

National Transportation Safety Board

Office of Research and Engineering

Washington, D.C. 20594

Performance Study

Specialist Report

Marie Moler

A. ACCIDENT

Location:	Lakeland, Florida
Date:	January 22, 2015
Time:	0913 EST
Airplane:	Piper PA-23, N465JA
NTSB Number:	ERA15FA109

B. GROUP

No vehicle performance group was formed.

C. SUMMARY

On January 22, 2015, about 0913 Eastern Standard Time (EST), a Piper PA-23, N465JA, registered to 55XRAY, Inc., operated by Tailwheels, Etc., descended into a building northwest of the Lakeland Linder Regional Airport (LAL), Lakeland, Florida. Visual meteorological conditions prevailed at the time and no flight plan was filed for the 14 Code of Federal Regulations Part 91 local, instructional flight. The airplane was destroyed and the certified flight instructor and pilot-rated student were fatally injured. There were no ground injuries. The flight originated about 0847 from LAL.

Radar Study
ERA15FA109, Piper PA-23, N465JA

RADAR STUDY

This study describes the accident airplane's ground track, altitude, and speed.

Radar data used in this study are from the Orlando, Florida MCO ASR-9 (airport surveillance radar) sampled at a frequency of every 4.5 seconds. The radar is approximately 45 nautical miles (NM) from the aircraft's final location. These radar have approximately a 60 NM range and an inherent uncertainty of ± 2 Azimuth Change Pulses (ACP) = $\pm (2 \text{ ACP}) \times (360^\circ/4096 \text{ ACP}) = \pm 0.176^\circ$ in azimuth, ± 50 ft in altitude, and $\pm 1/16$ NM in range.

Times in the study are reported in EST.

Weather Observation

The weather conditions reported at LAL at 0850 (just after take-off and 23 minutes before the last radar return) were winds from 80° at 3 kts, 7 miles prevailing visibility with scattered clouds at 12,000 ft. The temperature was 18°C (64°F), the dewpoint 17°C (62°F), and the altimeter pressure was 30.2 inHg. The wreckage site was less than 2.5 NM from LAL.

Radar Study
ERA15FA109, Piper PA-23, N465JA

Aircraft Flight Path, Rate of Turn, and Groundspeed

The MCO radar picked up the aircraft north of LAL at 849:50 EST as it climbed above 1200 ft mean sea level (MSL) or about 1100 ft above ground level (AGL). The flight recorded by radar was approximately 40 NM long and lasted 22 minutes and is shown in Figure 1. The last radar return was recorded at 0912:58 EST.



Figure 1. Aircraft flight path from MCO radar and wreckage location. Lakeland Linder Region Airport (LAL) is shown at the bottom of the figure.

The last maneuver of the aircraft recorded by radar was a right turn and is shown in Figure 2. The wreckage location lay along the final track of the aircraft and was about 1500 ft (0.3 miles)

Radar Study
ERA15FA109, Piper PA-23, N465JA

from the last radar return. The data points in Figure 2 are labeled with the aircraft's corrected altitude and selected times (in red) as recorded by radar. The final 13 points have no altitude associated with them and the reason for this is unknown. Rate of climb calculations could not be completed due to lack of altitude data for the critical portion of the recorded flight.

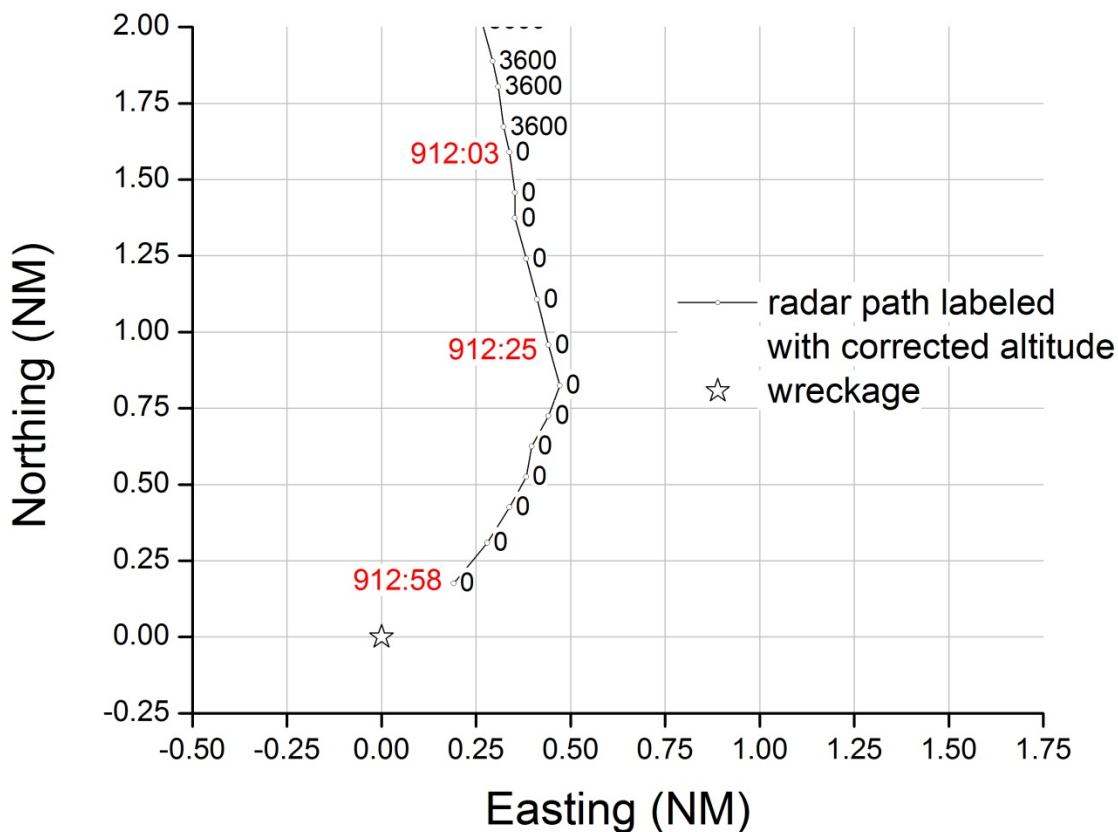


Figure 2. Flight path for final right turn. The 0,0 point of northing and easting is the wreckage location. Times for selected data points are shown in red.

Figure 3, below, shows the flight track of the aircraft for the final minute of flight. If the beginning of the final right turn was at 912:25.344 and a track of 172°, the rate of turn to the final radar point at 912:58.175 on track 239° was approximately 2 degrees/s.

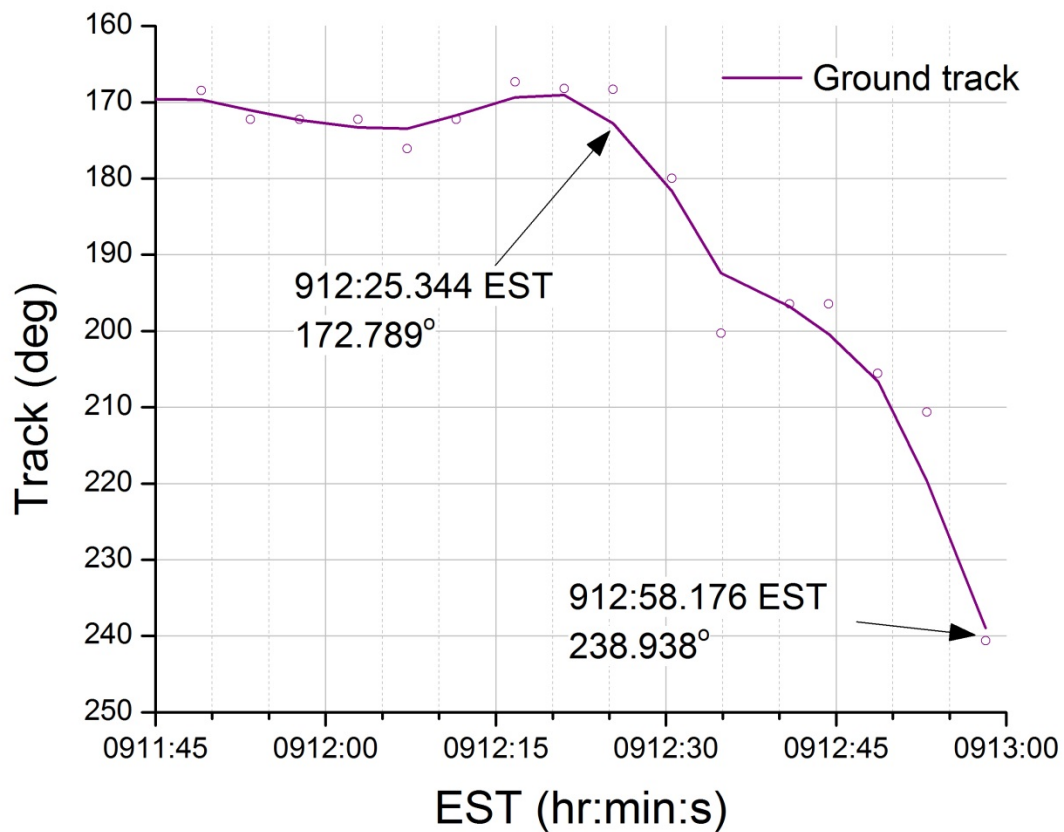


Figure 3. Flight track for final right turn.

The aircraft's groundspeed was calculated using the radar locations and is shown in Figure 4. Groundspeeds calculated from radar have uncertainties associated with timing and the number of significant digits of the recorded latitude and longitude. The aircraft's groundspeed varied between 70 kts and 130 kts (80 mph and 150 mph) during the flight. The aircraft's reported stall speed is 57 kts (66 mph) for gear and flaps up configuration [1].

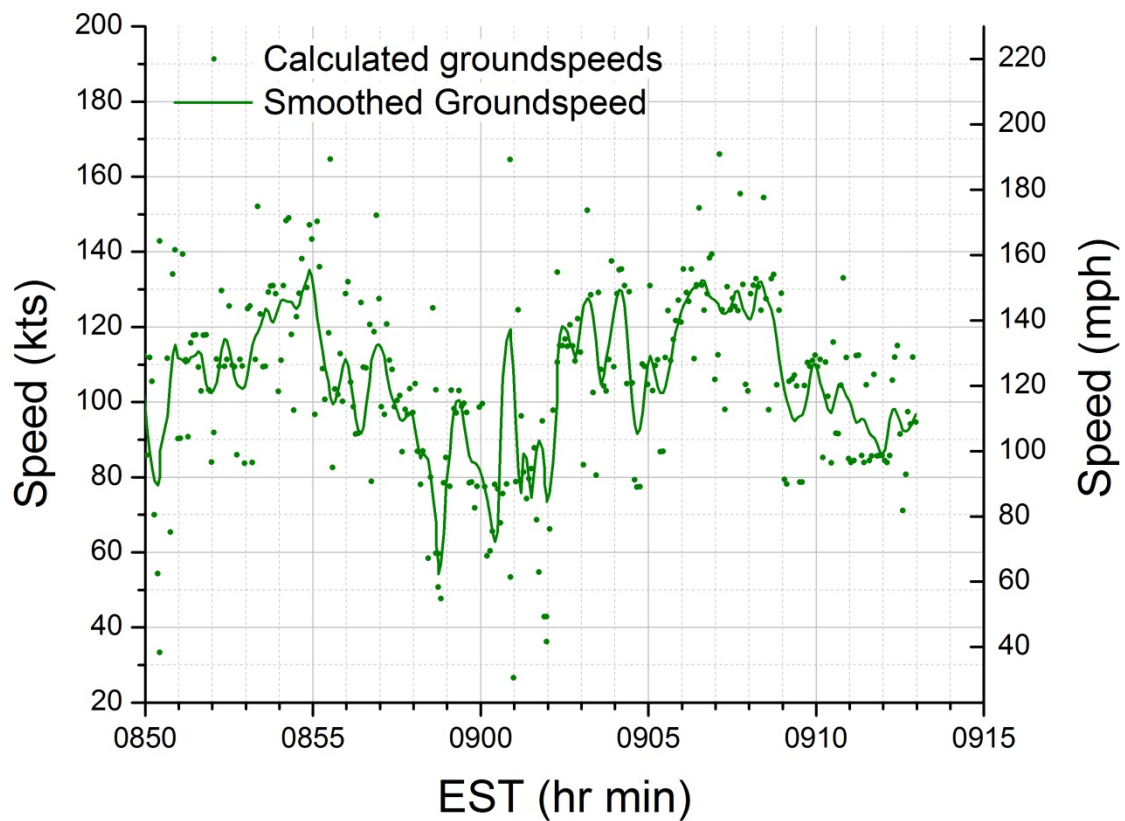


Figure 4. Aircraft's calculated ground speed.

Figure 5 shows the groundspeed for the final three minutes of recorded flight. If the ground speed at 910 was estimated to be 105 kts (121 mph) and the final speed to be 90 kts (103 mph) at 913, the aircraft was slowing at 5 kts/min (5.75 mph/min) as it entered and continued through the final right turn.

Radar Study
ERA15FA109, Piper PA-23, N465JA

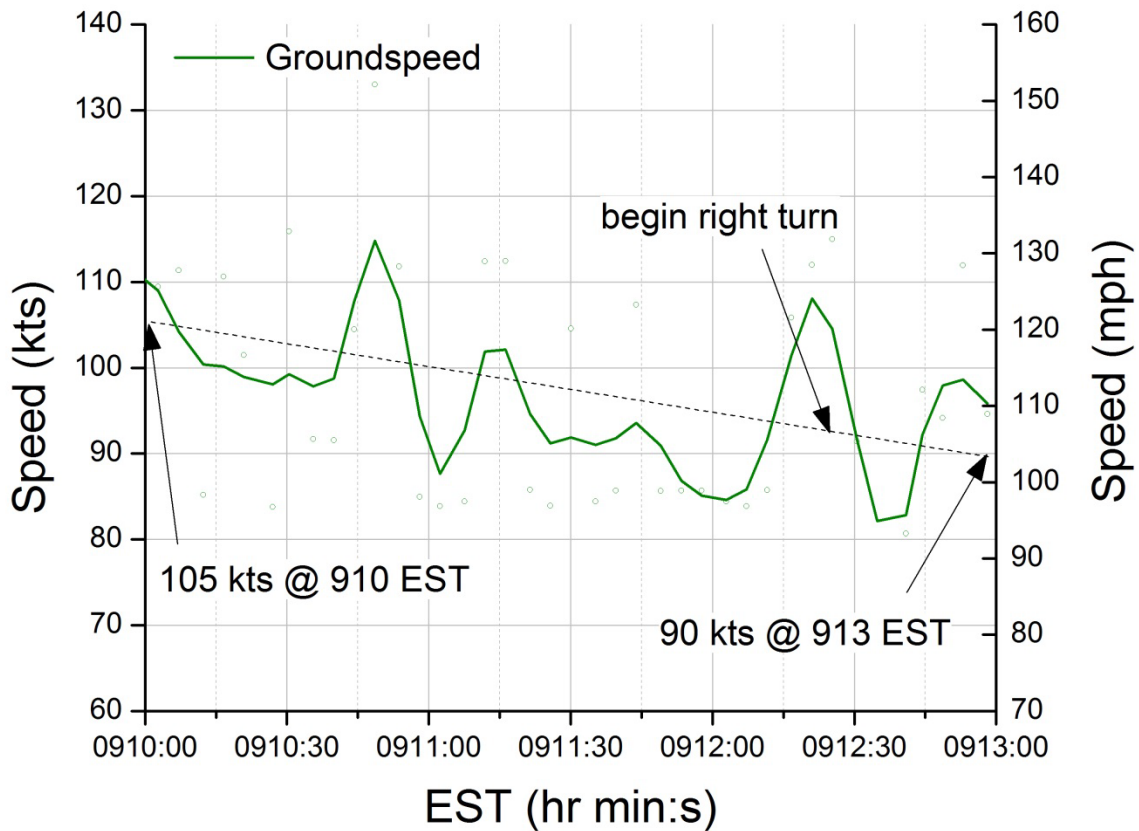


Figure 5. Aircraft's ground speed for final three minutes of flight. Points are the raw calculated data, and the green line shows a somewhat smoothed version. The dotted line is a straight line fit through the data in the figure.

VIDEO STUDY

Video from a nearby security camera recorded the aircraft descending into the building and the resulting fire. The security camera was at a facility about a half a mile west of the wreckage and recorded at a rate of 10 frames per second. The aircraft could just be seen in the far right side of the video image (example in Figure 6) for five frames.

Radar Study
ERA15FA109, Piper PA-23, N465JA



Figure 6. Second frame of aircraft descent from security camera video. The white arrow points to the aircraft.

The image of the aircraft was quite small in the video and distorted by the curvature of the lens since it was at the edge of the camera's field of view. Figure 7 shows a zoomed-in overlay of the five sequential frames of the aircraft's descent and one frame of the resulting fireball. The fireball image was from 9 frames after the last aircraft frame, or 9/10th of a second later. The image labeled '2' in Figure 7 appears to show the fuselage of the aircraft aligned vertically and the wings on the horizontal axis.

Radar Study
ERA15FA109, Piper PA-23, N465JA



Figure 7. Overlay of five frames of the aircraft's descent (numbered) into the building and a single frame of the resulting fireball. The fireball image was from 9 frames after the last aircraft frame.

The height of the aircraft when first in sight was determined by helicopter to be 145 ft above ground level. However, it was difficult to determine the true distance to ground in the image as

Radar Study
ERA15FA109, Piper PA-23, N465JA

ground level beneath the aircraft was obscured by trees and distorted by the edge of the lens. Figure 8 shows the image in Figure 7 rotated 18° to the left so that the horizon line is approximately horizontal. This rotation shows that the aircraft descended at a steep angle into the building, but was not coming straight down. Since the camera was west of the wreckage location, the aircraft was descending along a generally southerly heading. However, the quality of the image was not good enough to determine if the heading was due south, southeasterly, or southwesterly. The wreckage was southwest of the final radar return (refer back to Figure 2).

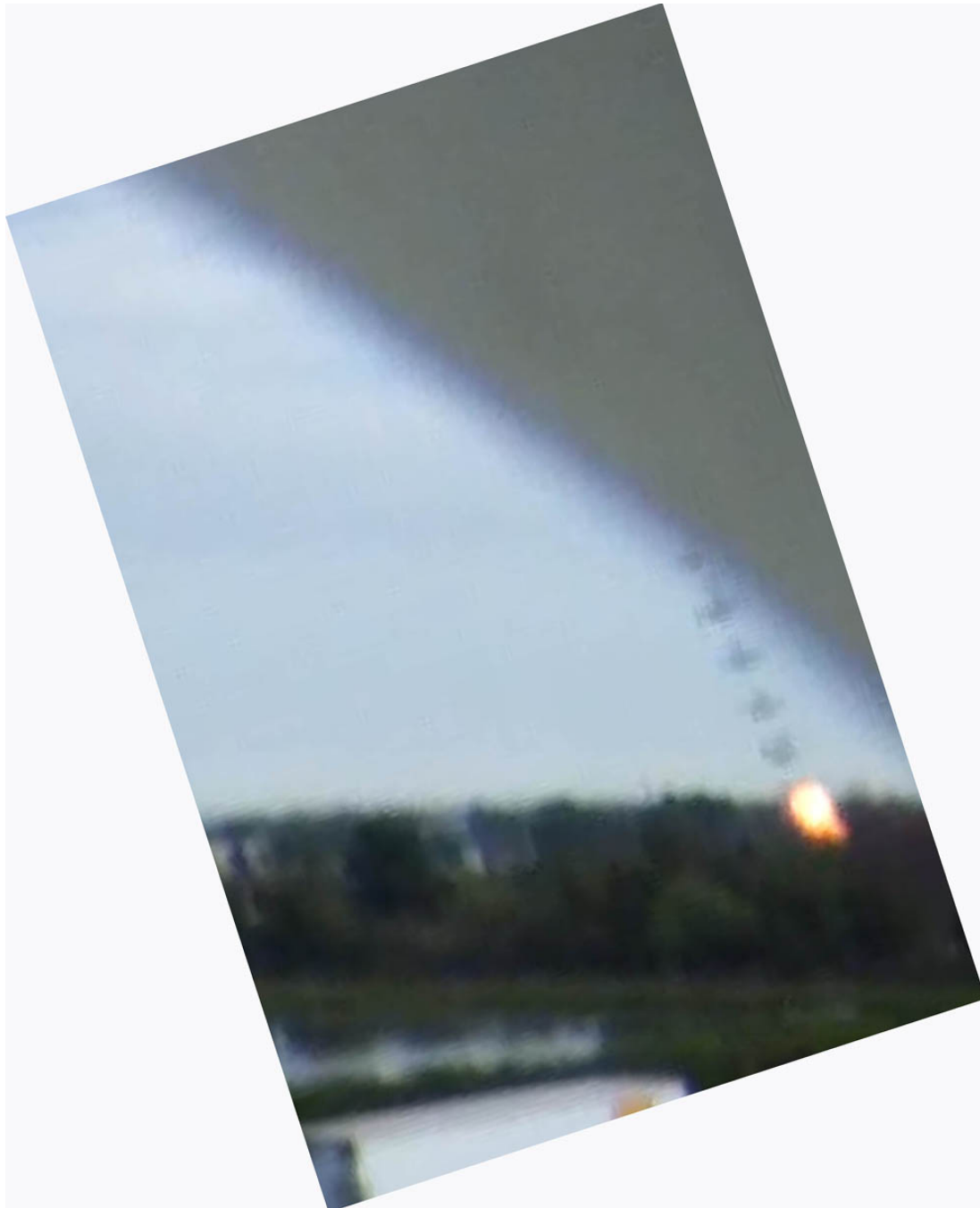


Figure 8. Overlay of five frames of the aircraft's descent into the building rotated 18° to the left.

Radar Study

ERA15FA109, Piper PA-23, N465JA

Assuming the full length of the aircraft was visible in Frame 2, the aircraft was roughly estimated to be falling at rate of one fuselage length per frame of video. The Piper PA-23 was approximately 31 ft long and the camera's frame rate was 10 Hz and the speed was calculated to be 310 ft/s (183 kts or 211 mph). This is an extremely approximate estimate due to the distortion of the lens, the blurriness of the aircraft image, and the unknown trajectory of the aircraft; but it is higher than the final calculated groundspeed from radar by more than 100 kts (or 100+ mph).

D. CONCLUSIONS

The aircraft's flight path, altitude, and calculated speeds from the available radar were not unusual for an aircraft of that type. The calculated groundspeeds were well above the aircraft's reported stall speed. The rate of turn for the aircraft's final radar recorded maneuver was not unusual. The lack of altitude data for the final 13 radar returns made further analysis of the aircraft's flight path impractical.

Video analysis of the security video showed the aircraft descending quickly along a steep angle from the north into the building. The projection of the aircraft changes in the sequential video images indicating it may have been tumbling or spinning as it fell.

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E. REFERENCES

1. Airplane Flight Manual for the Piper Model PA-23 Airplane. Piper Aircraft Corporation, Lock Haven, Pennsylvania. January 29, 1954.