

National Transportation Safety Board

Office of Research and Engineering

Washington, D.C. 20594

Performance Study

Specialist Report

Marie Moler

A. ACCIDENT

Location: Brighton, Colorado
Date: September 2, 2020
Time: 12:13 Mountain daylight time (MDT)
Airplane: Titan Mustang T-51, N153JW
NTSB Number: CEN20LA375

B. SUMMARY

On September 2, 2020, at 12:13 mountain daylight time, a Titan Mustang T-51 airplane, N153JW, was destroyed when it was involved in an accident near Brighton, Colorado. The pilot was fatally injured. 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 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 Denver International Airport (DEN), about eight miles from the accident, was 79°F (26°C), dew point 39°F (4°C), and the barometric setting was 30.12 inHg. Winds were 5 kts from 250°. Skies were clear.

Airplane speeds were calculated using the ADS-B position data and weather data. The airplane was flying in the vicinity of Van-Aire Skyport (CO12). It took off about 11:57 from runway 12 (Figure 1 and Figure 2) and circled the area. Just before 12:10 it descended and flew the length of runway 30. It then circled and repeated the maneuver about 12:12. The airplane crashed just after 12:13:05.

Performance Study
CEN20LA375, Titan Mustang T-51, N153JW

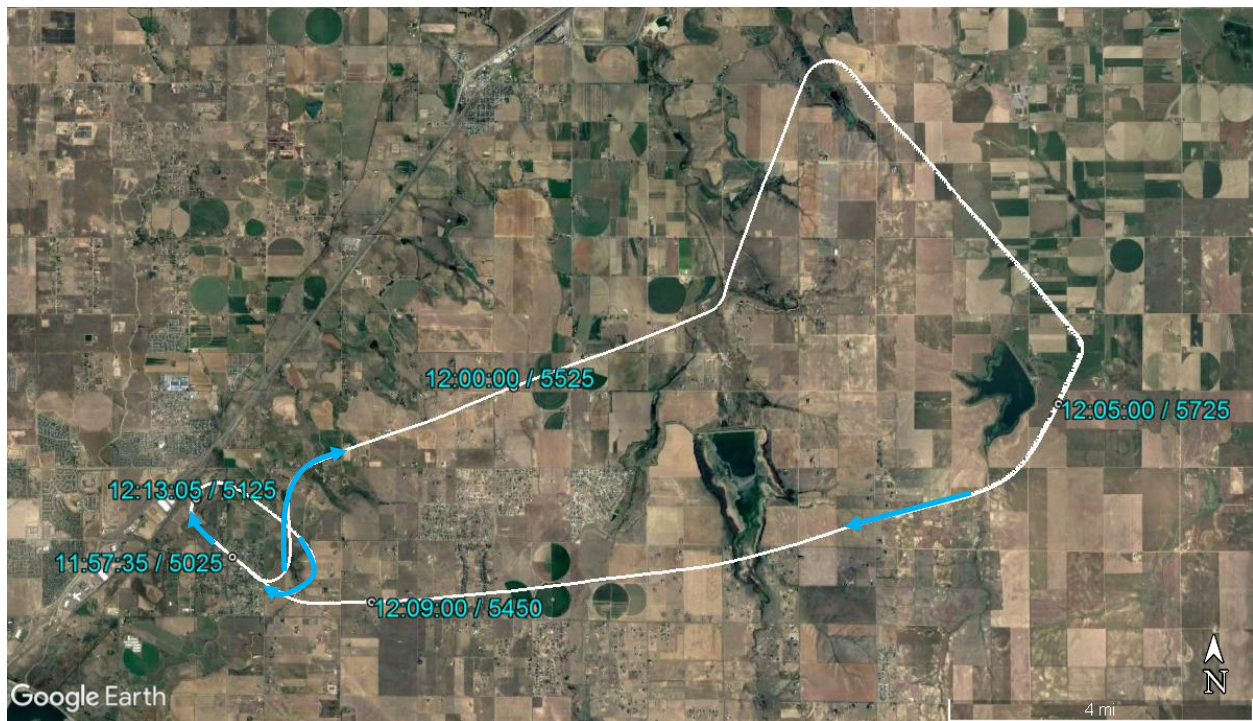


Figure 1. Accident flight with select times and altitudes above mean sea level (msl) annotated in blue.

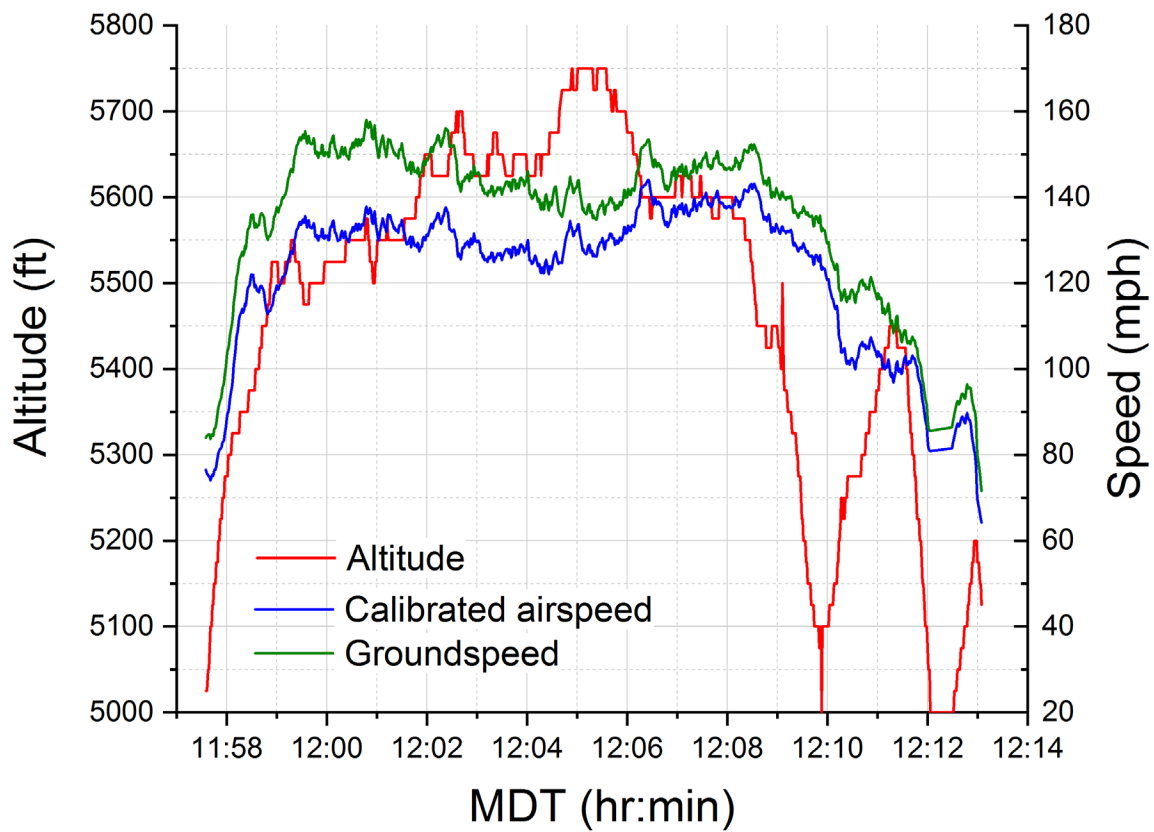


Figure 2. Altitude (msl) and calculated groundspeed and calibrated airspeed.

Performance Study

CEN20LA375, Titan Mustang T-51, N153JW

The airplane's airspeed was between 120 and 140 mph (104 and 121 kts) during the first 12 minutes of flight. The airplane then descended and slowed to about 100 mph (87 kts) as it overflew runway 30. It maintained 100 mph as it climbed again and circled. During the second overflight of runway 30 the airplane again descended, and its speed slowed further to about 80 mph (69 kts). During the second overflight there was a 26 second break in data while over runway 30. In Figure 2 this is marked by a flat speed calculation of about 80 mph in airspeed from 12:12:04 to 12:12:30. Details such as altitude of the over-runway portion of flight were not recorded in the ADS-B data.

As the airplane climbed the last time, airspeed increased to about 90 mph (78 kts) at 12:12:47. The airplane then began to slow as it continued climbing. At 12:12:56 the airplane reached 5,200 ft msl (about 175 ft above ground level) (Figure 3) and maintained that altitude for four seconds while the airplane slowed below 70 mph. At 12:13 the airplane descended and slowed while turning in towards the right and deviating from the earlier path. Data ended at 12:13:05 and the wreckage was located just beyond the last data point.

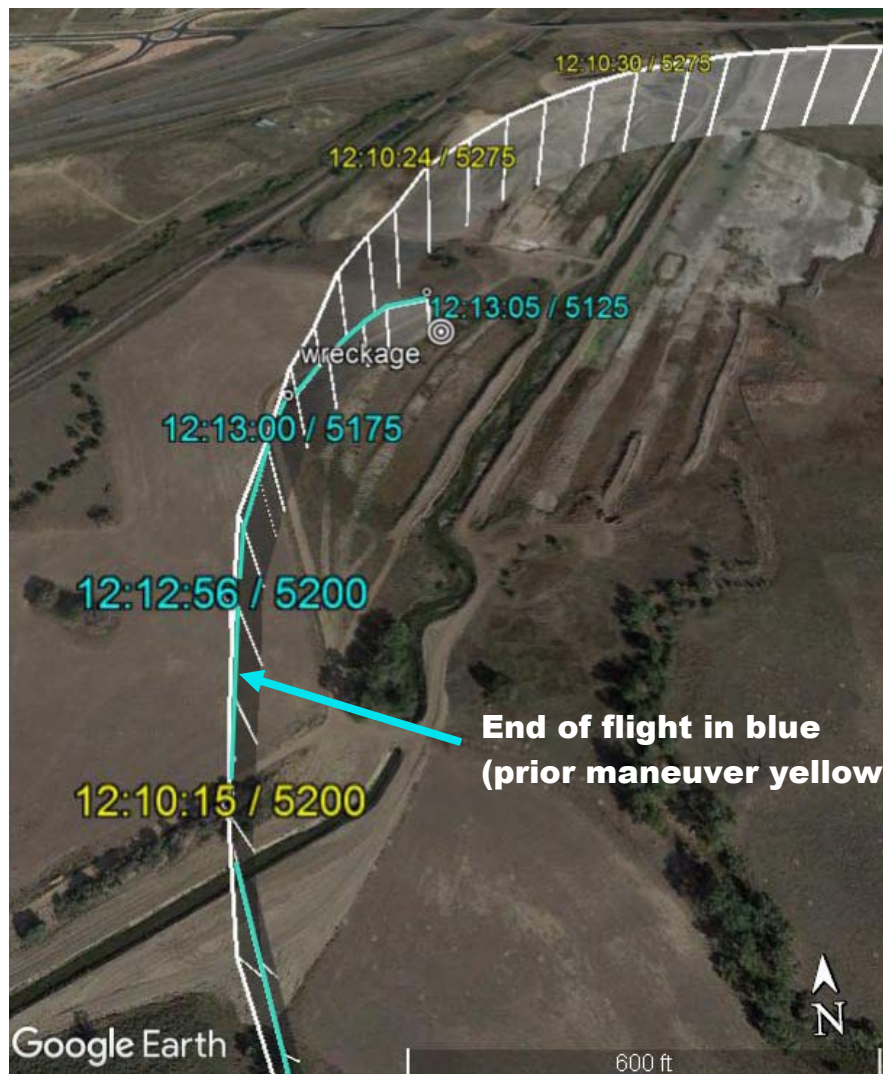


Figure 3. End of flight path labeled in blue. Earlier maneuver labeled in yellow.

Performance Study
CEN20LA375, Titan Mustang T-51, N153JW

Titan Aircraft provided lift data as a function of airplane weight for no flaps and full flaps settings. A worst-case power-off stall scenario was calculated for a heavy weight of 1,900 lbs and no flaps which resulted in a wings-level stall speed of 57 mph. Airplane bank angle was calculated using the flight path and a simple aerodynamic model. Figure 4 shows the heavy, no flaps stall speed as a function of bank angle. As the airplane goes from wings-level over the runway into the right turn, the stall speed rises. However, the airplane's speed was more than 10 mph higher than the stall speed when the airplane stopped climbing. Not until the stall speed increased with the tightening of the right turn and increasing bank angle did the airplane's speed drop below stall. This indicates that aerodynamic stall did not cause the loss of altitude and change in flight path.

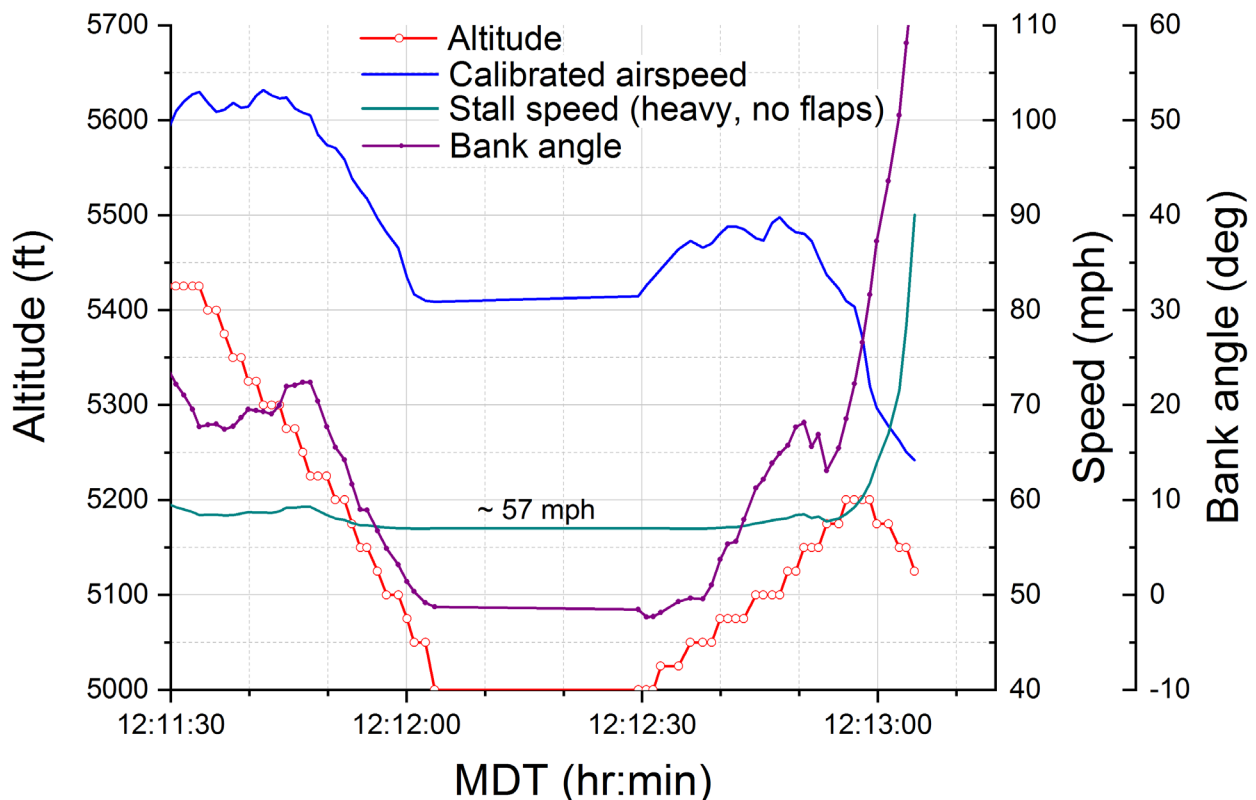


Figure 4. Altitude, calculated airspeed, and bank angle from the end of flight.

Performance Study
CEN20LA375, Titan Mustang T-51, N153JW

D. CONCLUSIONS

The airplane slowed during the initial overflight of runway 30 to an airspeed of about 100 mph and then slowed again to 80 mph during the second and final overflight of the runway. It cannot be determined from the data available why the airspeed for the second overflight was lower than the first or why it continued to lose speed during the final climb. The airplane began to descend and deviate from the earlier flight path at a speed greater than the reported stall speed (accounting for bank angle), indicating that aerodynamic stall did not cause the loss of altitude and change in flight path.

Marie Moler
Specialist – Airplane Performance
National Transportation Safety Board