

National Transportation Safety Board

Office of Research and Engineering

Washington, D.C. 20594

Performance Study

Specialist Report

Marie Moler

A. ACCIDENT

Location:	Jupiter, Florida
Date:	February 29, 2021
Time:	12:30 Eastern standard time (EST)
Airplane:	Luscombe 8E, N2960K
NTSB Number:	ERA21FA142

B. SUMMARY

On February 28, 2021, at 1230 eastern standard time, a Luscombe 8E, N2601T, was substantially damaged when it was involved in an accident near Jupiter, Florida. One pilot sustained fatal injuries and the second pilot sustained serious injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

C. PERFORMANCE STUDY

This performance study is based on a video study [1] which captured the airplane's flight above the runway and Automatic Dependent Surveillance-Broadcast (ADS-B) data provided by the Federal Aviation Administration (FAA). ADS-B broadcasts an airplane's Global Positioning System (GPS) position and other data to the ground where it is recorded. The GPS position has an accuracy of approximately 20 meters (m) in both the horizontal and vertical dimensions.

Weather recorded at North Palm Beach County General Aviation Airport (F45), about eight nautical miles from the accident, was temperature 82°F (28°C), dew point 66°F (19°C), and the barometric setting was 30.20 inHg. Winds were 9 kts from 150°.

The video recorded 28 seconds of flight as the airplane overflowed runway 9. Location, altitude, and roll data were determined from video time 7 seconds until 28 seconds and are shown with height above ground in Figure 1. Additionally, engine RPM was determined from the video sound for the duration of the video. ADS-B recorded seven locations from 12:27:10 until 12:27:17. Altitude data was not accurately recorded for these points. The airplane wreckage was another 261 ft beyond the final ADS-B point.

Performance Study
ERA21FA142, Luscombe 8E, N2960K

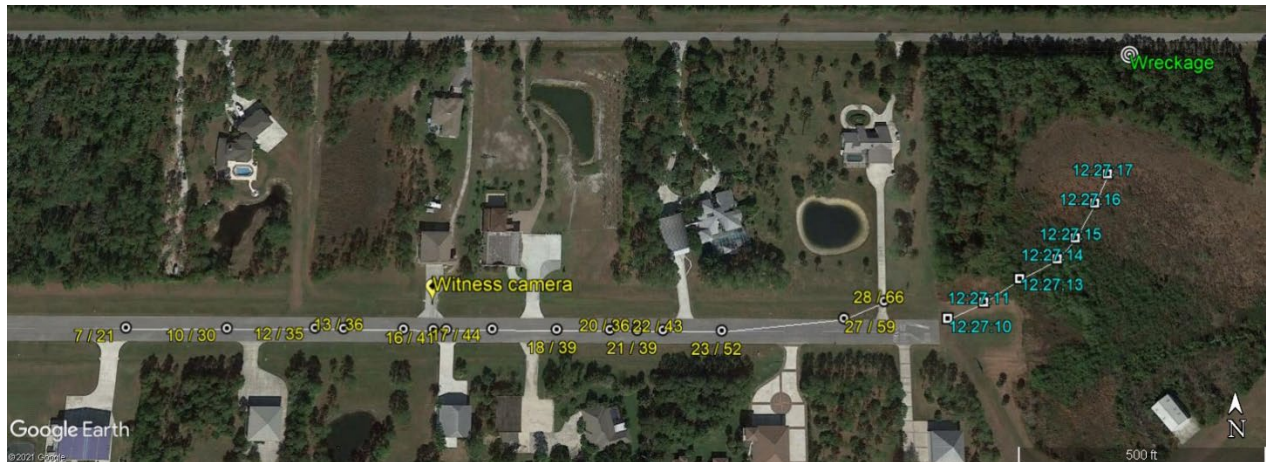


Figure 1. Yellow points from video study (camera location noted) with video time and height above ground in feet noted. Blue points from ADS-B data. Wreckage location in green.

Seconds 27 and 28 from the video data show the airplane turning to the left before the ADS-B data turned (Figure 1). The wreckage location was consistent with the final ADS-B flight path. When combining both sets of data, the final two video location points were shifted south to create a smoothed track between video second 23 and the first ADS-B data point, which was assigned a time of 29.5 seconds in the video timing scheme.

The video study also determined changes in engine RPM from the video sound. During the video, the engine cowling can be seen open and flapping (Figure 2).



Figure 2. Still from second 14 of video. The engine cowling (yellow arrow) is open and flapping.

Performance Study ERA21FA142, Luscombe 8E, N2960K

Figure 3 shows, in video time, the airplane's height above ground, calculated groundspeed and calibrated airspeed, and engine RPM. The ADS-B data did not include accurate altitude but the location data was used to calculate speed. Engine RPM dropped from near 2,300 at 10 seconds to 1,500 by 17 seconds.

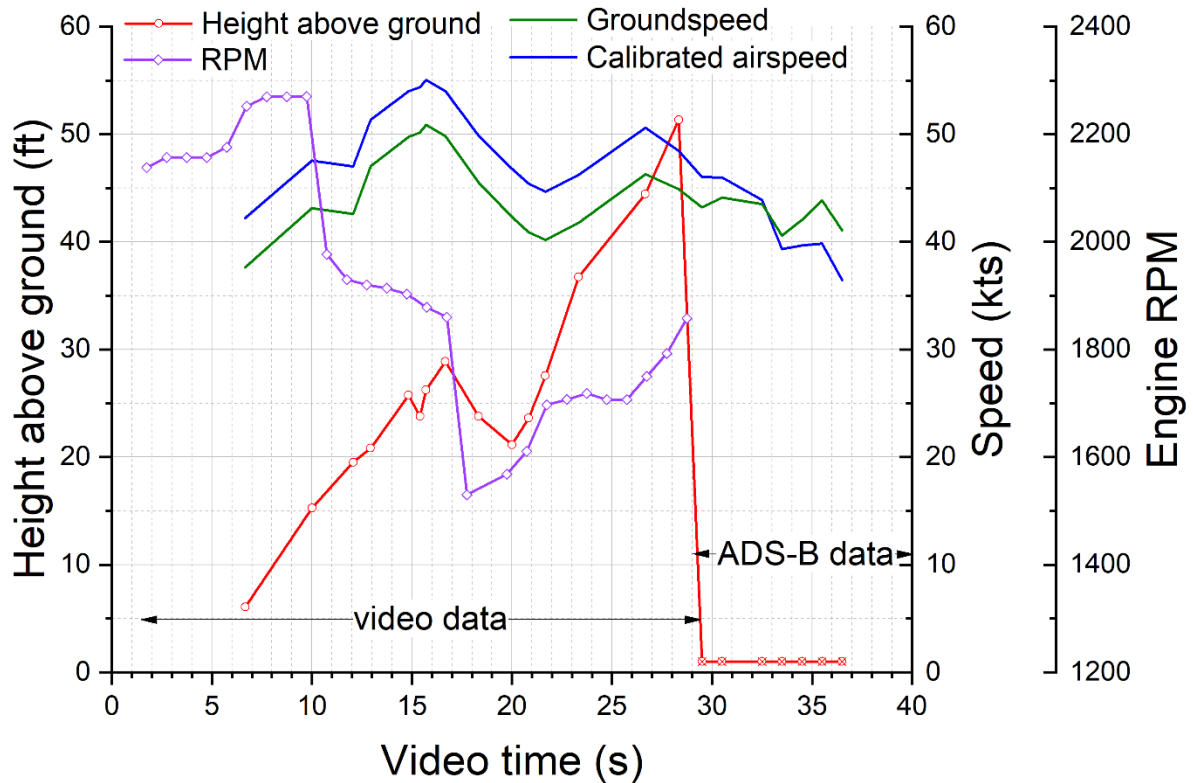


Figure 3. Airplane altitude, calculated groundspeed and airspeed, and engine RPM in video time.

During the initial seconds of the take-off climb, the airplane gained altitude and speed. At 10 seconds the engine RPM dropped and then decreased further at 17 seconds. After the second decrease in RPM, the airplane lost altitude and the speed reduced. The airplane again climbed and was 50 ft above the ground as it flew beyond the end of the runway. It continued to lose speed, however, and had slowed to below 40 kts by the end of the ADS-B data.

The Owner's Handbook [2] reported that the airplane's stall speed is 48 mph, indicated airspeed, or 42 kts. Indicated airspeed was not corrected to calibrated airspeed, as the aircraft-specific correction table was not available, but indicated and calibrated speeds should be within a few knots. As the airplane turned left, the bank angle increased to more than 20° which would have raised the stall speed above the reported 42 kts. The increasing stall speed and decreasing airplane speed likely led to aerodynamic stall.

Performance Study
ERA21FA142, Luscombe 8E, N2960K

D. CONCLUSIONS

The airplane lifted off of runway 9, climbed and gained speed, until the engine RPM decreased. The airplane continued to climb, but the airspeed decreased until it was likely below the reported stall speed in a banked turn.

Marie Moler
Specialist – Airplane Performance
National Transportation Safety Board

E. REFERENCES

1. Video Study, ERA21FA142, National Transportation Safety Board. 2021
2. Owners Handbook, Luscombe Silvaire Model 8E, Silvaire Aircraft, Fort Collins, Colorado.