Aviation Investigation Final Report

Location:	Palatka, Florida	**Accident Number:**	ERA18LA109
Date & Time:	March 16, 2018, 10:38 Local	**Registration:**	N486DA
Aircraft:	CIRRUS DESIGN CORP SR20	**Aircraft Damage:**	Substantial
Defining Event:	Midair collision	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

A Cirrus SR22 flown by a private pilot and a Cirrus SR20 flown by a pilot undergoing instruction and a flight instructor were performing touch-and-go landings at the airport. The pilot of the SR22 and the flight instructor of the SR20 reportedly announced their positions on the airport's common traffic advisory frequency (CTAF) as they flew around the airport traffic pattern. The SR22 pilot and the SR20 flight instructor both reported that they heard another pilot announce they were on a 6-mile final for the runway. The SR22 pilot turned onto the base leg and then onto final. The SR20 flight instructor stated that, because an airplane they had in sight was on short final approach, he chose to have the pilot undergoing instruction extend the downwind leg. When they were abeam the airplane that was on final, they turned onto base leg and then onto final. When the SR20 pilot undergoing instruction was just about to flare, the flight instructor heard "an explosion." When the SR22 was over the runway about ready to begin to flare, the pilot heard a "bang" and the nose came up; the two airplanes had collided. None of the pilots in either airplane reported seeing the other airplane before the collision. Both airplanes sustained substantial damage.

The pilot of the SR22 indicated that he could not understand some calls from the SR20, and the flight instructor of the SR20 indicated that he did not hear some radio calls from the SR22. Postaccident examinations of the radios and audio panels installed in the SR22 revealed no evidence of preimpact failures or malfunctions that would have precluded normal operation. At least one of the radios was tuned to the airport CTAF, and the audio select panel was configured to use that radio to transmit and receive audio. Functional testing revealed that both of the SR22's radios and the audio panel performed with no anomalies noted. Postaccident testing of the radios and audio select panel in the SR20 revealed no evidence of preimpact failures or malfunctions that would have precluded normal operation, although damage sustained during the accident prevented a successful functional test of the comm 1 radio

antenna's functionality. Both of the radios in the SR20 were found set to the airport CTAF, but the microphone/transmit selector on the audio panel was set to comm 3. The investigation could not determine when the microphone/transmit selector was set to the comm 3 position. Had the selector been inadvertently set in this position by the S20 flight crew during their flight, it would have resulted in their traffic pattern position reports not being broadcast over the CTAF. Review of certified audio recordings from the departure airports for both airplanes and another airport for the SR22 revealed that the beginning of one transmission from the SR22 pilot was not clearly enunciated and that several portions of transmissions from both SR20 pilots were difficult to discern and/or were poorly enunciated. Because there was no audio recording of transmissions at the accident airport, it could not be determined whether the clarity or lack of transmissions from either flight crew contributed to the accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

Both pilots' and the flight instructor's failure to identify, see, and avoid the other airplane, which resulted in a midair collision.

Findings

Personnel issues	Monitoring other aircraft - Pilot
Personnel issues	Monitoring other aircraft - Pilot of other aircraft
Personnel issues	Monitoring other aircraft - Instructor/check pilot
Personnel issues	(general) - Pilot
Personnel issues	(general) - Pilot of other aircraft
Personnel issues	(general) - Instructor/check pilot

Factual Information

History of Flight

Landing-flare/touchdown	Midair collision (Defining event)
Landing-flare/touchdown	Hard landing

On March 16, 2018, about 1038 eastern daylight time, a Cirrus Design Corp (Cirrus) SR22, N816CD, collided with a Cirrus SR20, N486DA (using call sign Connection 461), while both airplanes were on approach to land at Palatka Municipal – Lt. Kay Larkin Field (28J), Palatka, Florida. There were no injuries to the pilot of the SR22, or to the flight instructor and pilot undergoing instruction in the SR20. Both airplanes were substantially damaged. Both airplanes were being operated under the provisions of Title 14 Code of Federal Regulations Part 91; the SR20 was conducting an instructional flight. Visual meteorological conditions prevailed at the time and no flight plan was filed for either flight. The SR22 flight originated about 0932 from Jacksonville Executive Airport at Craig (CRG), Jacksonville, Florida, while the SR20 flight originated about 0953 from the Orlando Sanford International Airport (SFB), Orlando, Florida.

The pilot of the SR22 stated that after takeoff he proceeded to 28J, and with his radio tuned to the common traffic advisory frequency (CTAF), he heard transmissions from 2 pilots. The transmissions from one pilot were clear, while the transmissions from the other was not. He continued monitoring the CTAF and flew towards 28J, asking how many aircraft were in the traffic pattern at 28J. The pilot whose transmissions were clear announced two, to which he announced he could not understand the transmissions from the other pilot. At that time he believed the flight instructor of the SR20 asked how do you hear me or words to that effect. He reported the transmission from that pilot was low and he had trouble discerning what was said. While he was trying to determine what was said an unknown pilot said, "I hear you." For safety concerns he flew about 26 nm to Northeast Florida Regional Airport (SGJ), where he performed two touch-and-go (T&G) landings, then, thinking it might be safe at 28J, proceeded there.

The pilot of the SR22 further reported making his initial radio call on the 28J CTAF when the flight was 11 to 12 miles away. The flight continued towards 28J and when he was 6 miles away, he made a position report on the 28J CTAF. At that time there were still the same two airplanes in the traffic pattern. The transmissions from one airplane were "crystal clear", and that pilot reported departing the airport traffic pattern. He flew over 28J at 2,000 ft msl, which he announced, and then turned onto downwind leg for runway 27, flying at 1,000 ft and 100 knots. He called downwind, midfield downwind, base, and final, but did not see the other airplane that was in the airport traffic pattern. He performed a touch-and-go landing on runway 27, then decided to do one more before returning to CRG.

The SR22 pilot made radio calls on the CTAF announcing crosswind, and midfield left downwind, maintaining about 1/4 mile abeam the runway on the downwind leg. When he was abeam the numbers on the downwind leg of the airport traffic pattern flying at 100 knots, he watched an airplane roll onto the runway, and once that airplane began the takeoff roll, he started slowing and added the first notch of flaps. He also heard another airplane announce they were on a 6-mile final for the runway. When the

SR22 was 45° from the approach end of the runway, he turned onto base leg of the airport traffic pattern at about 900 ft maintaining 90 knots where he lowered another notch of flaps. He then turned onto final of the airport traffic pattern between 500 and 600 ft making radio calls for each of the legs, but he did not see the other airplane in the airport traffic pattern. He set up for landing maintaining 80 knots on final with full flaps extended, the landing and strobe lights on. When over the runway just about ready to begin to flare, he heard a "bang" sound and the nose came up. At that time he attributed the sound to be associated with a catastrophic engine failure. He did not have control over his airplane which veered to the right.

The flight instructor of the SR20 reported that when near 28J he heard runway 27 was in use. They continued to 28J and descended to 2,500 ft msl. When the flight was 10 miles from 28J, he made his first radio call announcing their position, and intention. The flight continued and he made another radio call when the flight was 7.5 miles from 28J. At the second radio call the pilot of one aircraft announced that he could not hear him well. He switched the radio to comm 2 and made another radio call. A pilot who was on the ground reported that he could hear them loud and clear. He then switched to comm 1 and the radios were working OK. Their flight continued towards 28J, and he announced on the 28J CTAF that they were coming from the south, and would be entering left downwind at a 45° for runway 27. They joined the left downwind for runway 27, and turned base and final making radio calls on the 28J CTAF for each leg of the airport traffic pattern. He announced they would be performing touch-and-go landings and would be remaining in the airport traffic pattern. The PUI completed two landings, and remained in the traffic pattern while the flight instructor announced on the 28J CTAF every call of the airport traffic pattern. While on the downwind leg for the third landing, they heard a pilot announce that they were on a 6-mile final for runway 27. That pilot announced that he was advise when he was near the lake. Because of an airplane that was on short final approach which they had in sight, he elected to have the PUI extend the downwind leg. When they were abeam the airplane that was on final, they turned onto the base leg, which he announced on the CTAF. The PUI then turned onto final, which he announced, and he also announced when the flight was on short final. At that time, he also announced that this would be their last landing, and they would be departing to the northeast. When the PUI was just about to flare, he heard an explosion. Their airplane drifted to the right and stopped.

The flight instructor of the SR20 further reported after coming to rest, he saw a propeller, secured the engine, and turned everything off, but he did not touch the radios, adding that he does not recall how the radios were configured. He believed he would have secured the electrical system before getting out of the airplane, and once out of it never returned to it. He estimated their flight was at 28J for about 20 minutes when the collision occurred.

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	29,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	July 30, 2015
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	October 19, 2017
Flight Time:	500 hours (Total, all aircraft), 139 hours (Total, this make and model), 440 hours (Pilot In Command, all aircraft), 180 hours (Last 90 days, all aircraft), 65 hours (Last 30 days, all aircraft), 6 hours (Last 24 hours, all aircraft)		

Student pilot Information

Certificate:	Private	**Age:**	27,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	August 10, 2017
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	February 21, 2018
Flight Time:	71 hours (Total, all aircraft), 5 hours (Total, this make and model), 16 hours (Pilot In Command, all aircraft), 34 hours (Last 90 days, all aircraft), 6 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	CIRRUS DESIGN CORP	**Registration:**	N486DA
Model/Series:	SR20 NO SERIES	**Aircraft Category:**	Airplane
Year of Manufacture:	2007	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	1831
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	March 4, 2018 Annual	**Certified Max Gross Wt.:**	3000 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	8171 Hrs at time of accident	**Engine Manufacturer:**	CONT MOTOR
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-360-ES
Registered Owner:	AEROSIM ACADEMY INC	**Rated Power:**	200 Horsepower
Operator:	AEROSIM ACADEMY INC	**Operating Certificate(s) Held:**	Pilot school (141)

The four seat, low-wing Cirrus SR22 airplane, serial number 0150, was manufactured in 2002. It was equipped with a Garmin GMA 340 audio select panel and two Garmin GNS 430 transceivers. It was not equipped with traffic collision avoidance system (TCAS) or ADS-B. The pilot was not recording audio transmissions, but reported he was wearing a Bose headset and was communicating on the common traffic advisory frequency (CTAF) using the comm 1 radio.

The pilot of the SR22 reported that since becoming a co-owner of the airplane in September 2017, there had not been any work done to the airplane's radios.

The four-seat, low-wing Cirrus SR20 airplane, serial number 20-1831, was manufactured in 2007. It was equipped with a Garmin GMA 340 audio select panel and two Garmin GNS 430W transceivers. It was not equipped with traffic collision avoidance system (TCAS) or ADS-B. None of the occupants were recording audio transmissions. At the time of the collision, the strobes, navigation and landing lights were on.

According to the operator of the SR20, a review of the discrepancy sheets for the period December 1, 2017, through the last discrepancy dated March 14, 2018, revealed no radio-related discrepancies during in that period of time.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	SGJ,10 ft msl	**Distance from Accident Site:**	25 Nautical Miles
Observation Time:	10:56 Local	**Direction from Accident Site:**	45°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	12 knots / None	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	310°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30.15 inches Hg	**Temperature/Dew Point:**	17°C / 9°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Sanford, FL (SFB)	**Type of Flight Plan Filed:**	None
Destination:	Palatka, FL (28J)	**Type of Clearance:**	None
Departure Time:	09:53 Local	**Type of Airspace:**	

Airport Information

Airport:	PALATKA MUNI - LT KAY LARKIN F 28J	**Runway Surface Type:**	Asphalt
Airport Elevation:	47 ft msl	**Runway Surface Condition:**	Unknown
Runway Used:	27	**IFR Approach:**	None
Runway Length/Width:	6000 ft / 100 ft	**VFR Approach/Landing:**	Touch and go;Traffic pattern

28J was a public use, non-towered airport owned by the city of Palatka, Florida. It was equipped with runways 09/27 and 17/35. The published common traffic advisory frequency (CTAF) was 122.8 MHz, which was not recorded.

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	29.658332,-81.683609(est)

Postaccident examination of the SR20 revealed the comm 1 antenna, which was mounted on the

centerline of the roof, just behind the doors, was missing. That area sustained significant impact-related damage consistent with contact by the propeller from the SR22. The comm 1 and 2 antennas from the SR22 were not damaged.

Both airplanes were powered and the selected radio frequencies and audio select panel were documented. The SR20 comm 1 transceiver was tuned to 122.80 MHz and the comm 2 transceiver was tuned to 122.80 MHz. The comm 1 and 3 radio selector switches were selected to listen on the audio select panel, and comm 3 "MIC" was selected to transmit on the audio select panel. The SR22 comm 1 transceiver was tuned to 122.80MHz and the comm 2 transceiver was tuned to 119.62 MHz. The comm 1 was selected to listen on the audio select panel, and comm 1 "MIC" was selected to transmit on the audio select panel.

Ground testing of the radios installed in the SR20 revealed comm 1 radio was unreadable and comm 2 radio was readable. The positions of the radios were swapped and the previously readable comm 2 radio became unreadable while the comm 1 radio was readable. Detailed examination of both transceivers revealed that they were within the manufacturer's specifications. Functional checks of all comm and MIC audio inputs of the audio select panel revealed that they were also within the manufacturer's specifications.

Ground testing of the radios of the SR22 found both operational in transmit and receive mode.

Additional Information

Review of Audio Recorded from Other Airports

Review of FAA certified audio recordings from the departure airports for both aircraft, and also SGJ for the SR22 revealed that with respect to the transmissions from the pilot of the SR22, the beginning of one transmission was not clearly enunciated, while several portions of transmissions from both pilots of the SR20 were difficult to discern and/or were poorly enunciated. There was no mention by any air traffic control facility for either flight about any issue with either airplane's radios.

Exemplar Audio Panel Configuration

Testing of an exemplar airplane operated by L3 Commercial Training Solutions revealed that with the audio select panel configured exactly like it had for the SR20 (MIC 3 selected to transmit), with any comm 1 or comm 2 selected to receive, neither radio would transmit when the push-to-talk switch was pressed. Testing also revealed that when electrical power was removed from the airplane, pushing of the buttons on the audio select panel would not change the setting when the audio select panel was powered up again.

Pilots' Postaccident Interactions

The pilot of the SR22 stated that postaccident, he and both pilots of the SR20 interacted, and during that interaction he relayed to the flight instructor that he never saw him and could not understand his calls. The flight instructor indicated, "I made this call, I made the call" referring to position reports on the CTAF. He asked the flight instructor if he heard him and his position report calls to which the flight instructor of the SR20 said yes. The flight instructor was asked why didn't he say something on the CTAF due to the traffic conflict, and his reply was, "I was just wondering why you were on top of us."

The flight instructor of the SR20 reported that after exiting the airplane, he and the pilot of the SR22 talked. During that conversation he was able to confirm that the SR22 pilot was the person who broadcast on the 28J CTAF that he could not hear the SR20's transmissions. He also indicated that after the SR22 pilot had said he could not hear them well, he never heard any more radio calls from him. The pilot of the SR22 indicated to the flight instructor of the SR20 that he never saw their airplane and asked him if he could hear his radio calls. He informed the SR22 pilot that he never heard his radio calls.

Arrival and Departure Time Estimates

Based on departure times, cruise speeds, and distances between departure airports, it is estimated that the SR22 arrived at 28J about 0947, departed about 0954, arrived at SGJ about 1009, departed there about 1017, and arrived at 28J about 1032. The SR20 arrived at 28J about 1017.

Administrative Information

Investigator In Charge (IIC):	Monville, Timothy
Additional Participating Persons:	Billy J Meadows; FAA/FSDO; Orlando, FL Donald R Andrews; FAA/FSDO; Orlando, FL Brannon D Mayer; Cirrus Aircraft; Duluth, MN Wade Hawker; L3 Commercial Training Solutions; Sanford, FL
Original Publish Date:	May 29, 2019
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=96885

Aviation Investigation Final Report

Location:	Palatka, Florida	**Accident Number:**	ERA18LA109
Date & Time:	March 16, 2018, 10:38 Local	**Registration:**	N816CD
Aircraft:	CIRRUS DESIGN CORP SR22	**Aircraft Damage:**	Substantial
Defining Event:	Midair collision	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

A Cirrus SR22 flown by a private pilot and a Cirrus SR20 flown by a pilot undergoing instruction and a flight instructor were performing touch-and-go landings at the airport. The pilot of the SR22 and the flight instructor of the SR20 reportedly announced their positions on the airport's common traffic advisory frequency (CTAF) as they flew around the airport traffic pattern. The SR22 pilot and the SR20 flight instructor both reported that they heard another pilot announce they were on a 6-mile final for the runway. The SR22 pilot turned onto the base leg and then onto final. The SR20 flight instructor stated that, because an airplane they had in sight was on short final approach, he chose to have the pilot undergoing instruction extend the downwind leg. When they were abeam the airplane that was on final, they turned onto base leg and then onto final. When the SR20 pilot undergoing instruction was just about to flare, the flight instructor heard "an explosion." When the SR22 was over the runway about ready to begin to flare, the pilot heard a "bang" and the nose came up; the two airplanes had collided. None of the pilots in either airplane reported seeing the other airplane before the collision. Both airplanes sustained substantial damage.

The pilot of the SR22 indicated that he could not understand some calls from the SR20, and the flight instructor of the SR20 indicated that he did not hear some radio calls from the SR22. Postaccident examinations of the radios and audio panels installed in the SR22 revealed no evidence of preimpact failures or malfunctions that would have precluded normal operation. At least one of the radios was tuned to the airport CTAF, and the audio select panel was configured to use that radio to transmit and receive audio. Functional testing revealed that both of the SR22's radios and the audio panel performed with no anomalies noted. Postaccident testing of the radios and audio select panel in the SR20 revealed no evidence of preimpact failures or malfunctions that would have precluded normal operation, although damage sustained during the accident prevented a successful functional test of the comm 1 radio

antenna's functionality. Both of the radios in the SR20 were found set to the airport CTAF, but the microphone/transmit selector on the audio panel was set to comm 3. The investigation could not determine when the microphone/transmit selector was set to the comm 3 position. Had the selector been inadvertently set in this position by the S20 flight crew during their flight, it would have resulted in their traffic pattern position reports not being broadcast over the CTAF. Review of certified audio recordings from the departure airports for both airplanes and another airport for the SR22 revealed that the beginning of one transmission from the SR22 pilot was not clearly enunciated and that several portions of transmissions from both SR20 pilots were difficult to discern and/or were poorly enunciated. Because there was no audio recording of transmissions at the accident airport, it could not be determined whether the clarity or lack of transmissions from either flight crew contributed to the accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

Both pilots' and the flight instructor's failure to identify, see, and avoid the other airplane, which resulted in a midair collision.

Findings

Personnel issues	Monitoring other aircraft - Pilot
Personnel issues	Monitoring other aircraft - Pilot of other aircraft
Personnel issues	Monitoring other aircraft - Instructor/check pilot
Personnel issues	(general) - Pilot
Personnel issues	(general) - Pilot of other aircraft
Personnel issues	(general) - Instructor/check pilot

Factual Information

History of Flight

Landing-flare/touchdown	Midair collision
Landing-flare/touchdown	Hard landing

On March 16, 2018, about 1038 eastern daylight time, a Cirrus Design Corp (Cirrus) SR22, N816CD, collided with a Cirrus SR20, N486DA (using call sign Connection 461), while both airplanes were on approach to land at Palatka Municipal – Lt. Kay Larkin Field (28J), Palatka, Florida. There were no injuries to the pilot of the SR22, or to the flight instructor and pilot undergoing instruction in the SR20. Both airplanes were substantially damaged. Both airplanes were being operated under the provisions of Title 14 Code of Federal Regulations Part 91; the SR20 was conducting an instructional flight. Visual meteorological conditions prevailed at the time and no flight plan was filed for either flight. The SR22 flight originated about 0932 from Jacksonville Executive Airport at Craig (CRG), Jacksonville, Florida, while the SR20 flight originated about 0953 from the Orlando Sanford International Airport (SFB), Orlando, Florida.

The pilot of the SR22 stated that after takeoff he proceeded to 28J, and with his radio tuned to the common traffic advisory frequency (CTAF), he heard transmissions from 2 pilots. The transmissions from one pilot were clear, while the transmissions from the other was not. He continued monitoring the CTAF and flew towards 28J, asking how many aircraft were in the traffic pattern at 28J. The pilot whose transmissions were clear announced two, to which he announced he could not understand the transmissions from the other pilot. At that time he believed the flight instructor of the SR20 asked how do you hear me or words to that effect. He reported the transmission from that pilot was low and he had trouble discerning what was said. While he was trying to determine what was said an unknown pilot said, "I hear you." For safety concerns he flew about 26 nm to Northeast Florida Regional Airport (SGJ), where he performed two touch-and-go (T&G) landings, then, thinking it might be safe at 28J, proceeded there.

The pilot of the SR22 further reported making his initial radio call on the 28J CTAF when the flight was 11 to 12 miles away. The flight continued towards 28J and when he was 6 miles away, he made a position report on the 28J CTAF. At that time there were still the same two airplanes in the traffic pattern. The transmissions from one airplane were "crystal clear", and that pilot reported departing the airport traffic pattern. He flew over 28J at 2,000 ft msl, which he announced, and then turned onto downwind leg for runway 27, flying at 1,000 ft and 100 knots. He called downwind, midfield downwind, base, and final, but did not see the other airplane that was in the airport traffic pattern. He performed a touch-and-go landing on runway 27, then decided to do one more before returning to CRG.

The SR22 pilot made radio calls on the CTAF announcing crosswind, and midfield left downwind, maintaining about 1/4 mile abeam the runway on the downwind leg. When he was abeam the numbers on the downwind leg of the airport traffic pattern flying at 100 knots, he watched an airplane roll onto the runway, and once that airplane began the takeoff roll, he started slowing and added the first notch of flaps. He also heard another airplane announce they were on a 6-mile final for the runway. When the

SR22 was 45° from the approach end of the runway, he turned onto base leg of the airport traffic pattern at about 900 ft maintaining 90 knots where he lowered another notch of flaps. He then turned onto final of the airport traffic pattern between 500 and 600 ft making radio calls for each of the legs, but he did not see the other airplane in the airport traffic pattern. He set up for landing maintaining 80 knots on final with full flaps extended, the landing and strobe lights on. When over the runway just about ready to begin to flare, he heard a "bang" sound and the nose came up. At that time he attributed the sound to be associated with a catastrophic engine failure. He did not have control over his airplane which veered to the right.

The flight instructor of the SR20 reported that when near 28J he heard runway 27 was in use. They continued to 28J and descended to 2,500 ft msl. When the flight was 10 miles from 28J, he made his first radio call announcing their position, and intention. The flight continued and he made another radio call when the flight was 7.5 miles from 28J. At the second radio call the pilot of one aircraft announced that he could not hear him well. He switched the radio to comm 2 and made another radio call. A pilot who was on the ground reported that he could hear them loud and clear. He then switched to comm 1 and the radios were working OK. Their flight continued towards 28J, and he announced on the 28J CTAF that they were coming from the south, and would be entering left downwind at a 45° for runway 27. They joined the left downwind for runway 27, and turned base and final making radio calls on the 28J CTAF for each leg of the airport traffic pattern. He announced they would be performing touch-and-go landings and would be remaining in the airport traffic pattern. The PUI completed two landings, and remained in the traffic pattern while the flight instructor announced on the 28J CTAF every call of the airport traffic pattern. While on the downwind leg for the third landing, they heard a pilot announce that they were on a 6-mile final for runway 27. That pilot announced that he was advise when he was near the lake. Because of an airplane that was on short final approach which they had in sight, he elected to have the PUI extend the downwind leg. When they were abeam the airplane that was on final, they turned onto the base leg, which he announced on the CTAF. The PUI then turned onto final, which he announced, and he also announced when the flight was on short final. At that time, he also announced that this would be their last landing, and they would be departing to the northeast. When the PUI was just about to flare, he heard an explosion. Their airplane drifted to the right and stopped.

The flight instructor of the SR20 further reported after coming to rest, he saw a propeller, secured the engine, and turned everything off, but he did not touch the radios, adding that he does not recall how the radios were configured. He believed he would have secured the electrical system before getting out of the airplane, and once out of it never returned to it. He estimated their flight was at 28J for about 20 minutes when the collision occurred.

Pilot Information

Certificate:	Private	**Age:**	40,Male
Airplane Rating(s):	Single-engine land; Single-engine sea	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	December 3, 2015
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	June 23, 2016
Flight Time:	252 hours (Total, all aircraft), 22 hours (Total, this make and model), 176 hours (Pilot In Command, all aircraft), 22 hours (Last 90 days, all aircraft), 22 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	CIRRUS DESIGN CORP	**Registration:**	N816CD
Model/Series:	SR22 UNDESIGNAT	**Aircraft Category:**	Airplane
Year of Manufacture:	2002	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	0150
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	February 5, 2018 Annual	**Certified Max Gross Wt.:**	3400 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	1063 Hrs as of last inspection	**Engine Manufacturer:**	Continental Motors, Inc
ELT:	C126 installed, not activated	**Engine Model/Series:**	IO-550-N7B
Registered Owner:	On file	**Rated Power:**	300 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	

The four seat, low-wing Cirrus SR22 airplane, serial number 0150, was manufactured in 2002. It was equipped with a Garmin GMA 340 audio select panel and two Garmin GNS 430 transceivers. It was not equipped with traffic collision avoidance system (TCAS) or ADS-B. The pilot was not recording audio transmissions, but reported he was wearing a Bose headset and was communicating on the common traffic advisory frequency (CTAF) using the comm 1 radio.

The pilot of the SR22 reported that since becoming a co-owner of the airplane in September 2017, there had not been any work done to the airplane's radios.

The four-seat, low-wing Cirrus SR20 airplane, serial number 20-1831, was manufactured in 2007. It was

equipped with a Garmin GMA 340 audio select panel and two Garmin GNS 430W transceivers. It was not equipped with traffic collision avoidance system (TCAS) or ADS-B. None of the occupants were recording audio transmissions. At the time of the collision, the strobes, navigation and landing lights were on.

According to the operator of the SR20, a review of the discrepancy sheets for the period December 1, 2017, through the last discrepancy dated March 14, 2018, revealed no radio-related discrepancies during in that period of time.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	SGJ,10 ft msl	**Distance from Accident Site:**	25 Nautical Miles
Observation Time:	10:56 Local	**Direction from Accident Site:**	45°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	12 knots / None	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	310°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30.15 inches Hg	**Temperature/Dew Point:**	17°C / 9°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Jacksonville, FL (CRG)	**Type of Flight Plan Filed:**	None
Destination:	Palatka, FL (28J)	**Type of Clearance:**	None
Departure Time:	09:32 Local	**Type of Airspace:**	

Airport Information

Airport:	PALATKA MUNI - LT KAY LARKIN F 28J	**Runway Surface Type:**	Asphalt
Airport Elevation:	47 ft msl	**Runway Surface Condition:**	Unknown
Runway Used:	27	**IFR Approach:**	None
Runway Length/Width:	6000 ft / 100 ft	**VFR Approach/Landing:**	Touch and go;Traffic pattern

28J was a public use, non-towered airport owned by the city of Palatka, Florida. It was equipped with runways 09/27 and 17/35. The published common traffic advisory frequency (CTAF) was 122.8 MHz, which was not recorded.

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	29.658332,-81.683609(est)

Postaccident examination of the SR20 revealed the comm 1 antenna, which was mounted on the centerline of the roof, just behind the doors, was missing. That area sustained significant impact-related damage consistent with contact by the propeller from the SR22. The comm 1 and 2 antennas from the SR22 were not damaged.

Both airplanes were powered and the selected radio frequencies and audio select panel were documented. The SR20 comm 1 transceiver was tuned to 122.80 MHz and the comm 2 transceiver was tuned to 122.80 MHz. The comm 1 and 3 radio selector switches were selected to listen on the audio select panel, and comm 3 "MIC" was selected to transmit on the audio select panel. The SR22 comm 1 transceiver was tuned to 122.80MHz and the comm 2 transceiver was tuned to 119.62 MHz. The comm 1 was selected to listen on the audio select panel, and comm 1 "MIC" was selected to transmit on the audio select panel.

Ground testing of the radios installed in the SR20 revealed comm 1 radio was unreadable and comm 2 radio was readable. The positions of the radios were swapped and the previously readable comm 2 radio became unreadable while the comm 1 radio was readable. Detailed examination of both transceivers revealed that they were within the manufacturer's specifications. Functional checks of all comm and MIC audio inputs of the audio select panel revealed that they were also within the manufacturer's specifications.

Ground testing of the radios of the SR22 found both operational in transmit and receive mode.

Additional Information

Review of Audio Recorded from Other Airports

Review of FAA certified audio recordings from the departure airports for both aircraft, and also SGJ for the SR22 revealed that with respect to the transmissions from the pilot of the SR22, the beginning of one transmission was not clearly enunciated, while several portions of transmissions from both pilots of the SR20 were difficult to discern and/or were poorly enunciated. There was no mention by any air traffic control facility for either flight about any issue with either airplane's radios.

Exemplar Audio Panel Configuration

Testing of an exemplar airplane operated by L3 Commercial Training Solutions revealed that with the audio select panel configured exactly like it had for the SR20 (MIC 3 selected to transmit), with any comm 1 or comm 2 selected to receive, neither radio would transmit when the push-to-talk switch was pressed. Testing also revealed that when electrical power was removed from the airplane, pushing of the buttons on the audio select panel would not change the setting when the audio select panel was powered up again.

Pilots' Postaccident Interactions

The pilot of the SR22 stated that postaccident, he and both pilots of the SR20 interacted, and during that interaction he relayed to the flight instructor that he never saw him and could not understand his calls. The flight instructor indicated, "I made this call, I made the call" referring to position reports on the CTAF. He asked the flight instructor if he heard him and his position report calls to which the flight instructor of the SR20 said yes. The flight instructor was asked why didn't he say something on the CTAF due to the traffic conflict, and his reply was, "I was just wondering why you were on top of us."

The flight instructor of the SR20 reported that after exiting the airplane, he and the pilot of the SR22 talked. During that conversation he was able to confirm that the SR22 pilot was the person who broadcast on the 28J CTAF that he could not hear the SR20's transmissions. He also indicated that after the SR22 pilot had said he could not hear them well, he never heard any more radio calls from him. The pilot of the SR22 indicated to the flight instructor of the SR20 that he never saw their airplane and asked him if he could hear his radio calls. He informed the SR22 pilot that he never heard his radio calls.

Arrival and Departure Time Estimates

Based on departure times, cruise speeds, and distances between departure airports, it is estimated that the SR22 arrived at 28J about 0947, departed about 0954, arrived at SGJ about 1009, departed there about 1017, and arrived at 28J about 1032. The SR20 arrived at 28J about 1017.

Administrative Information

Investigator In Charge (IIC):	Monville, Timothy
Additional Participating Persons:	Billy J Meadows; FAA/FSDO; Orlando, FL Donald R Andrews; FAA/FSDO; Orlando, FL Brannon D Mayer; Cirrus Aircraft; Duluth, MN Wade Hawker; L3 Commercial Training Solutions; Sanford, FL
Original Publish Date:	May 29, 2019
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=96885