

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



CEN24FA049

METEOROLOGY

Specialist's Factual Report

March 11, 2024

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A. ACCIDENT

Location: Sterling City, Texas
Date: November 29, 2023
Time: 1430 central standard time
2030 coordinated universal time (UTC)
Helicopter: MD600N helicopter; Registration: N745MB

B. METEOROLOGY SPECIALIST

Paul Suffern
Senior Meteorologist
National Transportation Safety Board
Washington, DC

C. DETAILS OF THE INVESTIGATION

The NTSB's Senior Meteorologist did not travel for this investigation but gathered all data remotely. Data for this investigation were collected from official National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) sources including the Weather Prediction Center (WPC) and the National Center 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 approximate latitude 31.923796° N, longitude 100.96924° W, and elevation of 2,635 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 WPC, 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 Federal Aviation Administration (FAA) "Aviation Weather Handbook", FAA-H-8083-28.¹

1.1 Surface Analysis Chart

The NWS Surface Analysis Chart centered over the south-central United States for 1500 CST is provided as figure 1 with the location of the accident site within the black circle. The chart depicted a low-pressure system at 1009-hectopascals (hPa) located in far western Texas. A trough² stretched southeastward from the low across southwestern Texas and northward into New Mexico and Colorado with the trough remaining east of the Rocky Mountains. A high-pressure system at 1024-hPa was located over Mississippi. Troughs and fronts can act as lifting mechanisms to help produce clouds and precipitation if sufficient moisture is present.

The station models closest to the accident site depicted air temperatures in the low 60 degrees Fahrenheit (°F), dew point temperatures in the 40s °F, mostly clear skies, and a south wind at 10 to 15 knots.

¹ [FAA-H-8083-28](#)

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

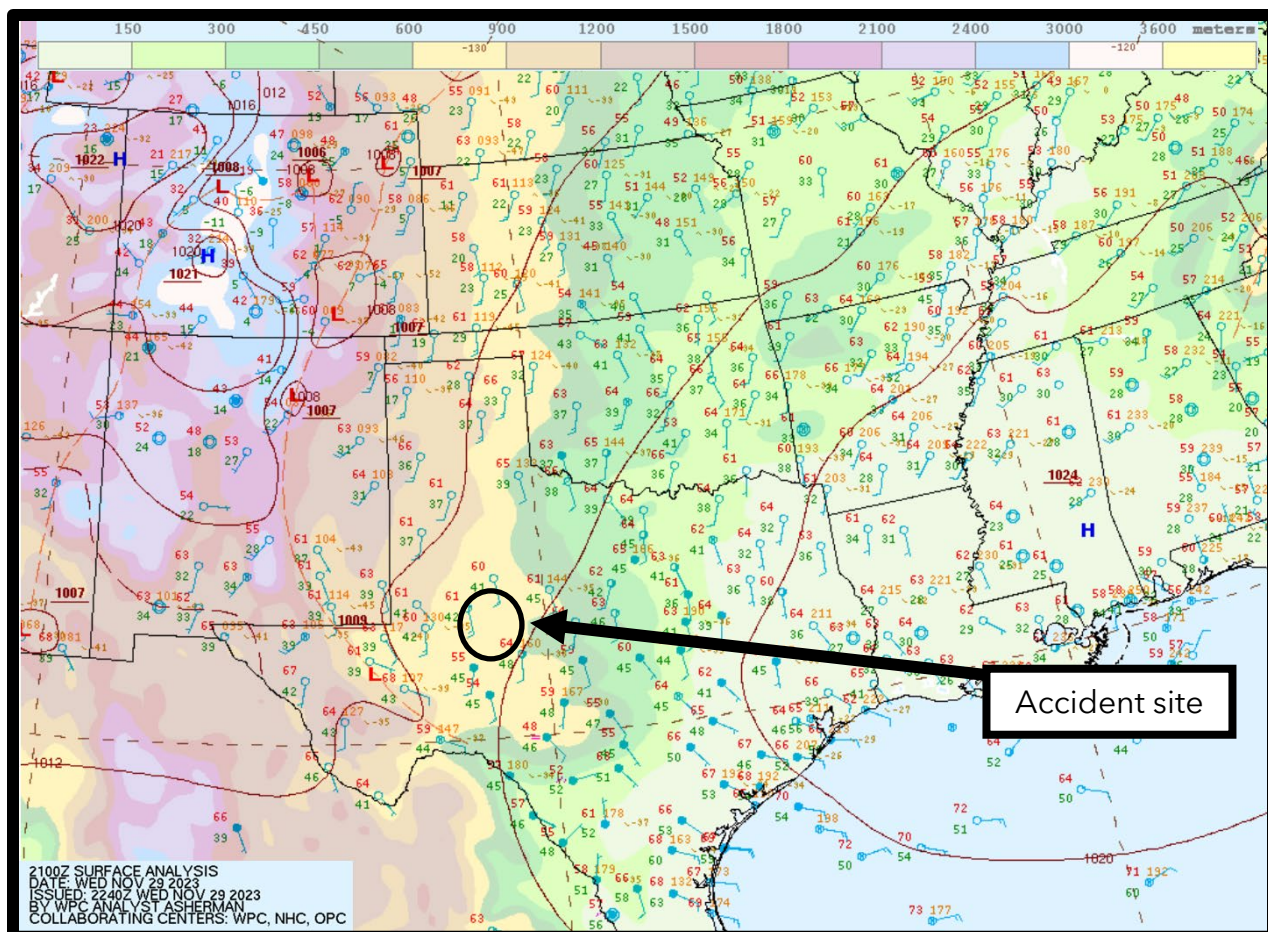


Figure 1. NWS Surface Analysis Chart for 1500 CST.

1.2 Upper Air Charts

The NWS Storm Prediction Center (SPC) Constant Pressure Charts for 1800 CST at 850-, 700-, and 500-hPa are presented in figures 2 through 4. The charts indicated a mid-level trough at 850- to 500-hPa (figures 2 and 4) in southeastern Colorado and northeastern New Mexico. The 850-hPa constant pressure chart depicted a south wind around 20 knots (figure 2) becoming a west 35 knot wind by 500-hPa (figure 4).

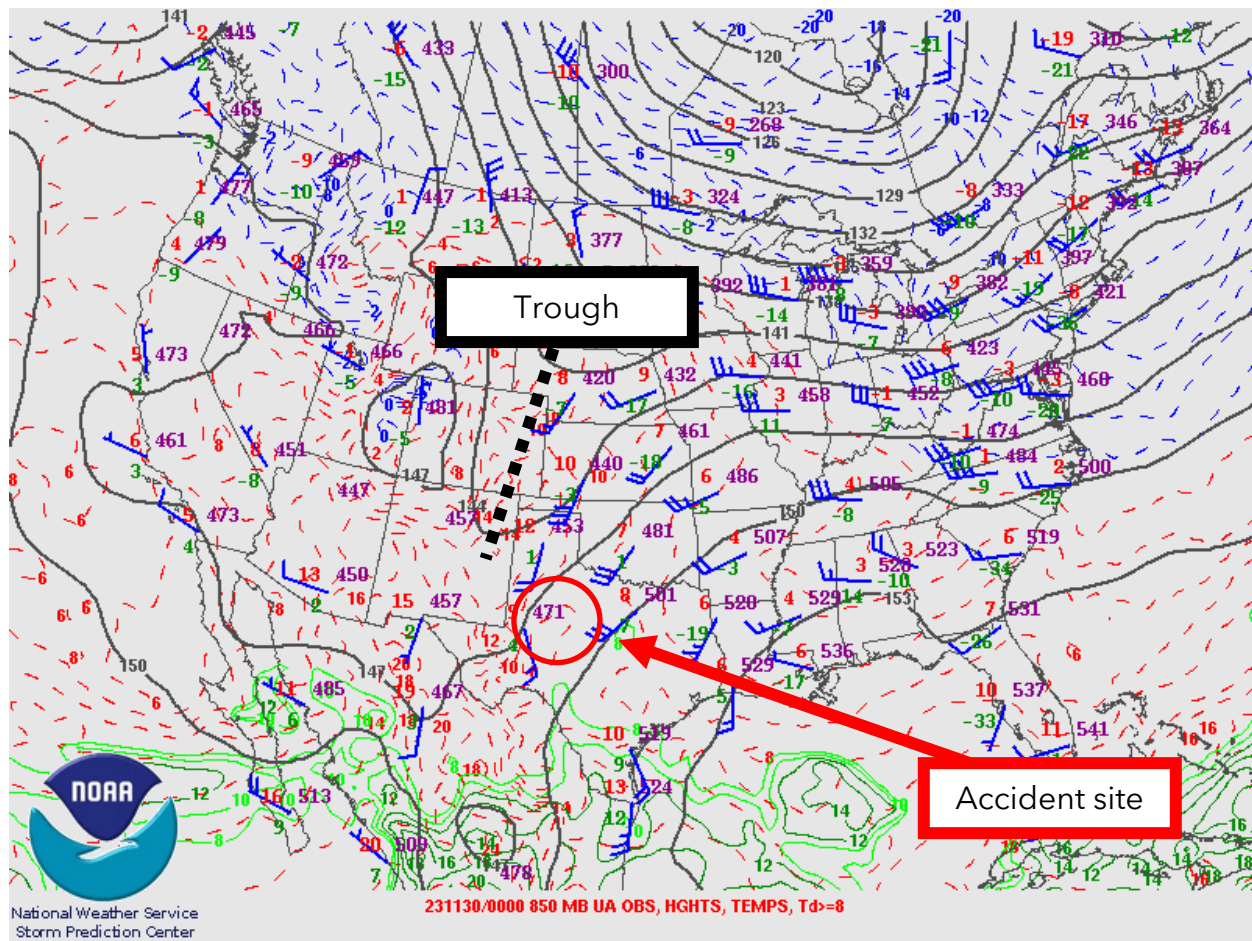


Figure 2. 850-hPa Constant Pressure Chart for 1800 CST.

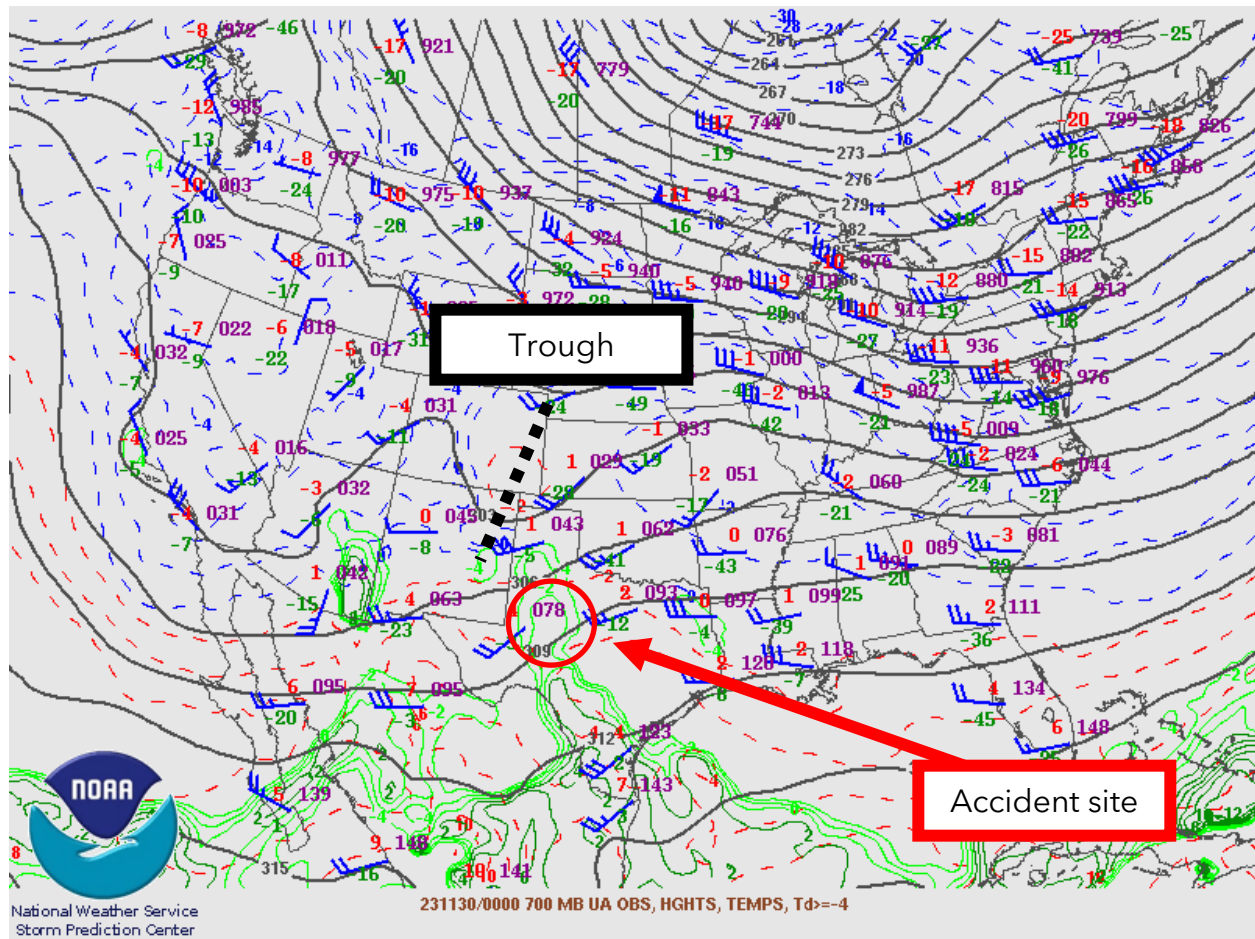


Figure 3. 700-hPa Constant Pressure Chart for 1800 CST.

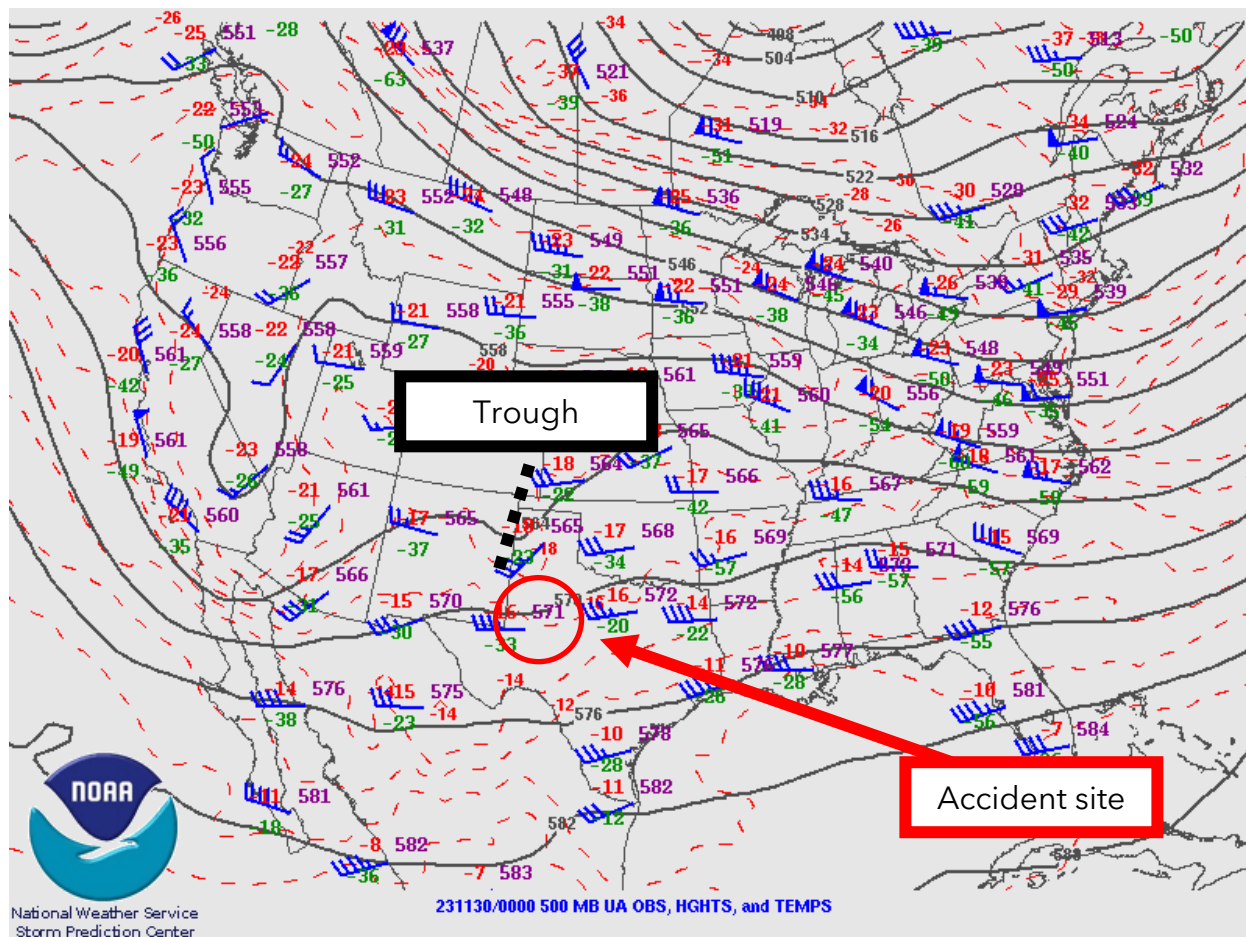


Figure 4. 500-hPa Constant Pressure Chart for 1800 CST.

2.0 Surface Observations

The area surrounding the accident site was documented using official Aviation Routine Weather Reports (METARs) and Special Reports (SPECIs)³. 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. A magnetic variation⁴ of 5.5° east was indicated over the area.

³ Latest criteria for SPECIs can be found in the Federal Meteorological Handbook: [Federal Meteorological Handbook Number 1, Surface Weather Observations and Reports \(icams-portal.gov\)](https://www.federalregister.gov/documents/2018/01/16/2018-01-16-federal-meteorological-handbook-number-1-surface-weather-observations-and-reports)

⁴ Magnetic variation - The angle (at a particular location) between magnetic north and true north. Latest measurement taken from <https://skyvector.com/>

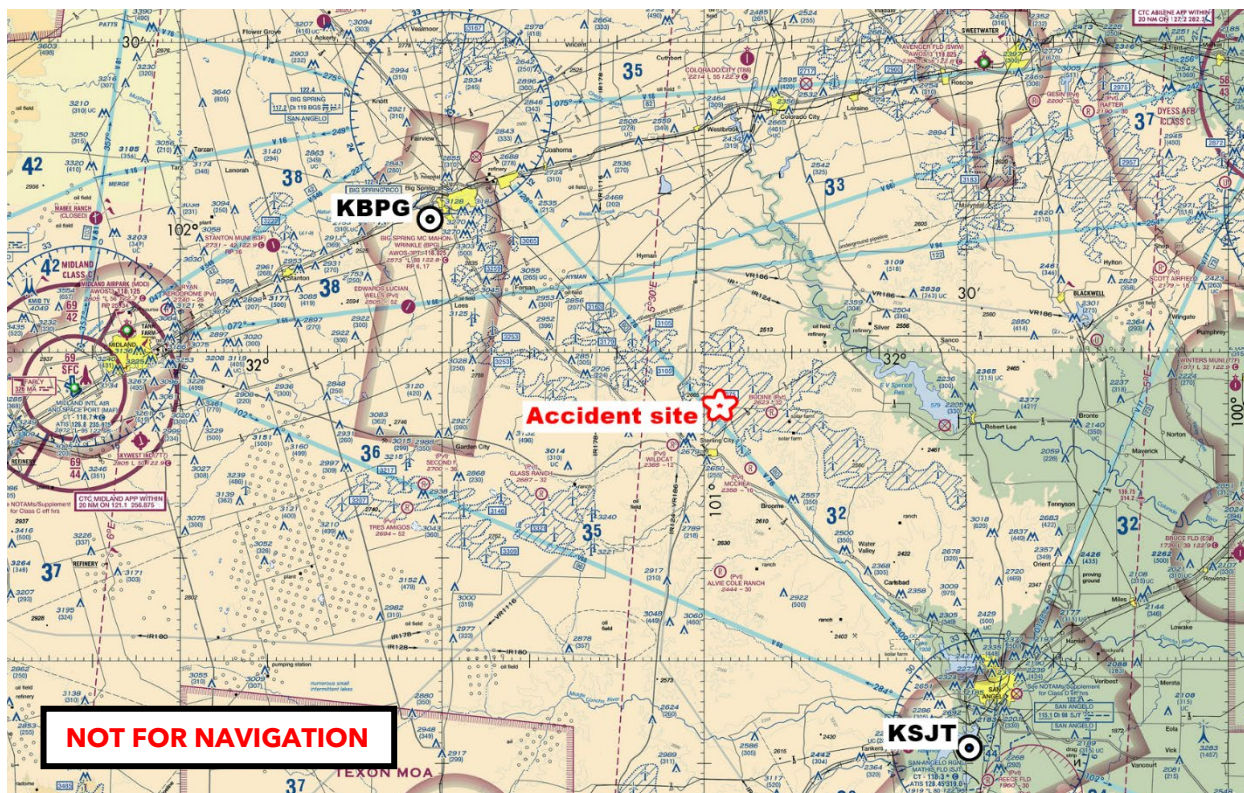


Figure 5. FAA sectional aeronautical chart of the accident area with the location of the accident site and surface observation sites noted.

Big Spring Mc Mahon-Wrinkle Airport (KBPG) had the closest official weather station to the accident site. KBPG had an Automated Weather Observing System (AWOS⁵) and its longline⁶ reports were not augmented. The KBPG AWOS was located 33 miles northwest of the accident site (figure 5) at an elevation of 2,573 ft, and issued the following observations surrounding the accident time:⁷

[1255 CST] METAR KBPG 291855Z AUTO 17011KT 10SM CLR 14/06
A3006 RMK AO2 T01360061=

⁵ AWOS - Automated Weather Observing System is equipped with meteorological instruments to typically 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. Certain AWOS may have different reporting or observational equipment.

⁶ "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.

⁷ The bold sections of products in this report are intended to highlight the text that directly reference the weather conditions that affected the accident region around the accident time. The local times in this section next to the METARs are provided for quick reference between UTC and local times.

[1315 CST] METAR KBPG 291915Z AUTO 18013G17KT 10SM CLR
14/06 A3005 RMK AO2 T01410063=

[1335 CST] METAR KBPG 291935Z AUTO 18011KT 10SM CLR 14/06
A3003 RMK AO2 T01440062=

[1355 CST] METAR KBPG 291955Z AUTO 16012G17KT 10SM CLR
15/06 A3002 RMK AO2 T01490060=

**[1415 CST] METAR KBPG 292015Z AUTO 17015KT 10SM CLR 16/06
A3001 RMK AO2 T01620059=**

ACCIDENT TIME 1430 CST

**[1435 CST] METAR KBPG 292035Z AUTO 17015KT 10SM CLR 16/06
A2999 RMK AO2 T01610058=**

[1455 CST] METAR KBPG 292055Z AUTO 17013KT 10SM SCT120 16/06
A2998 RMK AO2 T01610058=

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

KBPG weather at 1415 CST, automated, wind from 170° at 15 knots, visibility 10 miles or greater, clear skies below 12,000 ft⁸ above ground level (agl), temperature of 16° Celsius (C), dew point temperature of 6°C, and an altimeter setting of 30.01 inches of mercury (inHg). Remarks, automated station with a precipitation discriminator, temperature 16.2°C, dew point temperature 5.9°C.

KBPG weather at 1435 CST, automated, wind from 170° at 15 knots, visibility 10 miles or greater, clear skies below 12,000 ft agl, temperature of 16°C, dew point temperature of 6°C, and an altimeter setting of 29.99 inHg. Remarks, automated station with a precipitation discriminator, temperature 16.1°C, dew point temperature 5.8°C.

⁸ Section 12.6.9 from the Federal Meteorological Handbook: [Federal Meteorological Handbook Number 1, Surface Weather Observations and Reports \(icams-portal.gov\)](https://www.federalmetbook.com/)

San Angelo Regional Airport (KSJT) or Mathis Field was the next closest official weather station south of the accident site. KSJT had an Automated Surface Observing System (ASOS⁹) and its longline reports were augmented by air traffic control (ATC) when the tower was in operation¹⁰. The KSJT ASOS was located 42 miles southeast of the accident site (figure 5), at an elevation of 1,919 ft, and issued the following observations surrounding the accident time:

[1151 CST] METAR KSJT 291751Z 17011KT 10SM OVC024 14/07
A3013 RMK AO2 SLP202 T01440072 10156 20017 58017=

[1251 CST] METAR KSJT 291851Z 20014G20KT 10SM OVC028 16/08
A3009 RMK AO2 SLP186 T01560078=

[1317 CST] SPECI KSJT 291917Z 19014G26KT 10SM OVC030 16/08
A3007 RMK AO2 PK WND 20026/1910 T01610083=

**[1351 CST] METAR KSJT 291951Z 17012G24KT 10SM BKN032
16/08 A3005 RMK AO2 PK WND 20026/1910 SLP171 T01610083=**

ACCIDENT TIME 1430 CST

**[1451 CST] METAR KSJT 292051Z 18010G23KT 10SM BKN034
18/09 A3001 RMK AO2 SLP160 T01780089 56038=**

[1551 CST] METAR KSJT 292151Z 19017G22KT 10SM OVC035 16/08
A3000 RMK AO2 PK WND 17029/2107 SLP157 T01610083=

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

KSJT weather at 1351 CST, wind from 170° at 12 knots with gusts to 24 knots, visibility 10 miles or greater, broken ceiling at 3,200 ft agl, temperature of 16°C, dew point temperature of 8°C, and an altimeter setting of 30.05 inHg. Remarks, automated station with a precipitation discriminator, peak wind from 200° at 26 knots at 1310 CST, sea level pressure 1017.1-hPa, temperature 16.1°C, dew point temperature 8.3°C.

⁹ 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.

¹⁰ ATC hours of operation 0700 to 2100 local time.

KSJT weather at 1451 CST, wind from 180° at 10 knots with gusts to 23 knots, visibility 10 miles or greater, broken ceiling at 3,400 ft agl, temperature of 18°C, dew point temperature of 9°C, and an altimeter setting of 30.01 inHg. Remarks, automated station with a precipitation discriminator, sea level pressure 1016.0-hPa, temperature 17.8°C, dew point temperature 8.9°C, 3-hourly pressure tendency decreased by 3.8-hPa.

The observations from the KBPG and KSJT both reported VFR¹¹ conditions at the time of the accident, while KSJT reported broken ceilings and southerly winds gusting as high as 26 knots around the accident time.

3.0 Wind Farm Information

Wind speed information from a wind turbine located 900 ft west-northwest of the accident site was retrieved and its wind information can be found in figure 6 below. The wind speed sensor was located on a wind turbine tower around 80 meters or 262 ft agl with the wind speed reported in meters per second (m/s). The wind speed around the accident time ranged from 18 knots to 22 knots.

¹¹ 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.

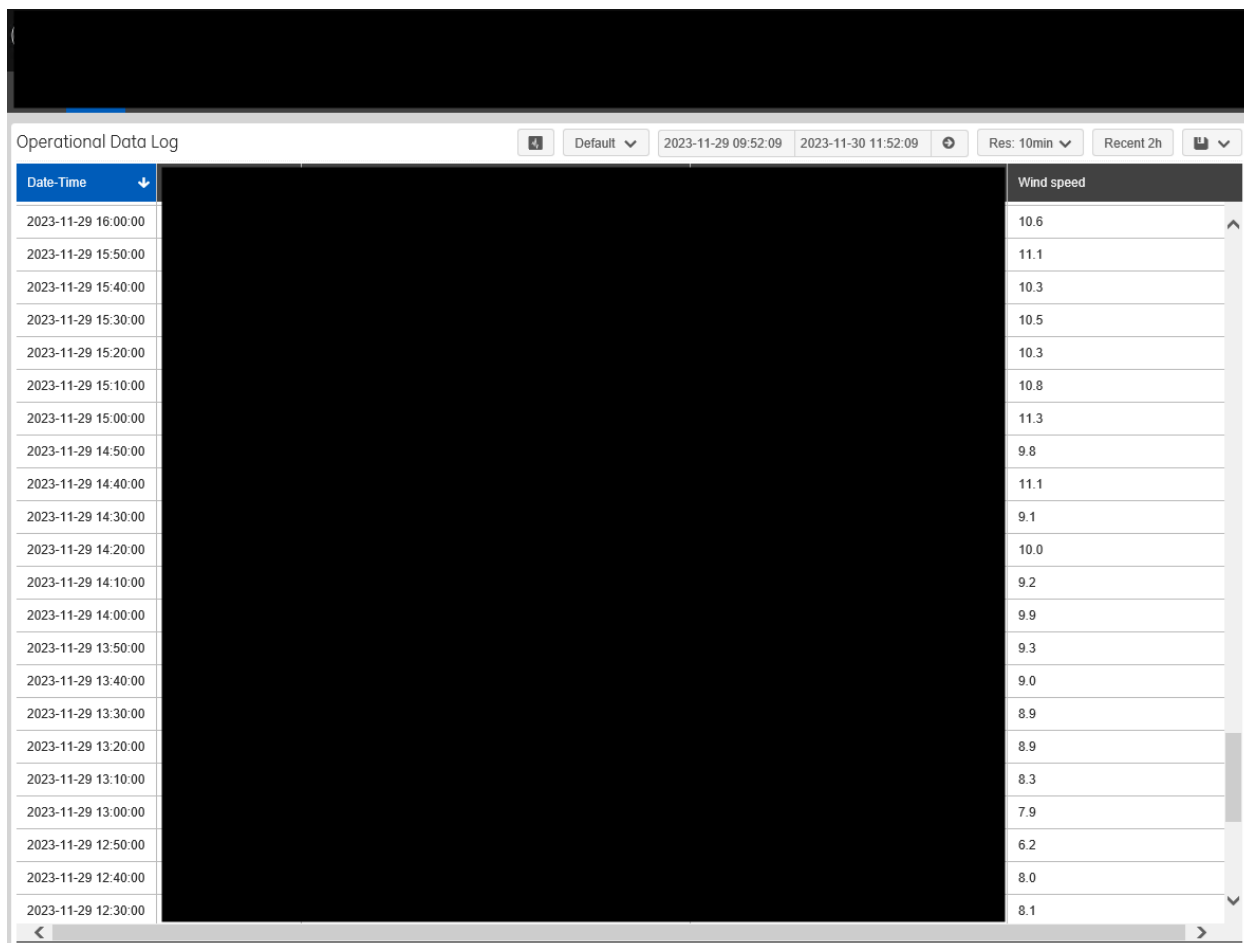


Figure 6. Wind speed information in m/s and time in CST.

4.0 Upper Air Sounding

A High-Resolution Rapid Refresh (HRRR)¹² model sounding was created¹³ for the approximate accident site coordinates for 1500 CST. The HRRR sounding was plotted on a standard Skew-T Log P diagram¹⁴ from the surface to 600-hPa (or approximately 14,000 ft) using the RAOB¹⁵ software package and is included as figure 7. The sounding depicted an elevation of 2,612 ft over the grid point with a near surface temperature of 15.0°C, a dew point temperature of 8.1°C, and a relative humidity of 63%, with a density altitude of 3,278 ft. The sounding depicted the lifted condensation level (LCL)¹⁶ at 5,454 ft (2,842 ft agl) and the convective condensation level (CCL)¹⁷ at 10,014 ft. The freezing level was located at 11,549 ft (7,400 ft agl). The precipitable water value at 0.80 inches.

¹² 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.

¹³ HRRR sounding was created using NOAA Air Resource Laboratory: [READY Archived Meteorology \(noaa.gov\)](https://ready.noaa.gov).

¹⁴ 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.

¹⁵ RAOB - (The complete Rawinsonde Observation program) is an interactive sounding analysis program developed by Esonde Research Services, The Villages, Florida.

¹⁶ LCL - The height at which a parcel of moist air becomes saturated when it is lifted dry adiabatically.

¹⁷ 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.

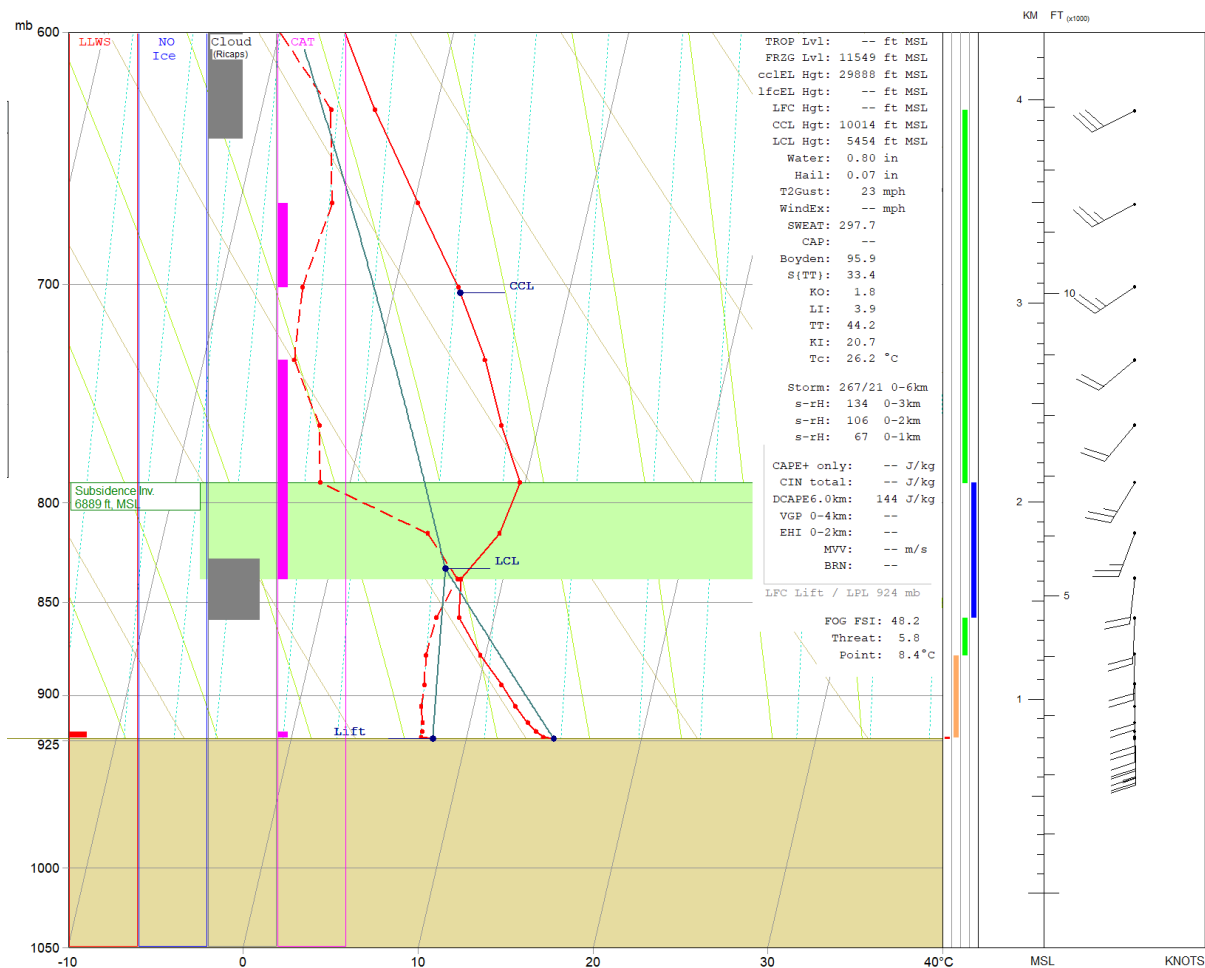


Figure 7. 1500 CST HRRR sounding.

The 1500 CST HRRR sounding indicated an unstable to conditionally unstable environment from the surface through 4,750 ft, then a stable layer between 4,750 and 7,000 ft. RAOB indicated a cloud layer between 2,000 ft agl and 3,000 ft agl with another cloud layer from 12,500 ft and above. No icing was indicated below 10,000 ft. The top of a subsidence inversion¹⁸ was indicated at 6,889 ft.

¹⁸ 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").

The 1500 CST HRRR sounding wind profile indicated a near-surface wind from 180° at 15 knots with the wind remaining southerly through 5,000 ft. The wind veered¹⁹ to the west-southwest by 10,000 ft. The wind speed increased to 20 knots by 500 ft agl and to 25 knots by 7,000 ft msl. RAOB indicated the possibility of light low-level wind shear (LLWS) in one layer between the surface and 500 ft agl. RAOB also indicated light clear air turbulence (CAT) in several layers between the surface and 12,000 ft.

5.0 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 1000 CST through 1800 CST and reviewed, and the closest images to the time of the accident were documented.

Figure 8 presents the GOES-16 visible image at 1431 CST at 2X magnification with the accident site highlighted with a red square. Cloud cover was indicated above the accident site with the higher cloud cover moving from southwest to northeast and the lower cloud cover moving from south to north around the accident time (attachment 1). The visible imagery did indicate transverse banding²⁰ in the lower cloud cover including the accident site. Figure 9 presents the GOES-16 infrared image at 1431 CST at 6X magnification with the accident site highlighted with a red square. Cloud cover was indicated above the accident site with lower brightness temperatures (yellow colors; higher cloud tops) were located east of the accident site at the accident time. The brightness temperature of 282 Kelvin²¹ above the accident site would have been near 4,500 ft based on the vertical temperature profile provided by the 1500 CST HRRR sounding. It should be noted these figures have not been corrected for any parallax error.

¹⁹ Veered - Wind turning clockwise with height.

²⁰

https://www.weather.gov/source/zhu/ZHU_Training_Page/Miscellaneous/gravity_wave/gravity_wave.html

²¹ Around 9°C.

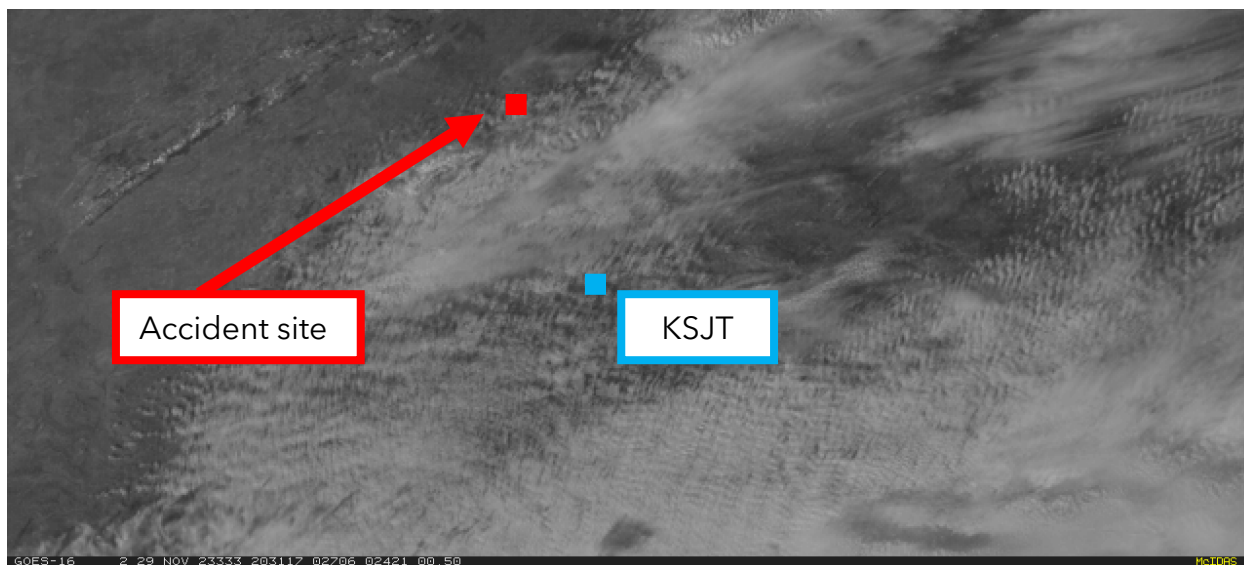


Figure 8. GOES-16 visible image at 1431 CST.

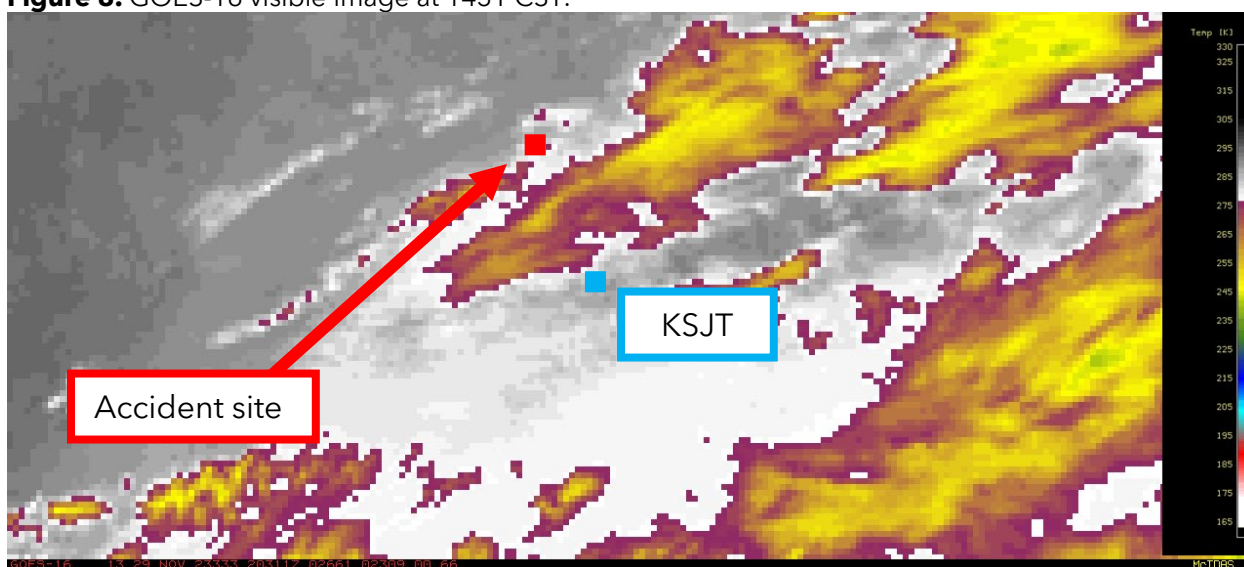


Figure 9. GOES-16 infrared image at 1431 CST.

6.0 National Radar Imagery

A regional view of the NWS National Reflectivity Mosaic is included as figure 10 for 1430 CST with the approximate location of the accident site marked by a red circle. The image depicted no echoes above the accident site.

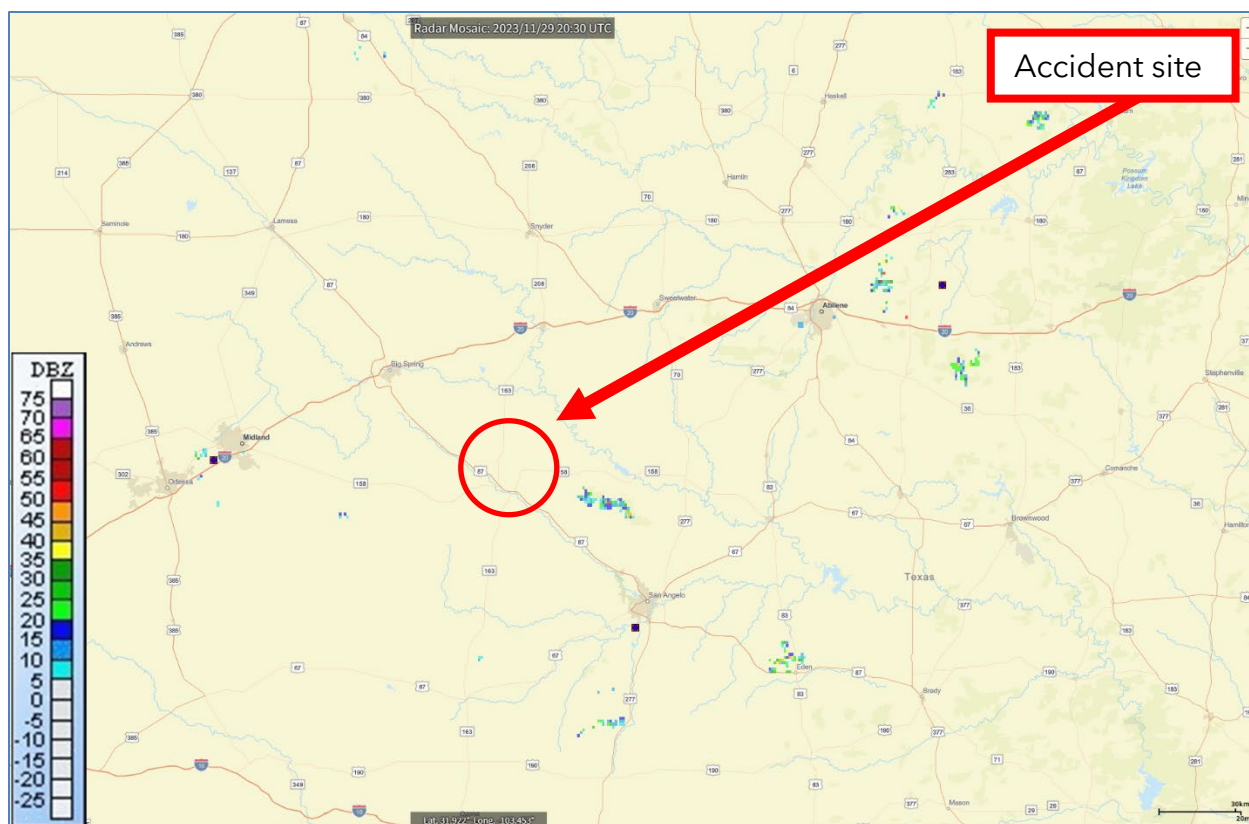


Figure 10. National Reflectivity Mosaic for 1430 CST.

7.0 Pilot Reports

The longline-disseminated pilot reports²² (PIREPs) distributed into the national airspace system (NAS) within 2 hours either side of the accident time and within 150 miles of the accident site at altitudes below 18,000 ft are shown here:

SJT UA /OV 10 N SJT/TM 2023/FL043/TP DA40/SK 045 BKN/RM DURD

SJT UA /OV SJT315018/TM 2253/FL043/TP PC12

8.0 Significant Meteorological Information

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

²² Only PIREPs with the World Meteorological Organization headers UBTX** and UBNM** were considered. These do not include pilot reports only broadcast via radio.

9.0 Center Weather Service Advisories

The Fort Worth (ZFW) Air Route Traffic Control Center (ARTCC) Center Weather Service Unit (CWSU) was responsible for the accident region. There was no Center Weather Advisory (CWA) valid for the accident site at the accident time.

10.0 Airmen's Meteorological Information

There were no NWS Aviation Weather Center (AWC) text Airmen's Meteorological Information (AIRMET) advisories valid for the accident site at the accident time.

11.0 Graphical Forecasts for Aviation

The Graphical Forecasts for Aviation (GFA)²³ products issued by the AWC before the accident flight and valid at 1200 CST and 1500 CST were not available due to AWC archiving constraints. There were no graphical AIRMETs (G-AIRMETs) valid for the accident site at 1200 and 1500 CST.

12.0 Terminal Aerodrome Forecast

KSJT was the closest site with an NWS Terminal Aerodrome Forecast²⁴ (TAF) current at the time of the accident. The amended KSJT TAF valid at the accident time was issued at 1342 CST and was valid for a 22-hour period beginning at 1400 CST. The amended 1342 CST TAF for KSJT was as follows:

```
FTUS44 KSJT 291942 AAA
TAFSJT
TAF AMD
KSJT 291942Z 2920/3018 18013G21KT P6SM BKN035
    FM300000 17011G16KT P6SM BKN015
    FM300600 18011KT P6SM BKN007
    FM301600 20015G22KT P6SM BKN015=
```

²³ Graphical Forecasts for Aviation (GFA) and Graphical AIRMETs (G-AIRMETs), found on the Aviation Weather Center webpage at <http://aviationweather.gov>, are graphical forecasts of en-route weather hazards valid at discrete times no more than 3 hours apart for a period of up to 12 hours into the future (for example, 00, 03, 06, 09, and 12 hours). G-AIRMETs are snap shots at discrete time intervals as defined above. The text AIRMET is the result of the production of the G-AIRMET but provided in a time smear for a 6hr valid period.

²⁴ 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

Between 1400 and 1800 CST the KSJT forecast expected a wind from 180° at 13 knots with gusts to 21 knots, greater than 6 miles visibility, and a broken ceiling at 3,500 ft agl.

The previous KSJT TAF was issued at 1120 CST and was valid for a 24-hour period beginning at 1200 CST. The 1120 CST TAF for KSJT was as follows:

FTUS44 KSJT 291720
TAFSJ
TAF
KSJT 291720Z 2918/3018 18011G17KT P6SM BKN020
FM292000 18013G21KT P6SM BKN025
FM300000 17011G16KT P6SM BKN015
FM300600 18011KT P6SM BKN007
FM301600 20015G22KT P6SM BKN015=

Between 1400 and 1800 CST the KSJT forecast expected a wind from 180° at 13 knots with gusts to 21 knots, greater than 6 miles visibility, and a broken ceiling at 2,500 ft agl.

13.0 National Weather Service Area Forecast Discussion

The NWS weather forecast office in San Angelo, Texas, (WFO SJT) was responsible for the public forecast in the region of the accident site. WFO SJT issued the following Area Forecast Discussion (AFD) at 1348 CST, the AFD issued closest to the accident time with an aviation section:

FXUS64 KSJT 291948
AFDSJT

Area Forecast Discussion
National Weather Service San Angelo TX
148 PM CST Wed Nov 29 2023

...New LONG TERM...

.SHORT TERM...
(This evening through Thursday)
Issued at 115 PM CST Wed Nov 29 2023

Stratus is currently occurring across much of the southern portions of West Central Texas early this afternoon and will steadily spread north across the area late this afternoon into the overnight hours. An upper level trough currently centered across California and Nevada will track east toward the Intermountain West this evening, then approach New Mexico and West Texas Thursday morning. Ahead of this feature surface moisture will quickly increase overnight, with

dewpoints increasing into the mid to upper 50s. The extensive cloud cover along with the higher dewpoints will keep overnight lows in the upper 40s to mid 50s.

As the aforementioned upper level trough approaches the area on Thursday, a Pacific cold front will track across the area Thursday afternoon. Isolated showers and thunderstorms are possible across our eastern counties along the front, but the majority of the shower and thunderstorm activity will remain east of our area. Gusty west winds of 15 to 25 mph will develop behind the front, during the afternoon hours. Highs on Thursday will be warmer, in the upper 60s to lower 70s.

&&

.LONG TERM...

(Thursday night through next Wednesday)

Issued at 145 PM CST Wed Nov 29 2023

By 00Z Friday, the aforementioned potent shortwave trough will be moving over the West Central Texas area. All rain chances should be over by this time as the upper trough and corresponding surface low push off to the north and east rather quickly. While the gusty west winds will taper off into the evening, a much drier air mass will move in place. Skies will start to clear for Friday but another quick shot of upper level moisture will keep high clouds in the picture, especially later in the day. Winds Friday will be quite a bit weaker than they were on Thursday behind the Pacific front but still modest out of the west with the downsloping component helping temperatures warm into the 60s and maybe even lower 70s across the NW Hill Country.

Though we will remain in a troughing regime with southwest flow aloft through Sunday as a broad upper trough traverses the Northern Plains, the pattern should remain rather benign for the weekend timeframe. Gusty winds out of the west will be possible both Saturday and Sunday, bringing in increasingly dry air and keeping highs in the upper 60s to low 70s areawide with plenty of sunshine. The dry forecast is expected to continue through at least midweek as we transition to northwest flow aloft. A weak frontal passage will be possible by Tuesday. However, with the dry airmass still well in place from the continued westerly winds from the previous days, this frontal passage will be dry and its overall effect pretty weak with highs only dropping a few degrees into the lower 60s for Tuesday. Winds quickly shift back to the south for Wednesday, likely negating the impact from the previous day's front.

&&

.AVIATION...

(18Z TAFS)

Issued at 1038 AM CST Wed Nov 29 2023

Stratus is currently occurring at all sites except KABI. A few breaks in the clouds are possible early this afternoon, which may result in VFR conditions. The stratus will steadily spread north by mid to late afternoon, resulting in a continuation of the MVFR ceilings. By late afternoon or early evening, MVFR ceilings will spread north to KABI and IFR conditions will develop at the other sites. IFR ceiling will then develop after midnight at KABI with IFR ceilings continuing at all sites through much of the morning hours Thursday. Patchy fog is possible Thursday morning, mainly at KJCT and KSOA. Any showers and thunderstorms are forecast to remain north and east of the sites.

&&

.PRELIMINARY POINT TEMPS/POPS...

Abilene	53	70	38	65	/	0	30	0	0
San Angelo	52	71	41	69	/	10	10	0	0
Junction	52	72	43	71	/	10	10	0	0
Brownwood	52	71	40	64	/	20	30	0	0
Sweetwater	52	68	38	65	/	10	20	0	0
Ozona	49	68	42	68	/	0	0	0	0
Brady	53	71	43	68	/	20	20	0	0

&&

.SJT WATCHES/WARNINGS/ADVISORIES...

None.

&&

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14.0 Winds and Temperature Aloft Forecast

The NWS 1357 CST, Winds and Temperature Aloft forecast valid for the closest point to the accident site is included below:

FBUS31 KWNO 291957

FD1US1

DATA BASED ON 291800Z

VALID 300000Z FOR USE 2000-0300Z. TEMPS NEG ABV 24000

FT	3000	6000	9000	12000	18000	24000	30000	34000	39000							
ABI	2134	+09	2423	+06	2429	-01	2638	-16	2553	-27	2575	40	2582	49	2580	57

The 1357 CST forecast was for use between 1400 CST and 2100 CST.

15.0 Pilot Weather Information

Title 14 CFR 91.103 states that “Each pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight.” FAA AC 91-92 “Pilot’s Guide to a Preflight Planning” (dated March 15, 2021) provided pilot guidance on preflight self-briefings, including planning, weather interpretation, and risk identification/mitigation skills. The AC further stated in part:

Pilots adopting these guidelines will be better prepared to interpret and utilize real-time weather information before departure and en route, in the cockpit, via technology like Automatic Dependent Surveillance-Broadcast (ADS-B) and via third-party providers.²⁵

A search of archived information indicated that the accident pilot did not request weather information from Leidos Flight Service or through ForeFlight. The accident pilot did have an account through ForeFlight, but only updated route strings on the accident day (attachment 2). It is unknown what weather information, if any, the accident pilot checked or received before or during the accident flight.

16.0 Astronomical Data

The astronomical data obtained²⁶ for the accident site on November 29, 2023, indicated the following:

SUN

Begin civil twilight 0658 CST

Sunrise 0724 CST

Sun transit 1232 CST

Accident time 1430 CST²⁷

Sunset 1740 CST

End civil twilight 1806 CST

At the time of the accident the Sun was 29.59° above the horizon at an azimuth of 211.72°.

²⁵ https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_91-92.pdf. The AC also listed multiple online FAA resources for aviation flight planning services for adverse weather.

²⁶ <https://www.suncalc.org/> and <https://www.mooncalc.org/>

²⁷ Inserted accident time for reference and context.

E. LIST OF ATTACHMENTS

Attachment 1 - GOES-16 visible imagery animation from 1501 to 1731 CST

Attachment 2 - ForeFlight Information

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