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

Performance Study

Specialist Report
Marie Moler

A. ACCIDENT

Location:	Bahama, North Carolina
Date:	October 21, 2014
Time:	1044 EDT
Airplane:	Beech D95A, N64GM
NTSB Number:	ERA15FA023

B. GROUP

No vehicle performance group was formed.

C. SUMMARY

On October 21, 2014, at 1044 eastern daylight time, a Beech D95A, N64GM, was substantially damaged when it impacted trees and terrain near Bahama, North Carolina. The flight instructor was fatally injured and the private pilot receiving instruction (student) was seriously injured. Visual meteorological conditions (VMC) prevailed, and no flight plan was filed for the local flight, which originated from Lake Ridge Aero Park (8NC8), Durham, North Carolina, about 1040. The instructional flight was conducted under the provisions of 14 Code of Federal Regulations Part 91.

PERFORMANCE STUDY

The performance study describes the accident airplane ground track, altitude, and speed. Radar data used in this study are primarily from the ASR-9 (airport surveillance radar) at Raleigh-Durham International Airport (KRDU) and sampled at a frequency of every 4.5 seconds. The radar is approximately 18 nautical miles from the aircraft's final location. These data have approximately a 60 nautical mile (NM) range and an inherent uncertainty of ±2 Azimuth Change Pulses (ACP) = ± (2 ACP) x (360º/4096 ACP) = ±0.176° in azimuth, ±50 ft in altitude, and ±1/16 NM in range. Times in the study are reported in EDT.

The aircraft's weight was unrecorded, but the weight of the two pilots aboard was estimated to be 160 and 170 lbs.

Weather Observation

The weather conditions reported at Person County Airport (KTDF) at 1055 EDT were 6 kts winds from 280°, 64°F (18°C) with a dew point of 50°F (10°C), and the pressure was 29.94 inHg. Visibility was ten miles, with scattered clouds at 10000 ft. KTDF is approximately 10 nautical miles northwest of the wreckage location.

Winds aloft for the area and time of the accident were provided by the NTSB meteorology group and are shown in Table 1.

Table 1. Winds aloft data.

Altitude (ft)	Direction (deg)	Magnitude (kts)
476	261	3
1073	275	3
1796	304	8
2534	286	8
3287	269	10

Aircraft ground track, altitude, and speed

The flight path is shown in Figure 1. The aircraft took off from Lake Ridge Aero Park (8NC8) at about 10:30 EDT and traveled northwest on a track of about 330°. The length of the flight path based on the radar returns was about 7 NM. Figure 2 shows the final five radar returns and the wreckage location. The second to last radar return was at 1700 ft msl and on a track of 331°. The final radar return was 400 ft lower and on a track of 270°. Wreckage elevation was about 400 ft.

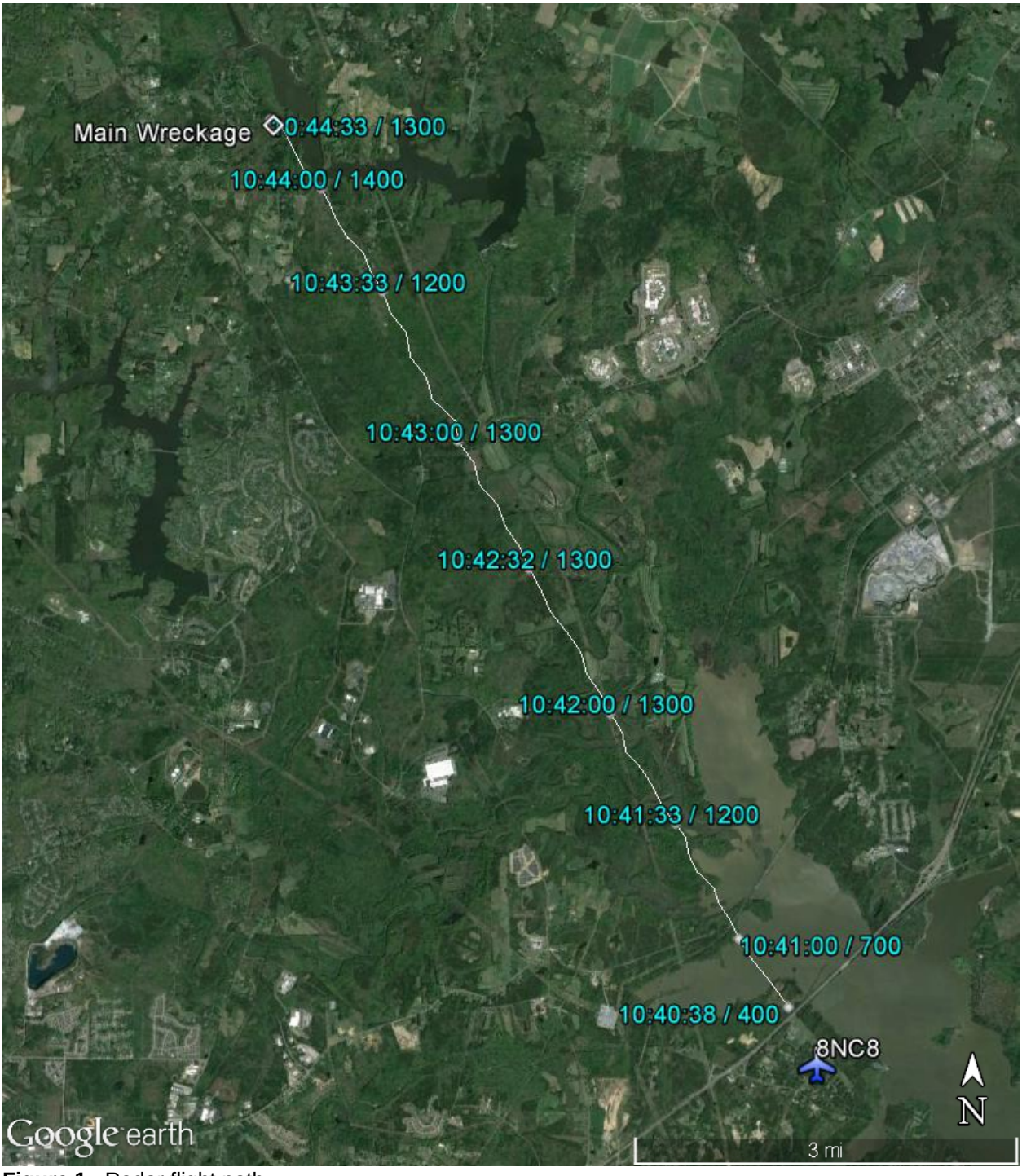

Figure 1. Radar flight path.

Figure 2. End of radar flight path.

The aircraft climbed and gained speed from takeoff to about 10:42 when the altitude leveled off at about 1300 ft (Figure 3). At about 10:43 the aircraft's altitude dropped to 1200 ft for about 45 seconds before climbing again to 1700 ft by 10:44:23. From 10:43 until near the end of the flight the aircraft lost speed from an airspeed of about 130 kts to an airspeed of 45 kts at 10:44:27, when the aircraft rapidly lost altitude.

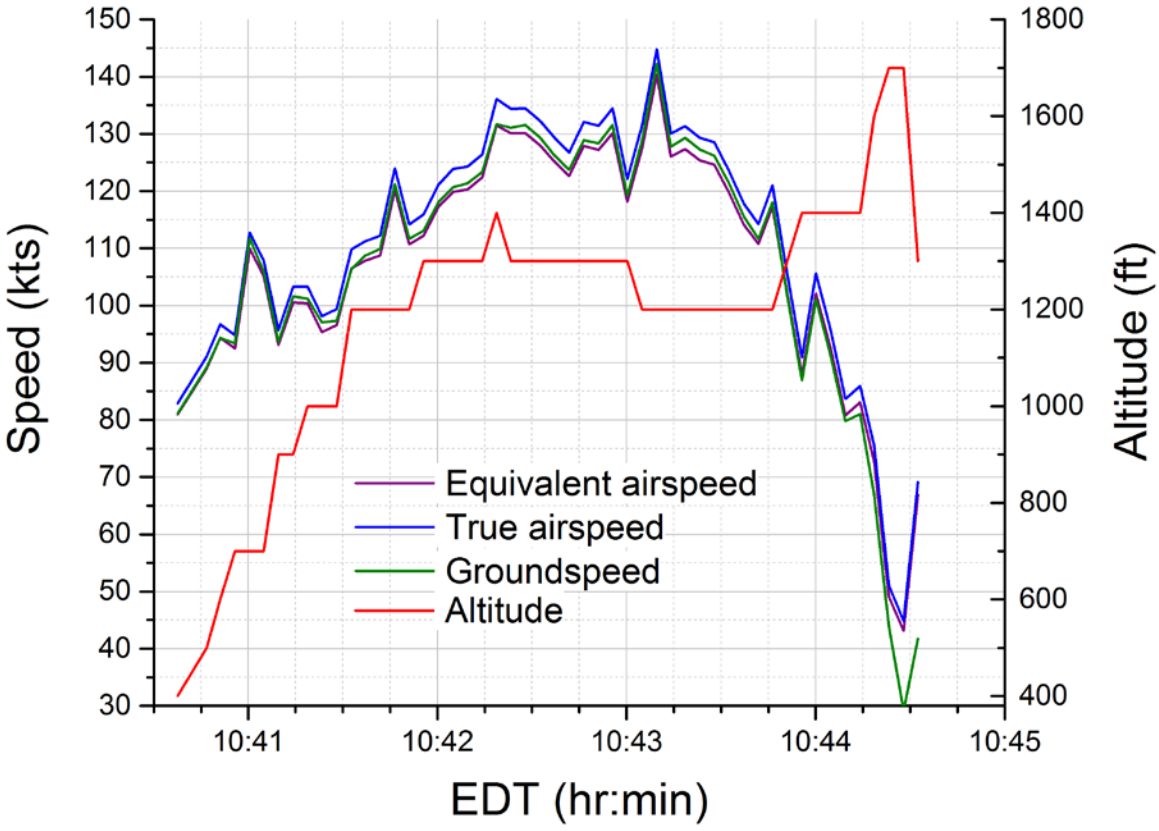

Figure 3. Calculated air and groundspeeds and recorded altitude for flight.

At 10:44:23, the peak of the aircraft's final climb, the equivalent airspeed was calculated to be less than 50 kts and slowing. Figure 4 shows the stall speeds for the Beech D95A [1] in indicated airspeed (within one or two knots of equivalent airspeed). For a gross weight of 4200 lbs (maximum take-off weight), 50 kts was below any of the gear and flaps up stall speeds. The empty weight of the airplane is listed as 2555 lbs; at that weight, the power-on stall speed would be expected to be reduced from 53 kts to 41 kts. The accident aircraft only had two people aboard with light baggage and was likely considerably lighter than maximum take-off weight.

The airplane was 8 miles away from Lake Ridge Aero Park (8NC8), the airport it originated from, and it was more than 10 miles away from Pearson County Airport (KTDF), the next airport along its flight path. It is likely that the airplane was flying under power and configured with gear and flaps up.

STALL SPEEDS (IAS)

GROSS WEIGHT 4200 LBS	LEVEL 	15° 	30° 	45° 
POWER	GEAR AND FLAPS UP			
*ON	61.0 MPH 53.0 KTS	62.0 MPH 54.0 KTS	65.5 MPH 57.0 KTS	72.5 MPH 63.0 KTS
OFF	85.0 MPH 73.5 KTS	86.5 MPH 75.0 KTS	91.5 MPH 79.5 KTS	101.0 MPH 87.5 KTS
GEAR AND FLAPS DOWN 28 DEGREES				
*ON	50.0 MPH 43.5 KTS	51.0 MPH 44.0 KTS	53.5 MPH 46.5 KTS	59.5 MPH 51.5 KTS
OFF	75.0 MPH 65.0 KTS	76.5 MPH 66.5 KTS	80.5 MPH 70.0 KTS	89.5 MPH 77.5 KTS
* 25.0″ Hg AND 2700 RPM				

Figure 4. Stall speeds from the Beech D95A Owner's Manual.

D. CONCLUSIONS

From 10:43 until the end of flight, the aircraft gained altitude while losing airspeed. The calculated equivalent airspeed was close to the aircraft's expected stall speed before losing altitude. The rapid loss of altitude and subsequent track deviation to the left is consistent with aerodynamic stall.

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E. REFERENCES

1. Beechcraft TravelAir D95A Owner's Manual. Beechcraft Aircraft Corporation, Wichita, Kansas, Issued June 12, 1963, Revised August 3, 1964.