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

Radar Performance Study

Specialist Report
Timothy Burtch

A. ACCIDENT

Location:	Waterford, Michigan
Date:	January 10, 2014
Time:	1948 EST
Airplane:	Cessna 310R, Registration N3829G
NTSB Number:	CEN14FA110

B. GROUP

No vehicle performance group was formed.

C. SUMMARY

On January 10, 2014, about 1948 eastern standard time (EST), a Cessna 310R, N3829G[1], impacted trees and terrain about 1,500 feet west of the approach end of runway 9R at Oakland County International Airport (KPTK), Pontiac, Michigan, during an instrument landing system (ILS) approach. Night instrument meteorological conditions prevailed at the time of the accident. The airplane was destroyed by impact forces and post impact fire. The commercial pilot sustained fatal injuries. The airplane was registered to and operated by Royal Air Freight, Inc., as flight 907 under 14 Code of Federal Regulations Part 91. The positioning flight was operating on an instrument flight rules flight plan and departed from Fulton County Airport-Brown Field (KFTY), Atlanta, Georgia, about 1701 EST.

[1] See Figure 1 for a picture of the accident airplane.

D. PERFORMANCE STUDY

The performance study describes the accident airplane ground track, altitude, and speed. Estimates of airplane pitch, roll, and heading derived from radar data are also presented.

The radar data used in the study are from the short-range Airport Surveillance Radar site at KPTK (ASR-9). These data have approximately a 60 nautical mile (NM) range and an inherent uncertainty and precision error 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. The KPTK radar data were filtered for transponder beacon code 7436, that of N3829G.

Times in the study are reported in EST as well as Greenwich Mean Time (GMT or "Z"): EDT = GMT – 5 hr.

Weather Observation

KPTK has an elevation of 981 ft mean sea level (msl) and 4˚ of west magnetic variation. The Automated Surface Observing System (ASOS) reports at KPTK around the time of the accident are as follows:

SPECI KPTK 110029Z 15010KT 1/4SM R09R/2000V2800FT FG VV002 02/01 A2986 RMK AO2
KPTK special weather on the 11th at 0029 GMT/1929 EST, wind from 150˚ at 10 knots, visibility ¼ statute mile, runway 9R runway visual range between 2000 and 2800 ft, fog, vertical visibility 200 ft, temperature of 2° C, dew point of 1° C, altimeter setting 29.86 inches of mercury. Remarks: The ASOS site is automated and has a precipitation sensor.

Accident at 0048Z
Accident occurred at approximately 0048 GMT/1948 EST.

METAR KPTK 110053Z 14009KT 1/4SM R09R/2000V2600FT FG VV002 02/02 A2985 RMK AO2
KPTK weather on the 11th at 0053 GMT/1953 EDT, wind from 140˚ at 9 knots, visibility ¼ statute mile, runway 9R runway visual range between 2000 and 2600 ft, fog, vertical visibility 200 ft, temperature of 2° C, dew point of 2° C, altimeter setting 29.85 inches of mercury. Remarks: The ASOS site is automated and has a precipitation sensor.

See the Meteorological Factual report for more detailed weather.

Airplane Ground Track, Altitude, and Airspeed

Figures 2 and 3 show the radar ground track for N3829G's approach into KPTK. Figure 4 is the approach plate for Oakland County's ILS 9R.

Figure 5 shows the altitude and airspeed estimated from radar data and the Meteorological Factual, while Figure 6 is an estimate of N3829G's pitch, roll, and heading angles during the final minutes of the flight.

Finally, Figures 7 and 8 provide an estimate of the accident flight path relative to the ILS 9R glideslope and localizer, respectively. The airplane begins the approach at an altitude of 2700 ft as called for in the procedure but right of the 092˚ final approach course. However, the airplane then remains above the glideslope until less than 0.5 NM from the runway threshold. This is shown in Figure 7. The airplane stays right of the localizer until 1.25 NM from the runway when it overshoots and turns back to recapture. This can be seen in Figure 8. The airplane overshoots the localizer once again before impacting trees and terrain.

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E. Figures

Figure 1: Accident Airplane N3829G, a 1977 Cessna 310R

Figure 2: Radar Ground Track From KPTK Radar

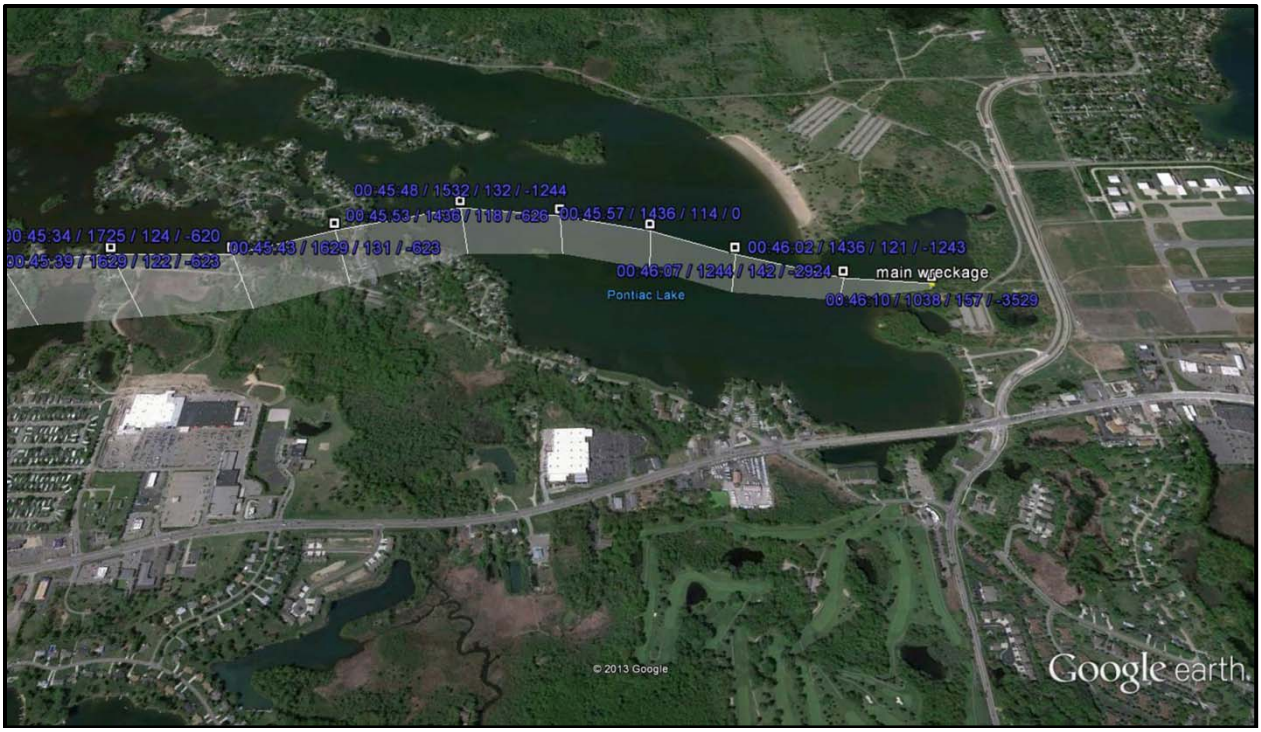

Figure 3: Final approach into KPTK with hh:mm:ss / hmsl (ft) / Vc (kt) / ROC (fpm)

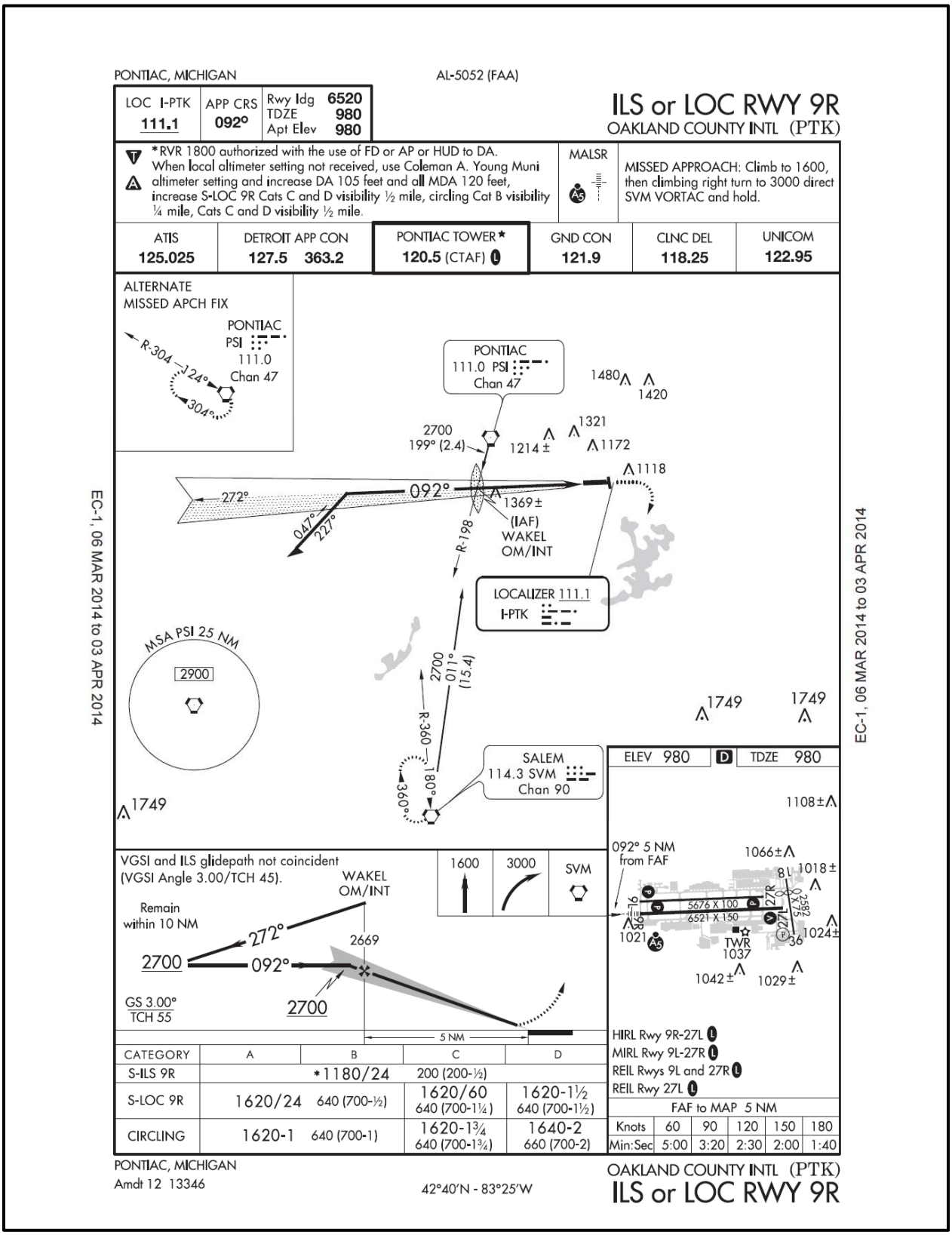

Figure 4: Oakland County ILS 9R Approach Plate

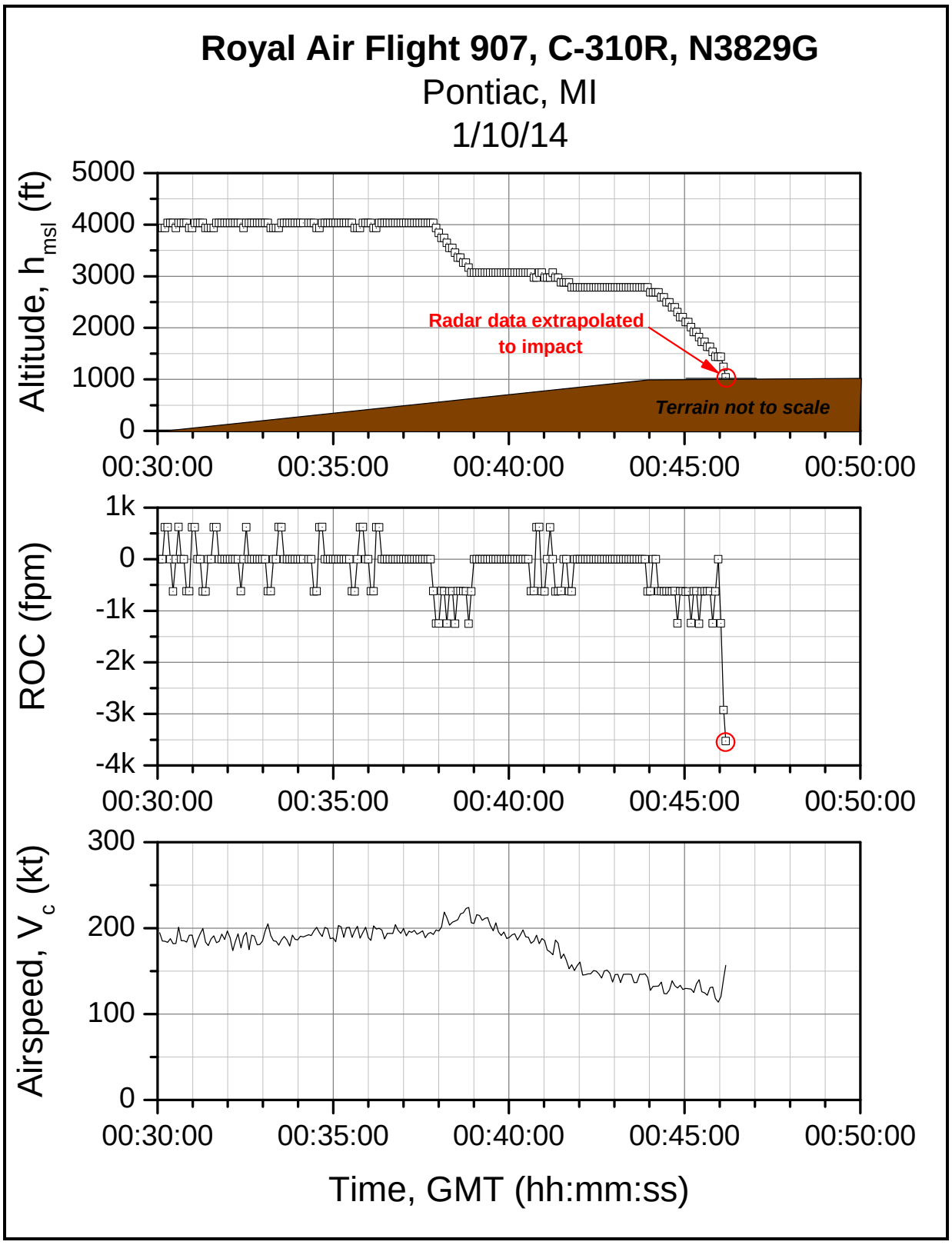

Figure 5: Altitude and Speed for Final Minutes of Flight

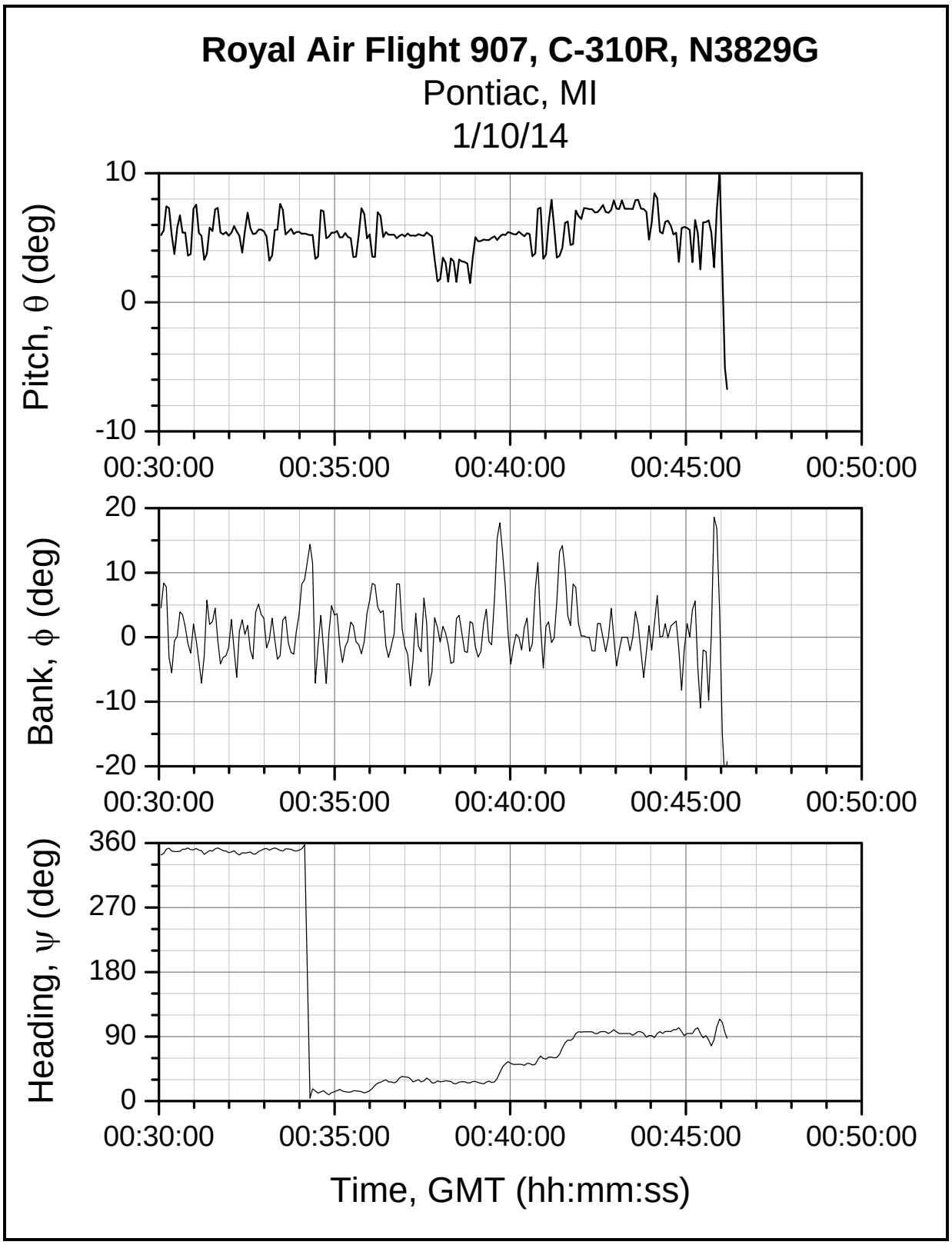

Figure 6: Pitch, Bank, and Heading for Final Minutes of Flight

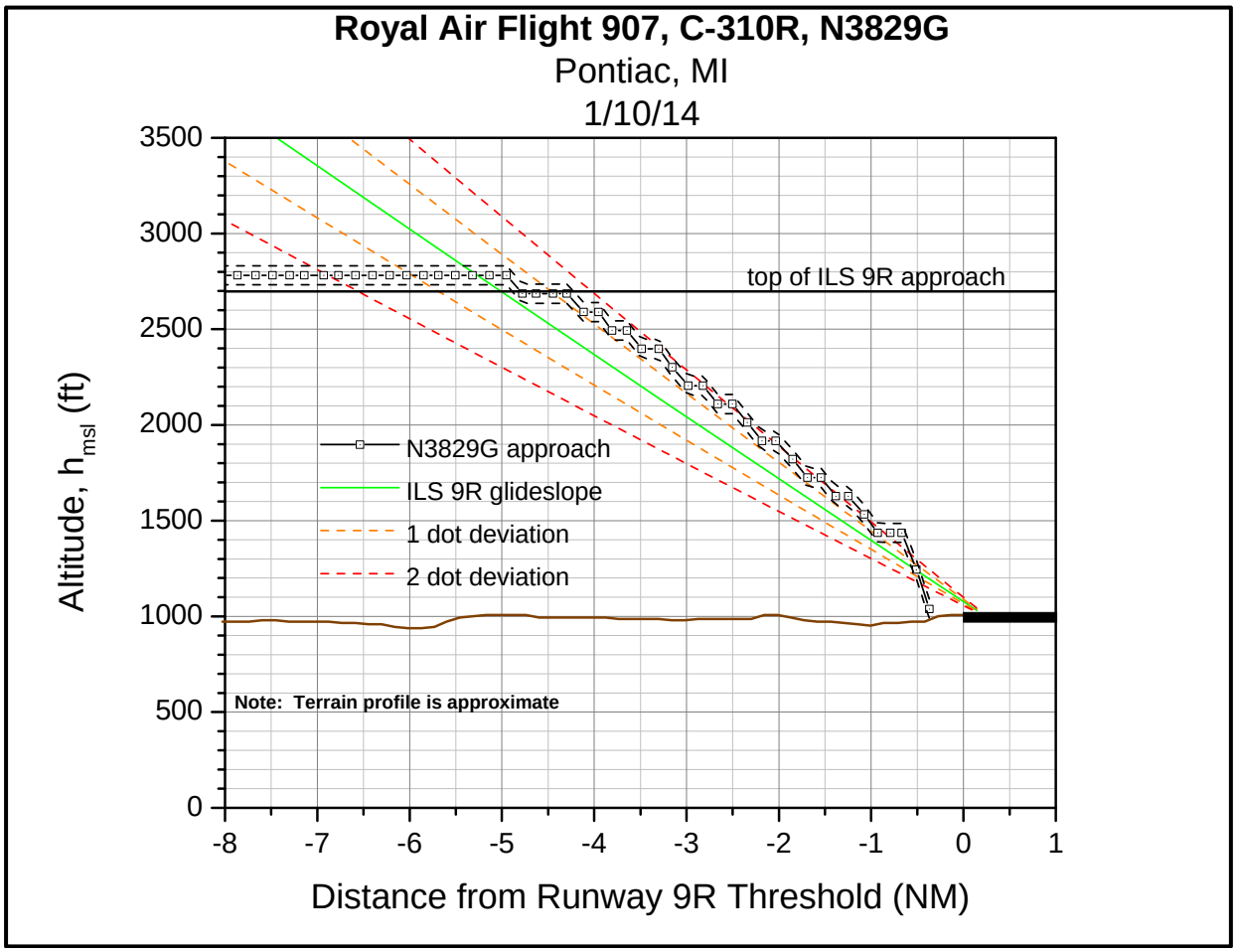

Figure 7: Flight Path Relative to KPTK Runway 9R Glideslope

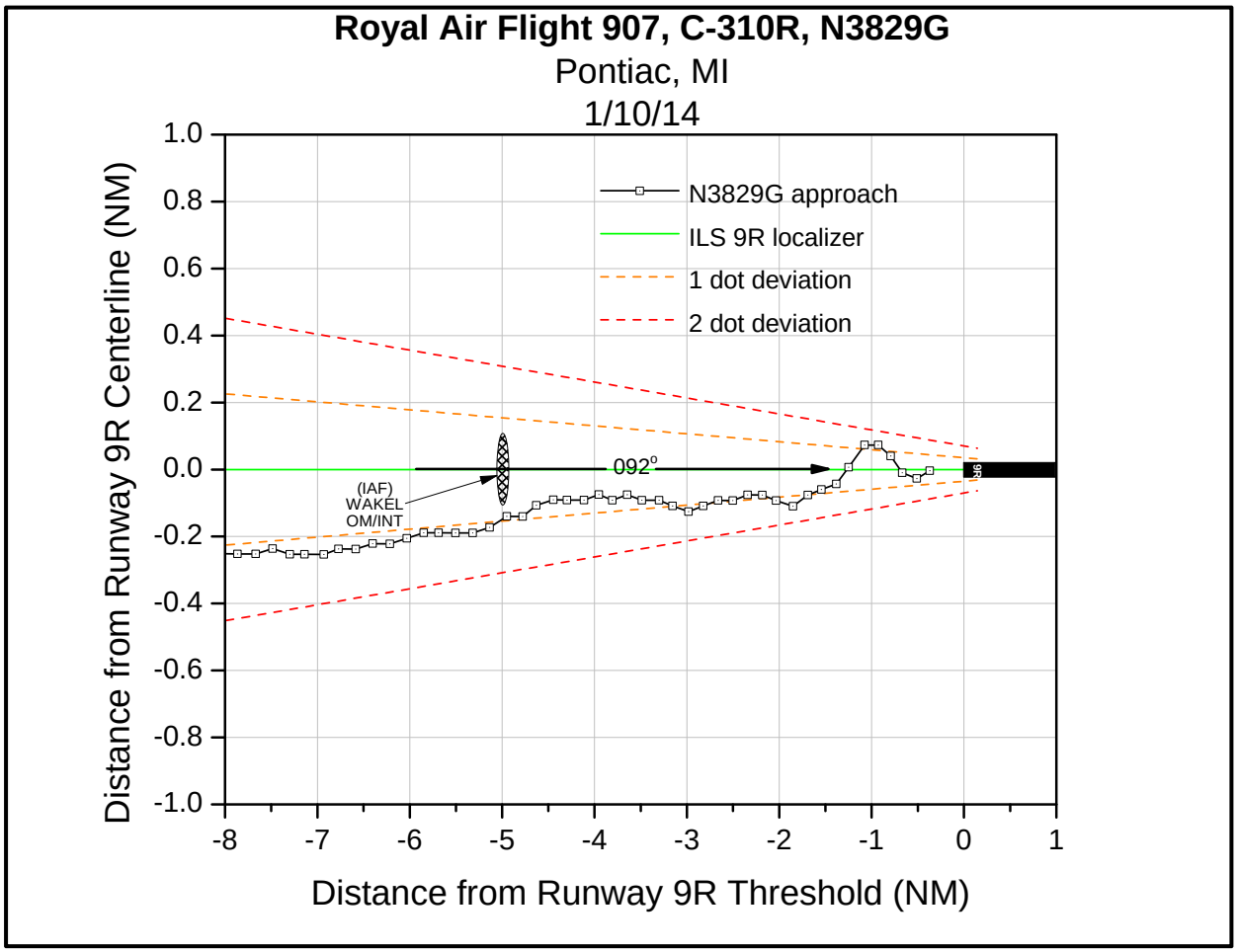

Figure 8: Ground Track Path Relative to KPTK Runway 9R Localizer