

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



WPR21FA025

VEHICLE PERFORMANCE

Performance Study

A. ACCIDENT

Location: Cordes Lakes, Arizona
Date: October 24, 2020
Time: 10:28 mountain standard time (MST)
17:28 UTC
Aircraft: Lancair 235, N25NL

B. SUMMARY

On October 24, 2020, about 10:28 mountain standard time, a Lancair 235, N25NL, was substantially damaged when it was involved in an accident near Cordes Lakes, Arizona. The pilot and passenger were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

C. PERFORMANCE STUDY

1.0 Available Data

This performance study is based on data recorded by two on-board Dynon devices [1]. The devices recorded the airplane's GPS position, altitude, winds, groundspeed, indicated airspeed, true airspeed, ground track, and magnetic heading. The Dynon devices also recorded the airplane's pitch, roll, angle of attack, and vertical and longitudinal accelerations, along with a variety of engine and avionic parameters. Data was recorded at 16 Hz.

ADS-B (automatic dependent surveillance - broadcast) data was also available, but at a much lower resolution than the position data recorded by the Dynon devices and was therefore not used.

2.0 Weather

At 10:53, the weather station nearest the accident location at Prescott Regional Airport (KPRC) in Prescott, Arizona, 29 nautical miles northwest of the accident site, recorded the temperature as 70°F (21°C), the dewpoint as 37°F (3°C), and the barometric pressure as 30.11 inHg. Winds were 9 kts from 150°. Skies were clear and visual meteorological conditions prevailed.

3.0 Flight Path

The airplane took off from Phoenix Deer Valley Airport (KDVT) in Phoenix, Arizona at about 10:11 (Figure 1). At 10:15, while climbing, the airplane turned left onto a northerly heading. The airplane continued to climb until it reached an altitude of 8,000 ft above mean seal level (msl) after 10:23 (Figure 2). The airplane's speed increased to between 130 and 150 kts of indicated airspeed at altitude.



Figure 1. Aircraft flightpath in blue with selected times and altitudes (msl) marked.

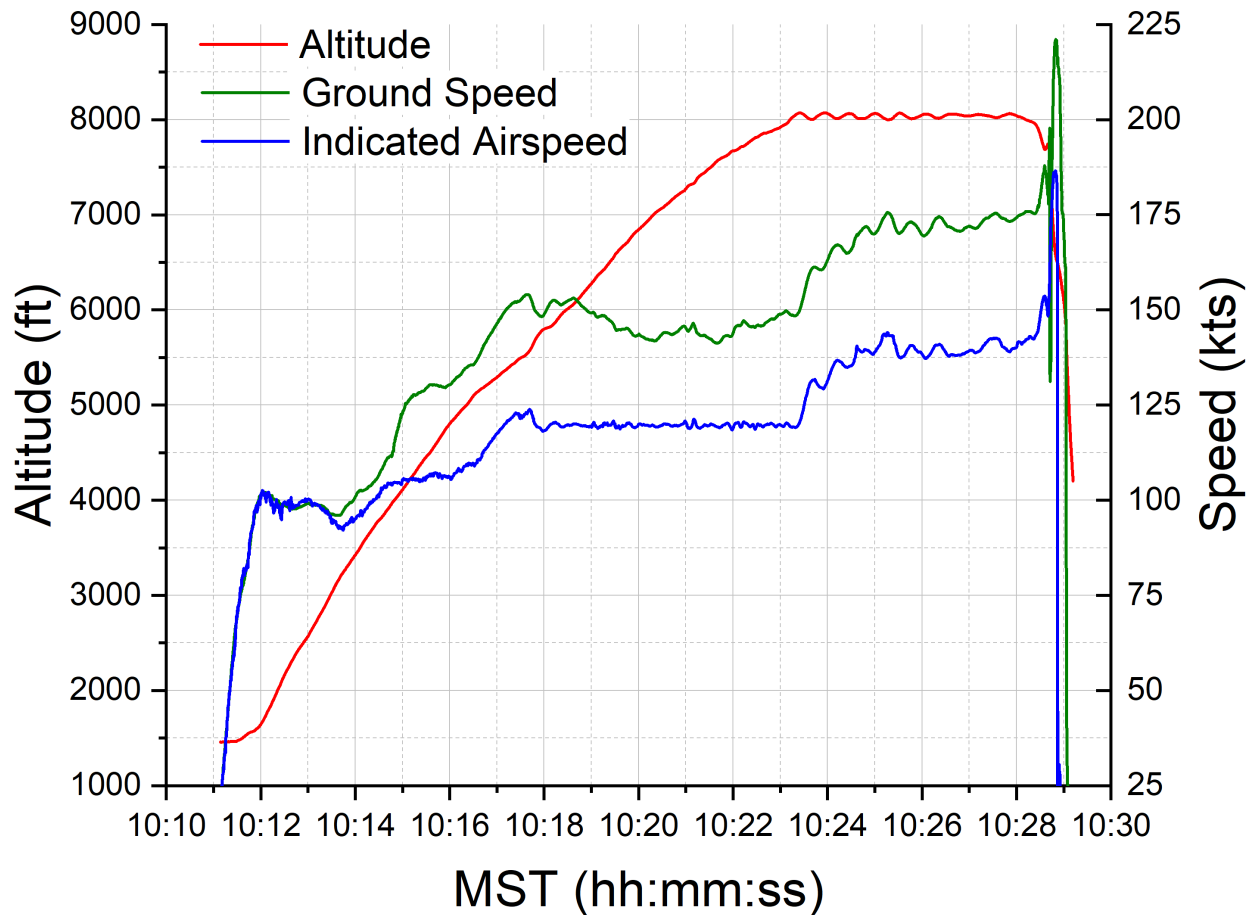


Figure 2. Recorded altitude (msl), groundspeed, and indicated airspeed for flight.

At 10:28:38 (Figure 3), the airplane executed a left 360° roll. The airplane descended over 1,000 ft during the maneuver. During the roll, the vertical acceleration varied between -0.7 g and 2.9 g. Figure 4 shows the roll and a number of engine parameters. During the roll, many engine parameters dropped or changed. After 10:28:50, a few seconds after the completion of the roll maneuver, engine RPM and oil pressure dropped to zero while airplane attitude, accelerations, and airspeed parameters became unreliable.

Data continued to be recorded until 10:29:11 (Figure 5). Terrain elevation in the area of the accident was between 3,700 and 3,800 ft. The last GPS position and altitude recorded was approximately 600 ft above the ground.

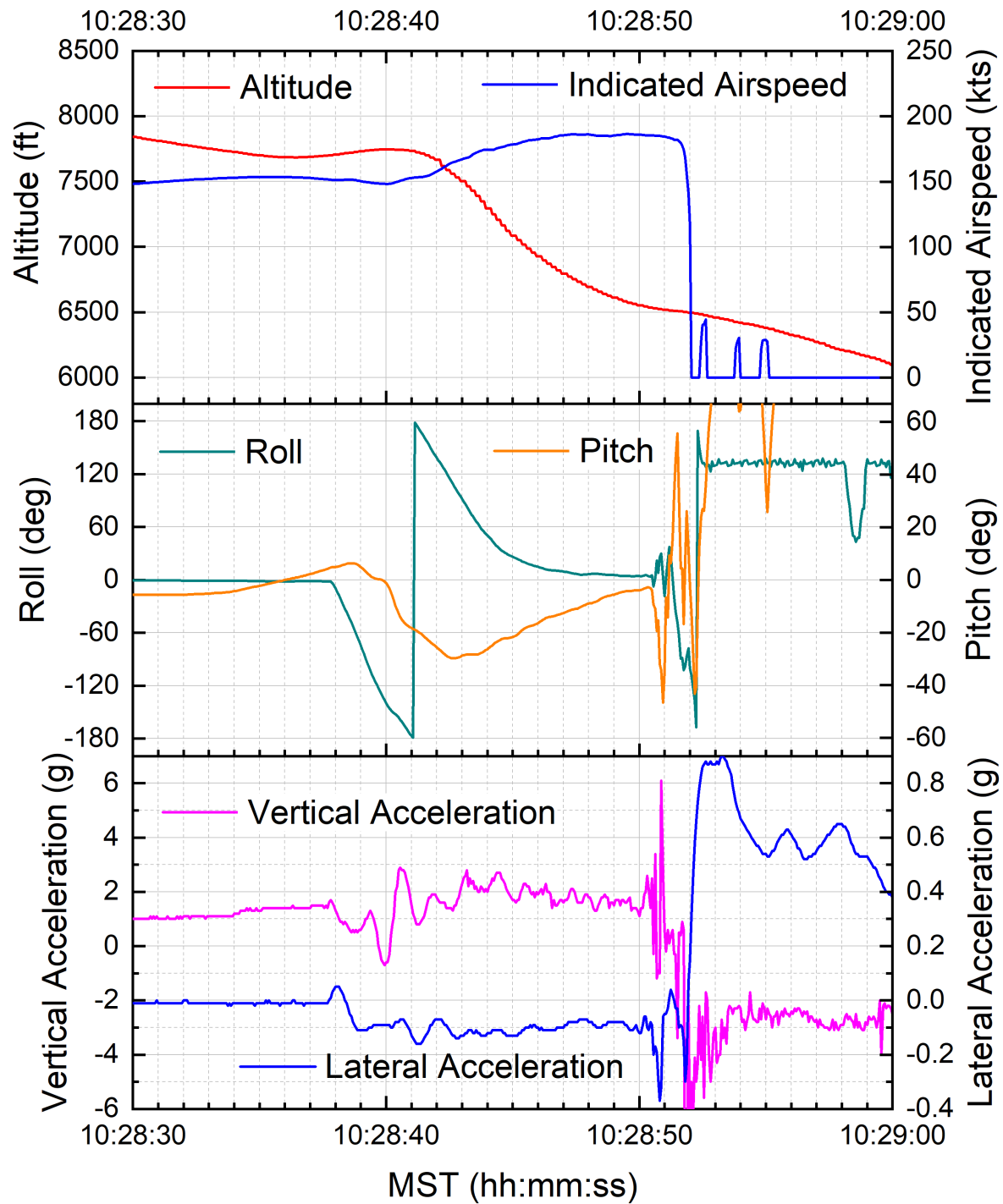


Figure 3. Altitude (msl), airspeed, roll, pitch, and vertical and lateral accelerations for 360° roll.

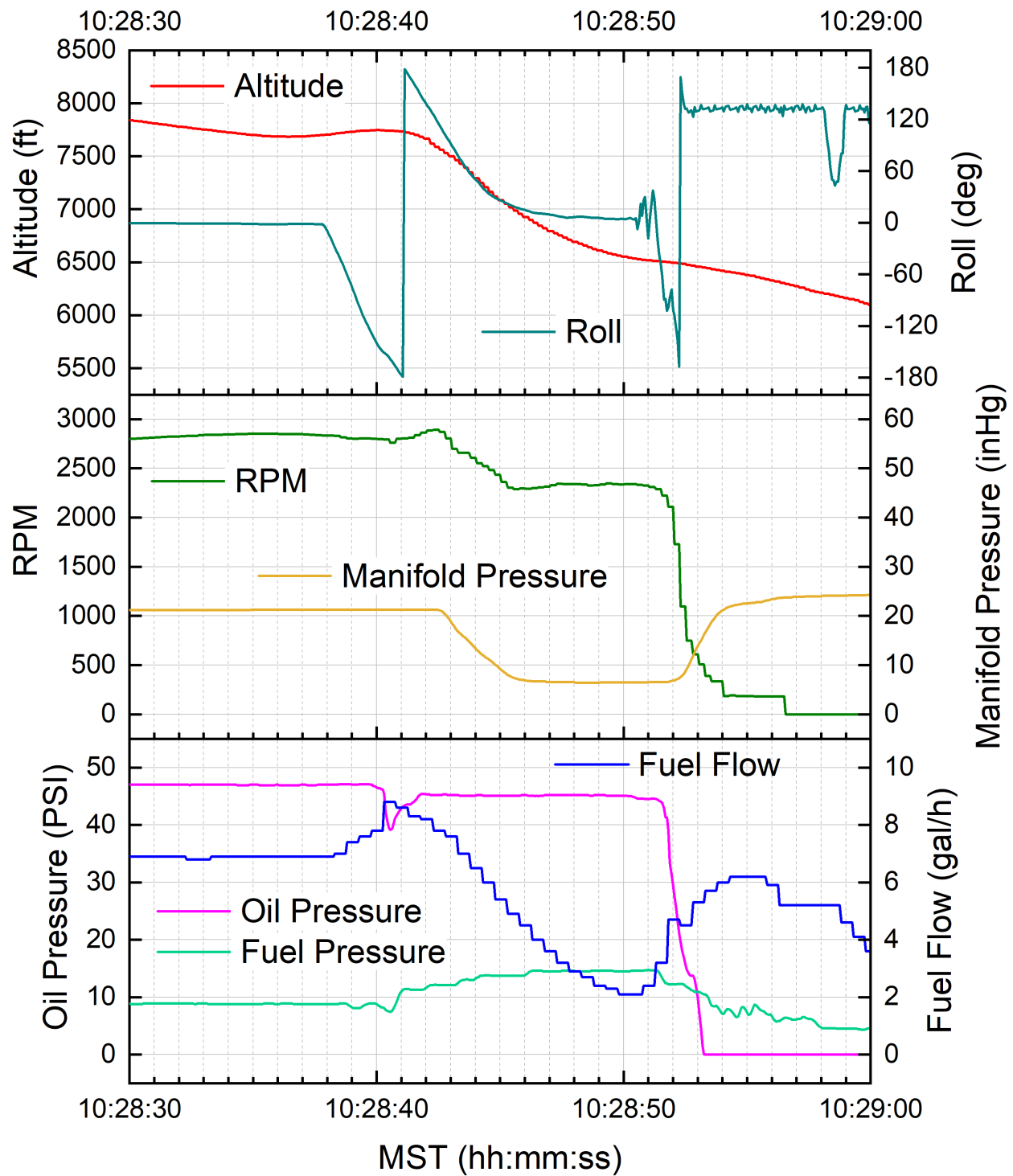


Figure 4. Altitude (msl), roll, and engine parameters at the end of flight.

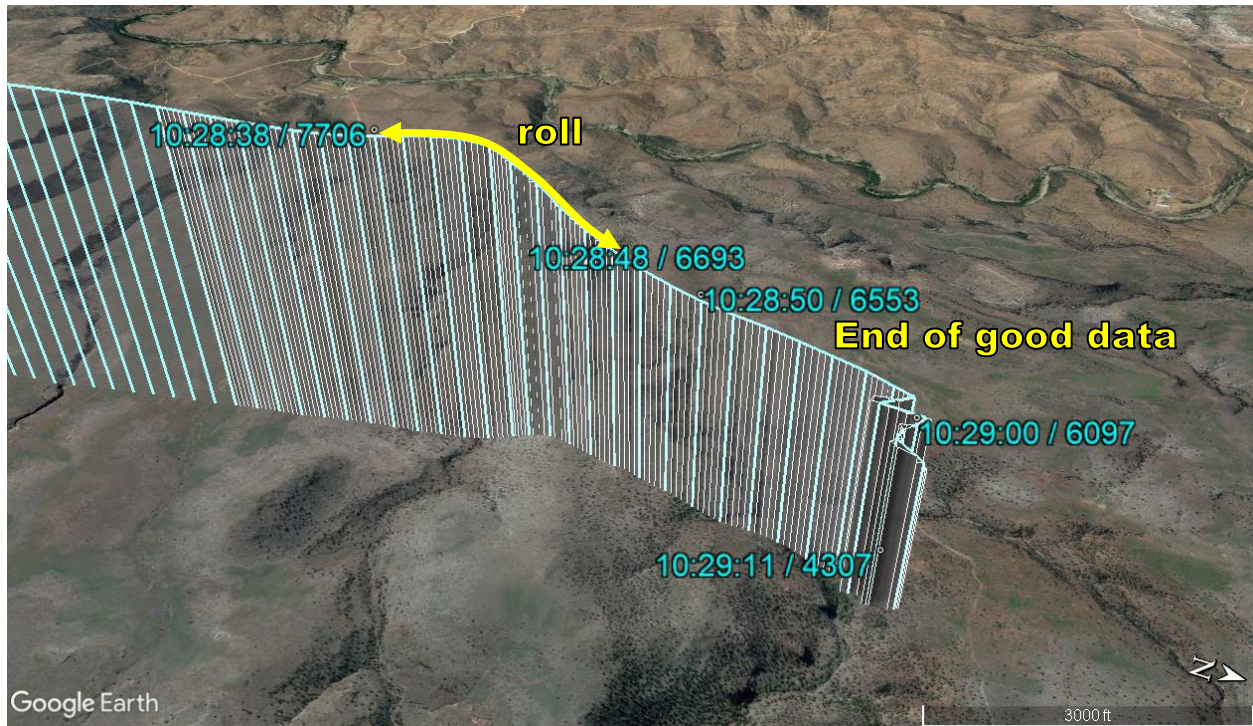


Figure 5. End of flight with selected times and altitudes (msl) noted.

D. SUMMARY

The flight proceeded normally from take-off at 10:11 until 10:28. About 10:28:38 the airplane performed a 360° left roll during which it lost over 1,000 ft of altitude. After 10:28:50, RPM and oil pressure dropped to zero and the attitude data became unreliable. The GPS position data continued until 10:29:11, shortly before impact.

E. REFERENCES

1. Cockpit Display - Recorded Flight Data, Specialist's Factual Report, WPR21FA025, National Transportation Safety Board.

Submitted by:

Marie Moler
Vehicle Performance Engineer