



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

May 10, 2022

Specialist's Factual Report

METEOROLOGY

CEN22FA082

A. ACCIDENT

Location: Hardy, Arkansas
Date: December 26, 2021
Time: 1729 central standard time
2329 Coordinated Universal Time (UTC)
Aircraft: Cessna 172E; Registration: N5798T

B. METEOROLOGY SPECIALIST

Specialist Paul Suffern
National Transportation Safety Board
Washington, DC

C. DETAILS OF THE INVESTIGATION

The National Transportation Safety Board's (NTSB) Meteorologist did not travel for this investigation and gathered the weather data for this investigation from official National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) sources and also from the National Centers for Environmental Information (NCEI). This Specialist's Factual Report contains the meteorological factors pertinent to the weather surrounding the accident time. All times are central standard time (CST) and are based upon the 24-hour clock, where local time is -6 hours from UTC. Directions are referenced to true north and distances are in nautical miles. Heights are above mean sea level (msl) unless otherwise noted. Visibility is in statute miles and fractions of statute miles. NWS station identifiers use the standard International Civil Aviation Organization 4-letter station identifiers versus the International Air Transport Association 3-letter identifiers, which deletes the initial country code designator "K" for U.S. airports.

The accident site was located at latitude 36.3461° N, Longitude 91.5422° W, at an approximate elevation of 730 feet (ft).

D. FACTUAL INFORMATION

1.0 Synoptic Situation

The synoptic or large-scale migratory weather systems influencing the area were documented using standard NWS charts issued by the National Center for Environmental Prediction and the Weather Prediction Center, located in College Park, Maryland. These are the base products used in describing synoptic weather features and in the creation of forecasts and warnings for the NWS. Reference to these charts can be found in the joint NWS and Federal Aviation Administration (FAA) Advisory Circular "Aviation Weather Services", AC 00-45H.¹

1.1 Surface Analysis Chart

The NWS Surface Analysis Chart centered over Arkansas for 1800 CST is provided as figure 1 with the location of the accident site within the black circle. The chart depicted a low-pressure system with pressure of 993-hectopascals (hPa) over central Kansas, with a warm frontal boundary extending eastward across Kansas, then southeastward across Missouri and northern Arkansas into Tennessee. The accident site was located just to the north of the warm frontal boundary on the cool side of the front.

The station models around the accident site depicted winds from the southeast around 5 knots, air temperatures in the low 50's to low 60's degrees Fahrenheit (°F), dew point temperatures in the low to mid 50's °F with temperature-dew point spreads of 4°F or less, overcast skies, and mist reported at the station models to the northeast through south of the accident site.

¹ https://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentID/1030235

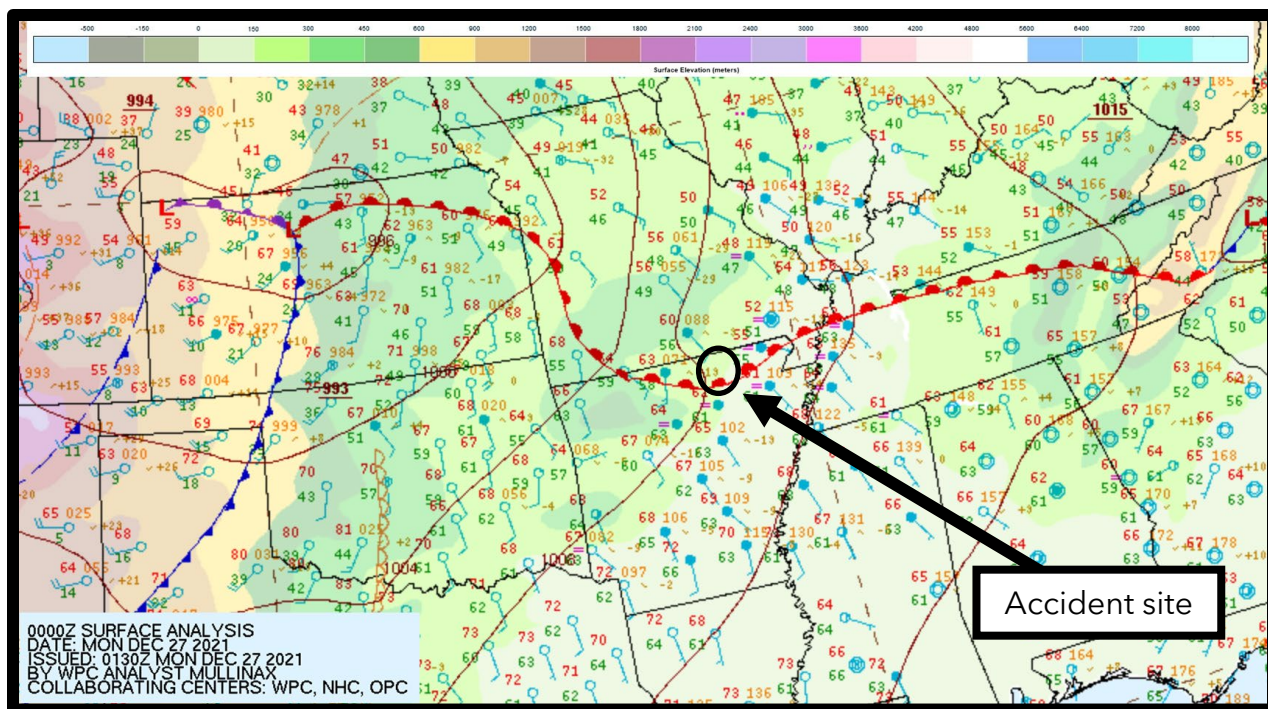


Figure 1. NWS Surface Analysis Chart for 1800 CST.

1.2 Upper Air Charts

The NWS Storm Prediction Center (SPC) Constant Pressure Charts for 1800 CST at 925-, 850- and 700-hPa are presented in figures 2 through 4. The accident site was in the vicinity of a low- and mid-level trough². Troughs can act as lifting mechanisms to help produce clouds and precipitation if sufficient moisture is present. There was a south wind at 35 knots at 925-hPa with the wind becoming westerly through 700-hPa. The wind speed increased to 45 knots by 700-hPa.

² Trough - An elongated area of relatively low atmospheric pressure or heights.

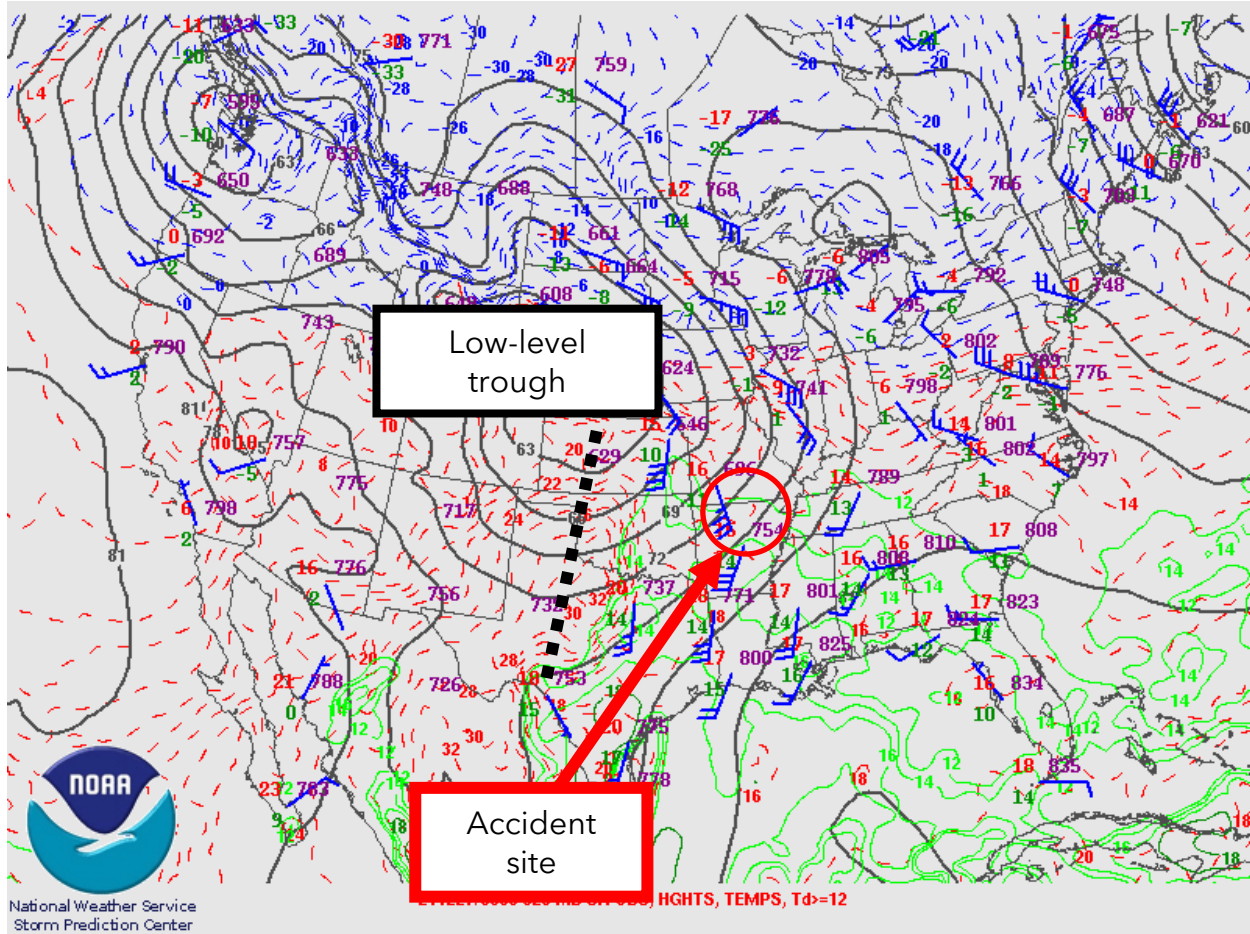


Figure 2. 925-hPa Constant Pressure Chart for 1800 CST.

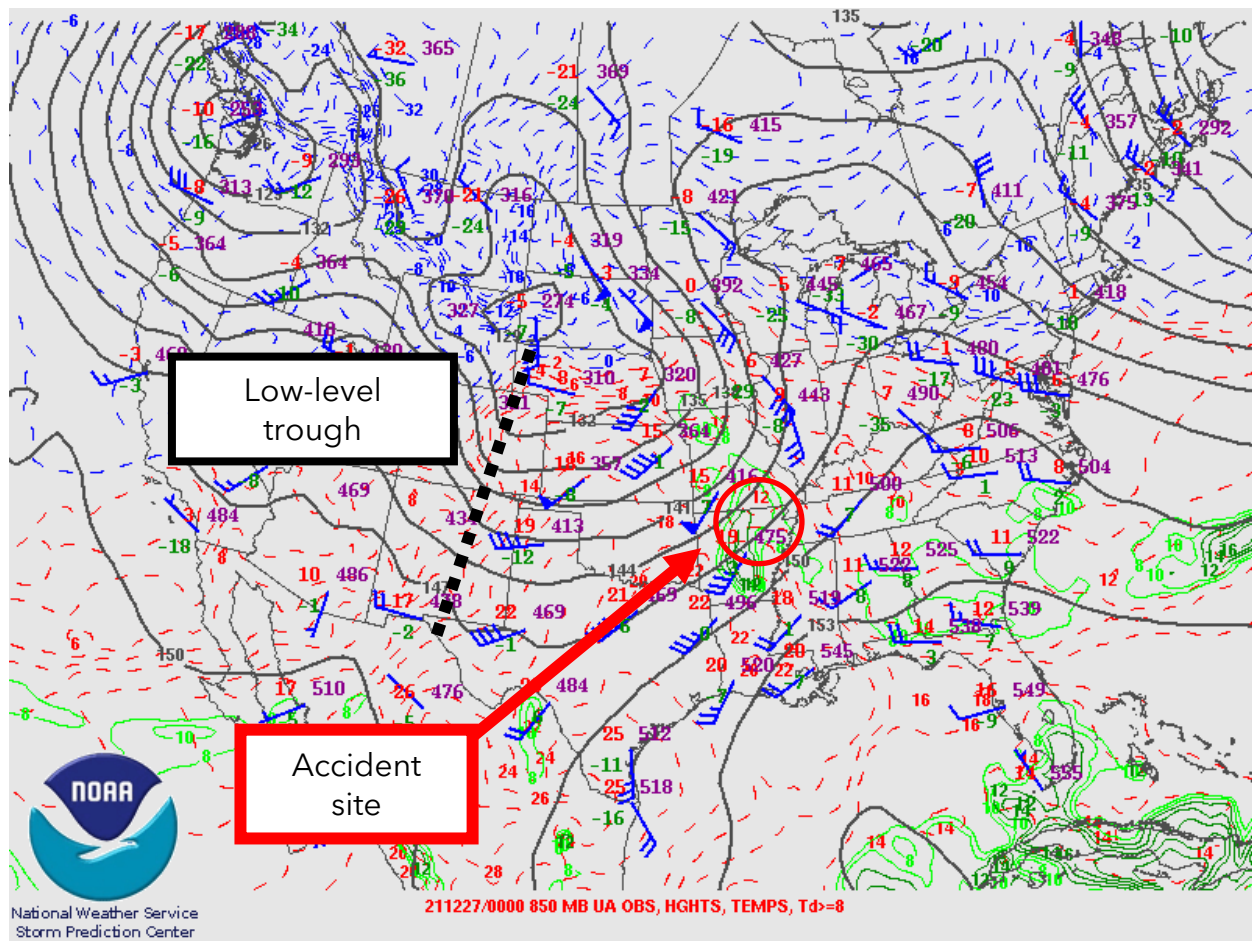


Figure 3. 850-hPa Constant Pressure Chart for 1800 CST.

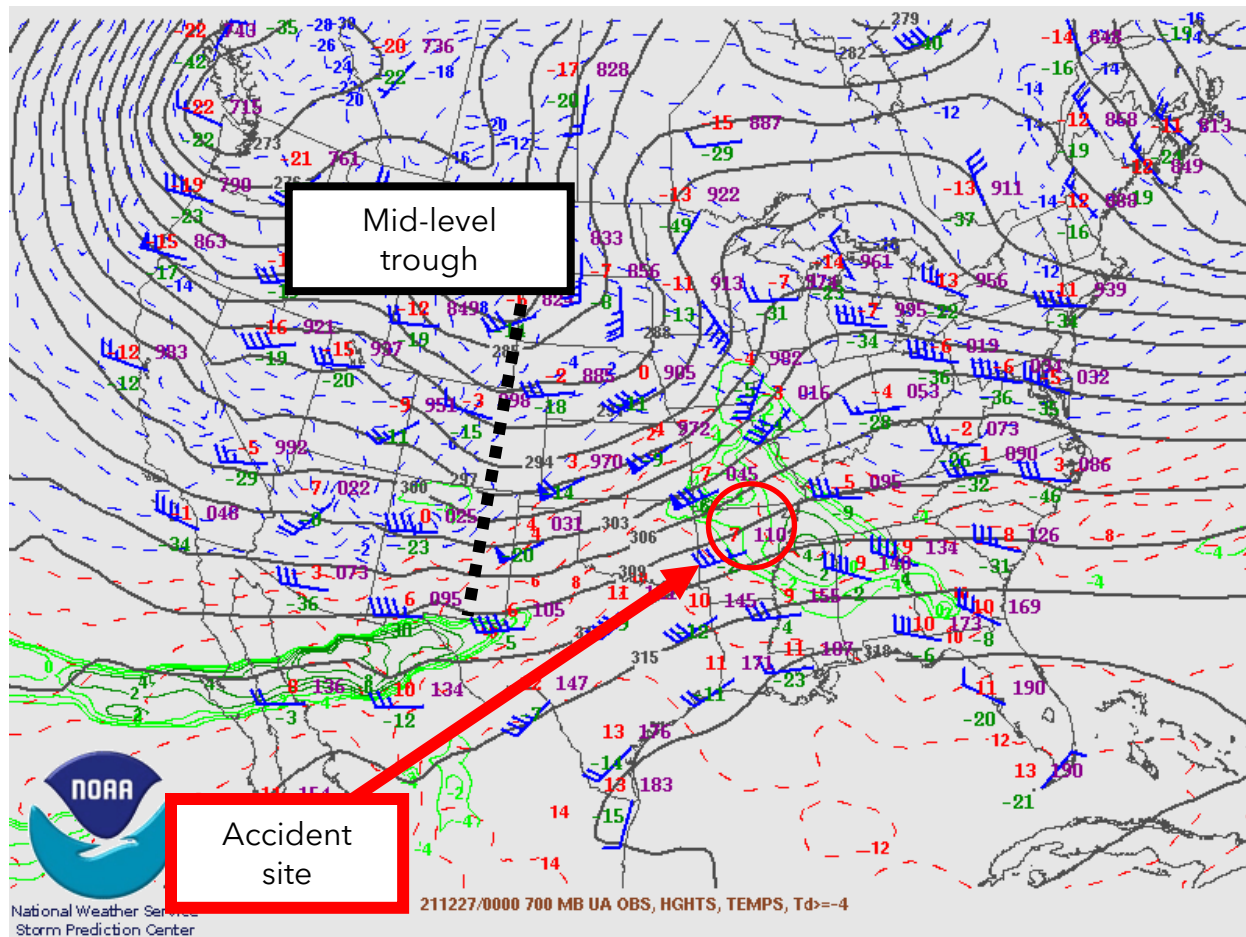


Figure 4. 700-hPa Constant Pressure Chart for 1800 CST.

2.0 Surface Observations

The area surrounding the accident site was documented using official Aviation Routine Weather Reports (METARs) and Specials Reports (SPECIs). The following observations were taken from standard code and are provided in plain language. Figure 5 is a local sectional chart with the accident site and the closest weather reporting locations marked.

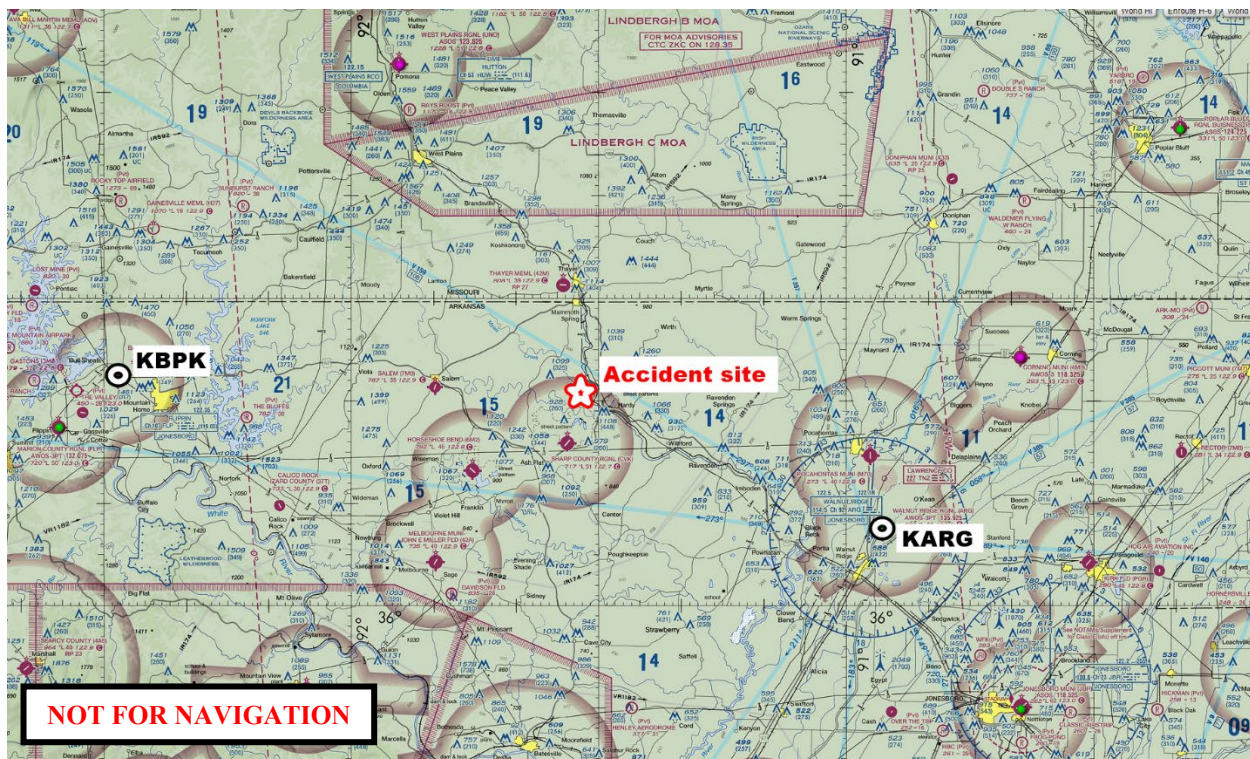


Figure 5. Sectional map of the accident area with the location of the accident site and surface observation sites.

Walnut Ridge Regional Airport (KARG) had the closest official weather station to the accident site. KARG had an Automated Weather Observing System (AWOS³) whose longline⁴ reports were not augmented. The KARG AWOS was located 33 miles east-southeast of the accident site, at an elevation of 279 ft, and had a 1° westerly magnetic variation⁵ (figure 5). KARG AWOS observations surrounding the accident time are shown below:⁶

³ AWOS - Automated Weather Observing System is equipped with meteorological instruments to observe and report temperature, dewpoint, wind speed and direction, visibility, cloud coverage and ceiling up to 12,000 feet, and altimeter setting. AWOS are maintained by the FAA.

⁴ "Longline" refers to the dissemination of weather observations with the intent that they are available in near-real time to national databases and accessible to the general global public from a large number of vendors. This does not include public accessibility to observations from a reporting station's Very High Frequency (VHF; line-of-site) or telephone broadcast, where applicable. Longline dissemination of weather observations is the primary vehicle through which the weather observations are distributed.

⁵ Magnetic variation - The angle (at a particular location) between magnetic north and true north. Latest measurement taken from <https://skyvector.com/>

⁶ The bold sections in this NWS product and the rest of the products in this report are intended to highlight the text that directly reference the weather conditions that affected the accident location around the accident time. The local times in this section next to the METARs are provided for quick reference between UTC and local times around the accident time.

[1614 CST] SPECI KARG 262214Z AUTO 11007KT 3/4SM BR OVC002
14/14 A2988 RMK AO2 RVRNO

[1631 CST] SPECI KARG 262231Z AUTO 11007KT 1/2SM FG OVC002
14/ A2987 RMK AO2 RVRNO

[1656 CST] METAR KARG 262256Z AUTO 12006KT 1/2SM FG OVC002
14/14 A2987 RMK AO2 SLP116 T01390139 RVRNO

[1712 CST] SPECI KARG 262312Z AUTO 12005KT 1/4SM FG OVC002
14/ A2987 RMK AO2 RVRNO

***[1719 CST] SPECI KARG 262319Z AUTO 12006KT 1/2SM FG
OVC002 14/ A2986 RMK AO2 RVRNO***

ACCIDENT TIME 1729 CST

***[1739 CST] SPECI KARG 262339Z AUTO 12008KT 1SM BR OVC002
14/14 A2985 RMK AO2 RVRNO***

[1749 CST] SPECI KARG 262349Z AUTO 13007KT 1 3/4SM BR OVC002
15/15 A2985 RMK AO2

The bold type observations decoded in plain language were as follows:

KARG weather at 1719 CST, automated, wind from 120° at 6 knots, visibility a ½ mile, fog, overcast ceiling at 200 ft above ground level (agl), temperature of 14° Celsius (C), and an altimeter setting of 29.86 inches of mercury (inHg). Remarks, station with a precipitation discriminator, runway visual range not available.

KARG weather at 1739 CST, automated, wind from 120° at 8 knots, visibility 1 mile, mist, overcast ceiling at 200 ft agl, temperature of 14°C, dew point temperature 14°C, and an altimeter setting of 29.85 inHg. Remarks, station with a precipitation discriminator, runway visual range not available. For additional KARG AWOS observations please see attachment 1.

The closest station reporting visual flight rule conditions was Baxter County Airport (KBPK). KBPK had an Automated Surface Observing System (ASOS⁷) whose longline reports were not augmented. The KBPK ASOS was located 45 miles west of the accident site, at an elevation of 928 ft, and had a 0° W magnetic variation (figure 5). KBPK ASOS observations surrounding the accident time are shown below:

[1253 CST] METAR KBPK 261853Z AUTO 14007KT 10SM FEW120 17/10
A2986 RMK AO2 SLP107 T01720100

[1353 CST] METAR KBPK 261953Z AUTO 16009KT 10SM CLR 19/11
A2982 RMK AO2 SLP093 T01940111

[1553 CST] METAR KBPK 262153Z AUTO 19010G20KT 10SM CLR 19/14
A2978 RMK AO2 SLP080 T01890139

[1642 CST] SPECI KBPK 262242Z AUTO 19013KT 10SM BKN023 18/14
A2978 RMK AO2 T01780139

***[1653 CST] METAR KBPK 262253Z AUTO 19011G20KT 10SM
BKN023 18/14 A2977 RMK AO2 SLP077 T01780139***

ACCIDENT TIME 1729 CST

***[1753 CST] METAR KBPK 262353Z AUTO 19013G18KT 10SM
BKN020 OVC025 17/14 A2975 RMK AO2 SLP071 T01720144
10200 20156 58013***

[1853 CST] METAR KBPK 270053Z AUTO 20010KT 10SM OVC023
18/14 A2975 RMK AO2 SLP070 T01780144

The bold type observations decoded in plain language were as follows:

KBPK weather at 1653 CST, automated, wind from 190° at 11 knots with gusts to 20 knots, visibility 10 miles or greater, broken ceiling at 2,300 ft agl, temperature of 18°C, dew point temperature 14°C, and an altimeter setting of 29.77 inHg. Remarks, station with a precipitation discriminator, sea level pressure 1007.7-hPa, temperature 17.8°C, dew point temperature 13.9°C.

⁷ ASOS - Automated Surface Observing System is equipped with meteorological instruments to observe and report wind, visibility, weather phenomena, ceiling, temperature, dewpoint, altimeter, and barometric pressure. ASOS are maintained by the NWS.

KBPK weather at 1753 CST, automated, wind from 190° at 13 knots with gusts to 18 knots, visibility 10 miles or greater, broken ceiling at 2,000 ft agl, overcast skies at 2,500 ft agl, temperature of 17°C, dew point temperature 14°C, and an altimeter setting of 29.75 inHg. Remarks, station with a precipitation discriminator, sea level pressure 1007.1-hPa, temperature 17.2°C, dew point temperature 14.4°C, 6-hourly maximum temperature of 20.0°C, 6-hourly minimum temperature of 15.6°C, 3-hourly pressure decrease of 1.3 hPa.

The observations from KARG surrounding the accident time indicated LIFR⁸ conditions with mist and fog. LIFR conditions were present at KARG as early as 1446 CST with IFR conditions present at 1129 CST (attachment 1). MVFR conditions were present at KBPK around the accident time.

⁸ As defined by the NWS and the FAA Aeronautical Information Manual (AIM) section 7-1-7 defines the following general flight categories:

- Low Instrument Flight Rules (LIFR*) – ceiling below 500 ft above ground level (agl) and/or visibility less than 1 statute mile.
- Instrument Flight Rules (IFR) – ceiling between 500 to below 1,000 feet agl and/or visibility 1 to less than 3 miles.
- Marginal Visual Flight Rules (MVFR**) – ceiling from 1,000 to 3,000 ft agl and/or visibility 3 to 5 miles.
- Visual Flight Rules (VFR) – ceiling greater 3,000 ft agl and visibility greater than 5 miles.

* By definition, IFR is a ceiling less than 1,000 ft agl and/or visibility less than 3 miles while LIFR is a sub-category of IFR.

**By definition, VFR is a ceiling greater than or equal to 3,000 ft agl and visibility greater than 5 miles while MVFR is a sub-category of VFR.

3.0 Upper Air Sounding

A High-Resolution Rapid Refresh (HRRR)⁹ model sounding was created for the accident site for 1700 CST with a surface elevation of 564 ft.¹⁰ The 1700 CST HRRR sounding was plotted on a standard Skew-T Log P diagram¹¹ with the derived stability parameters included in figure 6 with data from the surface to 700-hPa (or approximately 10,000 ft). These data were analyzed using the RAOB¹² software package. The sounding depicted the lifted condensation level (LCL)¹³ at 211 ft agl (775 ft msl) and the convective condensation level (CCL)¹⁴ at 2,777 ft msl. The freezing level was located at 12,447 ft. The precipitable water value was 1.05 inches.

⁹ The HRRR is a NOAA real-time three-kilometer resolution, hourly-updated, cloud-resolving, convection-allowing atmospheric model, initialized by three-kilometer grids with three-kilometer radar assimilation. Radar data is assimilated in the HRRR every 15 minutes over a one-hour period.

¹⁰ HRRR sounding was created using NOAA Air Resource Laboratory:

<https://ready.arl.noaa.gov/READYamet.php>

¹¹ Skew T log P diagram - is a standard meteorological plot using temperature and the logarithmic of pressure as coordinates, used to display winds, temperature, dew point, and various indices used to define the vertical structure of the atmosphere.

¹² RAOB - (The complete Rawinsonde Observation program) is an interactive sounding analysis program developed by Eosonde Research Services, The Villages, Florida.

¹³ LCL - The height at which a parcel of moist air becomes saturated when it is lifted dry adiabatically.

¹⁴ CCL - The level in the atmosphere to which an air parcel, if heated from below, will rise dry adiabatically, without becoming colder than its environment just before the parcel becomes saturated.

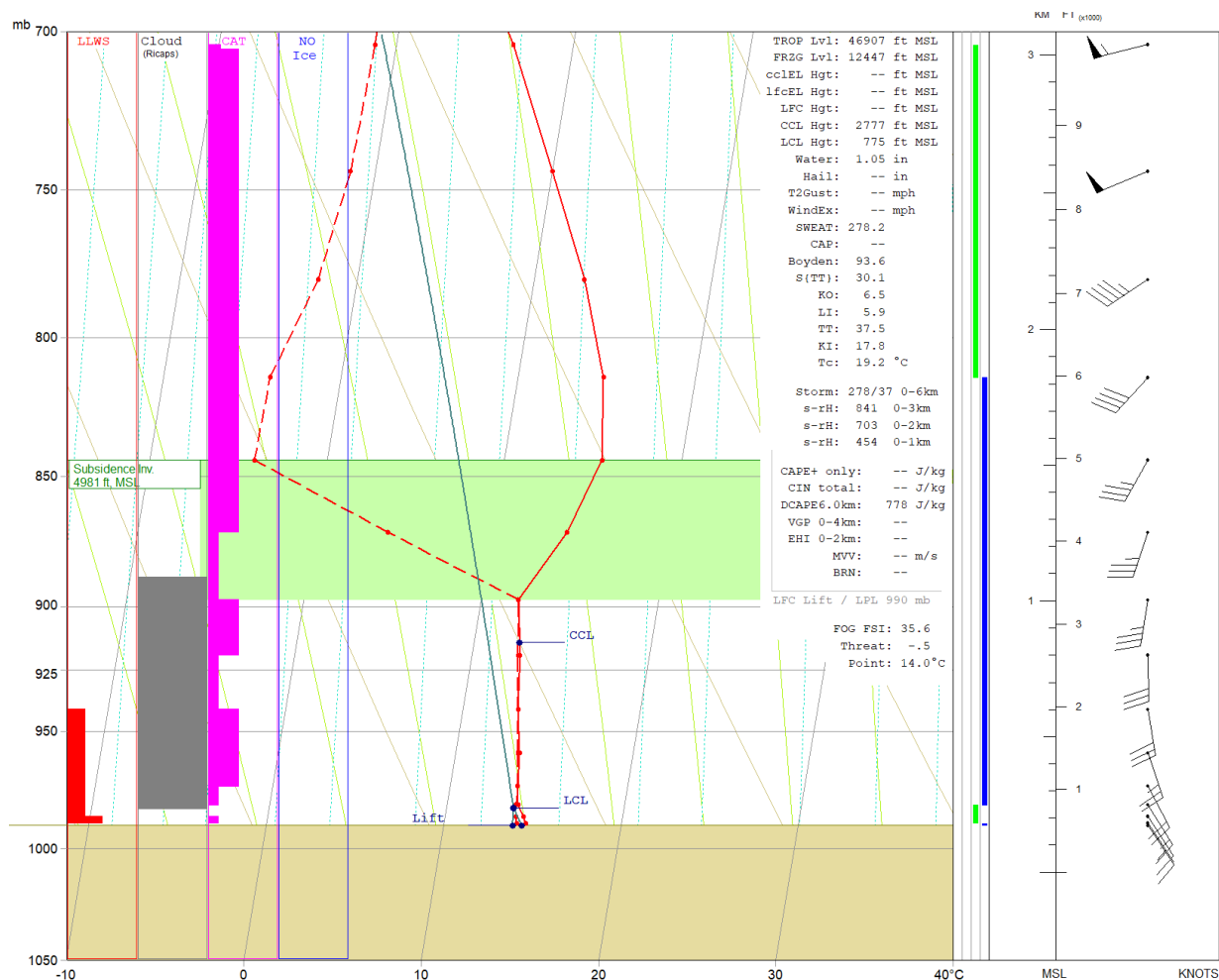


Figure 6. 1700 CST HRRR sounding.

The 1700 CST HRRR sounding for the accident site indicated a stable environment from 200 ft agl through 6,000 ft msl. Clouds were indicated by RAOB to be present from 200 ft agl through 3,500 ft msl. The top of a subsidence inversion¹⁵ was noted at 4,981 ft. No icing potential was indicated by RAOB below 10,000 ft.

The 1700 CST HRRR sounding wind profile indicated a near surface wind from 147° at 8 knots with the wind veering¹⁶ to the west by 10,000 ft. The wind speed was between 10 to 30 knots between the 150 ft agl and 1,300 ft agl. The wind speed continued to increase with height to 55 knots by 10,000 ft. RAOB indicated the possibility of light to moderate low-level wind shear (LLWS) below 2,000 ft agl, and light to moderate clear air turbulence below 10,000 ft.

¹⁵ Inversion - A departure from the usual decrease of the value of an atmospheric property with increasing altitude; also, the layer through which this departure occurs (the "inversion layer"), or the lowest altitude at which the departure is found (the "base of the inversion").

¹⁶ A clockwise turning of the wind with height in the northern hemisphere.

4.0 Satellite Data

Geostationary Operational Environmental Satellite number 16 (GOES-16) visible and infrared data were obtained from an archive at the Space Science Engineering Center at the University of Wisconsin-Madison in Madison, Wisconsin, and processed using the Man-computer Interactive Data Access System software. Visible and infrared imagery (GOES-16 bands 2 and 13) at wavelengths of 0.64 microns (μm) and 10.3 μm , respectively, were retrieved for the period from 1400 CST through 2000 CST and reviewed, and the closest images to the time of the accident were documented. Given the sun angle, the visible imagery (band 2) did not provide useful information.

Figure 7 presents the GOES-16 infrared imagery from 1730 CST at 4X magnification with the accident site highlighted with a red square and cloud cover indicated above the accident site. The lower brightness temperatures (green and blue colors; higher cloud tops) were located to the northeast through southwest of the accident site. The brightness temperature of about 272 Kelvin above the accident site would have been near 12,000 ft based on the vertical temperature profile provided by the 1700 CST HRRR sounding (not shown). It should be noted these figures have not been corrected for any parallax error. The Nighttime Microphysics Red, Green, Blue (RGB) imagery¹⁷ indicated 2 different layers of cloud cover above the accident site with the aqua colored lower clouds in place across central Arkansas to southern Missouri, and the darker red and purple higher cloud cover moving from west to east (attachment 2).

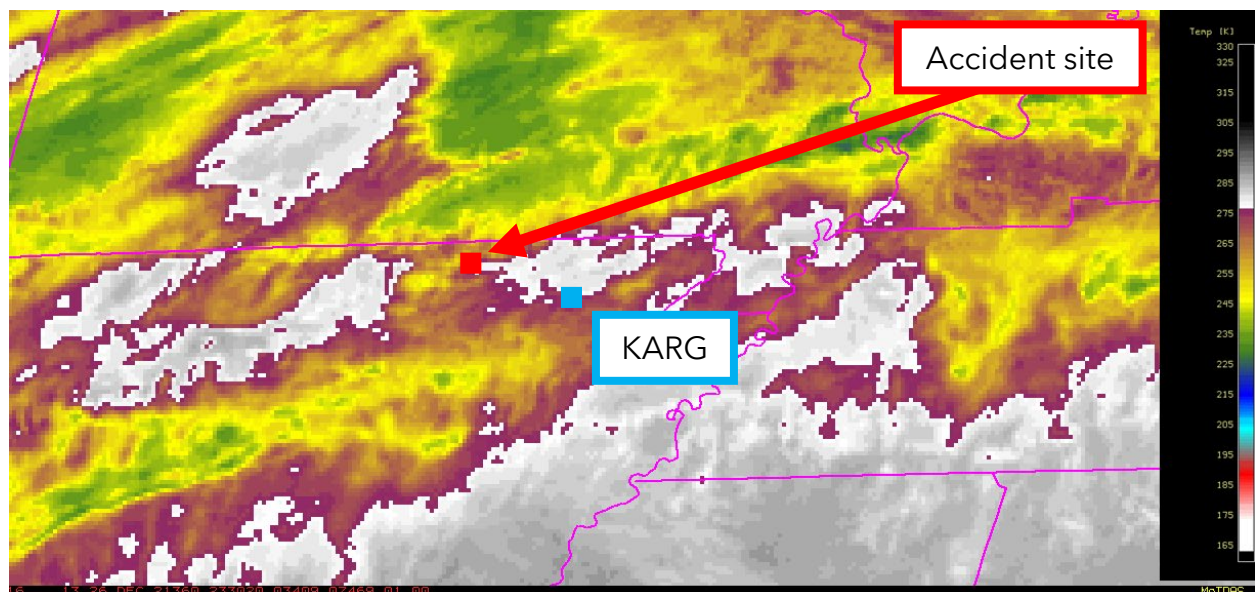


Figure 7. GOES-16 infrared image at 1730 CST.

¹⁷ [RGB Nighttime Microphysics Reference Guide.pdf \(nasa.gov\)](#)

5.0 National Radar Imagery

A regional view of the NWS National Reflectivity Mosaic is included as figure 8 for 1730 CST with the approximate location of the accident site was located within the marked red circle. The image depicted no echoes above the accident site.

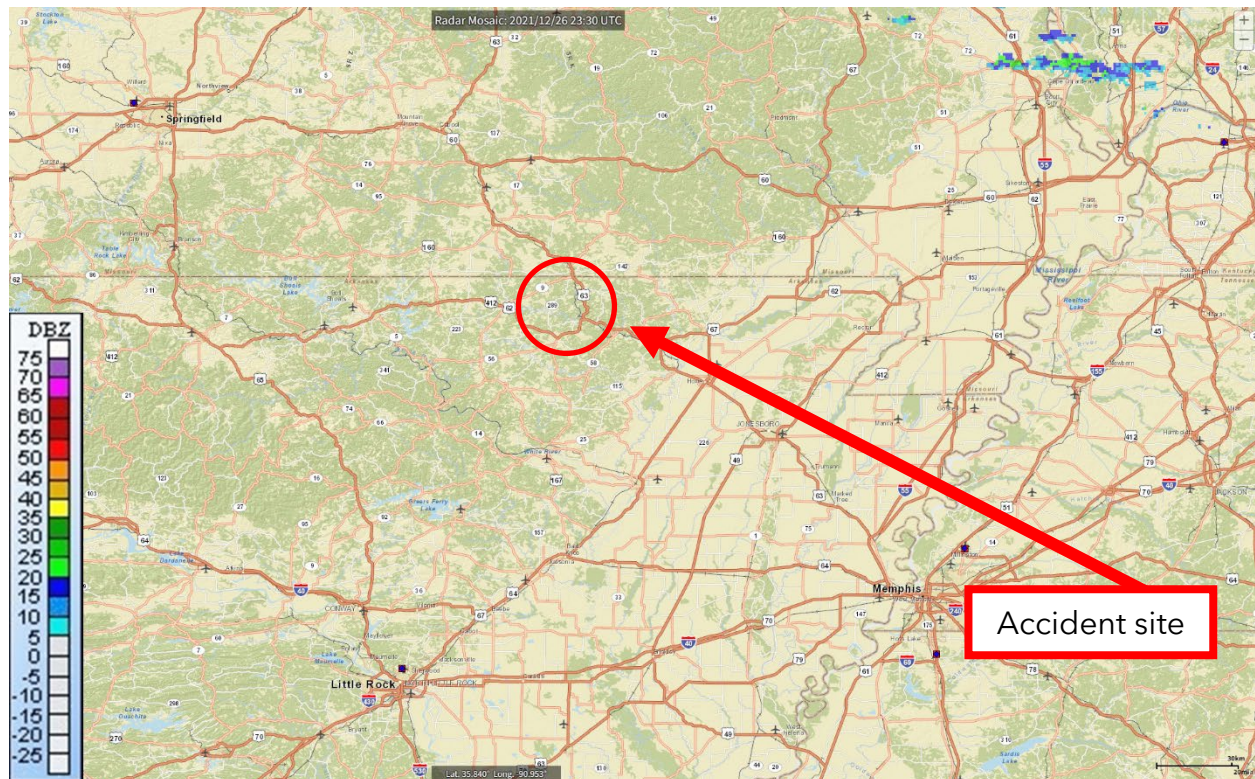


Figure 8. National Reflectivity Mosaic for 1730 CST.

6.0 Pilot Reports

The longline-disseminated pilot reports¹⁸ (PIREPs) distributed into the national airspace (NAS) were reviewed for about two hours either side of the accident time and the PIREPs within 150 miles of the accident site below 18,000 ft are shown below:

MEM UA /OV MEM 4 MILES SOUTH/TM 2239/FL026/TP H/MD11/SK BKN026

MEM UA /OV MEM/TM 2300/FLDURGD/TP LJ60/SK BASES 025

MWA UA /OV MWA/TM 2352/FL030/TP C402/SK BASES 022 TOPS 027/RM

ZKC/FD1/CJ

¹⁸ Only pilot reports with the World Meteorological Organization headers UBAR*, UBMO**, UBTN**, UBIL**, and UBMS** were considered. These do not include pilot reports only broadcast via radio.

MEM UA /OV MEM/TM 0052/FL038/TP A306/RM BASES 038
MEM UA /OV MEM/TM 0105/FL040/TP B350/RM BASES 040
SGF UA /OV LBO/TM 0134/FL050/TP PA32/SK SKC/TB OCNL LGT/IC NEG/RM
ZKC/FD1/CJ

7.0 Significant Meteorological Information

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

8.0 Center Weather Service Advisories

The Memphis (ZME) Air Route Traffic Control Center (ARTCC) Center Weather Service Unit (CWSU) was responsible for the accident region. ZME CWSU issued CWA 106 at 1555 CST valid through 1800 CST forecasting LIFR conditions for the accident site and northeastern Arkansas with conditions expected to improve by 1800 CST:

**FAUS21 KZME 262155
ZME1 CWA 262200
ZME CWA 106 VALID UNTIL 270000
FROM 40NNE ARG-25N DYN-15NE LIT-65N LIT-40NNE ARG
AREA LIFR CONDS. CIGS AOB 005 AND/OR VIS AOB 1SM BR/FG. CONDS EXPD
TO IMPR MOST LOCATIONS BY 00Z. AR MO TN
=**

In addition, ZME CWSU issued several pre-duty weather briefings valid for the accident day and those can be found in attachment 3.

9.0 Airmen's Meteorological Information

There was an Airmen's Meteorological Information (AIRMET) advisory Sierra valid for the accident site at the accident time. The AIRMET Sierra issued at 1445 CST forecast IFR conditions in mist and fog through 2100 CST:

WAUS43 KPCI 262045
WA3S
-CHIS WA 262045
AIRMET SIERRA UPDT 8 FOR IFR AND MTN OBSCN VALID UNTIL 270300
.
AIRMET IFR...ND SD NE MN IA MO WI LM LS MI IL IN KY
FROM 40NNW INL TO 60ESE INL TO BAE TO 20SW FWA TO 30SE IND TO
20SW PXV TO 20NNE COU TO 20ENE FSD TO 30WSW OBH TO 40ENE LBF TO
50WSW RAP TO 50NNW ISN TO 80SW YWG TO 40NNW INL

CIG BLW 010/VIS BLW 3SM PCPN/BR. CONDS CONTG BYD 03Z THRU 09Z.

.
AIRMET IFR...MO IL IN KY OK TX AR TN MS
FROM 20NNE COU TO 20SW PXV TO 20NNE BWG TO 20ESE BNA TO 60W MSL
TO 20NNE ELD TO 60W TXK TO 40SSW MLC TO 70W ARG TO 20NNE COU
CIG BLW 010/VIS BLW 3SM BR/FG. CONDS CONTG BYD 03Z THRU 09Z.

.
AIRMET MTN OBSCN...KY TN
FROM HNN TO HMV TO GQO TO 50WSW LOZ TO HNN
MTNS OBSC BY CLDS/BR. CONDS DVLPG AFT 21Z. CONDS CONTG BYD 03Z
THRU 09Z.

.
OTLK VALID 0300-0900Z...IFR ND SD MN IA MO WI LM LS MI IL IN KY
BOUNDED BY 50NNW ISN-60WNW INL-70SE YQT-20NW TVC-20SE GRR-20NW
ROD-30N IJU-20SW PXV-60ESE FAM-50ENE SGF-30NNW COU-30N FSD-20NNW
PIR-40WNW RAP-50NNW ISN
CIG BLW 010/VIS BLW 3SM PCPN/BR. CONDS CONTG THRU 09Z.

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10.0 Graphical Forecasts for Aviation

The Graphical Forecasts for Aviation (GFA) products issued before the accident flight and valid at 1800 CST are shown in attachment 4. The GFA surface forecast applicable to the accident region that was valid before the accident flight's departure for times surrounding the accident time indicated VFR to IFR surface visibilities, a southeast surface wind at 5 knots with gusts to 15 knots, and fog. The GFA cloud forecast applicable to the accident region that was valid before departure for times surrounding the accident time indicated overcast cloud coverage with ceilings at 500 ft and cloud tops at 5,000 ft with cirrus cloud above. The Graphical AIRMET¹⁹ (G-AIRMET) Sierra for IFR conditions was overlaid on the GFA surface forecast imagery. The only human-generated information reflected in the two GFA products were the G-AIRMETs. For more information, please see attachment 4.

11.0 Terminal Aerodrome Forecast

There were no airports within 40 miles of the accident site with an NWS Terminal Aerodrome Forecast²⁰ (TAF).

¹⁹ <https://aviationweather.gov/gairmet>

²⁰ According to NWS Instruction 10-813: "An NWS TAF consists of the expected meteorological conditions significant to aviation at an airport for a specified time period. For the U.S., this is the area within five (5) statute miles (SM) of the center of an airport's runway complex."
www.nws.noaa.gov/directives/sym/pd01008013curr.pdf

12.0 National Weather Service Area Forecast Discussion

The NWS office in Little Rock, Arkansas, (WFO LZK) was responsible for the public forecast in the region of the accident site. WFO LZK issued the following Area Forecast Discussion (AFD) at 1134 CST, the closest AFD to the accident time with an aviation section, that identified reduced visibilities and ceilings due to a warm front:

FXUS64 KLZK 261734
AFDLZK

Area Forecast Discussion
National Weather Service Little Rock AR
1134 AM CST Sun Dec 26 2021

.UPDATE...

Visibility values continue to slowly improve, per recent surface observations. Dense fog advisory to expire at noon.

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.AVIATION...

Areas of visibility reductions due to visibility appear to focused near slow moving warm front, subjectively analyzed from north of Mt. Ida, to near Little Rock, to Searcy. Expect additional MVFR visibility overnight across the southern 2/3 of the forecast area. MVFR ceilings to prevail across most sites through this period.

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.PREV DISCUSSION...(ISSUED 1010 AM CST Sun Dec 26 2021)

UPDATE...

Pockets of dense fog remain across the forecast area. Most concentrated areas are located from the Little Rock area eastward. Expect slow improvements in visibility reductions through early afternoon.

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PREV DISCUSSION...(ISSUED 535 AM CST Sun Dec 26 2021)

UPDATE...

Updated to include the 12Z aviation discussion.

AVIATION...

Dense fog for central and southern terminals is giving way to IFR/LIFR VIS conditions. Fog is expected through much of the morning and completely dependent on the frontal boundary. Current expectations lifts much of the fog by the late morning hours, however, some improvement in VIS could happen as early as sunrise. VFR conditions are expected for the afternoon hours. Winds are

expected to be out of the south and gusting at times.

PREV DISCUSSION...(ISSUED 356 AM CST Sun Dec 26 2021)
SHORT TERM...Today Through Monday Night

To begin the period, quasi-zonal flow over the CWA will contribute to settled weather Sunday. However, a low pressure system, tracking across the Great Lakes, will pull a cold front into the state. This cold front is expected to stall across the state Monday increasing POPs through the end of the short term period into the long term.

Areas of dense fog will be possible through Sunday morning as a stalled frontal boundary has positioned itself over the state providing calm winds and high RH values. Currently, the stalled frontal boundary looks positioned over central AR, making this the area most possible for dense fog. Although, patchy, dense fog cannot be ruled out for areas in southern AR as well.

Southerly flow is expected to contribute to above average temperatures in the short term. Highs temperatures are expected to be in the upper 60s to mid 70s across the state with overnight lows in the 50s and 60s.

LONG TERM...Tuesday Through Saturday

The long term will definitely become more active compared to the short term period. Overall, the upper pattern will feature expansive SW flow over the eastern two-thirds of the CONUS due to troughing in the Four Corners and ridging over FL. Not many changes will be noted until the very end of the period once these features eject Eward into the Rockies.

At the surface, high pressure will be located beneath the upper ridge and a series of low pressures will develop in lee of the Rockies and slide NE within background SW upper flow. On Tuesday, one of these surface lows should be located over the Cntrl Plains with associated warm front, along the AR/MO border and lifting Nward, and a cold front becoming established over KS/OK/Cntrl TX pushing Eward. PoP chances will return to the region adjacent the warm front and ahead of the cold front, which should affect mainly the Nrn and Wrn half of the state. This particular surface low will lift NE towards the Great Lakes, however a surface boundary will be left in its wake draped across the state.

Another round of precipitation is expected on Wednesday as upper level energy moves through the flow and interacts with the quasi-stationary boundary. A brief lull in precipitation is expected Thursday and Thursday night as the front moves Sward slightly.

By Friday afternoon, a new surface low is expected to develop over the Cntrl Plains. This developing low should aid in the boundary lifting back to the N as a warm front. This new surface low should

track a bit further S than the previous one. As a result, scattered showers and thunderstorms will return to the forecast on Saturday, affecting a larger portion of AR. At this time the threat for severe weather looks low. QPF amounts still appear low with amounts generally less than one inch.

Temperatures through the period will be above average but breaks in the extreme warmth will be offset by cooler air found N of the boundary. Locations S of this boundary will remain in the warm/moist airmass that we have experienced on Christmas Day, will experience through the short term period, and into the long term. In fact, it is quite possible we will end the year with no additional freezing temperatures across the CWA.

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.LZK Watches/Warnings/Advisories...

Dense Fog Advisory until noon CST today FOR Arkansas-Bradley-Calhoun-Clark-Cleveland-Dallas-Garland-Grant-Hot Spring-Jefferson-Lincoln-Lonoke-Monroe-Ouachita-Prairie-Pulaski-Saline-Woodruff.

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13.0 Winds and Temperature Aloft Forecast

There were no NWS Winds and Temperature Aloft forecast points within 100 miles of the accident site.

14.0 Accident Pilot Weather Briefing

The accident pilot did not request weather information²¹ from Leidos Flight Service.

A search of archived ForeFlight information indicated that the accident pilot did have a ForeFlight account and could have looked at "live" weather data, but that data is not logged. With no internet access while in flight, ForeFlight is still able to access weather information via ADS-B²² or SiriusXM²³, but leaving no remote record of such access. The accident did not request a weather briefing or review static weather imagery prior to the accident flight. For more information please see attachment 5.

²¹ https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_91-92.pdf

²² [Automatic Dependent Surveillance-Broadcast \(ADS-B\) \(faa.gov\)](#)

²³ [SiriusXM Aviation: Weather & Entertainment | SiriusXM](#)

15.0 Witness Information

A witness located approximately a half mile to the northwest of the accident site stated there was heavy fog present in the area with "500 ft visibility", calm wind, no precipitation, and a temperature near 70°F at the accident time. For more information please see attachment 6.

16.0 Astronomical Data

The astronomical data obtained for the accident site on December 26, 2021, indicated the following:

SUN

Begin civil twilight	0647 CST
Sunrise	0716 CST
Sun transit	1207 CST
Sunset	1658 CST
End civil twilight	1727 CST
Accident time	1729 CST ²⁴

At the time of the accident the Sun was located at an altitude of -6.52° and azimuth of 245.70°.

E. LIST OF ATTACHMENTS

Attachment 1 - Additional KARG AWOS observations

Attachment 2 - GOES-16 Nighttime Microphysics RGB imagery from 1601 to 1801 CST

Attachment 3 - ZME CWSU pre-duty weather briefings valid on the accident day

Attachment 4 - GFA valid for the accident site at accident time

Attachment 5 - ForeFlight correspondence

Attachment 6 - Witness information statement

Submitted by:

Paul Suffern
Senior Meteorologist

²⁴ Inserted accident time for reference and context.