Aviation Investigation Final Report

Location:	Martinsville, Virginia	**Accident Number:**	ERA24LA007
Date & Time:	October 11, 2023, 22:47 Local	**Registration:**	N253BC
Aircraft:	Cirrus SR22	**Aircraft Damage:**	Substantial
Defining Event:	Collision during takeoff/land	**Injuries:**	4 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot had just refueled the airplane and planned to fly a night, visual flight rules, cross-country flight. The pilot used 50% flaps for the normal takeoff; after he established a positive rate of climb, the pilot retracted the flaps. Shortly after retracting the flaps, the primary flight display (PFD) reportedly "blinked off" momentarily and then reappeared with a "Taxiway! Taxiway!" alert, and the multifunction display (MFD) screen was orange, which confused the pilot. He then looked up, saw a large pine tree ahead, and attempted to avoid the tree; however, the airplane impacted trees, resulting in substantial damage to the airplane. After the tree impact, the pilot was able to maintain control of the airplane, return to the departure airport, and land uneventfully.

Examination of the PFD and MFD databases revealed no anomalies that would have resulted in a PFD malfunction. Postaccident examination of the airplane and avionics revealed no malfunctions or failures that would have precluded normal operation.

Review of onboard data revealed that after retracting the flaps from 50%, the airplane began to descend despite no change in engine power. The descent continued until the recorded airspeed decreased to 0 kts and became unreliable, likely as a result of tree impact damage to the pitot tube. The data further revealed that there was no recorded electrical power loss or loss of engine power throughout the flight.

Recorded data revealed that the airplane was over its maximum gross weight at the time of the accident, which likely led to a longer takeoff distance and reduced climb performance.

The airplane's avionics display was capable of providing terrain warnings and alerts. During the accident flight, the airplane was operated within the performance envelope that would trigger a "Too Low, Terrain" caution message, and the terrain would be illuminated amber. The system

was also capable of alerting the pilot when the system detected that the airplane was taking off or landing on a non-runway. These alerts will provide a voice alert of “Taxiway” and a visual annunciation of “TWY TAKEOFF” or “TWY LANDING,” respectively. It is likely that when the pilot allowed the airplane to descend, the MFD terrain turned amber in color to alert the pilot of being too low, and the system calculated that the pilot was landing on a non-runway, which then triggered the “TWY LANDING” visual and aural alert. Although the terrain alerting function appears to have operated as designed, the pilot’s lack of understanding of the alerts likely distracted him and led him to interpret their display as an avionics failure.

Probable Cause and Findings

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

The pilot’s failure to maintain a positive climb rate after takeoff while distracted by primary flight display anomaly and terrain alerts. Contributing to the accident was the pilot’s decision to take off with the airplane over its maximum gross weight, which reduced its initial climb performance.

Findings

Personnel issues	Task monitoring/vigilance - Pilot
Aircraft	Climb rate - Not attained/maintained
Personnel issues	Decision making/judgment - Pilot
Personnel issues	Weight/balance calculations - Pilot

Factual Information

History of Flight

Initial climb	Flight instrument malf/fail
Initial climb	Collision during takeoff/land (Defining event)

On October 11, 2023, about 2247 eastern daylight time, a Cirrus SR-22 airplane, N253BC, was substantially damaged when it was involved in an accident near Martinsville, Virginia. The pilot and three passengers were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

According to the pilot, he refueled the airplane, completed a preflight inspection, updated the airplane's electronic flight instrument system, and departed Blue Ridge Airport (MTV), Martinsville, Virginia, for a night, visual flight rules, cross-country flight to Oklahoma. The pilot reported that on takeoff, after he established a positive rate of climb at an airspeed of 95 kts, he retracted the flaps, which had been set to 50%. Shortly thereafter, he reported that the PFD "blinked off" momentarily and then reappeared with a "Taxiway! Taxiway!" banner. He looked at the MFD and noted that it was "completely orange" and appeared to depict an autopilot track turning directly left, which he found confusing and made him wonder if the autopilot was engaged. The pilot further reported that it was "an extremely dark evening" and he "just happened to look up" and saw that the airplane was flying directly toward a large pine tree. He attempted to avoid the tree; however, the airplane struck trees to the left of and about 1.1 miles away from the departure end of the runway.

The pilot was able to maintain control of the airplane, and the engine was developing full power as the airplane continued to climb to the traffic pattern altitude. The pilot stated that the airplane was "very shaky," and that he was unable to see the altitude on the primary flight display. He was not certain if the autopilot was engaged, so he repeatedly pressed the autopilot disconnect button. He circled back toward MTV, trimmed the airplane for landing, and made a safe landing on runway 13, after which he immediately cleared the runway and shut off the engine.

The airplane sustained substantial damage to the wings and the windscreen during the accident sequence. Examination of the pitot tube revealed that its inlet was obstructed by material consistent with the impacted trees.

The airplane was equipped with two Garmin GDU 1250A 12-inch displays. One display, the PFD, was installed directly in front of the left (pilot's) seat, and the second unit, the MFD, was installed above the center console. The PFD was intended to be the primary display of flight parameter information (including attitude, airspeed, heading, and altitude) during normal

operations. The PFD accepted data from a variety of sources, including the MFD and the Integrated Avionics Units, through a high-speed data bus connection. In conjunction with a Flight Management System Keyboard, the PFD also controlled and displays all communication and navigation frequencies and displayed warning/status annunciations for airplane's systems. The MFD depicted navigation, terrain, engine, and traffic data, navigation and communication frequencies, and annunciation information.

The avionics platform allowed for loading updated databases into the system. The updates were loaded onto the airplane using the MFD or PFD card slots and inserting an SD card with the update(s) into the slot. The procedure for loading databases into the avionics platform is provided in the Cirrus Cockpit Reference Guide for the SR20/SR22/SR22T.

During postaccident interviews, the pilot indicated that he updated the airplane's databases the morning of the accident but had to reload them because they did not load correctly during the first attempt. An examination of both GDUs revealed that several of the databases were missing; however, according to the airframe manufacturer, the database status was normal for the particular airplane and avionics system.

The airplane's display system for the PFD and MFD had a display backup mode. According to the Cirrus SR22T Pilot's Operating Handbook (POH):

> In the event of a detected display failure, the Integrated Avionics System automatically switches to Display Backup Mode. In Display Backup Mode, all essential flight information from the PFD is presented on the remaining display in the same format as in normal operating mode with the addition of the Engine Indicating System. The change to backup is completely automated and no pilot action is required. However, if the system fails to detect a display problem, Display Backup Mode may be manually activated by pressing the red DISPLAY BACKUP Button. Pressing this button again deactivates Display Backup Mode.

The airplane was equipped with standby instruments for airspeed, attitude, and altitude, powered independently of the PFD and MFD, and located just below the PFD. In the case of a primary instrument failure, the standby instruments were available to the pilot. After the accident, the PFD, MFD, and standby instruments were powered up, and all displays operated normally.

The Garmin system was capable of recording flight and engine data on an SD card installed in the MFD. The airframe manufacturer extracted SD card data from the accident airplane and provided it to the NTSB Vehicle Recorder Laboratory for examination. The SD card contained the accident flight recording and was about 12 minutes long. The data recorded did not indicate that there was any interruption in electrical power during the flight.

The airplane was also equipped with an Appareo RDM-300 digital flight data recorder, which recorded all parameters recorded by the Garmin G1000 as well as additional airplane parameters. The data revealed that for takeoff, flaps were set at 50%, in accordance with the

airplane's POH. Full power was applied, the airplane began its takeoff roll about 2246:14, and it reached rotation speed (77 kts) at 2246:29. The airplane began its initial climb, and at 2246:48, at an altitude of 1,100 ft, the flaps retracted. The airplane continued to climb for about 8 seconds, reaching an altitude of 1,134 ft, after which it began to descend, despite the engine being at full power. The descent continued for about 15 seconds, and the descent rate increased to a maximum of 736 ft per minute. While in the descent, the airspeed increased from 110 to 137 kts. During the descent, at 2247:11, the autopilot system was engaged. At 2247:12, at an altitude of 1,031 ft, the indicated airspeed decreased to 0 kts, consistent with tree impact damage to the pitot tube. This was immediately followed by a vertical speed increase, and the airplane began to climb again, reaching a maximum altitude of 2,270 ft. The indicated airspeed remained between 0 and 43 kts for the remainder of the recording. At 2249:32, the autopilot system was disengaged. Except for the indicated airspeed, the data indicated no malfunctions of the airplane for the remainder of the return to the departure airport.

The airplane's avionics system was capable of recording the gross weight of the airplane by using the empty weight of the airplane and values entered by the pilot for fuel onboard and weights of the passengers and baggage. According to the recorded data, the airplane had a gross weight of 3,782.5 lbs at takeoff. The maximum takeoff weight indicated in the Cirrus SR22T POH was 3600 lbs. According to the Pilot's Handbook of Aeronautical Knowledge, FAA publication FAA-H-8083-25C:

> The takeoff/climb and landing performance of an aircraft are determined on the basis of its maximum allowable takeoff and landing weights. A heavier gross weight results in a longer takeoff run and shallower climb, and a faster touchdown speed and longer landing roll. Even a minor overload may make it impossible for the aircraft to clear an obstacle that normally would not be a problem during takeoff under more favorable conditions.

The avionics system was equipped with the Garmin SurfaceWatch feature, which was capable of providing visual and aural annunciations to help prevent potential runway incursions or excursions during ground and air operations in the airport environment. Two of the alerts for the SurfaceWatch system were the taxiway takeoff and taxiway landing warnings. These warnings would provide a voice alert of "Taxiway" and a visual annunciation of "TWY TAKEOFF" or "TWY LANDING," respectively. These warnings were provided when the system detected that the airplane was taking off from or landing on a non-runway.

According to the Cirrus Perspective+ Pilot's Guide, the avionics system was capable of providing a Negative Climb Rate After Takeoff alert. During the accident flight, the airplane was operated within the performance envelope that would trigger a "Too Low, Terrain" caution message, which would also illuminate the terrain amber on the display. However, the G1000 only recorded terrain warnings, not cautions, and no terrain warnings were recorded during this flight.

The Takeoff Minimums, (Obstacle) Departure Procedures, and Diverse Vector Area (Radar Vectors) section of the FAA Chart Supplement provided specific guidance regarding takeoff minimums and obstacles for MTV. For departures from runway 31, the supplement stated that it is necessary to have a minimum climb rate of 321 ft per nautical mile. It noted specific obstacles when departing runway 31, including trees that began 82 ft from the departure end of the runway and were 9 ft right of the runway's extended centerline, up to 100 ft above ground level (agl) (1,058 ft mean sea level [msl]). The supplement also reported trees beginning 102 ft from the departure end of the runway that were 94 ft left of the extended runway centerline, up to 77 ft agl (1,047 ft msl).

Pilot Information

Certificate:	Private	**Age:**	57,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:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	September 13, 2023
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	May 18, 2023
Flight Time:	758 hours (Total, all aircraft), 260 hours (Total, this make and model), 716 hours (Pilot In Command, all aircraft), 55 hours (Last 90 days, all aircraft), 18 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Passenger Information

Certificate:		**Age:**	Female
Airplane Rating(s):		**Seat Occupied:**	Right
Other Aircraft Rating(s):		**Restraint Used:**	3-point
Instrument Rating(s):		**Second Pilot Present:**	No
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:**	Male
Airplane Rating(s):		**Seat Occupied:**	Rear
Other Aircraft Rating(s):		**Restraint Used:**	3-point
Instrument Rating(s):		**Second Pilot Present:**	No
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:**	Female
Airplane Rating(s):		**Seat Occupied:**	Rear
Other Aircraft Rating(s):		**Restraint Used:**	3-point
Instrument Rating(s):		**Second Pilot Present:**	No
Instructor Rating(s):		**Toxicology Performed:**	
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Make:	Cirrus	**Registration:**	N253BC
Model/Series:	SR22 T	**Aircraft Category:**	Airplane
Year of Manufacture:	2023	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	9143
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	October 11, 2023 100 hour	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:	5 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	121 Hrs as of last inspection	**Engine Manufacturer:**	Continental Motors
ELT:	Installed, not activated	**Engine Model/Series:**	TSIO-550-K
Registered Owner:	On file	**Rated Power:**	315 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night
Observation Facility, Elevation:	MTV,941 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	22:35 Local	**Direction from Accident Site:**	309°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.96 inches Hg	**Temperature/Dew Point:**	12°C / 11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Martinsville, VA	**Type of Flight Plan Filed:**	None
Destination:	Guthrie, OK (GOK)	**Type of Clearance:**	VFR flight following
Departure Time:		**Type of Airspace:**	Class G

Airport Information

Airport:	BLUE RIDGE MTV	**Runway Surface Type:**	Asphalt
Airport Elevation:	940 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	31	**IFR Approach:**	None
Runway Length/Width:	5002 ft / 100 ft	**VFR Approach/Landing:**	Precautionary landing

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	3 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	4 None	**Latitude, Longitude:**	36.630833,-80.018333

Administrative Information

Investigator In Charge (IIC):	Gibson, Kurt
Additional Participating Persons:	Daniel McSherry; FAA/FSDO; Richmond, VA Mark Haroldson ; Cirrus Aircraft; Duluth, MN
Original Publish Date:	February 11, 2026
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=193235