

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



CEN21FA209

VEHICLE PERFORMANCE

Aircraft Performance Study

A. ACCIDENT

Location: Hattiesburg, Mississippi
Date: May 4, 2021
Time: 23:05 Central daylight time (CDT)
04:05 UTC, May 5, 2021
Airplane: Mitsubishi MU-2B, N322TA

B. SUMMARY

On May 4, 2021, about 2305 central daylight time, a Mitsubishi MU-2B-60 airplane, N322TA, was destroyed when it was involved in an accident near Hattiesburg, Mississippi. The pilot and two passengers were fatally injured. The airplane collided with a private residence; one occupant was fatally injured, and two other occupants sustained minor injuries. The airplane was operated under the provisions of Title 14 *Code of Federal Regulations* Part 91 as a personal flight.

C. PERFORMANCE STUDY

1.0 Available Data

This performance study is based on Automatic Dependent Surveillance-Broadcast (ADS-B) data. 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 (65 ft) in both the horizontal and vertical dimensions.

2.0 Weather

Weather was recorded at the Hattiesburg Bobby L. Chain Municipal Airport (KHBG), approximately 2 NM from the accident site. The temperature was reported as 66°F (19°C), the dew point was 64°F (18°C), and the barometric setting was 29.95 inHg. Winds were calm and a broken cloud base at 600 ft above ground level was reported. Night instrument meteorological conditions (IMC) prevailed.

3.0 Flight Path

The aircraft took off from Wichita Falls Municipal Airport in Wichita Falls, Texas at about 20:58 CDT (Figure 1). The airplane climbed to about 24,000 ft above mean sea level (msl) (Figure 2). The pilot checked in with Houston Air Route Traffic Control Center (ARTCC) Picayune sector (ZHU27) and requested to descend [1] into Hattiesburg. The airplane was cleared to 2,400 ft and shortly after 22:35, the airplane began its descent. During the descent, the pilot discussed the current weather and

requested the RNAV GPS Y approach to runway 13 at Hattiesburg (see Appendix for approach chart).

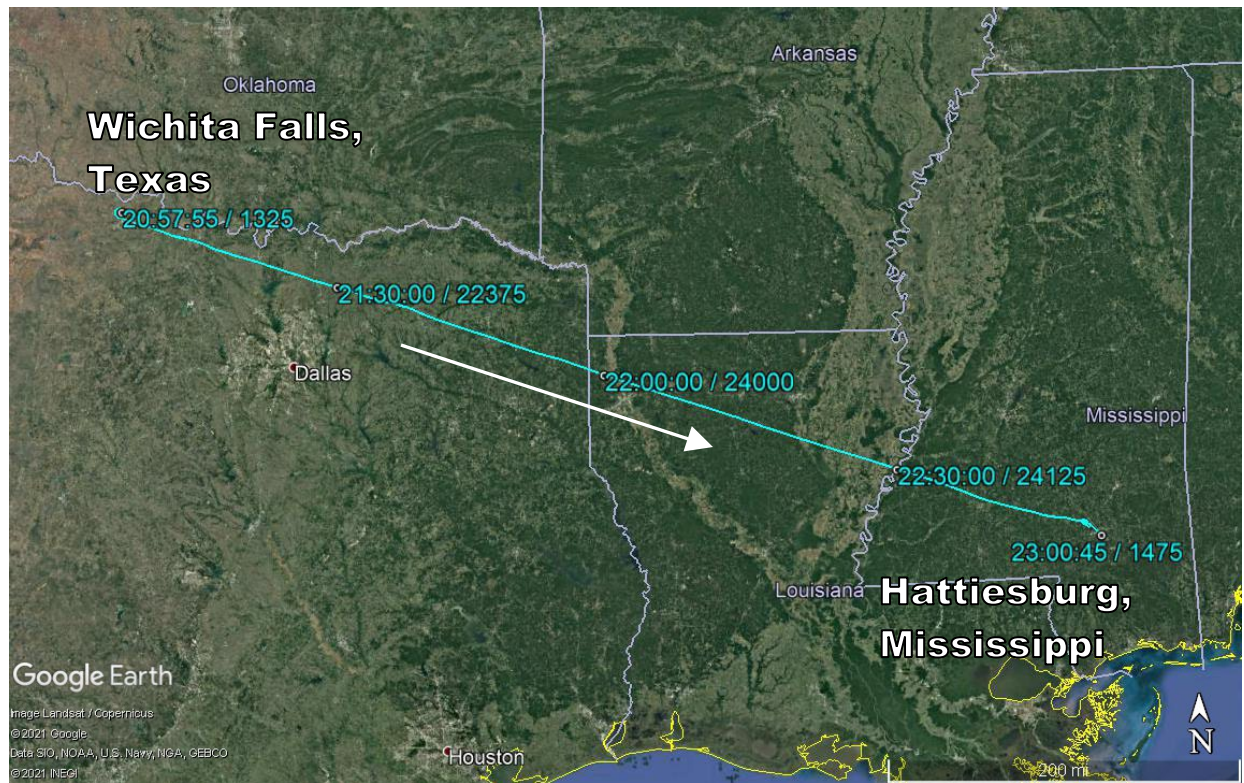


Figure 1. Accident flight in blue with select times and altitudes (msl) annotated in blue.

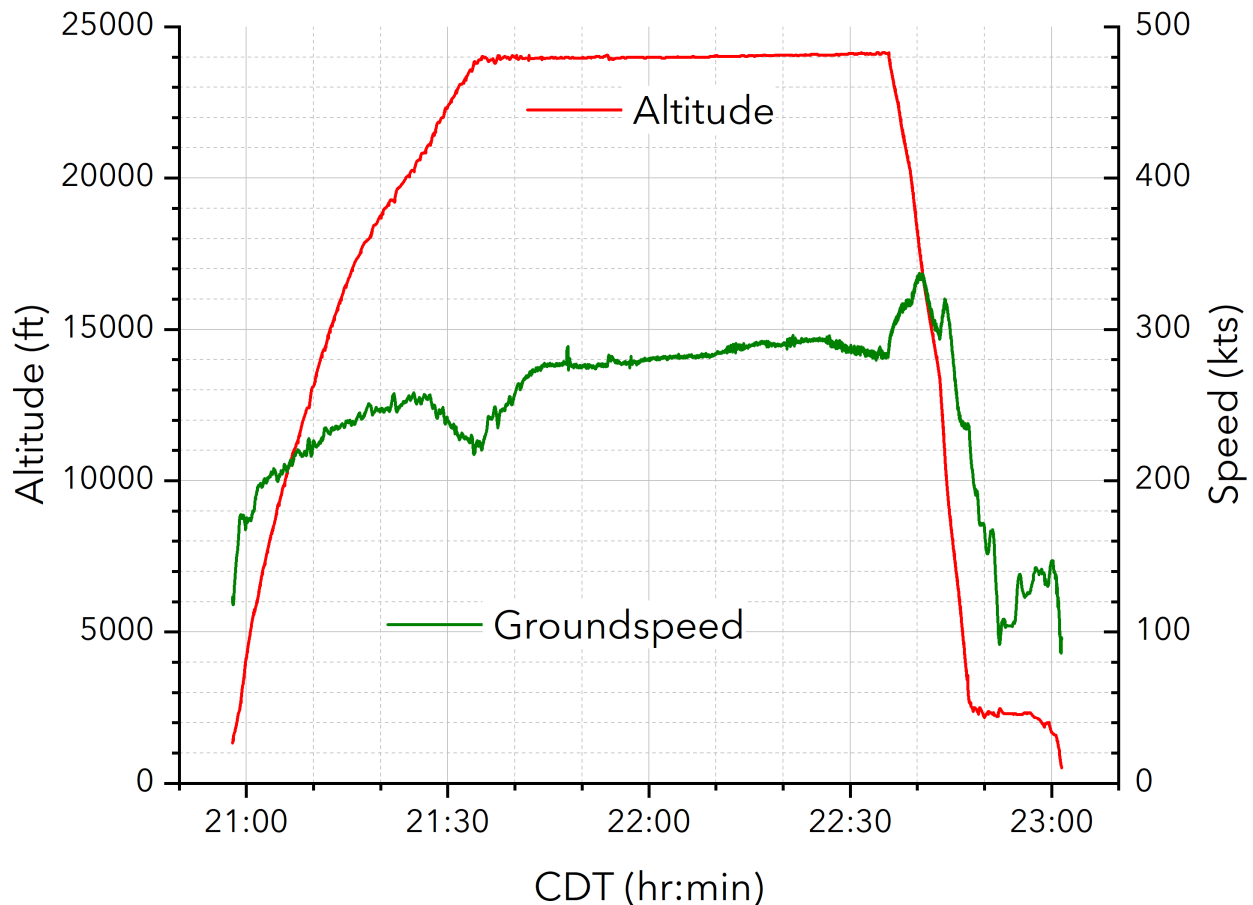


Figure 2. Altitude (msl) and calculated groundspeed.

There is no control tower at KHBG, so at 22:49 the pilot asked ZHU27 for clearance for the approach. ZHU27 cleared the pilot for the approach and directed him to maintain 2,400 ft. At about 22:51 the airplane began a procedure turn consistent with the RNAV approach to runway 13 (Figure 3). By 22:58 the airplane track was aligned with the runway approach heading. ADS-B data ended at 23:01:28, 732 ft before the airplane's point of impact.



Figure 3. Approach flight path and impact location, selected times and altitudes (msl) annotated in blue. Waypoints HILGA and CUPPA and the airport are also indicated; see the approach chart in the Appendix.

As the airplane entered the procedure turn, its altitude was about 2,300 ft and descending and the airspeed was 160 kts (Figure 4). The altitude for the procedure turn and for HILGA is listed as 2,500 ft but earlier instructions from ATC were to maintain 2,400 ft. At 22:52:12 the airplane had slowed to 88 kts of airspeed at 2,450 ft. At flaps 5°¹ 9,500 lbs gross weight, the airplane's wings-level power-idle stall speed would have been about 88 kts calibrated airspeed. Engine power would lower the speed at which stall occurs. For flaps 20°, the power-idle stall speed would have been 78 kts. For flaps up, the power-idle stall speed would have been 95 kts.

The airplane reached 100 kts of airspeed while descending from 2,500 ft to 2,300 ft, then accelerated to 130 kts, and slowed again to 120 kts, before more gradually regaining 140 kts while descending after leaving the procedure turn (Figure 4).

¹ The Airplane Flight Manual [2] recommends flaps 5° on approach for speeds under 175 KCAS and flaps 20° when below 155 kts.

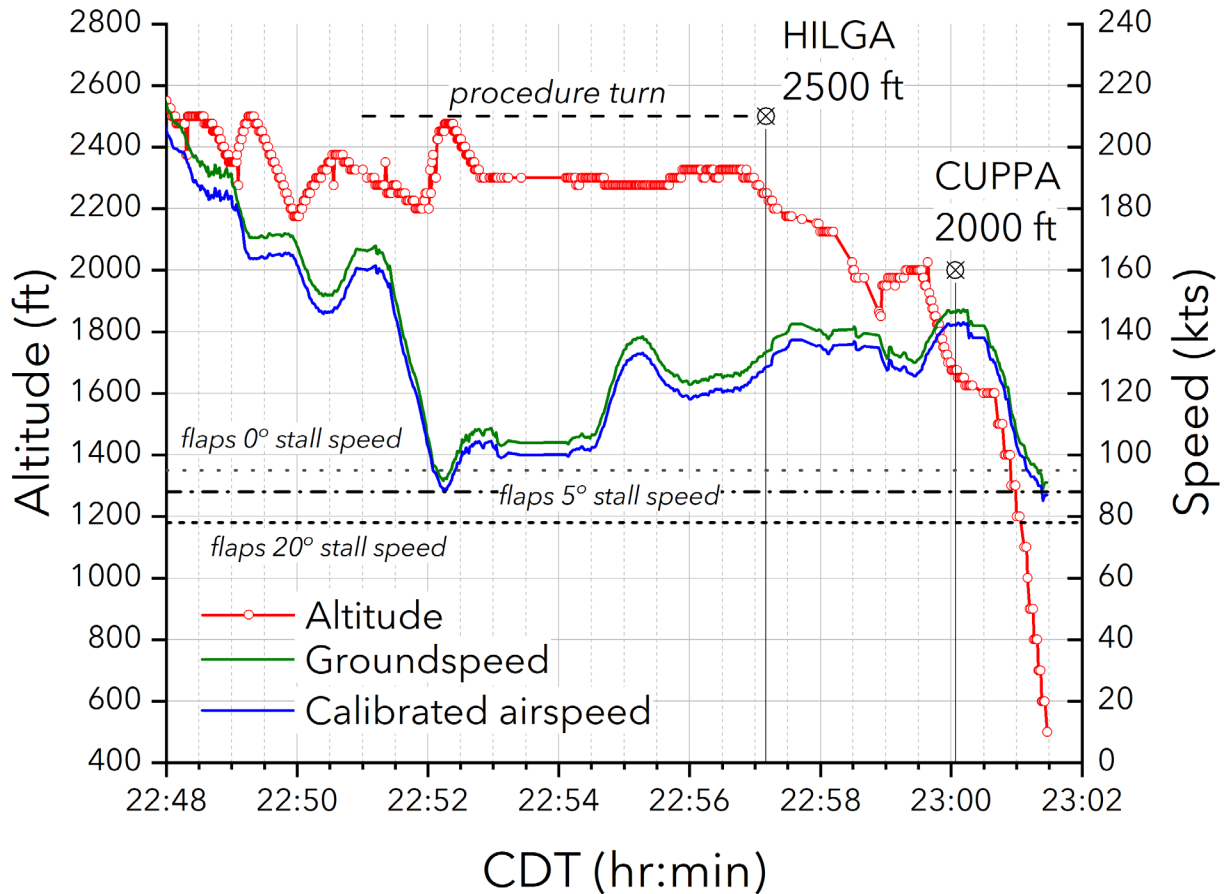


Figure 4. End of flight altitude (msl) and calculated groundspeed and calibrated airspeed.

After completing the procedure turn, the airplane passed CUPPA about 300 ft low and descending (Figure 5). The airplane leveled out for about 30 seconds and by 23:00:40 was then above the recommended 3° glide path to runway 13.

The airplane then entered a descent of about 1,300 fpm and passed below glide path. The airplane continued to decelerate, reaching a calculated calibrated airspeed of 85 kts at 23:01:24, seven knots above the flaps 20° power-idle stall speed, but below the other stall speed values. Examination of the wreckage found the flaps at 20°. The final data position at 23:01:28 was 300 ft above terrain and 750 ft from the wreckage location.

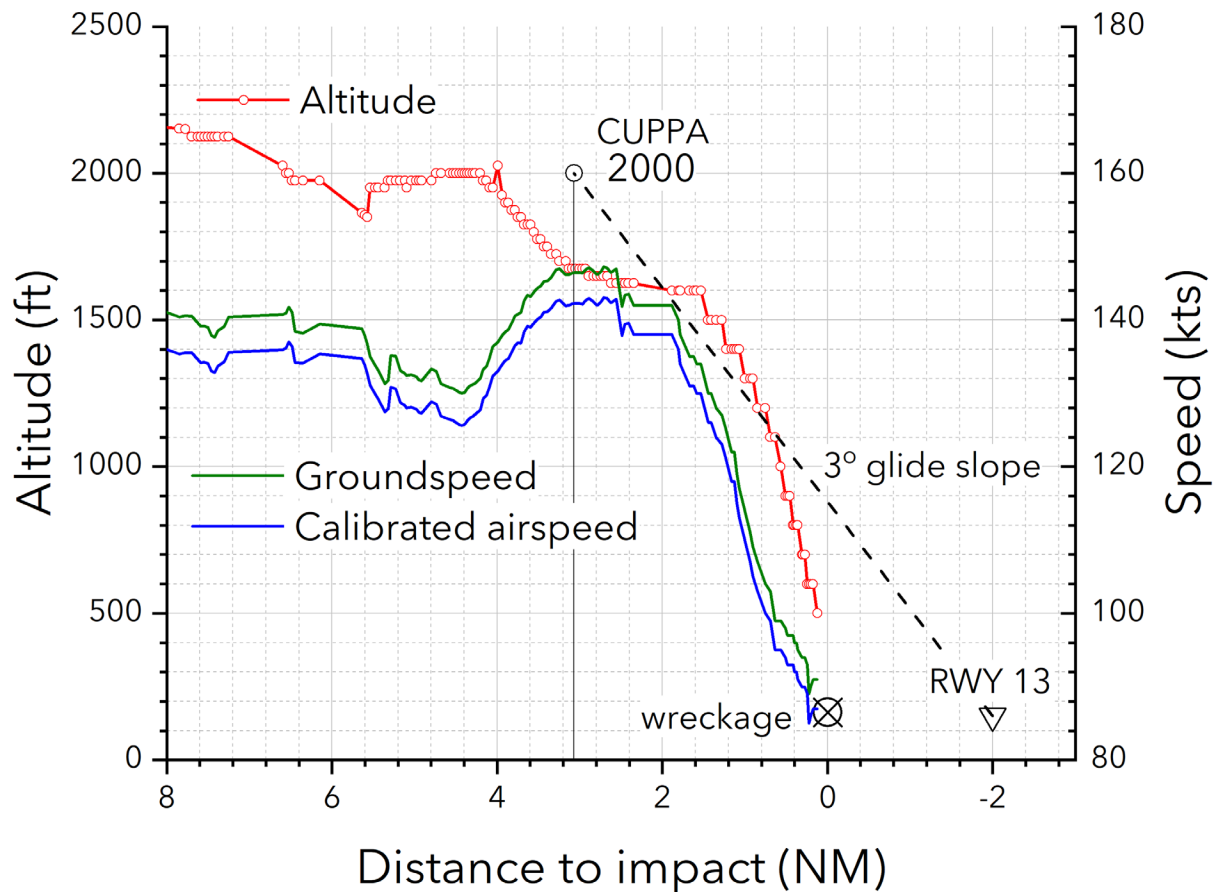


Figure 5. End of flight with wreckage location, the threshold to runway 13, CUPPA waypoint, and approximate 3° glide slope marked.

The airplane was in night conditions and above the reported broken cloud base until 23:01:22. The threshold of runway 13 was 2 NM beyond the wreckage location.

4.0 Prior Flights

ADS-B data from the three flights prior to the accident were obtained for comparison purposes. On April 29, 2021, the airplane flew from Destin, Florida to Mobile, Alabama. Figure 6 shows the airplane's approach into Mobile. Winds were 9 kts from 140°, visibility was 10 statute miles and skies were clear. Between 14:57 and 15:00 the airplane rapidly accelerated from 140 kts airspeed to 180 kts, then decelerated to 110 kts. For a flaps 20° landing, the airplane's approach calibrated airspeed should be between 99 kts (light) and 110 kts (heavy). The airplane's final calculated airspeed was 107 kts, approximately 1.25 NM from the threshold of runway 14. The airplane was within 50 ft of the 3° glidepath when on the runway heading.

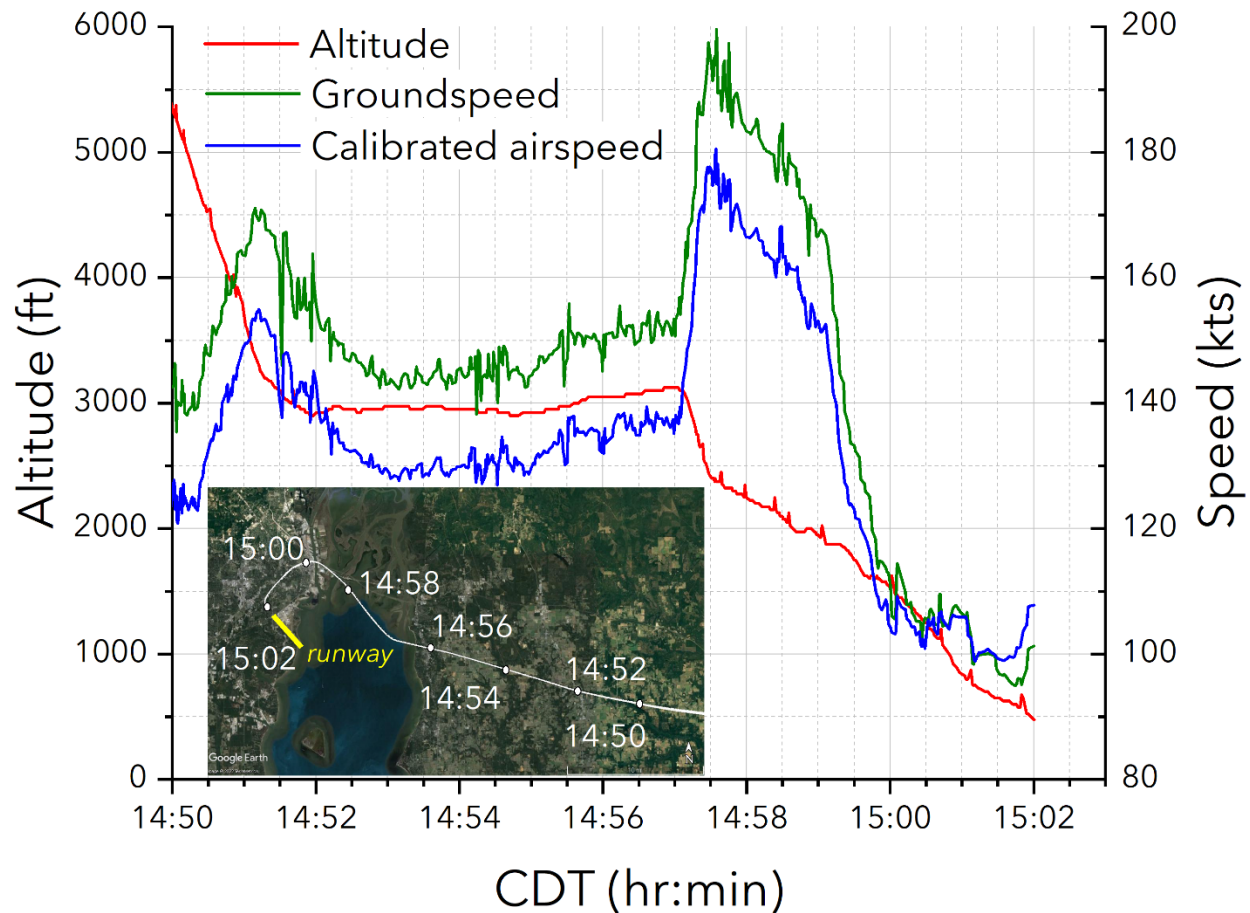


Figure 6. April 29, 2021 flight into Mobile, Alabama. Recorded altitude and calculated groundspeed and calibrated airspeed are shown versus local time. The inset shows the flight path to runway 14.

On May 1, 2021, the airplane left Mobile to return to Destin. Figure 7 shows the airplane's approach into Destin. Winds were 3 kts from 290°, skies were clear, but haze was reported. The airplane's final calculated airspeed, 1.22 NM from the threshold to runway 14, was 92 kts, slower than the recommended approach speeds for flaps 20°. The airplane was within 50 ft of the 3° glidepath when on the runway heading.

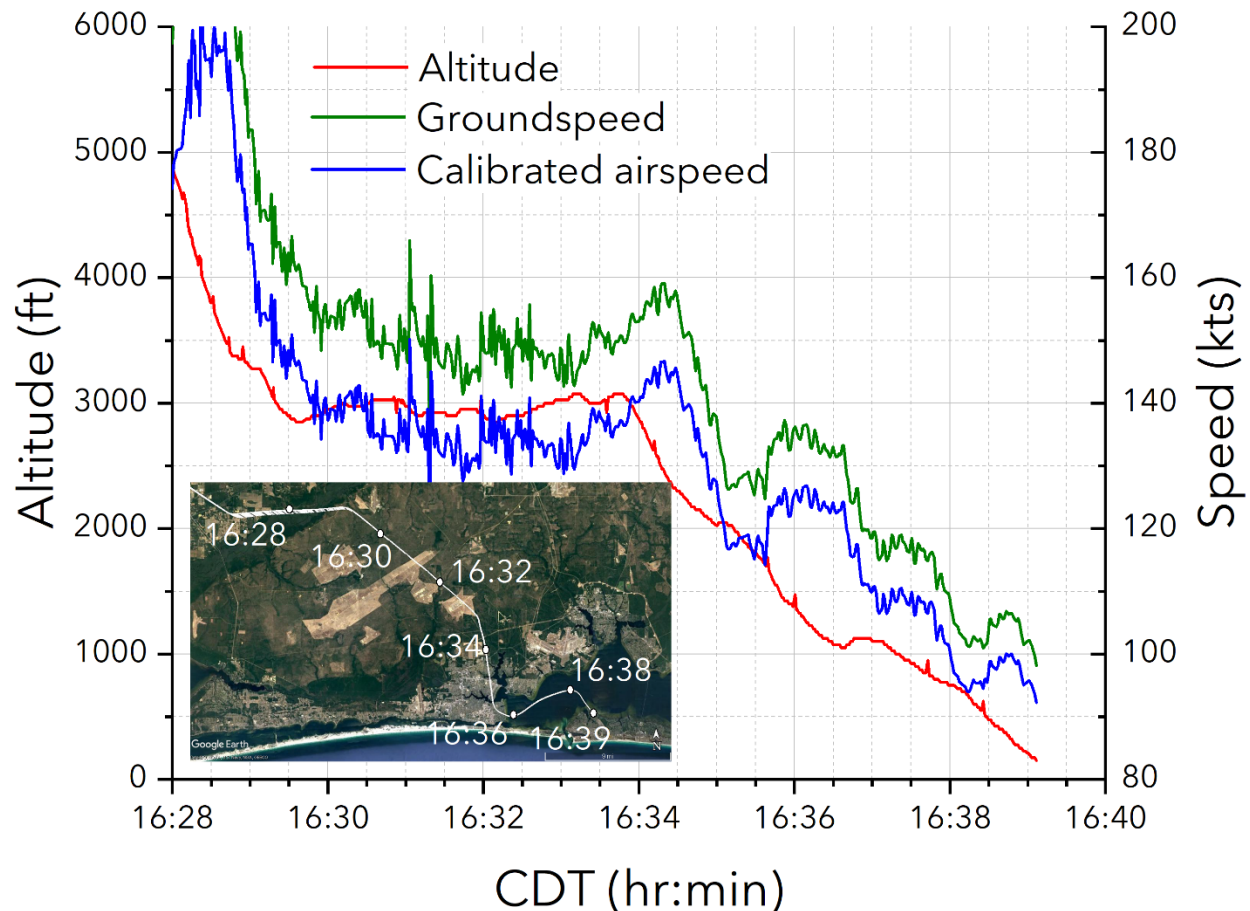


Figure 7. May 1, 2021 flight into Destin, Florida. Recorded altitude and calculated groundspeed and calibrated airspeed are shown versus local time. The inset shows the flight path to runway 14.

The third flight left Destin, Florida at 21:00 on May 2, 2021 and arrived in Wichita Falls, Texas at 00:32 on May 3. Both earlier flights (on April 29 and May 1) were during daylight hours and the pilot made turns onto final within 2-3 NM of the runway threshold. This flight was a night with no moon². Winds were 9 kts from 140° and skies were clear. Figure 8 shows the approach into Wichita Falls. The airplane turned onto final at 00:24, about 18 NM from the runway threshold. It deviated slightly to the left before returning to the runway heading by 00:26. The airplane slowed from 140 kts to 90 kts before accelerating again. The final calculated calibrated airspeed, 1,200 ft from the threshold of the runway, was 120 kts. That speed was 10 kts faster than the highest approach speed recommended for flaps 20°.

² The moon on May 3, 2021 in Wichita Falls, Texas would not rise until 02:36.

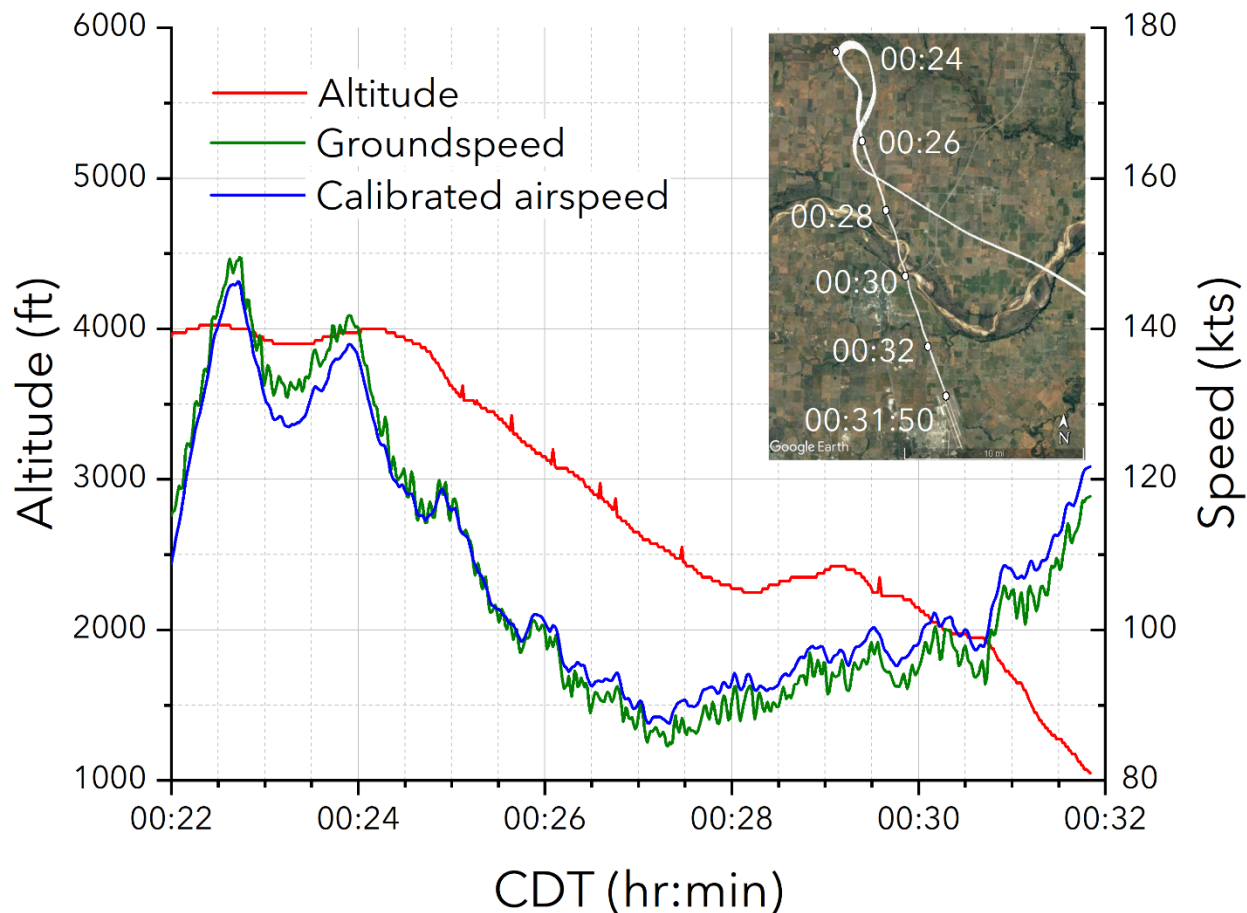


Figure 8. May 1, 2021 flight into Wichita Falls, Texas. Recorded altitude and calculated groundspeed and calibrated airspeed are shown versus local time. The inset shows the flight path to runway 15 R.

Additionally, Figure 9 shows the final approach into Wichita Falls for the final 10 NM. The altitude was slightly above and then below the altitude specified for two waypoints (see Appendix for the approach plate), and the airplane initially captured the glide path into runway 15C, stopped descending while continuing to accelerate until 200 ft above the glide path, and then recaptured the glide path again.

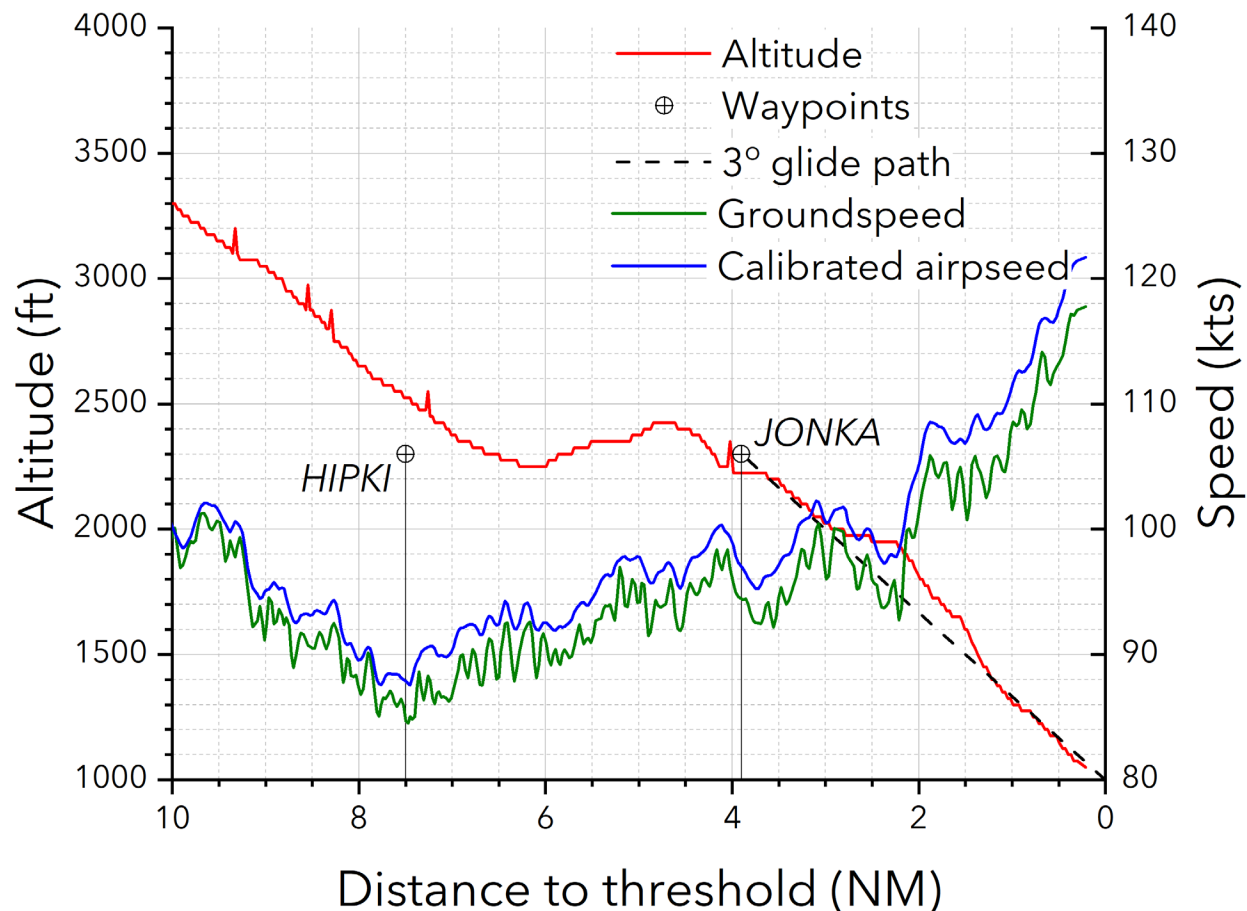


Figure 9. May 1, 2021 flight into Wichita Falls, Texas. Recorded altitude and calculated groundspeed and calibrated airspeed are shown versus distance to runway 15C threshold. The altitude and location of two waypoints and the 3° glide path are shown.

The approaches for Mobile and Wichita Falls showed large variations in airspeed. The approaches for Destin and Wichita Falls had final approach speeds either below (Destin) or above (Wichita Falls) the recommended approach speeds for a flaps 20° landing. The Wichita Falls landing also showed the airplane slowing to below 90 kts while still over 7 NM from the runway and 200 ft above the glide path during the final descent. All three of the flights prior the accident flight exhibited airspeed issues. The night flight into Wichita Falls also showed some difficulty maintaining the glide path at the end of flight.

D. CONCLUSIONS

About ten minutes before the accident, the airplane flew the procedure turn for runway 13 while airspeed varied from briefly below the flaps 5° power-off stall speed of 88 kts to over 160 kts. Altitude varied between 2,200 ft and 2,500 ft. The airplane passed navigation waypoints 200 ft to 300 ft low. About five nautical miles from the runway, the airplane stopped descending until it was then above the glide path. It then

descended below the glide path while continuing to lose airspeed, approaching the flaps 20° stall speed before impacting the ground a few seconds later.

The three flights prior to the accident flight were also found to have variable airspeed or approach speeds above or below the range of recommended approach speeds. The last prior flight also showed the airplane 200 ft above the glide path for a portion of the final descent.

E. REFERENCES

1. Aircraft Accident Package for N322TA, 21-001-ZHU. Federal Aviation Administration, 2021.
2. MU-2B-60 Airplane Flight Manual, Mitsubishi Heavy Industries, LTD, 1978.

Submitted by:

Marie Moler
Vehicle Performance Engineer

APPENDIX

WAAS CH 86720 W13B	APP CRS 132°	Rwy Idg TDZE 151 Apt Elev 151	5098
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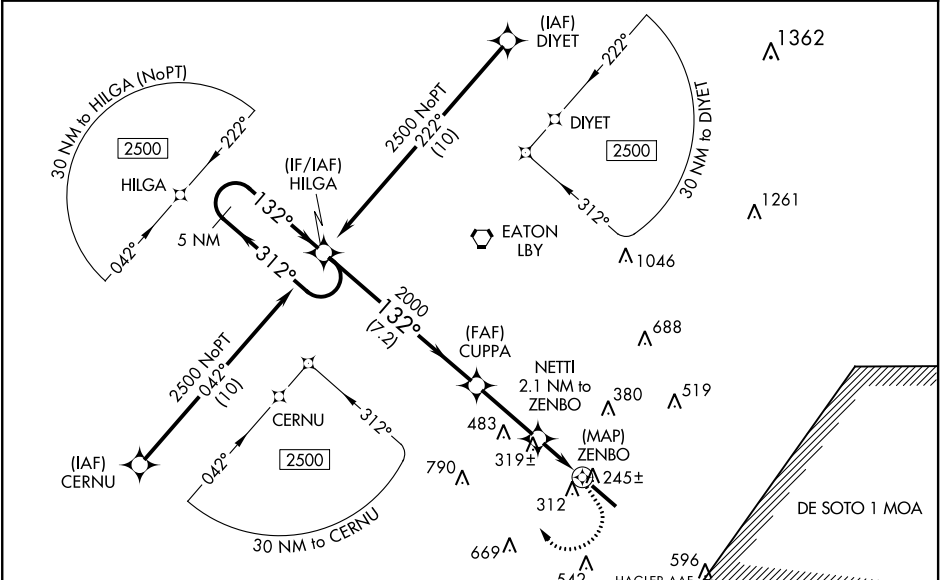
RNAV (GPS) Y RWY 13

HATTIESBURG BOBBY L CHAIN MUNI (HBG)

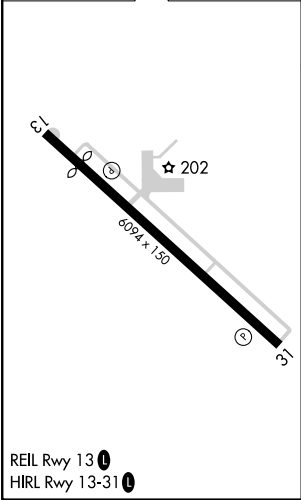
▼ For uncompensated Baro-VNAV systems, LNAV/VNAV NA below -15°C (5°F) or above 43°C (109°F). DME/DME RNP-0.3 NA. When local altimeter setting not received, use Hattiesburg-Laurel Rgnl altimeter setting and increase all DA 51 feet and all MDA 60 feet. Increase LPV all Cats and LNAV Cat C/D visibility ½ mile and LNAV/VNAV all Cats and Circling Cat C visibility ¼ mile. Baro-VNAV and VDP NA when using Hattiesburg-Laurel Rgnl altimeter setting.

MISSED APPROACH: Climbing right turn to 2500 direct HILGA and hold.

ASOS 135.425	HOUSTON CENTER 126.8 327.8	UNICOM 122.8 (CTAF) 0
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ELEV 151	TDZE 151
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Uncontrolled helicopter and military airlift aircraft in vicinity of Hagler AAF and Shelby Auxiliary 1 Airfield.

5 NM Holding Pattern HILGA

VGSI and RNAV glidepath not coincident (VGSI Angle 3.00/TCH 50).

GP 3.00° TCH 40

2500 ← 312° → 132° → 132° → 2000

CUPPA 2000

NETTI 2.1 NM to ZENBO

*1.2 NM to RWY 13

ZENBO

*1080

7.2 NM 2.9 NM 1.6 NM 0.5 0.7

CATEGORY	A	B	C	D
LPV DA	442-1 291 (300-1)			
LNAV/VNAV DA	523-1¼ 372 (400-1¼)			
LNAV MDA	580-1 429 (500-1)		580-1¼ 429 (500-1¼)	
CIRCLING	620-1 469 (500-1)	700-1 549 (600-1)	700-1½ 549 (600-1½)	720-2 569 (600-2)

