

National Transportation Safety Board

Office of Aviation Safety Washington, D.C. 20594-2000 July 30, 2013 WEATHER STUDY ERA13FA273

A. Accident

Location: Manchester, Kentucky
Date: June 6, 2013
Time: about 2315 eastern daylight time (0315 UTC¹ on June 7, 2013)
Aircraft: Bell 206L-1, registration: N114AE

B. Meteorological Specialist

Mike Richards Senior Meteorologist National Transportation Safety Board Operational Factors Division, AS-30 Washington, DC 20594-2000

C. Details of the Investigation

The National Transportation Safety Board's meteorological specialist was not on scene and gathered weather data for this investigation from the Washington D.C. office from official National Oceanic and Atmospheric Administration (NOAA)'s National Weather Service (NWS) sources including the National Climatic Data Center (NCDC), except where noted. All times are for June 6, 2013, unless otherwise noted, and are based upon the 24-hour clock. Directions are referenced to true north and distances in nautical miles. Heights are above mean sea level (msl) unless otherwise noted. Distances along the surface of the earth are calculated using the "Great Circle" formula.

Coordinates used for the accident locations: 37.1328° North latitude, 83.75652° West longitude.

¹ UTC – abbreviation for Coordinated Universal Time

Synoptic Conditions



Figure 1 – NWS Surface Analysis Chart for 2300 EDT.

The NWS Surface Analysis Chart for 2300 EDT (figure 1) depicted a low-pressure center very near to the accident location, with a cold front extending southwest, and a warm front extending east from the low-pressure center. A separate cold front was advancing from the north through the northern portion of Kentucky. Surface temperatures in eastern Kentucky and eastern Tennessee were generaly in the high 60's° Fahrenheit (F). Dew point temperatures were in the mid- to high 60's°F. Station models depicted the wind as calm or light, with one station near the accident site reporting mist.

A NWS Weather Depiction Chart (figure 2) for 0000 EDT on June 7, 2013, depicted fronts in a similar fashion to the Surface Analysis Chart. In addition, the Weather Depiction Chart, which provides contours for areas of IFR^2 and $MVFR^3$ conditions, indicated the accident location was in an area of VFR^4 conditions with ceilings greater than 3,000 feet above ground level (agl) and a visibility greater than 5 miles.

² Instrument Flight Rules (IFR) – ceiling less than 1,000 feet agl and/or visibility less than 3 miles

³ Marginal Visual Flight Rules (MVFR) – A sub-category of Visual Flight Rules indicating ceiling between 1,000 and 3,000 feet agl (inclusive) and/or visibility between 3 and 5 miles (inclusive)

⁴ Visual Flight Rules (VFR) – ceilings at or greater than 1,000 feet agl and visibility at or greater than 3 miles



A regional Next-Generation Radar (NEXRAD) mosaic (figure 3) obtained from the NCDC for 2315 EDTdid not identify any radar returns in the area of the accident location.



Figure 3 – NCDC NEXRAD mosaic from 2315 EDT.

Surface Observations

London-Corbin Airport/Magee Field (KLOZ) in London, Kentucky, was located approximately 16 miles to the west-southwest of the accident site at an elevation of 1,212 feet. The following automated reports were issued from KLOZ during the time period surrounding the accident time:

[2153 EDT] METAR KLOZ 070153Z AUTO 00000KT 8SM OVC075 21/20 A2980 RMK AO2 SLP080 T02110200

[2253 EDT] METAR KLOZ 070253Z AUTO 00000KT 6SM BR FEW055 SCT080 21/19 A2981 RMK AO2 SLP084 T02060194 53004

[2353 EDT] METAR KLOZ 070353Z AUTO 00000KT 6SM BR SCT055 20/19 A2981 RMK AO2 SLP083 T02000194

At 2253 EDT, KLOZ reported a calm wind, visibility of 6 miles, mist, few clouds at 5,500 feet agl, scattered clouds at 8,000 feet agl, temperature of 21° Celsius (C), dew point temperature of 19°C, altimeter setting 29.81 inches of mercury. Remarks: station with a precipitation discriminator, sea-level pressure of 1008.4 hectopascals (hPa), hourly temperature of 20.6°C and hourly dew point temperature of 19.4°C, pressure increase of 0.4 hPa during last three hours.

Julian Carroll Airport (KJKL) in Jackson, Kentucky, was located approximately 35 miles to the northeast-north of the accident site at an elevation of 1,381 feet. The following automated reports were issued from KJKL during the time period surrounding the accident time:

- [2153 EDT] METAR KJKL 070153Z AUTO 00000KT 10SM FEW033 OVC080 22/20 A2981 RMK AO2 SLP081 T02170200
- [2253 EDT] METAR KJKL 070253Z AUTO 00000KT 10SM OVC080 21/19 A2981 RMK AO2 SLP083 T02110194 53004
- [2353 EDT] METAR KJKL 070353Z AUTO 00000KT 10SM SCT030 BKN080 20/18 A2982 RMK AO2 SLP086 T02000183

At 2253 EDT, KJKL reported a calm wind, visibility of 10 miles or greater, overcast cloud base at 8,000 feet agl, temperature of 21°C, dew point temperature of 19°C, altimeter setting 29.81 inches of mercury. Remarks: station with a precipitation discriminator, sea-level pressure of 1008.3 hPa, hourly temperature of 21.1°C and hourly dew point temperature of 19.4°C, pressure increase of 0.4 hPa during last three hours.

Model Sounding

A North American Mesoscale (NAM) model sounding (figure 4) for the accident location at 2300 EDT was retrieved from NOAA's Air Resources Laboratory. The NAM model sounding indicated the layer between 3,000 and 9,000 feet was nearly saturated. Below 3,000 feet the atmosphere was somewhat drier, with higher relative humidities near the surface. No temperature inversions were noted. Winds near the surface were light and variable.



Figure 4 – NAM model sounding for the accident site in SkewT/LogP format for 2300 EDT, surface to 500 hPa.

Satellite Imagery

Geostationary Operational Environmental Satellite (GOES)-13 infrared (10.7µm) data were obtained from an archive at the Space Science Engineering Center (SSEC) at the University of Wisconsin-Madison (UW) in Madison, Wisconsin, and processed using the Man computer Interactive Data Access System (McIDAS). Imagery from 2315 EDT is presented in figure 5. The GOES-13 infrared imagery identified cloudy conditions at the accident location, with cloud-top temperatures varying between approximately -5°C and -50°C in the accident region. When considering the NAM model sounding, -5°C corresponded to a height of approximately 17,200 feet. It should be noted that all satellite data presented in this section have not been corrected for any parallax error.



Figure 5 – GOES-13 10.7 μ m (infrared) color-enhanced imagery from 2315 EDT. Red dot denotes accident location.

Terminal Aerodrome Forecasts

A Terminal Aerodrome Forecast (TAF)⁵ issued at 1934 EDT for KLOZ forecasted for the accident time: variable wind at 3 knots, visibility greater than 6 miles, scattered clouds at 2,000 feet agl, scattered clouds at 4,000 feet agl.

KLOZ 062334Z 0700/0724 25008KT P6SM VCSH SCT020 BKN040 **FM070300 VRB03KT P6SM SCT020 SCT040** FM070700 00000KT 1SM BR FEW007 FM071400 VRB05KT P6SM VCSH FEW025 SCT040=

⁵ Conditions forecasted in the TAF are only official for 5 statute miles from the forecast site.

Area Forecast

An Area Forecast that included eastern Kentucky was issued at 2145 EDT by the Aviation Weather Center in Kansas City, Missouri. The portion of the Area Forecast directed toward eastern Kentucky forecasted for times until 0000 EDT on June 7, 2013: ceiling broken at 5,000 feet msl with cloud tops to 12,000 feet msl and widely scattered light rain showers.

FAUS43 KKCI 070145 FA3W _CHIC FA 070145 SYNOPSIS AND VFR CLDS/WX SYNOPSIS VALID UNTIL 072000 CLDS/WX VALID UNTIL 071400...OTLK VALID 071400-072000 ND SD NE KS MN IA MO WI LM LS MI LH IL IN KY

SEE AIRMET SIERRA FOR IFR CONDS AND MTN OBSCN. TS IMPLY SEV OR GTR TURB SEV ICE LLWS AND IFR CONDS. NON MSL HGTS DENOTED BY AGL OR CIG.

SYNOPSIS...SEE LTST NHC ADVISORY ON T.S. ANDREA. 02Z STNR FNT W NY-LOW W WV PNHDL-LOW NR HNN. CDFNT HNN-N CNTRL KY. CDFNT HNN-LOW E CNTRL AL-SW LA CST-LOW NR IAH. STNR FNT IAH-S TX BIG BEND-FAR W TX-N CNTRL NM. WKNG CDFNT E CNTRL SASK-XTRM W ND. HIGH W LS. 20Z CDFNT LOW NERN WV-SC MTNS-CNTRL FL PNHDL-NW GLFMEX-XTRM NERN MEX. HIGH W LS.

KY

W...SCT CI. OCNL SCT080. OTLK...VFR. CNTRL...SCT035 SCT090. 09Z BKN020 TOP 050. OTLK...MVFR CIG. 16Z VFR. E...BKN050 TOP 120. WDLY SCT -SHRA. 04Z SCT030 SCT050. 09Z VIS 3SM BR. OTLK...VFR SHRA.

Aviation Section of the Area Forecast Discussion

An Area Forecast Discussion (AFD) was issued at 2053 EDT by the NWS Weather Forecast Office in Jackson, Kentucky (KJKL). The aviation portion of the AFD, which was originally issued at 2005 EDT in a previous AFD, is presented here.

FXUS63 KJKL 070253 AAB AFDJKL AREA FORECAST DISCUSSION...UPDATED NATIONAL WEATHER SERVICE JACKSON KY 1053 PM EDT THU JUN 6 2013

AVIATION...(FOR THE 00Z TAFS THROUGH 00Z FRIDAY EVENING) ISSUED AT 805 PM EDT THU JUN 6 2013 ISOLATED CONVECTION IS POSSIBLE UNTIL AN HOUR OR TWO PAST SUNSET AT THE TAF SITES AND WELL INTO THE NIGHT OVER THE FAR SOUTHEAST. FOG OR LOW STRATUS DEVELOPMENT CANNOT BE RULED OUT AT THE TAF SITES...BUT THERE MAY BE ENOUGH CLOUDS THROUGH THE NIGHT TO KEEP CONDITIONS FALLING AS LOW AS MUCH OF THE GUIDANCE SUGGESTS. LAMP AND OTHER GUIDANCE SUGGESTS CONDITIONS FALLING TO NEAR...IF NOT BELOW AIRPORT MINIMUMS OVERNIGHT. CONFIDENCE IN THIS WAS NOT ALL THAT HIGH DUE TO UNCERTAINTY IN CLOUD COVER OVERNIGHT...BUT OPTED TO TREND IN A PERIOD OF IFR AT THE TAF SITES BETWEEN ABOUT 7Z AND 14Z. WINDS SHOULD BE LIGHT AND VARIABLE THROUGH THE PERIOD.

AIRMETs

One Airmen's Meteorological Information (AIRMET) advisory was active at low altitudes for the accident location at the accident time. This AIRMET for IFR conditions was issued at 2245 EDT.

WAUS43 KKCI 070245 WA3S _CHIS WA 070245 AIRMET SIERRA FOR IFR AND MTN OBSCN VALID UNTIL 070900 . AIRMET IFR...IN KY TN FROM 20S FWA TO CVG TO HNN TO HMV TO GQO TO 40W IIU TO 20SSW IND TO 20S FWA CIG BLW 010/VIS BLW 3SM BR. CONDS DVLPG 03-06Z. CONDS CONTG BYD 09Z THRU 15Z.

SIGMETs

There were no convective or non-convective Significant Meteorological Information (SIGMET) advisories active for the accident location at the accident time.

CWSU Products

There were no Center Weather Advisories or Meteorological Impact Statements issued by the Center Weather Service Unit (CWSU) at the Indianapolis Air Route Traffic Control Center that were active for the accident location at the accident time.

Pilot Weather Briefing

There were no records of a pre-flight weather briefing through Lockheed Martin Flight Services or DUAT vendors.

Astronomical Data

The astronomical data obtained from the United States Naval Observatory for 37.1°N and 83.8°W, indicated the following:

SUNSunset2053 EDTEnd Civil Twilight2123 EDT

MOON

Moonset Moonrise 1915 EDT 0035 EDT (on June 7, 2013)

> Submitted by: Mike Richards NTSB, AS-30