth, MN Michael Grimes; Teledyne Continental Motors; Mobile, AL
Original Publish Date:	December 28, 2006
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=60969