

National Transportation Safety Board
Office of Research and Engineering
Washington, D.C. 20594

Airplane Performance Study

Specialist Report Timothy Burtch

A. ACCIDENT

Location: Prairie Grove, Arkansas
Date: September 23, 2019
Time: 0140 GMT (2040 CDT)
Airplane: Cessna 150G, N4658X
NTSB Number: CEN19FA332

B. GROUP

No vehicle performance group was formed.

C. SUMMARY

On September 23, 2019, about 2040 central daylight time (CDT), a Cessna 150G, N4658X, was substantially damaged when it impacted terrain near Prairie Grove, Arkansas. The pilot, the sole occupant, was fatally injured, and the airplane was substantially damaged. The airplane was operated as a Title 14 Code of Federal Regulations Part 91 personal flight.

Times in the study are quoted in CDT. CDT = Greenwich Mean Time (GMT) – 5 hr.

D. THE AIRPLANE

A picture of the accident airplane, a Cessna 150G, is shown in Figure 1. The airplane was manufactured by Cessna in 1966, and is registered to Wingnut Enterprises, LLC, of Allen, Texas.

E. WEATHER SUMMARY

The closest National Weather Service reporting location to the accident site was Drake Field airport (FYV), in Fayetteville, Arkansas. The airport is where N4658X had taken off from at about 2026 CDT and is located approximately 18 miles northeast of the accident site at an elevation of 1,252 ft. The FYV ASOS reported the following approximately 47 minutes before the accident.

METAR KFYV 240053Z 00000KT 10SM SCT048 22/17 A3004

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The automated surface weather observation at Drake Field airport on September 23rd at 1953 CDT is wind calm; 10 statute miles visibility; scattered clouds at 4,800 feet (ft) above the ground (agl) or 6,052 ft above mean sea level (msl); temperature 22° Celsius (C); dew point 17°C; altimeter 30.04" mercury.

The next closest location was Fort Smith Regional Airport (FSM) in Fort Smith, AR. The airport is in the direction of where N4658X was headed and is located approximately 23 miles south of the accident site at an elevation of 469 ft. The FSM ASOS reported the following approximately 8 minutes after the accident. (See Figure 2 for the location of the weather reporting stations relative to the accident site.)

SPECI KFSM 240148Z 00000KT 10SM SCT018 BKN085 26/24 A3000

The automated surface weather observation at Fort Smith Regional airport on September 23rd at 2048 CDT is wind calm; 10 statute miles visibility; scattered clouds at 1,800 ft agl or 2,300 ft msl; broken clouds at 8,500 ft agl; temperature 26° Celsius (C); dew point 24° C; altimeter 30.00" mercury.

Based on weather reports in the area, the accident flight was headed towards lower cloud bases and more saturated air and possible fog (as indicated in the temperature/dew point spread). N4658X took off with 6,052 ft msl scattered clouds and a 5°C spread, and the accident site was approximately halfway to Ft. Smith which was reporting scattered clouds at 2,300 ft msl and a 2°C spread¹. The accident airplane reached a maximum altitude of 4,390 ft msl before maneuvering erratically and departing controlled flight.

In addition to the clouds, at the time of the accident both the sun and the moon were more than 15° below the horizon and provided no illumination. The moon (a waning crescent with 23% of the disk visible) would not be rising until 0202 CDT on 9/24/2019².

F. PERFORMANCE STUDY

The airplane performance study is largely based on Automatic Dependent Surveillance-Broadcast (ADS-B) data provided by the Federal Aviation Administration (FAA). ADS-B is a primary technology supporting the FAA's Next Generation Air Traffic Control System, or NextGen, which is shifting airplane separation and air traffic control from ground-based radar to satellite-derived positions. ADS-B broadcasts an airplane's Global Positioning System (GPS) position to the ground where it is displayed to Air Traffic Control. The GPS position is also transmitted to other airplanes with ADS-B receivers, either directly or relayed through ground stations, to allow self-separation and to increase situational awareness.

¹ A landowner close to the accident crash site reported "fog was incredibly dense and was quite high ... The weather reported that it was clear. (However) it was difficult to see our house at 400 ft away."

² The end of civil twilight or the beginning of nighttime as defined by the FAA was at 1938 CDT on September 23, 2019.

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GPS has an accuracy of approximately 20 meters (m) in both the horizontal and vertical dimensions. GPS augmented with the Wide Area Augmentation System (WAAS)³ is accurate to approximately 1.5 – 2 meters.

Figure 3 shows the altitude, rate of climb, and groundspeed recorded in the ADS-B data for the entire 16-minute flight. Figure 4 contains the same recorded parameters but highlights the last six minutes of the flight.

The data indicate an abrupt airplane maneuver at approximately 2040:07 which resulted in a momentary 4,000 ft/min rate of climb. The airplane was at an altitude of 4,328 ft when the climb was initiated. During the climb, the recorded groundspeed⁴ went from 90 kt at 2040:07 to 30 kt at 2040:21. The airplane pitch attitude went from 5° to 60° nose-up for the same period of time. See Figure 5.

The power off stall speed listed in the Cessna 150G pilot operating handbook is 48 kt at the maximum gross weight and flaps up⁵. As a result, it is likely that the accident pilot exceeded the wing's critical angle-of-attack and stalled the airplane at approximately 2040:21. The ADS-B data subsequently show the airplane descending at nearly 6,000 ft/min at 2040:31. The recorded bank angle shows the airplane inverted at 2040:33. Bank angle is shown in Figure 5. Figure 6 is a Google Earth image of the final ADS-B data points from the flight.

G. SUMMARY AND CONCLUSIONS

Recorded FAA ADS-B data indicate that the pilot of N4658X likely stalled the airplane while climbing out from Drake Field airport, Fayetteville, Arkansas, on the return flight to Aero Country airport, McKinney, TX. Clouds and darkness would have obscured the horizon and the ground and made stall recovery more difficult.

Title 14 Code of Federal Regulations Part 91, Preflight action, states that pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight. This includes weather reports and forecasts.

Figure 7 shows the flight to Fayetteville preceding the accident. The accident pilot appears to have flown directly towards severe weather after take-off before turning east to circumvent the cells with the highest radar reflectivity. There is no record of the pilot obtaining a weather briefing for the accident flight or previous flight.

Timothy Burtch
Specialist – Airplane Performance
National Transportation Safety Board

³ WAAS collects, processes, and corrects GPS information to ensure that the data the pilot receives can be trusted:
https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=14974&omniRss=fact_sheetsAoc&cid=103_F_S

⁴ Calm winds were being reported across the area. As a result, groundspeed and true airspeed would be similar.

⁵ The stall speed for the accident airplane would be slightly lower than published because of power and a lighter gross weight.

H. FIGURES



Figure 1: Accident Airplane, N4658X, a Cessna 150G

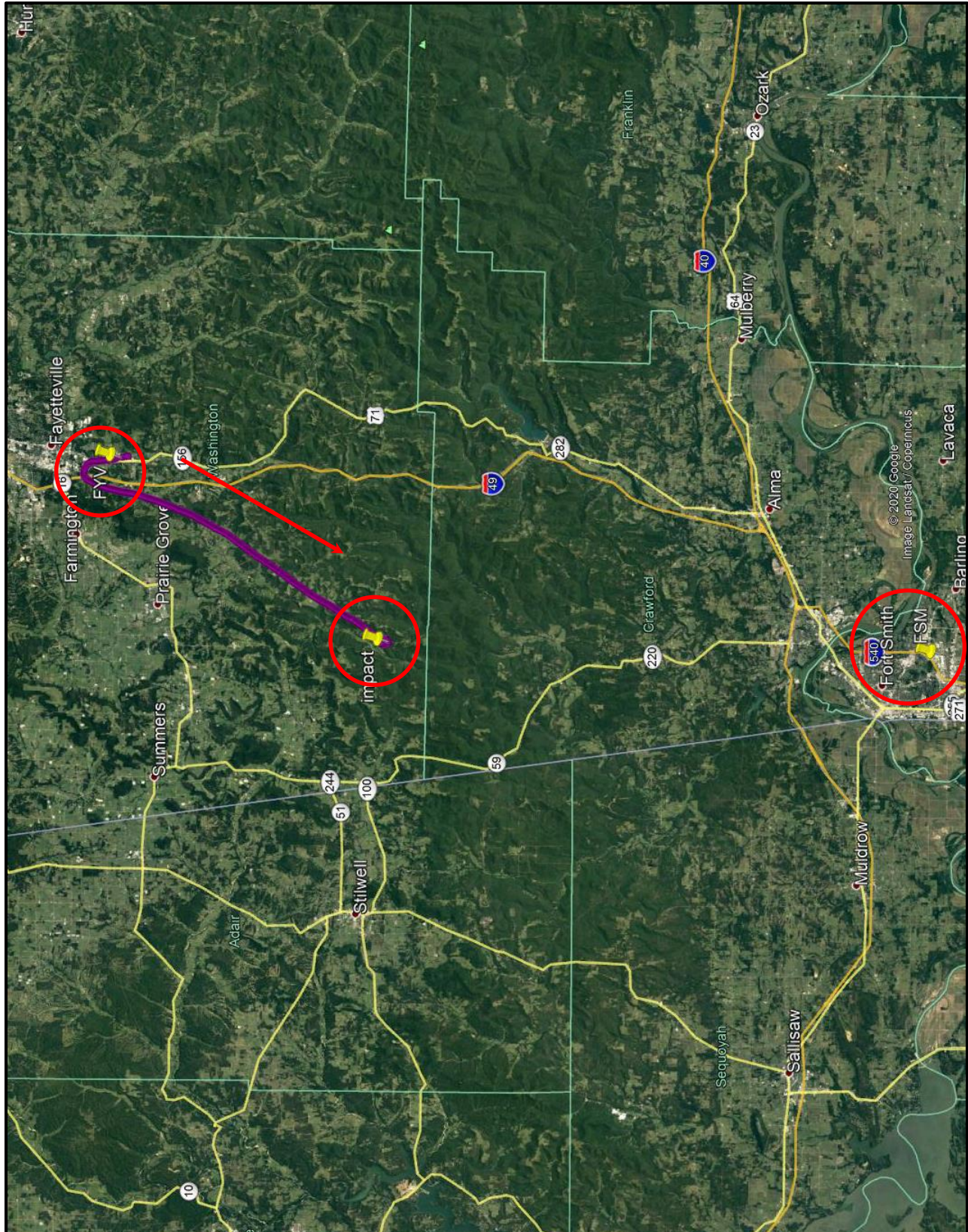


Figure 2: Weather Reporting Sites Fayetteville (FYV) and Fort Smith (FSM)

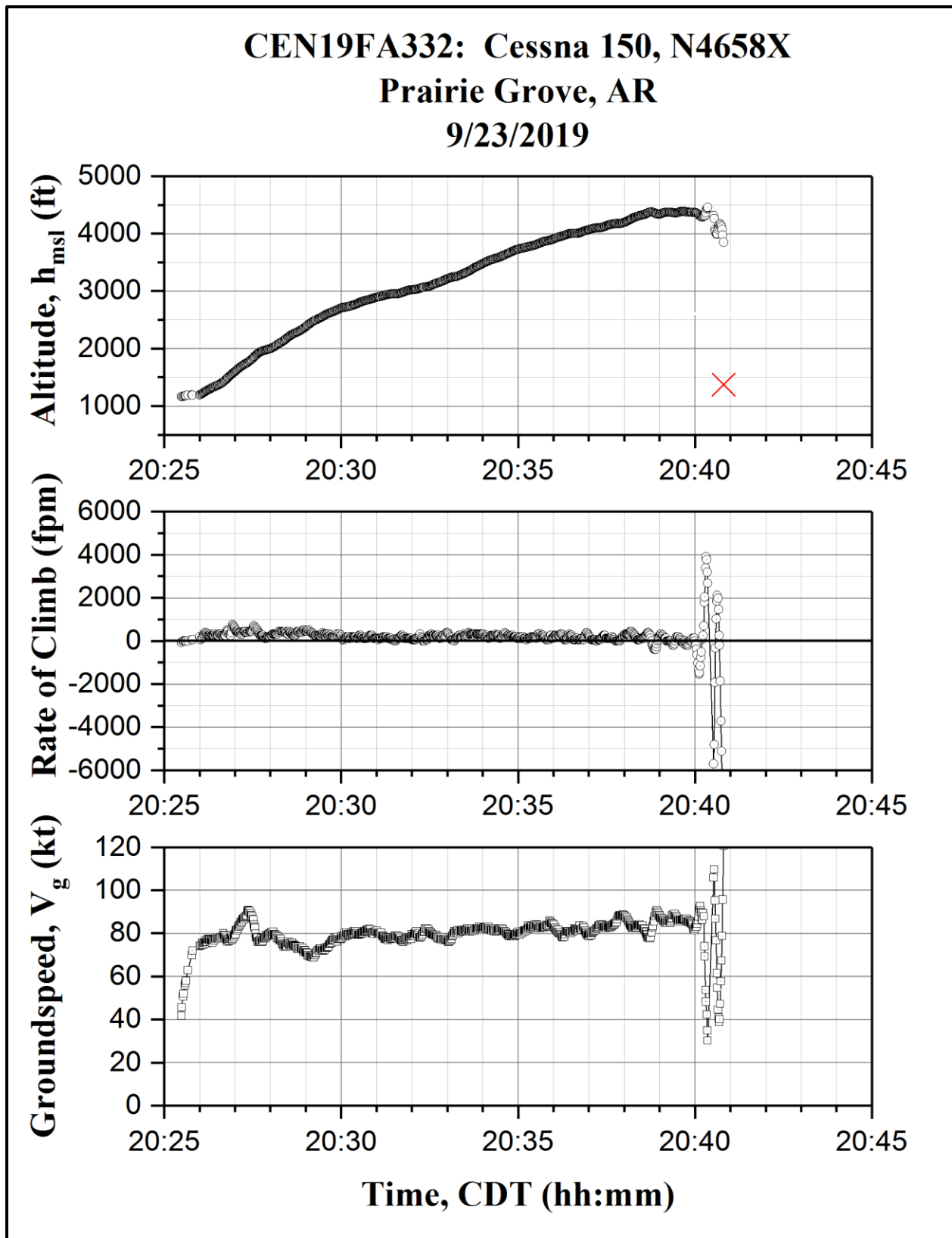


Figure 3: Altitude and Airspeed for Entire Flight Based on ADS-B Data

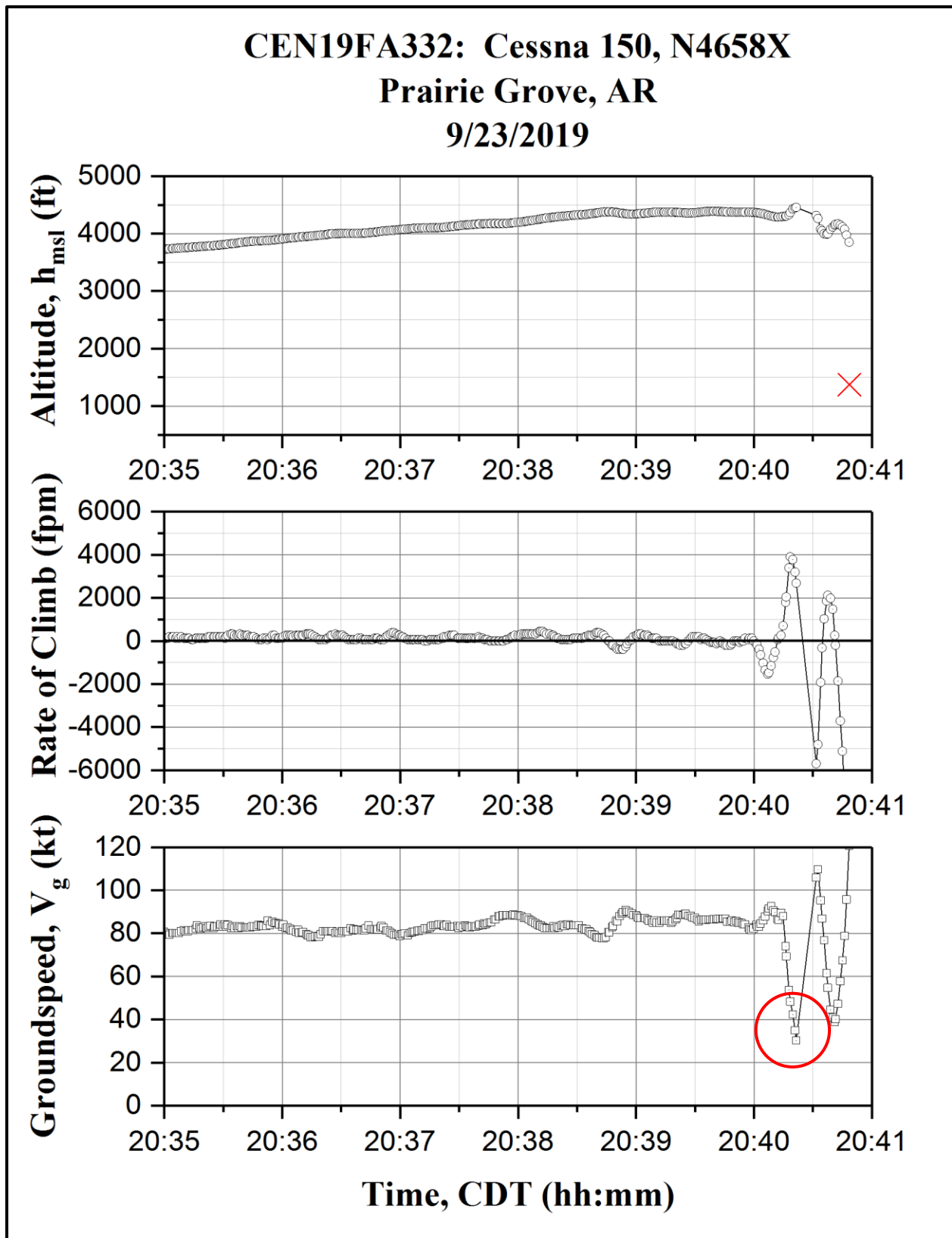


Figure 4: Altitude and Speed for Final Six Minutes

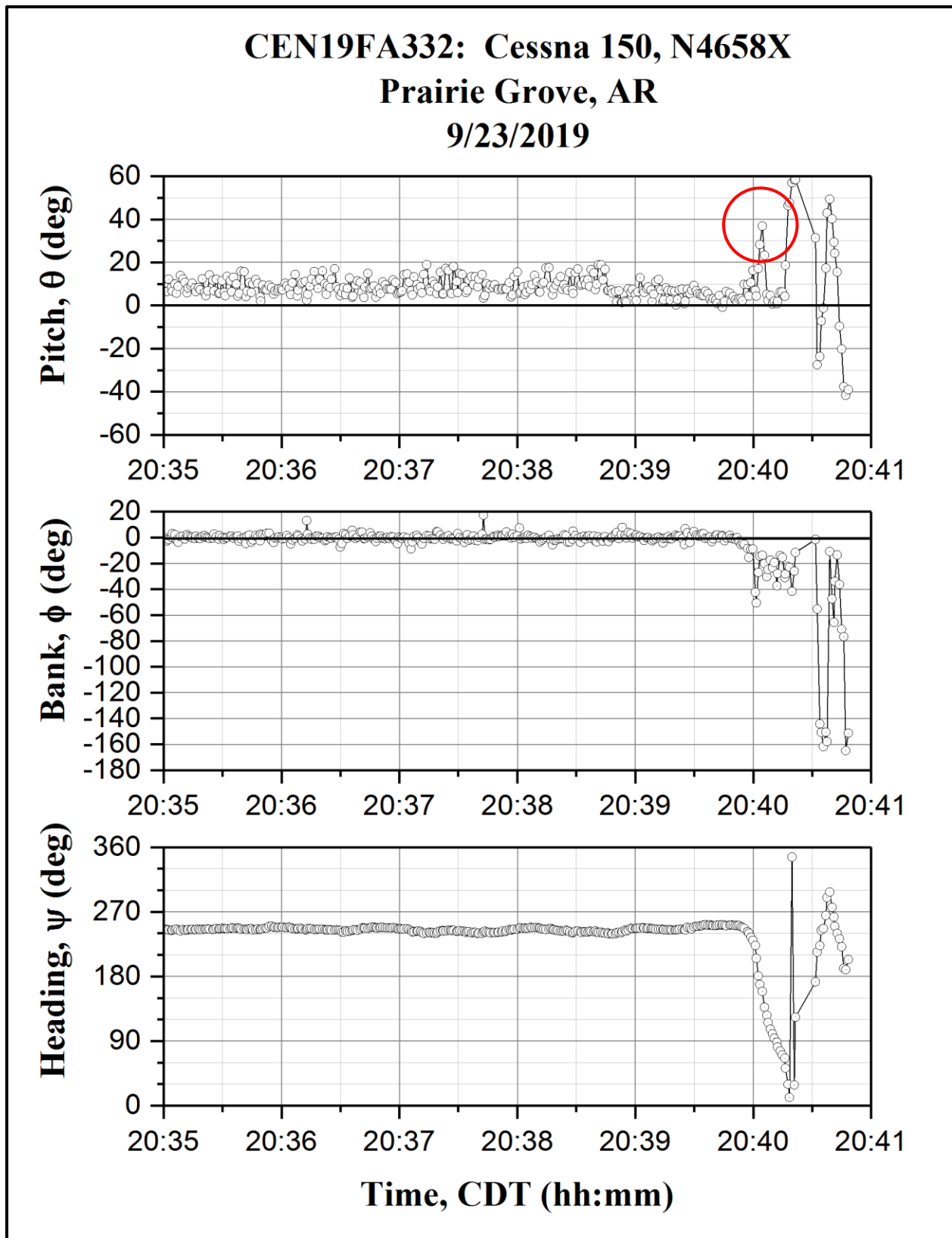


Figure 5: Pitch, Bank, and Heading Based on ADS-B Data for Final Six Minutes



Figure 6: Google Earth Image of Final ADS-B Data Points

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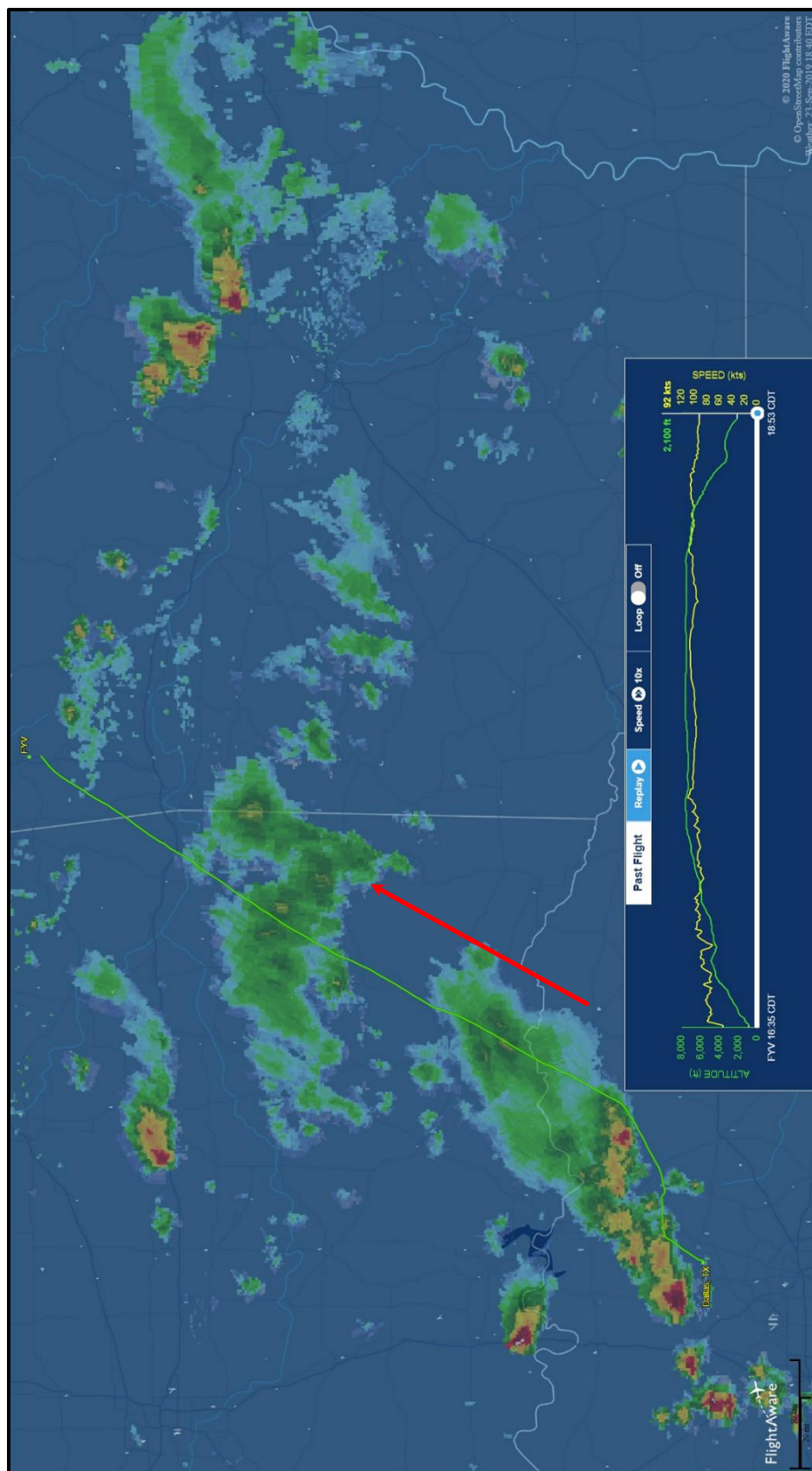


Figure 7: N4658X's 1635 CDT Flight up from McKinney, TX (T31) to FYV