Aviation Investigation Final Report

Location:	Kill Devil Hills, North Carolina	**Accident Number:**	ERA24FA397
Date & Time:	September 28, 2024, 17:19 Local	**Registration:**	N1281F
Aircraft:	CIRRUS DESIGN CORP SR22	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of control in flight	**Injuries:**	5 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot departed on a multi-leg flight from the airport where the airplane was based and made stops at three other airports before continuing to the destination airport. ADS-B data for the accident flight showed that, after departure from the third airport, the pilot flew the airplane 6.5 nautical miles (nm) to the destination airport and directly entered the left downwind leg of the traffic pattern for a runway with a published traffic pattern to the right.

While on the final approach, the pilot descended the airplane, flew low above the runway, then climbed the airplane. Data recovered from the airplane's recoverable data module (RDM) showed that, while the airplane was low over the runway, the stall warning tone sounded before the pilot increased the engine power and initiated the climb. The pilot subsequently used left turns to fly a return pattern back to the runway and then reestablished the airplane on the final approach.

A witness reported that, during the pilot's second approach to the runway, the airplane was high. The weather conditions reported at the airport about the time of the accident included a quartering left headwind at 6 knots, gusting to 14 knots. ADS-B and RDM data showed that, as the airplane passed the mid-point of the runway, it made a steep left turn. It then impacted the tops of 50-ft-tall trees off the left side of the runway, coming to rest in heavily wooded terrain, where a significant postimpact fire ensued. A postaccident examination of the airframe and engine did not reveal evidence of any preimpact mechanical malfunction or failure that would have precluded normal operation.

The RDM data revealed that the second final approach was unstable, such that the stall warning tone sounded, and the pilot responded by increasing engine power an initiating climb

with an excessive nose-up pitch control input. During that time, the airplane's nose-up pitch and its left roll continued to increase before the data ended.

Based on this information, it is likely that during the go-around attempt the pilot exceeded the airplane's critical angle of attack, which resulted in an aerodynamic stall and loss of airplane control. It is possible that, after the pilot fueled the airplane at the most recent departure airport, the airplane's loading was near its maximum gross weight. This condition, if present, could have adversely affected the control characteristics of the airplane, increasing the difficulty for the pilot in maintaining airplane control.

Toxicological testing of the pilot indicated that he had used the antidepressant medication vilazodone. Whether he was impaired by effects of vilazodone or an associated underlying condition at the time of the accident could not be determined. One laboratory detected mildly elevated carboxyhemoglobin, a marker of carbon monoxide exposure. This result could be attributed to smoke inhalation during the postimpact fire.

Probable Cause and Findings

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

The pilot's exceedance of the airplane's critical angle of attack during a go-around attempt, which resulted in an aerodynamic stall and loss of airplane control.

Findings

Personnel issues	Aircraft control - Pilot
Personnel issues	Incorrect action sequence - Pilot
Personnel issues	Monitoring equip/instruments - Pilot
Aircraft	Airspeed - Not attained/maintained
Aircraft	Angle of attack - Not attained/maintained

Factual Information

History of Flight

Landing	Landing area overshoot
Landing	Loss of control in flight (Defining event)

On September 28, 2024, at 1719 eastern daylight time, a Cirrus Design Corp SR22 airplane, N1281F, was destroyed when it was involved in an accident near Kill Devil Hills, North Carolina. The private pilot and four passengers were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations (CFR)* Part 91 personal flight.

ADS-B data provided by the FAA showed that pilot departed from Moore County Airport (SOP), Carthage, North Carolina, about 1116 on a multi-leg flight with stops in Ocracoke Island Airport (W95), Ocracoke, North Carolina, and Dare County Regional Airport (MQI), Manteo, North Carolina, before continuing to First Flight Airport (FFA), Kill Devil Hills, North Carolina. FFA was about 6.5 nm northeast of MQI.

The ADS-B data showed that the airplane departed MQI about 1710, then the pilot flew to FFA and directly entered a left downwind leg for runway 21. The published airport traffic pattern for runway 21 was a right pattern. A review of recorded audio from the FFA common traffic advisory frequency (CTAF) revealed that the pilot first announced his intent to land at the airport then provided a position report to announce his entry to the left downwind leg for runway 21. About 3 minutes later, the pilot's next communication reported that he was "circling for a left downwind for runway 21," which was the last communication from the flight.

After the airplane entered the left downwind leg for runway 21, the pilot subsequently turned onto the left base leg. Data recovered from the airplane's RDM showed that, about 1714:30, the airplane descended through 1,000 ft msl at a reduced engine power setting. (See the "Flight Recorders" section for more information about the RDM.) The ADS-B data showed the airplane then aligned with the final approach for runway 21 about 1714:43.

The RDM data showed that, at 1713:48, the pilot increased the flaps to 50%, then at 1714:20, he increased them to 100%. The RDM data showed that, about 1715:35, when the airplane was very low over the runway, the stall warning tone sounded for about 1 second, and the pilot increased the engine power. The pilot then climbed the airplane to about 900 ft mean sea level (msl) and rejoined the traffic pattern using left turns. The RDM data showed that the pilot reduced the flaps incrementally to 50% then 0% during the climb.

The ADS-B data showed that, as the airplane approached runway 21 a second time, the pilot turned it to align with the final approach about 1717:47. The RDM data showed that, by that

time, the airplane was configured with 100% flaps (which the pilot selected at 1717:17) and a reduced engine power setting. One witness in a vehicle about 1/4 mile north of the airport reported seeing an airplane flying low toward the airport in a “slight lean” to the left.

According to a former military pilot who saw part of the airplane’s final approach over the runway, the airplane was “in a slow descent” but “seemed very high for being almost all the way down the runway.” He stated that the airplane appeared to be in controlled, wings-level flight at the time that he looked away from it. Seconds later, he heard the sounds of metal and trees breaking and saw smoke.

The ADS-B data showed that, as the airplane passed the mid-point of the 3,000-ft-long runway, it turned left toward the east. The RDM data showed that the airplane’s stall warning tone activated at 1718:42 when the airplane was very low over the runway and generally persisted (with a brief, 1-second interruption) until the data recording ended at 1718:53. The RDM data also showed that, about the same time that the stall warning tone activated, the pilot reduced the flaps to 50% and increased the engine power.

The RDM data showed that, as the pilot initiated a climb, the airplane’s nose pitched up to 9°, and the indicated airspeed dropped to 57 kts. According the airplane manufacturer, normal pitch for takeoff and climb was 7° nose up. The indicated airspeed then increased to 75 kts. During the 3 seconds before the data ended, the airplane’s nose-up pitch increased from 14.6° to 30.45°, its left roll reached 12.94°, and its indicated airspeed dropped to 61 kts.

The RDM data showed that the engine was operating about 2,600 rpm and about 100% power when the data stopped, and the exhaust gas temperatures and cylinder head temperatures for all cylinders were consistent with normal engine operation.

Accident site evidence showed that the airplane impacted the tops of 50-ft trees about 190 ft east of the runway centerline and struck additional trees before coming to rest about 300 ft east of the runway in heavily wooded terrain, where a significant postimpact fire ensued (see figure).

Figure. ADS-B data showing the airplane's flight track during the accident approach (green line) and the previous approach to runway 21 (yellow line).

Pilot Information

Certificate:	Private	**Age:**	44,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	February 8, 2023
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 650 hours (Total, all aircraft), 100 hours (Total, this make and model)		

Passenger Information

Certificate:		**Age:**	Female
Airplane Rating(s):		**Seat Occupied:**	Rear
Other Aircraft Rating(s):		**Restraint Used:**	
Instrument Rating(s):		**Second Pilot Present:**	Yes
Instructor Rating(s):		**Toxicology Performed:**	
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:			

Student pilot Information

Certificate:	Student	**Age:**	43,Male
Airplane Rating(s):	None	**Seat Occupied:**	Right
Other Aircraft Rating(s):		**Restraint Used:**	4-point
Instrument Rating(s):		**Second Pilot Present:**	Yes
Instructor Rating(s):		**Toxicology Performed:**	
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	February 16, 2023
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 1 hours (Total, all aircraft)		

Passenger Information

Certificate:		**Age:**	Male
Airplane Rating(s):		**Seat Occupied:**	Rear
Other Aircraft Rating(s):		**Restraint Used:**	
Instrument Rating(s):		**Second Pilot Present:**	Yes
Instructor Rating(s):		**Toxicology Performed:**	
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:			

Passenger Information

Certificate:		**Age:**	6,Male
Airplane Rating(s):		**Seat Occupied:**	Rear
Other Aircraft Rating(s):		**Restraint Used:**	
Instrument Rating(s):		**Second Pilot Present:**	Yes
Instructor Rating(s):		**Toxicology Performed:**	
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:			

The pilot held a commercial certificate with ratings for airplane single-engine land and instrument airplane. His last logbook entry was dated September 9 with an unspecified year. The logbook reflected that, at that time, he had logged 449.2 total hours. The logbook showed a total of 14.7 hours in the accident airplane make and model, 13.5 hours of which were dual instruction received. The pilot also logged 14.3 hours in Cirrus SR20 model airplanes, 12.6 hours of which were dual instruction received. His logbook contained endorsements indicating that he satisfactorily completed the flight review required by 14 *CFR* 61.56 and an instrument proficiency check (IPC) required by 14 *CFR* 61.57(d) on September 20, 2024.

According to the accident airplane's registration file, the pilot purchased it new in August 2023. An interview with the director of flight operations (DFO) at a flight center where the pilot most recently trained revealed that the accident pilot began training with the flight center in June 2021 and flew with flight instructors there 20 times before he took delivery of the airplane.

According to the DFO, the pilot began his Cirrus transition training with the flight center but completed the visual flight rules (VFR) portion of the course elsewhere with a Cirrus employee instructor following delivery of the airplane. The DFO stated that the pilot subsequently completed the instrument flight rules portion of the training with one of the flight center's instructors.

The DFO stated that the flight center did not provide the pilot any further instruction for about a year, until the pilot sought instruction for his IPC for his insurance renewal. The DFO stated that he flew with the pilot on September 4, 2024, but did not sign off on the IPC because the pilot's performance on many items was not to the flight center's standards. (The DFO provided a record from his own logbook indicating that the flight was 1.8 hours and that he did not sign off on the pilot's IPC.)

The DFO stated that a training plan was put in place for the pilot to improve in the areas in which his performance was not up to standards. The pilot subsequently completed two simulator lessons followed by two flight lessons in the accident airplane. The simulator

sessions and the first flight were focused on instrument flying skills to meet standards required by the IPC, and the second flight was focused on VFR maneuvers and landings. The DFO stated that the four training events took place between September 13 and 20, 2024.

Aircraft and Owner/Operator Information

Aircraft Make:	CIRRUS DESIGN CORP	**Registration:**	N1281F
Model/Series:	SR22	**Aircraft Category:**	Airplane
Year of Manufacture:	2023	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	9379
Landing Gear Type:	Tricycle	**Seats:**	5
Date/Type of Last Inspection:	August 16, 2024 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:	20 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	108 Hrs at time of accident	**Engine Manufacturer:**	Continental
ELT:	Installed, not activated	**Engine Model/Series:**	IO-550-N
Registered Owner:	PANTHEON AVIATION LLC	**Rated Power:**	310 Horsepower
Operator:	PANTHEON AVIATION LLC	**Operating Certificate(s) Held:**	None

The accident airplane was configured with two front seats and a three-place rear bench seat. It had a maximum gross weight of 3,600 lbs.

A self-service fuel receipt for the airplane showed that the pilot added 44 gallons of fuel at MQI. The airplane's RDM recorded that, before departure from MQI, the fuel gauges indicated a total of 60 gallons of fuel on board.

The RDM data also showed that the airplane's computed gross weight at takeoff from MQI was 3,597 lbs and, at the end of the data, it was 3,578.5 lbs. According to the airplane manufacturer, the data reflected a weight reduction as fuel was consumed, but the accuracy of the gross weight data was dependent upon the accuracy of data manually input by the pilot for the occupant weights, cargo weight, and fuel totalizer. The RDM did not record what values the pilot used for occupant and cargo weights.

A comparison of the pilot-input fuel totalizer values with the fuel quantities indicated by the fuel gauges revealed that, for the first flight leg of the accident day and the accident flight, the pilot-input fuel totalizer values were 5 gallons and 6 gallons lower, respectively, than the fuel quantities indicated by the fuel gauges. That is, for the accident flight, the pilot set the fuel totalizer value to 54 gallons before departure from MQI.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	FFA,13 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	17:10 Local	**Direction from Accident Site:**	1°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots / 14 knots	**Turbulence Type Forecast/Actual:**	None /
Wind Direction:	170°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.84 inches Hg	**Temperature/Dew Point:**	27°C / 20°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Manteo, NC (MQI)	**Type of Flight Plan Filed:**	None
Destination:	Kill Devil Hills, NC	**Type of Clearance:**	None
Departure Time:	17:10 Local	**Type of Airspace:**	Class G

The wind reported at FFA about the time of the accident was 170° at 6 knots, gusting to 14 knots.

Airport Information

Airport:	First Flight FFA	**Runway Surface Type:**	Asphalt
Airport Elevation:	8 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	21	**IFR Approach:**	None
Runway Length/Width:	3000 ft / 60 ft	**VFR Approach/Landing:**	Go around;Traffic pattern

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	3 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	5 Fatal	**Latitude, Longitude:**	36.015372,-75.671062

Examination of the accident site revealed evidence consistent with the airplane's left wing striking 50-ft trees off the east (left) side of runway 21 before the airplane contacted the ground about 135 ft from the initial contact point. The airplane came to rest in wooded terrain on an approximate 222° heading and a field elevation of 11 ft. The airplane was mostly consumed by a postimpact fire. The main wreckage area contained the fuselage, engine, empennage, right wing, and a majority of the left wing.

The empennage remained partially attached to the fuselage and was mostly consumed by postimpact fire. The empennage structure was twisted 180°. Rudder and elevator control cable continuity was established from their respective flight control surfaces to the cockpit.

The right wing remained with the fuselage structure. The inboard portion of the wing was mostly consumed by fire, and the flap was consumed by fire. The outboard portion of the right wing and wing tip were intact and displayed thermal damage. The left wing tip was separated from the main wreckage and was found in a tree at the initial impact point. The left wing's navigation lighting wiring remained with the wing tip and was wrapped around the tree. The left aileron and other portions of the left wing were found about halfway from the initial contact point and the main wreckage. The remainder of the left wing remained with the fuselage and was consumed by fire, along with the left flap. The flap actuator was found within the fuselage debris and indicated that the flaps were at the 100% position.

The cockpit was consumed by postimpact fire. The airplane was equipped with Garmin G1000 displays, which were destroyed. The engine control levers were destroyed. The fuel selector position could not be determined due to thermal damage.

The fuel selector position could not be determined. The fuel pump switch was not located. Fuel blighting was evident on the leaves of trees between the initial impact point and the main wreckage.

The airplane was equipped with a Cirrus Airframe Parachute System. A portion of the rocket motor was found adjacent to the empennage and was damaged consistent with postimpact thermal exposure. The harness, suspension lines, and canopy were all contained within the deployment bag and remained restrained within the empennage in a packed state.

The engine remained attached to the airplane firewall. The engine and its accessories were exposed to the postimpact fire. The fuel pump was removed for examination, and the drive coupling shaft was found intact. The top spark plugs were removed for examination and displayed coloration consistent with normal engine operation. The engine crankshaft was manually rotated, and thumb compression was attained on all six cylinders. The crankshaft and camshaft continuity were confirmed throughout the engine. The magnetos sustained severe thermal damage rendering them untestable.

The airplane was equipped with a three-blade propeller. Propeller strike marks were observed on a large diameter tree directly in front of the engine with slash signatures measuring about 8 to 12 inches apart on the tree trunk. A 12-inch section of the tree trunk was severed. All three

propeller blades were liberated from the propeller hub assembly. One blade was found about 10 ft forward of the hub assembly in one piece. A second blade was found below the hub assembly fractured in half consistent with impact forces. The third propeller blade was recovered several months later by the National Park Service and was sent to the recovery facility.

Flight recorders

The airplane was equipped with an Appareo RDM-300 unit that was located within the empennage. Examination of the unit revealed that it contained various flight and engine parameter data for the accident flight leg and others. Select data parameters are discussed in the “History of Flight” section of this report.

Medical and Pathological Information

The pilot’s autopsy was performed at East Carolina University Brody School of Medicine in the North Carolina Medical Examiner System. According to the autopsy report, the pilot’s cause of death was multiple thermal injuries. The pilot’s autopsy did not identify significant natural disease. There was autopsy evidence of smoke inhalation, and autopsy toxicology detected carboxyhemoglobin (a marker of carbon monoxide exposure) at 11% in aortic blood.

FAA Forensic Sciences Laboratory’s postmortem toxicological testing detected vilazodone in aortic blood at 201 ng/mL and in urine at 550 ng/mL. Anastrozole also was detected in aortic blood and urine. Carboxyhemoglobin was not detected in aortic blood at a reporting threshold of 10%.

Vilazodone is a prescription medication that may be used to treat major depressive disorder and certain other conditions. Vilazodone commonly carries a warning that it may cause sleepiness or affect the ability to make decisions, think clearly, or react quickly and that users should not drive, operate heavy machinery, or do other dangerous activities until they know how the drug affects them. Additionally, major depressive disorder can cause cognitive and psychomotor impairment.

As of the date of the accident, the FAA considered vilazodone unacceptable for pilot medical certification. In August 2025, the FAA added vilazodone to the list of antidepressants that may be considered for FAA medical certification via Special Issuance, subject to case-by-case evaluation of the underlying condition and its response to treatment. The pilot had not reported vilazodone use or an associated underlying condition to the FAA as of his last aviation medical examination in February 2023.

Anastrozole is a prescription medication. In men, it is commonly used in the treatment of low testosterone; it may also be used to treat breast cancer. Anastrozole is not typically impairing but can have adverse side effects. It is one of the acceptable medications under Conditions Aviation Medical Examiners Can Issue (CACI) criteria for low testosterone, if other criteria are met. The pilot had not reported anastrozole use or an associated underlying condition to the FAA.

Carboxyhemoglobin is formed when carbon monoxide binds to hemoglobin in blood, diminishing the blood's ability to deliver oxygen to body tissues. Carbon monoxide is an odorless, tasteless, colorless, nonirritating gas that can be produced during hydrocarbon combustion. Exposure to carbon monoxide usually occurs by inhalation of smoke or exhaust fumes. Nonsmokers normally have carboxyhemoglobin levels of less than 1 to 3%, while heavy smokers may have levels as high as 10 to15%.

Additional Information

According to the FAA "Pilot's Handbook of Aeronautical Knowledge," FAA-H-8083-25C, chapter 10, "compliance with the weight and balance limits of any aircraft is critical to flight safety. Operating above the maximum weight limitation…adversely affects its performance." The handbook stated that "an overloaded aircraft may not be able to leave the ground, or, if it does become airborne, it may exhibit unexpected and unusually poor flight characteristics….Excessive weight reduces flight performance in almost every respect." The handbook listed several performance deficiencies associated with overloading, including higher takeoff speed, longer takeoff run, reduced rate and angle of climb, reduced maneuverability, and higher stalling speed, among others. It also stated that undesirable effects of a CG location aft of the allowable range included "decreased static and dynamic

longitudinal stability" and may include "extreme control difficulty" and "violent stall characteristics," among others.

According to the Pilot's Operating Handbook (POH) for the Cirrus Design SR22, a normal landing should have the flaps set to 100% with an airspeed of 80-85 knots indicated airspeed (KIAS). During a go-around, the power lever should be full forward and flaps should be set to 50% with an airspeed of 80-85 KIAS. The flaps are moved to the up position after being clear of obstacles. Additionally, the rate of climb for a 3,600 lb airplane at sea level on a 20°C day would be 1,256 ft/min at a climb speed of 97 KIAS.

The POH says that during a stall, the stall speed warning horn sounded between 5 and 10 knots before the stall and a Crew Alerting System displays a STALL Warning annunciation. When the weight of the airplane was 3,600 lbs, with most aft CG and a bank angle of 30°, the stall speed with 100% full down flaps was 66 KIAS.

Administrative Information

Investigator In Charge (IIC):	Enders, Ryan
Additional Participating Persons:	J Ferrell; Continental ; Mobile, AL Mark Haroldson; Cirrus; Duluth, MN Eden King; FAA FSDO; Greensboro, NC
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Investigation Class:	Class 3
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=195219

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