



# Aviation Investigation Final Report

<b>Location:</b>	Mathias, West Virginia	<b>Accident Number:</b>	ERA10LA506
<b>Date &amp; Time:</b>	September 30, 2010, 10:45 Local	<b>Registration:</b>	N567WT
<b>Aircraft:</b>	Cirrus SR22	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Collision with terr/obj (non-CFIT)	<b>Injuries:</b>	1 Serious, 1 Minor
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

Nearing the conclusion of a two-hour cross-country instrument flight rules flight, the pilot was flying a holding pattern around the initial approach fix, waiting for the weather conditions at the destination airport to improve. While holding, the pilot noted calm wind on the surface and wind gusts of up to 40 knots in turbulence aloft. After holding for about 15 minutes, the pilot decided to execute the instrument approach. While descending to the final approach fix, the airplane slowed, the turbulence worsened, and the autopilot disengaged. The specific reason for the autopilot disengagement was not precisely determined, although it was likely due to a very brief (unrecorded) activation of the stall warning or an inadvertent manual disengagement. After the autopilot disengaged, and following several pitch and roll oscillations, the pilot lost control of the airplane. During the resulting dive, the airplane pitched to an attitude of 86 degrees nose down, reaching a maximum airspeed of 171 knots and 3.29 g's. The pilot successfully activated the whole-airframe ballistic recovery parachute system, and the airplane subsequently descended under the parachute canopy, coming to rest about 10 nautical miles from the destination airport in a densely wooded area, suspended about 25 feet above the ground. The forecasted weather for the flight included widespread instrument meteorological conditions and turbulence above the destination airport, and an adjacent area of forecasted convective weather, temperature inversion, and associated wind shear. Weather radar imagery of the immediate area of the accident site, about the time of the accident, included areas of light to moderate intensity precipitation.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's loss of control of the airplane during an instrument approach in turbulent weather conditions.

## Findings

<b>Personnel issues</b>	Aircraft control - Pilot
<b>Environmental issues</b>	(general) - Contributed to outcome

## Factual Information

### History of Flight

<b>Approach-IFR initial approach</b>	Loss of control in flight
<b>Emergency descent</b>	Off-field or emergency landing
<b>Emergency descent</b>	Collision with terr/obj (non-CFIT) (Defining event)

### HISTORY OF FLIGHT

On September 30, 2010, about 1030 eastern daylight time, a Cirrus SR22, N567WT, was substantially damaged during impact with trees after the pilot activated the Cirrus Airframe Parachute System (CAPS) near Mathias, West Virginia. The certificated private pilot incurred serious injuries and the passenger incurred minor injuries during post-impact egress from the airplane. Instrument meteorological conditions (IMC) prevailed, and an instrument flight rules flight plan was filed for the personal flight, which departed Fayette County Airport (I23), Washington Court House, Ohio, about 0820, and was destined for Grant County Airport (W99), Petersburg, West Virginia. The flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91.

During post-accident interviews, and in a written statement, the pilot recounted the accident. The pilot stated that he checked the weather via the internet the evening prior to the flight, again the morning of the flight, and a third time just prior to departure from I23. He stated that the weather reports were "not too encouraging" but that the ceilings at W99 were "coming up."

The pilot departed I23, and after approximately two hours of enroute flying, entered a holding pattern at the initial approach fix for the GPS RWY 31 approach at W99, at the published altitude of 5,500 feet msl. The pilot continued to hold for approximately 30 minutes while he waited for the weather to improve, and reported that there was virtually no turbulence until he entered the hold. He was cleared by air traffic control to initiate the approach, and noted that the winds at his altitude were gusting out of the southeast around 40 knots, and that the reported weather at W99 included calm winds.

After crossing OGMEY for the final time, the pilot began descending the airplane from 5,000 feet msl, toward the final approach fix, and he slowed the airplane to 90 knots. During the descent, the turbulence worsened, and as the wings rocked violently, the autopilot disengaged. The pilot watched as the airspeed decreased to around 80 knots, and he thought the airplane might stall, so he "pushed the nose down," added power, and applied "hard" right rudder. He then received a terrain warning, and responded by pulling the nose up, but was unable to level the wings. About that time the pilot realized he had lost control of the airplane, as it pitched nose down in a left bank. He perceived this to be the entry to a spin, and subsequently activated the CAPS. The airplane descended under the parachute and came to rest in trees

about 25 feet above the ground, 9.8 nm east of W99.

After attempting to establish radio communications, the pilot and passenger fastened together several luggage tie-down straps and lowered themselves out of the airplane. During the egress, the pilot fell and landed on his back, fracturing two vertebral bones. The passenger sprained his ankle.

#### PERSONNEL INFORMATION

The pilot held a private pilot certificate with ratings for airplane single engine land, and instrument airplane. He reported 700 total hours of flight experience, 600 hours of which were in the accident airplane make and model. He also reported 82 and 99 hours of actual and simulated instrument flight experience, respectively. Of the 82 hours of actual instrument experience, 6.5 were logged within the 90 days preceding the accident. He also logged a total of 8 instrument approaches during that 90-day period, all of which were conducted in the accident airplane. His most recent FAA third-class medical certificate was issued in February, 2010.

#### AIRCRAFT INFORMATION

According to FAA records, the airplane was manufactured in 2009. It was equipped with a Continental IO-550-N, 310-horsepower, turbo-normalized reciprocating engine. The pilot reported to the FAA that the airplane's most recent annual inspection was conducted in July, 2010.

#### METEOROLOGICAL INFORMATION

The National Weather Service (NWS) Boston Area Forecast described a warm front extending over the region, with the forecast for West Virginia indicating overcast clouds at 3,000 feet msl with cloud tops to 30,000 feet, visibility 4 miles in moderate rain and mist; with a slight improvement in ceiling and visibility by 1400. Marginal visual meteorological conditions (MVMC) were expected to continue through the evening. The forecast was amended by AIRMET Sierra for IMC over the area. The NWS had AIRMETS Sierra and Tango current over the region for IMC, mountain obscuration conditions, and moderate turbulence below 15,000 feet. The conditions were expected to continue through 1700. Further east, over Maryland and Virginia, an AIRMET for low-level wind shear and strong surface winds was in effect, as well as a Convective SIGMET for an area of embedded severe thunderstorms, a weather watch for the potential for severe tornadic thunderstorms, as well as a SIGMET for high altitude turbulence.

The closest terminal area forecast to the to the accident site was from Elkins-Randolph County Airport (EKN), Elkins, West Virginia, located about 34 nautical miles west of W99. The forecast prior to the flight's departure expected MVMC to IMC to prevail due to light to moderate rain and mist, with broken to overcast ceilings.

The NWS Surface Analysis Chart for 1100 depicted the accident site ahead, or west, of a warm front associated with a deepening low pressure system over the Virginia and North Carolina boarder south of the accident site. Clouds and precipitation were predominating over the region, with severe thunderstorms over the Atlantic coastal states and extensive IMC over West Virginia, Pennsylvania, Maryland, and Virginia.

The NWS hourly Radar Summary Chart for 0919 depicted an extensive area of weather echoes over the area, with a few areas embedded intense to extreme intensity precipitation echoes in the vicinity of West Virginia. The NWS Sterling, Virginia (LWX) WSR-88D base reflectivity images surrounding the period of the accident depicted an area of echoes of 25 to 35 dBZ "light to moderate" intensity echoes over KW99 and the accident site.

The 0800 upper air sounding for Washington/Dulles International Airport (IAD), Sterling, Virginia, located about 70 nautical miles east of the accident site, depicted a saturated environment from the surface to approximately 18,000 feet msl. A defined frontal inversion was noted from the surface to about 1,300 feet msl, with light surface winds below the inversion and a rapid veering of the wind to the south and increase in wind speed with height.

There was an urgent pilot report from a pilot operating a Cirrus SR22 at 0944 in the vicinity of Elkins, West Virginia, or approximately 25 miles northeast of the W99, reporting severe turbulence at 8,000 feet.

The 1042 weather observation at W99, included calm winds, 3 statute miles visibility in heavy rain, an overcast ceiling at 800 feet, temperature 16 degrees C, dew point 13 degrees C, and an altimeter setting of 29.61 inches of mercury. The remarks section indicated an hourly precipitation of 0.25 inches and there were no remarks indicating that thunderstorms or lightning were present.

During a telephone interview, the airport manager of W99 estimated that, about the time of the accident, the ceiling was approximately 300 feet. He stated that he could not see the end of the runway from his location on the airport, which he estimated to be a distance of about 2,000 feet.

The pilot indicated he obtained a self briefing on the weather through the internet on the evening before and twice on the morning prior to departure. He indicated he was aware of the reported and forecast conditions.

#### AIRPORT INFORMATION

The GPS RWY 31 instrument approach procedure at W99 was arranged as a basic 'T', with initial approach waypoints oriented perpendicular to the final approach course. The OMGEY intersection was an initial approach fix (IAF) / intermediate fix (IF) with a right-turn holding pattern oriented along the final approach course, and was located about 14 nautical miles west of the W99 runway 32 threshold. The final approach fix, PADOH, was located 5.2 nautical

miles northwest from OMGEY, along the final approach course. The minimum altitude prior to crossing OMGEY was 5,500 feet, and the minimum altitude prior to crossing PADOH was 4,500 feet.

## WRECKAGE AND IMPACT INFORMATION

The airplane came to rest suspended approximately 25 feet above the ground among trees on sloping terrain. The CAPS remained attached to the airframe. The fuselage, horizontal stabilizer, and left elevator were substantially damaged during the impact.

## ADDITIONAL INFORMATION

### Recoverable Data Module

The airplane was equipped with a recoverable data module (RDM), which recorded numerous parameters a sample rate of 1 hertz. The RDM contained data from the previous 145 hours that the airplane was powered. According to the RDM, the airplane departed I23 about 0818 EDT and climbed to a cruise altitude of 9,000 feet, reaching it at 0827. Pitot heat was activated during cruise at 0858:30 and remained on for the duration of the flight. During cruise, the autopilot and flight director were active. At 0915 the airplane began descending, leveling off at 7,000 feet and again at 6,000 feet.

At 1001, the airplane began a series of right turns consistent with a holding pattern around the OMGEY intersection that lasted until approximately 1021. At approximately 1028 the airplane descended to about 5,200 feet and began tracking toward the PADOH intersection, with the flaps configured to the 50-percent position. At this time the autopilot was engaged in altitude hold vertical mode and global positioning system lateral mode with approach coupled. Over the next 1.5 minutes, the airspeed gradually decreased from around 115 knots to around 80 knots, while the normalized angle of attack increased from around 0.075 to around 0.800.

At 1029:24, the autopilot disengaged while the airplane was flying at an indicated airspeed of 76 knots and a normalized angle of attack of 0.811. Five seconds later, the stall warning briefly activated, at an indicated airspeed of 86 knots and a normalized angle of attack of 0.814. Over the next 17 seconds the airplane rolled 46 degrees left wing down, followed by 42 degrees right wing down. The airplane then rolled left while simultaneously pitching to 25 degrees nose up before the stall warning again activated continuously for 13 seconds. While the stall warning was active, the airspeed decreased from 79 knots to 64 knots, before increasing again to 88 knots, and the normalized angle of attack increased from 0.768 to 0.998, before decreasing again to 0.695 one second after the stall warning deactivated. The pitch then began to decrease to 86 degrees nose down while the reaching a maximum bank of 153 degrees left wing down at 1030:12. During this time the indicated airspeed reduced from 79 knots to 64 knots, before increasing again as the airplane continued to pitch nose down. The airplane then began to pitch up toward a level attitude, while the airspeed increased from 88 knots to 171 knots over a period of 8 seconds. During the descent, the airplane reached a

vertical speed of -12,000 fpm and the normal acceleration (g-force) increased to 3.29 g's. The CAPS handle was activated at 1030:21, while the airplane's attitude was 2 degrees left wing down, the pitch was 2 degrees airplane nose up, and the airspeed was 171 knots. The CAPS rocket deployed one second later, at an altitude of 4,000 feet msl (about 1,200 feet agl). The recorded data ended at 1031:26.

### Autopilot Disconnect

The accident airplane was equipped with a Garmin GFC 700 Automatic Flight Control System, which was fully integrated with the airframe manufacturer's avionics system architecture. According to the airplane's pilot operating handbook, the minimum speed for autopilot operation was listed as 80 knots.

According to the airframe manufacturer, an autopilot disconnect could be initiated by several manual or automatic methods including (but not limited to): manually activating one of the autopilot disconnect switches on either control stick; manually toggling the "AP" button on the autopilot mode controller; manually activating the Take Off / Go Around button on the power lever; automatically by exceeding roll or pitch engagement limits of +/- 75 and +/-30 degrees, respectively; or automatically by the activation of the stall warning.

### Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	61, Male
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 3 With waivers/limitations	<b>Last FAA Medical Exam:</b>	February 18, 2010
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	August 21, 2009
<b>Flight Time:</b>	711 hours (Total, all aircraft), 600 hours (Total, this make and model), 625 hours (Pilot In Command, all aircraft), 52 hours (Last 90 days, all aircraft), 22 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Cirrus	<b>Registration:</b>	N567WT
<b>Model/Series:</b>	SR22	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	3440
<b>Landing Gear Type:</b>	Tricycle	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	July 2, 2010 Annual	<b>Certified Max Gross Wt.:</b>	3400 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	230 Hrs at time of accident	<b>Engine Manufacturer:</b>	Continental
<b>ELT:</b>	Installed, activated, did not aid in locating accident	<b>Engine Model/Series:</b>	IO-550-N
<b>Registered Owner:</b>	Morris Aviation LLC	<b>Rated Power:</b>	310 Horsepower
<b>Operator:</b>	Morris Aviation LLC	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Instrument (IMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	EKN,1987 ft msl	<b>Distance from Accident Site:</b>	34 Nautical Miles
<b>Observation Time:</b>	10:51 Local	<b>Direction from Accident Site:</b>	88°
<b>Lowest Cloud Condition:</b>		<b>Visibility</b>	3 miles
<b>Lowest Ceiling:</b>	Overcast / 800 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	/	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>		<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	29.61 inches Hg	<b>Temperature/Dew Point:</b>	16°C / 13°C
<b>Precipitation and Obscuration:</b>	Heavy - None - Rain		
<b>Departure Point:</b>	Wshngton Ct Hs, OH (I23 )	<b>Type of Flight Plan Filed:</b>	IFR
<b>Destination:</b>	Petersburg, WV (W99 )	<b>Type of Clearance:</b>	IFR
<b>Departure Time:</b>	08:20 Local	<b>Type of Airspace:</b>	



## Airport Information

<b>Airport:</b>	Grant County Airport W99	<b>Runway Surface Type:</b>	
<b>Airport Elevation:</b>	963 ft msl	<b>Runway Surface Condition:</b>	
<b>Runway Used:</b>		<b>IFR Approach:</b>	RNAV
<b>Runway Length/Width:</b>		<b>VFR Approach/Landing:</b>	None

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Serious	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	1 Minor	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Serious, 1 Minor	<b>Latitude, Longitude:</b>	38.938331,-78.947776(est)

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Diaz, Dennis
<b>Additional Participating Persons:</b>	Mike Filippelli; FAA/FSDO; Baltimore, MD Bradley T Miller; Cirrus Aircraft Corporation; Duluth, MN
<b>Original Publish Date:</b>	March 8, 2012
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class</a>
<b>Note:</b>	
<b>Investigation Docket:</b>	<a href="https://data.ntsb.gov/Docket?ProjectID=77458">https://data.ntsb.gov/Docket?ProjectID=77458</a>

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