



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	College Station, TX	<b>Accident Number:</b>	CEN13LA149A
<b>Date &amp; Time:</b>	02/01/2013, 0805 CST	<b>Registration:</b>	N247RB
<b>Aircraft:</b>	Cirrus Design Corporation SR22	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Midair collision	<b>Injuries:</b>	1 Minor
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Business		

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## Analysis

A review of available flightpath data established that there was a midair collision between a Cessna 152 and a Cirrus SR22 at 3,500 ft mean sea level (msl). The flight instructor of the Cessna 152 reported that he was conducting a local training flight with a primary student on her second instructional flight. The commercial pilot of the Cirrus SR22 was on a business flight en route to the same airport from which the Cessna 152 had departed. Both flights were operating in visual meteorological conditions (VMC).

The flight instructor stated that they had been practicing basic attitude flight maneuvers, and, as the airplane was climbing to 3,500 ft msl while maintaining a southeast heading, they felt an impact that originated from the right side of the airplane, aft of the main cabin, and heard a loud bang. He added that they were not in radio contact with the tower controller before the collision. The flight instructor subsequently observed that the right main landing gear wheel had separated from the airplane. After informing the tower controller of the damage, they were asked to perform a low pass and then to circle the airport until emergency equipment was in position. After circling the airport several times, the flight instructor made an uneventful landing.

The Cirrus pilot reported that, while established in cruise flight at 3,500 ft msl, the airplane's windshield suddenly imploded from an apparent impact with an object. His initial thought was that the airplane had collided with a bird because he had not received any alerts from the airplane's traffic advisory system nor did he see another aircraft. He subsequently recovered from an unintended descent before continuing directly toward the planned destination and declaring an emergency with the tower controller. The pilot reported that he had not established radio contact with the tower controller before the collision. He subsequently landed the airplane without further incident.

The flightpath data showed that the Cirrus had maintained a 080-degree true course at 3,500 ft msl for about 14 minutes before the collision. About 90 seconds before the collision, the Cessna was in a climbing left turn from a west-southwest course to the south-southeast. The plotted data established that, during the 70 seconds before the collision, the Cessna maintained

a 160-degree true course and continued to climb from 3,100 ft to a maximum GPS altitude of 3,573 ft, which was recorded about 12 seconds before the collision. The Cessna subsequently descended about 60 ft during the 12-second period before the collision. The calculated angle between each airplane's flightpath was about 80 degrees at the time of the collision. During the 70 seconds before the collision, the Cessna's relative position to the Cirrus flightpath averaged 27 degrees left of course (11-o'clock position). Conversely, the Cirrus's position relative to the Cessna flightpath averaged 72 degrees right of course (between the 2- and 3-o'clock positions).

Additional review of air traffic control radar track data revealed no transponder beacon returns associated with the Cessna until 2 minutes 34 seconds after the collision. During the same time period, primary radar returns were recorded by the radar sensor that closely matched the flightpath as recorded by the flight instructor's portable GPS receiver. However, after the collision, the radar sensor began receiving transponder beacon returns from the Cessna that included a 1200 beacon code with associated mode-C altitude data. A reinforced beacon return was received for a remainder of the flightpath. When presented with a summary of the radar track data, the flight instructor acknowledged that he likely departed with the transponder off, or in the standby position, and then subsequently turned it on following the collision. Additionally, postaccident testing of the airplane's altitude, static, and transponder systems revealed no anomalies that would have precluded their normal operation.

The Cirrus was equipped with a traffic advisory system, which actively interrogates other nearby aircraft transponders to provide the pilot with relevant traffic advisories; however, the system only displayed traffic targets from those aircraft that have transponders that could be interrogated. When a target airplane has its transponder turned off, selected to standby, or is malfunctioning, the system does not generate a traffic advisory. Additionally, the system's operating manual cautioned that pilots should remain vigilant for nontransponder-equipped aircraft or aircraft with unresponsive transponders. A postaccident data extraction from the Cirrus's recoverable data module established that a traffic advisory was issued shortly after takeoff while the airplane was on initial climb from the departure airport; however, there were no traffic advisories issued for the remainder of the accident flight.

In conclusion, given the flightpath data and that VMC existed at the time of the accident, the pilots should have been able to see the other airplane and maintain adequate separation. The Cirrus was equipped with a traffic advisory system; however, the flight instructor likely had the Cessna's transponder turned off or placed in standby before the collision, which prevented a traffic advisory message from being issued to the pilot of the Cirrus. However, if the flight instructor had turned on the transponder before departure, a traffic advisory would likely have been issued to the pilot of the Cirrus and the collision avoided.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The flight instructor's and commercial pilot's failure to see and avoid the other airplane, which resulted in a collision during cruise flight. Contributing to the accident was the failure of the flight instructor of the other airplane to activate the transponder before departure, which

resulted in no traffic advisories being issued before the collision.

## Findings

<b>Aircraft</b>	ATC transponder system - Not used/operated (Factor)
<b>Personnel issues</b>	Monitoring other aircraft - Pilot (Cause) Monitoring other aircraft - Pilot of other aircraft (Cause) Use of equip/system - Pilot of other aircraft (Factor)

## Factual Information

On February 1, 2013, at 0805 central standard time, a Cirrus model SR22 airplane, N247RB, and a Cessna model 152 airplane, N93124, collided inflight about 13 miles west-southwest of Easterwood Field Airport (CLL), College Station, Texas. Both airplanes were able to land at CLL following the collision. The Cirrus SR22 sustained substantial damage to the upper cockpit fuselage structure and the commercial pilot sustained minor injuries. The Cessna 152 sustained minor damage to the right main landing gear assembly and the flight instructor and the student pilot were not injured. The Cirrus SR22 was owned by a private individual, but operated by the Cirrus Aircraft Corporation as a demonstration airplane. The Cessna 152 was owned and operated by the Texas A&M Flying Club. Visual meteorological conditions prevailed at the time of the accident. Both flights were being conducted under the provisions of 14 Code of Federal Regulations Part 91. The Cirrus SR22 departed Austin Executive Airport (EDC) at 0748 and was en route to CLL. The Cessna 152 departed CLL at 0744 for a local instructional flight.

According to a statement provided by the Cirrus pilot, after climbing above the departure airport's traffic pattern altitude he engaged the autopilot system and continued direct toward CLL under visual meteorological conditions. The cruise portion of the flight was at 3,500 feet mean sea level (msl). The pilot reported that as the flight approached CLL, with the autopilot system engaged, at 3,500 feet msl, the windshield suddenly imploded from an apparent impact with an object. His initial thought was that the airplane had collided with a bird because he had not received any alerts from the airplane's traffic advisory system nor did he see another aircraft. He subsequently recovered from an unintended descent before continuing direct toward CLL and declaring an emergency with the tower controller. The pilot reported that he had not established radio contact with the tower controller before the inflight collision. A normal landing was subsequently made on runway 16 without further incident.

The Cessna flight instructor reported that the local training flight was with a primary student on her second instructional flight. The flight consisted of basic attitude flight maneuvers, which included level and climbing turns, climbs and descents to predetermined altitudes, and maintaining level flight while tracking a course. The flight instructor stated that as they were climbing to 3,500 feet msl, while maintaining a southeast heading, they felt an impact and heard a loud bang. He reported that the impact originated from the right side of the airplane, aft of the main cabin. The flight instructor noted that there were no apparent flight control issues following the collision and that he observed no damage to the right wing. Shortly after the collision, his student saw another airplane in a rapid descent at their 10 o'clock position. The flight instructor entered a descending left turn to follow the other airplane. Shortly thereafter, the flight instructor heard another airplane declare an emergency on the tower frequency due to an imploded windshield. He noted that they were monitoring the tower frequency before the collision, but had not established radio contact with the tower controller. He turned in the general direction of CLL with the intention of returning to the airport, while continuing to monitor the tower controller's communications with the other aircraft. The flight instructor noted that at some point he told the tower controller that they had hit something and were returning to the airport. The tower controller requested that the Cessna stay west of the airport while the other aircraft landed. After the other airplane had landed, the tower controller transmitted that the other airplane had tire marks on its roof and requested that they make a low approach to verify the condition of their landing gear. The flight instructor

stated that he then observed that the right main landing gear wheel had separated from the airplane. His student, seated in the left seat, confirmed that the left landing gear and wheel appeared undamaged. After informing the tower controller of their damage, they were asked to perform a low pass and then to circle the airport until emergency equipment was in position. After circling the airport several times the flight instructor made an uneventful landing on runway 22.

Global positioning system (GPS) data was extracted from the Cirrus airplane and the Cessna flight instructor's portable GPS receiver. The extracted GPS data was reviewed using software that displayed the individual flight paths in a simulated three-dimensional environment. After departure, the Cirrus proceeded direct toward CLL at a cruise altitude of 3,500 feet msl. The plotted GPS data indicated that the Cirrus SR22 was established on a 080 degree true course at 3,500 feet msl for about 14 minutes before the collision. After departure, the Cessna proceeded northwest of CLL where it completed several maneuvers that were consistent with basic attitude flight instruction. About 90 seconds before the collision, the Cessna was in a climbing left turn from a west-southwest course to the south-southeast. The plotted data established that during the 70 seconds before the collision, the Cessna maintained a 160 degree true course. While on the south-southeast course the Cessna continued to climb from 3,100 feet to a maximum GPS altitude of 3,573 feet, which was recorded about 12 seconds before the collision. The Cessna subsequently descended about 60 feet during the 12 second period before the collision. The calculated descent rate, during the 12 second period before the collision, was about 300 feet per minute.

According to available flight path data, at 0805:47, the two airplanes collided at 3,500 feet msl. The calculated angle between the each airplane's flight path was about 80 degrees at the time of the collision. During the 70 seconds before the collision, the Cessna's relative position to the Cirrus flight path averaged 27 degrees left of course (11 o'clock position). Conversely, the Cirrus's position relative to the Cessna flight path averaged 72 degrees right of course (between 2 and 3 o'clock position).

A review of air traffic control (ATC) radar data revealed no transponder beacon returns associated with the Cessna after its departure from CLL until 2 minutes 34 seconds after the collision. During the same time period, raw radar returns, also known as primary radar returns, were recorded by the ATC radar sensor that closely matched the flight path as recorded by the Cessna flight instructor's portable GPS receiver. Primary radar data does not include any altitude or beacon code information. The beacon code and encoded altitude information is received by ATC radar when the airplane transponder is turned on and selected to transmit. According to radar data, after the collision, at 0808:21, the ATC radar sensor began receiving transponder beacon returns from the Cessna that included a 1200 beacon code with associated mode-C altitude data. A reinforced beacon return was received for a remainder of the Cessna flight path. Further review of the ATC radar data established that there were reinforced beacon returns for the Cirrus airplane throughout its entire flight.

The Cirrus was equipped with a Garmin model GTS 800 traffic advisory system, which actively interrogates other nearby aircraft transponders to provide the pilot with relevant traffic advisories. According to manufacturer documentation, the Garmin GTS 800 only displays traffic targets from those aircraft that have transponders that can be interrogated. In the event when a target airplane has its transponder turned off, selected to standby, or is malfunctioning, the system will not generate a traffic advisory. Additionally, the Garmin GTS 800 operating

manual notes that pilots should remain vigilant for non-transponder equipped aircraft or aircraft with unresponsive transponders.

When presented with a summary of the ATC radar data, the flight instructor acknowledged that he likely departed with the transponder off, or in the standby position, and then subsequently turned it on following the collision. Additionally, postaccident testing of the Cessna's altitude, static, and transponder systems revealed no anomalies that would have precluded their normal operation.

The Cirrus was equipped with a Recoverable Data Module (RDM) that recorded, among other flight parameter data, when a traffic advisory was issued. A postaccident data extraction revealed that a traffic advisory was issued shortly after takeoff, while the Cirrus was on initial climb from the departure airport. No additional traffic advisories were issued for the remainder of the accident flight.

At 0753, the CLL automated surface observing system reported the following weather conditions: wind calm, visibility 10 miles, sky clear, temperature 7 degrees Celsius, dew point 3 degrees Celsius, and an altimeter setting of 30.35 inches of mercury. According to astronomical data, at the time of the inflight collision, the location of the sun was between 8-10 degrees above the horizon and about 115 degrees east of true north.

## History of Flight

Enroute	Midair collision (Defining event)
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## Pilot Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	31, Male
<b>Airplane Rating(s):</b>	Multi-engine Land; 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>	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 2 With Waivers/Limitations	<b>Last Medical Exam:</b>	09/02/2012
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	08/23/2011
<b>Flight Time:</b>	4492 hours (Total, all aircraft), 3505 hours (Total, this make and model), 4235 hours (Pilot In Command, all aircraft), 124 hours (Last 90 days, all aircraft), 21 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Cirrus Design Corporation	Registration:	N247RB
Model/Series:	SR22	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	3865
Landing Gear Type:	Tricycle	Seats:	5
Date/Type of Last Inspection:	10/12/2012, 100 Hour	Certified Max Gross Wt.:	3400 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	173 Hours	Engine Manufacturer:	Continental
ELT:	C126 installed, not activated	Engine Model/Series:	IO-550-N68B
Registered Owner:	Richard R. Bowie	Rated Power:	310 hp
Operator:	Cirrus Aircraft Corporation	Air Carrier Operating Certificate:	None

## Meteorological Information and Flight Plan

Observation Facility, Elevation:	CLL, 321 ft msl	Observation Time:	0753 CST
Distance from Accident Site:	11 Nautical Miles	Condition of Light:	Day
Direction from Accident Site:	80°	Conditions at Accident Site:	Visual Conditions
Lowest Cloud Condition:	Clear	Temperature/Dew Point:	7°C / 3°C
Lowest Ceiling:	None	Visibility	10 Miles
Wind Speed/Gusts, Direction:	Calm	Visibility (RVR):	
Altimeter Setting:	30.35 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Pflugerville, TX (EDC)	Type of Flight Plan Filed:	None
Destination:	College Station, TX (CLL)	Type of Clearance:	None
Departure Time:	0748 CST	Type of Airspace:	Class E

## Airport Information

Airport:	Easterwood Field Airport (CLL)	Runway Surface Type:	N/A
Airport Elevation:	321 ft	Runway Surface Condition:	
Runway Used:	N/A	IFR Approach:	None
Runway Length/Width:		VFR Approach/Landing:	Traffic Pattern

## Wreckage and Impact Information

Crew Injuries:	1 Minor	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Minor		

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Andrew T Fox	<b>Adopted Date:</b>	08/01/2016
<b>Additional Participating Persons:</b>	James D Moore; Federal Aviation Administration - Houston FSDO; Houston, TX Brannon D Mayer; Cirrus Aircraft Corporation; Duluth, MN		
<b>Publish Date:</b>	08/01/2016		
<b>Note:</b>	The NTSB did not travel to the scene of this accident.		
<b>Investigation Docket:</b>	<a href="http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=86138">http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=86138</a>		

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