



## **NATIONAL TRANSPORTATION SAFETY BOARD**

Office of Aviation Safety  
Washington, D.C. 20594

June 14, 2021

### **Specialist's Factual Report**

# **METEOROLOGY**

ERA21FA140

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## **A. ACCIDENT**

Location: Gainesville, Georgia  
Date: February 26, 2021  
Time: 1811 eastern standard time  
2311 Coordinated Universal Time (UTC)  
Airplane: Cessna R182; Registration: N3652G

## **B. METEOROLOGIST**

Paul Suffern  
Senior Meteorologist  
Operational Factors Division (AS-30)  
National Transportation Safety Board

## **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 factual contains the meteorological factors pertinent to the weather surrounding the accident time. All times are eastern standard time (EST) on February 26, 2021, and are based upon the 24-hour clock, where local time is -5 hours from UTC. Directions are referenced to true north and distances 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 34.2622° N, Longitude 83.8486° W, with an approximate elevation of 1,200 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.<sup>1</sup>

#### **1.1 Surface Analysis Chart**

The NWS Surface Analysis Chart centered over the southeastern United States for 1900 EST is provided as figure 1 with the location of the accident site within the red circle. The chart depicted a frontal boundary located from the western Atlantic Ocean across southern South Carolina and central Georgia to eastern Mississippi connected to a low-pressure center with a pressure of 1013-hectopascals (hPa). Another low-pressure center was located in southeastern Arkansas along a frontal boundary with the low-pressure center having a pressure of 1011-hPa. The accident site was located north of the frontal boundary in northern Georgia on the cool side of the front.

The station models around the accident site depicted air temperatures in the low 50’s degrees Fahrenheit (°F), dew point temperatures in the mid 40’s °F with temperature-dew point spreads of 4°F or less, a northeast wind at 10 knots, and overcast skies.

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<sup>1</sup>

[https://www.faa.gov/regulations\\_policies/advisory\\_circulars/index.cfm/go/document.information/documentID/1030235](https://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentID/1030235)

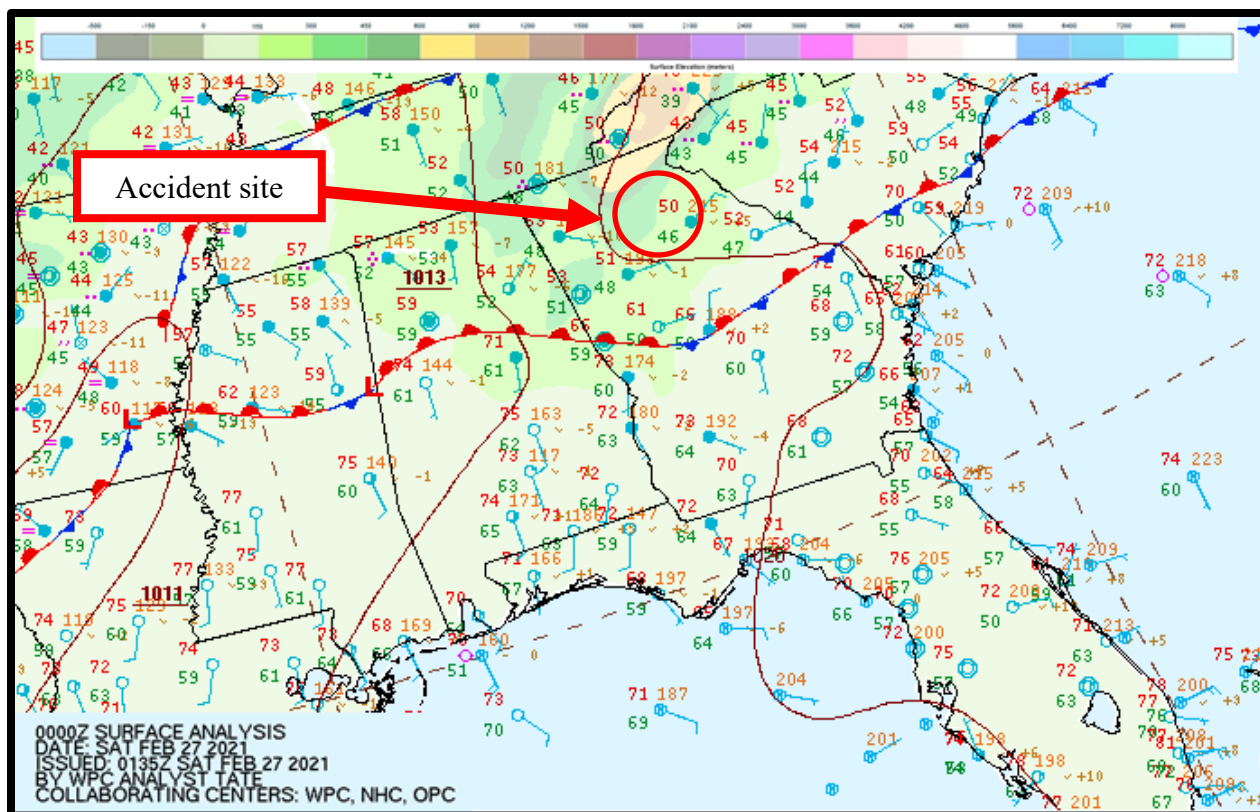


Figure 1 – NWS Surface Analysis Chart for 1900 EST.

## 1.2 Upper Air Charts

The NWS Storm Prediction Center (SPC) Constant Pressure Charts for 1900 EST at 925-, 850- and 700-hPa are presented in figures 2 through 4. A low-level trough<sup>2</sup> was located northeast of the accident site at 925- and 850-hPa (figures 2 and 3). Troughs can act as lifting mechanisms to help produce clouds and precipitation if sufficient moisture is present. There was a south wind at 25 knots at 925-hPa with the wind becoming southwesterly at 40 knots by 700-hPa.

<sup>2</sup> Trough – An elongated area of relatively low atmospheric pressure or heights.

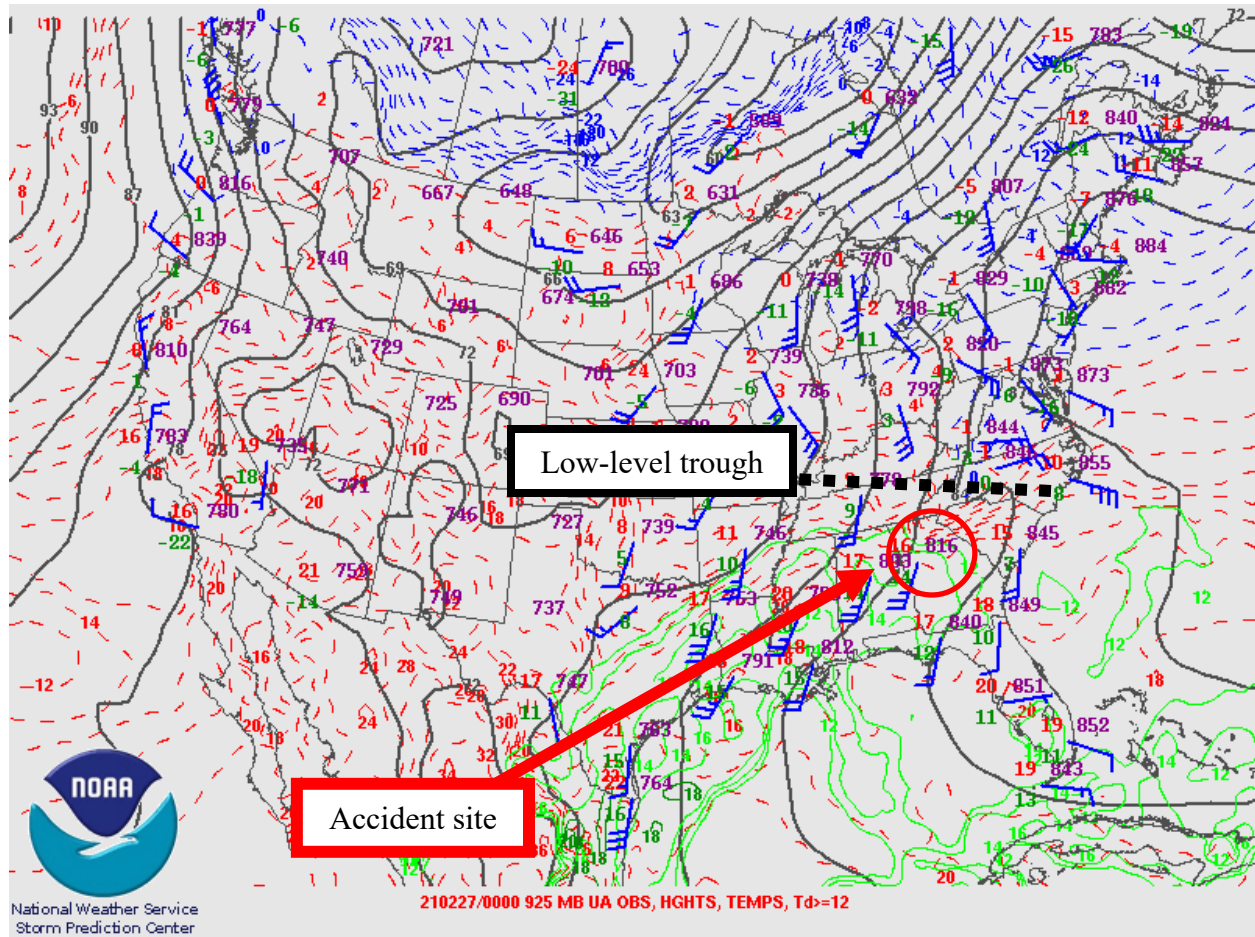


Figure 2 – 925-hPa Constant Pressure Chart for 1900 EST.

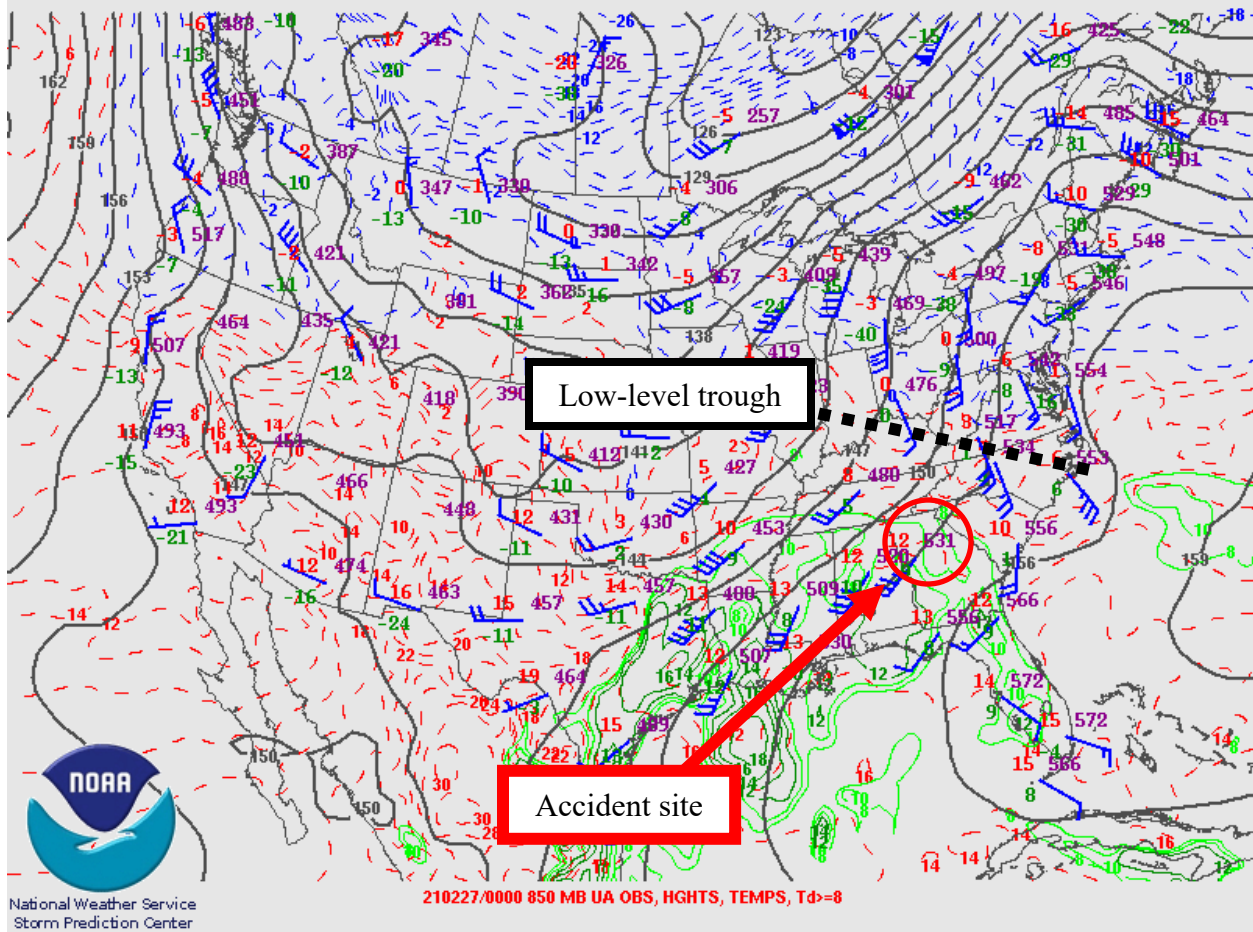
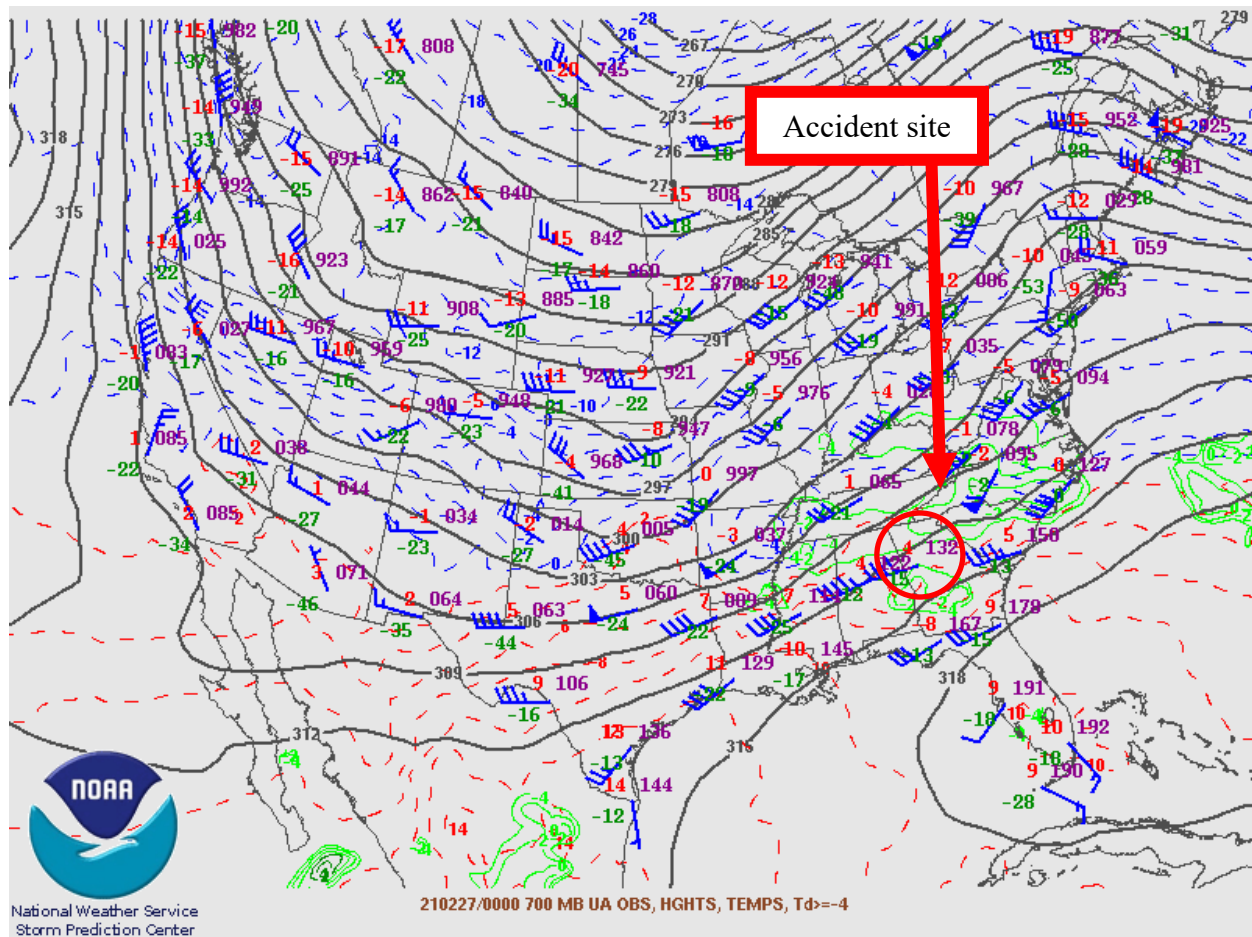


Figure 3 – 850-hPa Constant Pressure Chart for 1900 EST.

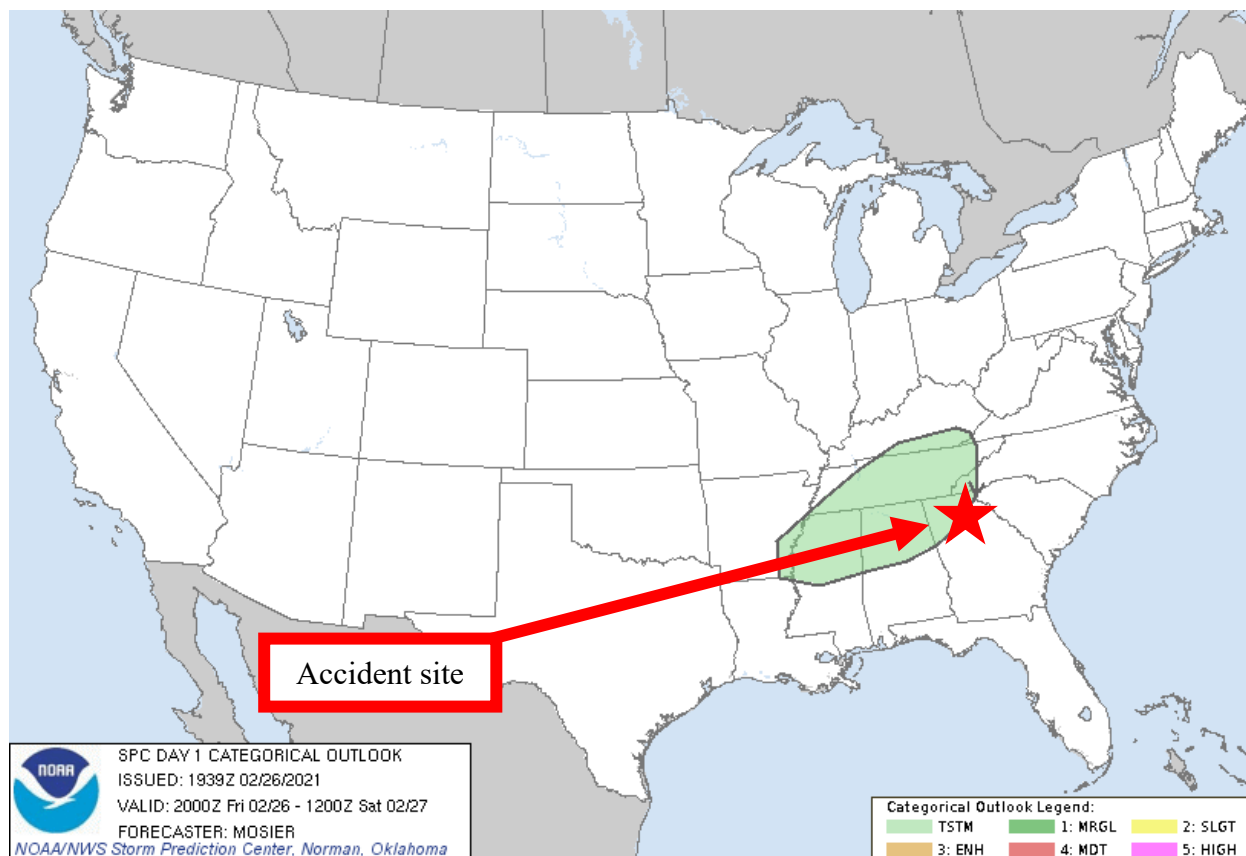


**Figure 4 – 700-hPa Constant Pressure Chart for 1900 EST.**

## 2.0 SPC Convective Outlook

SPC issued the following Day 1 Convective Outlook at 1439 EST (figure 5) with areas of general thunderstorms forecast for the accident site. SPC defines the “TSTM” area as an area that encloses where a 10% or higher probability of thunderstorms is forecast during the valid period. The SPC Day 1 Convective Outlook text follows figure 5.





**Figure 5 – SPC day 1 Convective Outlook valid at the time of the accident.**

SPC AC 261939

Day 1 Convective Outlook  
NWS Storm Prediction Center Norman OK  
0139 PM CST Fri Feb 26 2021

Valid 262000Z - 271200Z

...NO SEVERE THUNDERSTORM AREAS FORECAST...

...SUMMARY...

Thunderstorms are possible this evening and tonight across portions of the Tennessee Valley.

...20Z Update...

...TN Valley...

Recent satellite imagery shows a well-defined shortwave progressing through the MS Valley and another emerging out of the central High Plains. Precipitation shield associated with the lead shortwave continues to spread eastward into the middle/upper OH Valley and central Appalachians. Lightning is not expected within this area of showers. As mentioned in the previous discussion, an additional round of showers and thunderstorms is anticipated later this evening as low-level flow and isentropic ascent increase ahead of the second shortwave. Modest buoyancy should temper overall storm intensity,

but an storm or two could become strong enough to produce isolated marginal hail.

..Mosier.. 02/26/2021

.PREV DISCUSSION... /ISSUED 1021 AM CST Fri Feb 26 2021/

...TN Valley Vicinity...

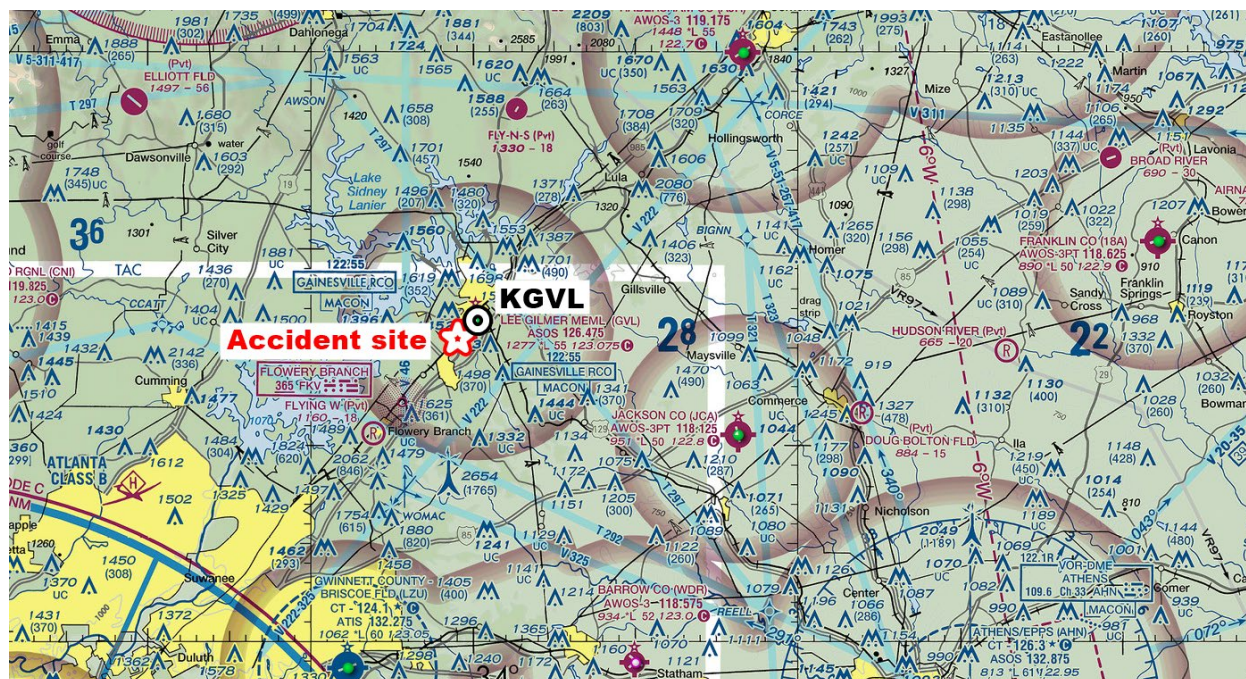
A shortwave trough is evident this morning over AR/LA tracking eastward into the Mid-South. Thunderstorms have been accompanying this system overnight and this morning, but lightning activity has diminished greatly during the past few hours. This trend is likely to continue through the mid/late afternoon as the upper system de-amplifies. By early evening, southwesterly low-level winds will strengthen across parts of MS/AL/TN, resulting in renewed potential for a few thunderstorms tonight. Weak instability should preclude the risk of severe storms.

[CLICK TO GET WUUS01 PTSDY1 PRODUCT](#)

NOTE: THE NEXT DAY 1 OUTLOOK IS SCHEDULED BY 0100Z

### 3.0 Surface Observations

The area surrounding the accident site was documented using official Aviation Routine Weather Reports (METARs) and Specials (SPECIs). The following observations were taken from standard code and are provided in plain language. Figure 6 is a local sectional chart with the accident site and the closest weather reporting location marked.



**Figure 6 – Sectional map of the accident area with the location of the accident site and surface observation site.**

Lee Gilmer Memorial Airport (KGVL) had the closest official weather station to the accident site. KGVL had an Automated Surface Observing System (ASOS<sup>3</sup>) whose longline<sup>4</sup> reports were not supplemented. The KGVL ASOS was located within a mile of the accident site, at an elevation of 1,277 ft, and had a 6° westerly magnetic variation<sup>5</sup> (figure 6). The following automated longline observations were disseminated during the times surrounding the accident:<sup>6</sup>

[1553 EST] METAR KGVL 262053Z AUTO 07007KT 2 1/2SM -RA BR OVC003 07/06  
A3017 RMK AO2 RAB25 SLP214 P0001 60002 T00720061 55013=  
  
[1601 EST] SPECI KGVL 262101Z AUTO 08007KT 4SM -RA BR OVC003 07/06 A3016  
RMK AO2 P0000 T00720061=  
  
[1615 EST] SPECI KGVL 262115Z AUTO 06006KT 5SM BR OVC004 07/06 A3017  
RMK AO2 RAE06 P0000 T00720061=  
  
[1653 EST] METAR KGVL 262153Z AUTO 07008KT 5SM BR OVC004 07/06 A3017  
RMK AO2 RAE06 SLP213 P0000 T00720061=  
  
***[1753 EST] METAR KGVL 262253Z AUTO 08009KT 4SM BR OVC004 07/06 A3016  
RMK AO2 SLP213 T00720061=***

#### **ACCIDENT TIME 1811 EST**

***[1853 EST] METAR KGVL 262353Z AUTO 07007G18KT 6SM BR OVC004 07/06 A3016  
RMK AO2 RAB09E37 SLP212 P0000 60002 T00720061 10078 20072 56005=***  
  
[1902 EST] SPECI KGVL 270002Z AUTO 07009KT 6SM BR OVC003 07/06 A3016  
RMK AO2 T00720061=

KGVL weather at 1753 EST, automated, wind from 080° at 9 knots, visibility 4 miles, mist, overcast ceiling 400 ft above ground level (agl), temperature of 7° Celsius (C), dew point temperature of 6°C, and an altimeter setting of 30.16 inches of mercury (inHg). Remarks: automated station with a precipitation discriminator, sea level pressure 1021.3 hPa, temperature 7.2°C, dew point temperature 6.1°C.

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<sup>3</sup> 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.

<sup>4</sup> “Longline” refers to the dissemination of weather observations with the intent that they are available in near-real time to national databases (effectively, the whole world) 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 general global public has access to surface weather observations, particularly outside of the aviation community.

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

<sup>6</sup> 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.

KGVL weather at 1853 EST, automated, wind from 070° at 7 knots with gusts to 18 knots, visibility 6 miles, mist, overcast ceiling 400 ft agl, temperature of 7°C, dew point temperature of 6°C, and an altimeter setting of 30.16 inHg. Remarks: automated station with a precipitation discriminator, rain began at 1809 EST and rain ended at 1837 EST, sea level pressure 1021.2 hPa, a trace of precipitation since 1753 EST, 6-hourly precipitation of 0.02 inches, temperature 7.2°C, dew point temperature 6.1°C, 6-hourly maximum temperature of 7.8°C, 6-hourly minimum temperature of 7.2°C, 3-hourly pressure decrease of 0.5 hPa.

The observations from KGVL surrounding the accident time indicated LIFR<sup>7</sup> conditions with rain occurring between 1809 and 1837 EST and an east wind gusting to 18 knots.

#### 4.0 Upper Air Sounding

A High-Resolution Rapid Refresh (HRRR)<sup>8</sup> model sounding was created for the accident site for 1800 EST which provided a surface elevation of 1,201 ft.<sup>9</sup> The 1800 EST HRRR sounding was plotted on a standard Skew-T Log P diagram<sup>10</sup> with the derived stability parameters included in figure 7 with data from the surface to 700-hPa (or approximately 10,000 ft msl). These data were analyzed using the RAOB<sup>11</sup> software package. The sounding depicted the lifted condensation level (LCL)<sup>12</sup> at the surface, the level of free convection (LFC)<sup>13</sup> at 93 ft agl (1,294 ft msl), and the convective condensation level (CCL)<sup>14</sup> at 6,563 ft msl. The freezing level was located at 10,773 ft msl. The precipitable water value was 1.13 inches.

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<sup>7</sup> 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.

<sup>8</sup> 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.

<sup>9</sup> HRRR sounding was created using NOAA Air Resource Laboratory: <https://ready.arl.noaa.gov/READYamet.php>

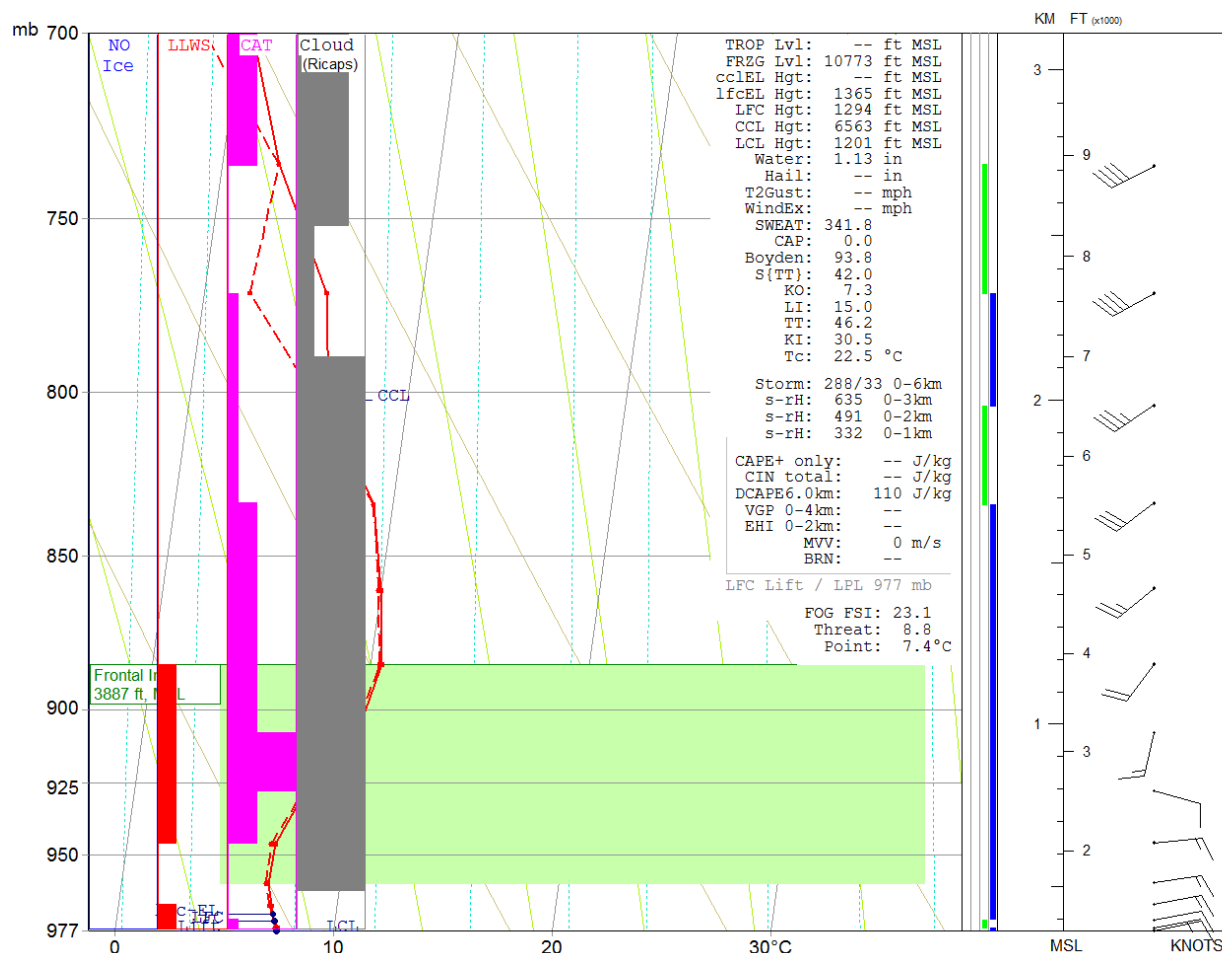
<sup>10</sup> Skew T log P diagram – is a standard meteorological plot using temperature and the logarithmic of pressure as coordinates, used to display winds, temperature, dew point, and various indices used to define the vertical structure of the atmosphere.

<sup>11</sup> RAOB – (The complete Rawinsonde Observation program) is an interactive sounding analysis program developed by Eosonde Research Services, The Villages, Florida.

<sup>12</sup> LCL - The height at which a parcel of moist air becomes saturated when it is lifted dry adiabatically.

<sup>13</sup> LFC – The level at which a parcel of saturated air becomes warmer than the surrounding air and begins to rise freely. This occurs most readily in a conditionally unstable atmosphere.

<sup>14</sup> 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 – 1800 EST HRRR sounding.**

The 1800 EST HRRR sounding for the accident site indicated a mainly stable environment from the surface through 5,500 ft msl with a frontal inversion<sup>15</sup> at 3,887 ft msl. Clouds were indicated by RAOB above 500 ft agl through 10,000 ft msl. No icing was indicated below 10,000 ft msl.

The 1800 EST HRRR sounding wind profile indicated a near surface wind from 078° at 8 knots with the wind veering<sup>16</sup> to the southwest by 3,000 ft msl. The wind speed increased to 15 knots by 500 ft agl and to 40 knots by 8,000 ft msl. RAOB indicated the possibility of light low-level wind shear (LLWS) between the surface and 4,000 ft msl. RAOB indicated the possibility of moderate or greater clear-air turbulence between 2,000 ft and 6,000 ft msl.

<sup>15</sup> 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").

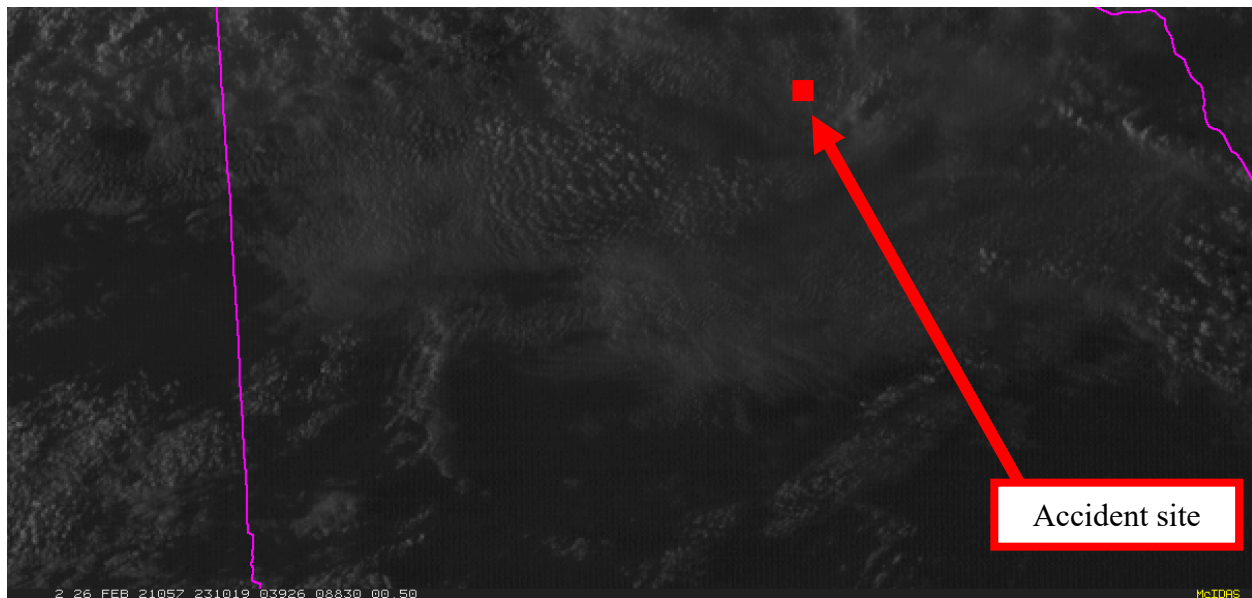
<sup>16</sup> A clockwise turning of the wind with height in the northern hemisphere.



## 5.0 Satellite Data

The 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 ( $\mu\text{m}$ ) and 10.3  $\mu\text{m}$ , respectively, were retrieved for the period from 1600 EST through 2100 EST and reviewed, and the closest images to the time of the accident were documented.

Figure 8 presents the GOES-16 visible imagery from 1810 EST at 2X magnification with the accident site highlighted with a red square. There was cloud cover above the accident site at the accident time with the cloud cover moving from southwest to northeast (attachment 1). Figure 9 presents the GOES-16 infrared imagery from 1810 EST at 6X magnification with the accident site highlighted with a red square. The lower brightness temperatures (yellow colors; higher cloud tops) were located north of the accident site. Based on the brightness temperatures (about 271 Kelvin) above the accident site and the vertical temperature profile provided by the 1800 EST HRRR sounding, the approximate cloud-top heights over the accident site were 13,000 ft msl at 1810 EST. It should be noted these figures have not been corrected for any parallax error.



**Figure 8 – GOES-16 visible image at 1810 EST.**

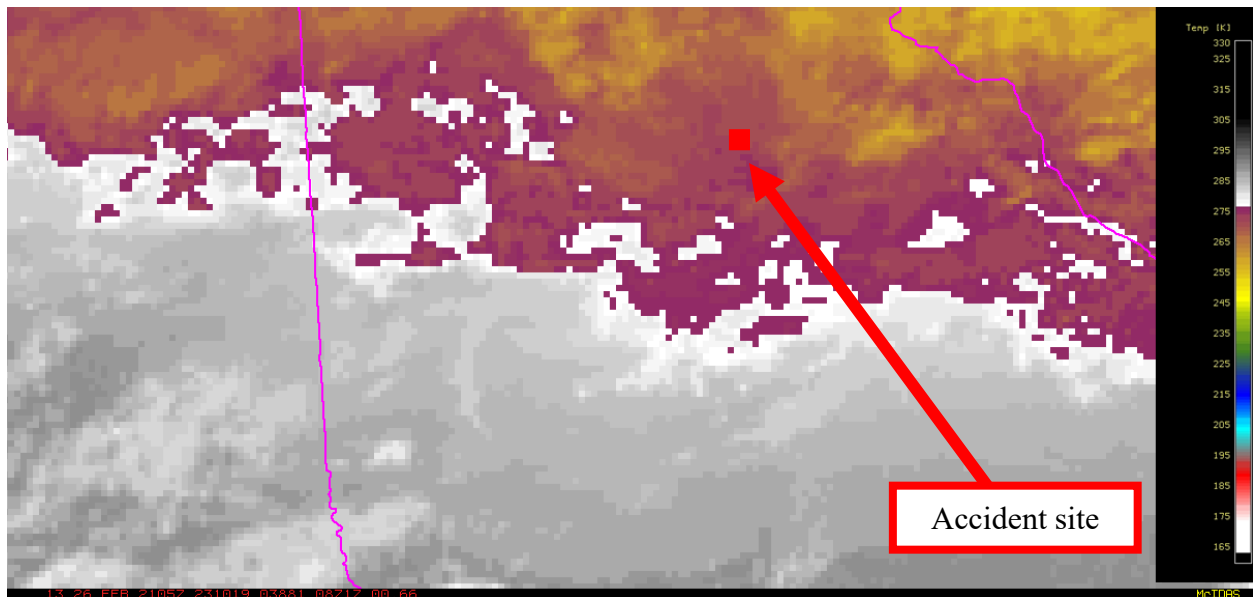


Figure 9 – GOES-16 infrared image at 1810 EST.

## 6.0 Regional Radar Imagery Information

A regional view of the NWS national composite radar mosaic is included as figure 10 for 1810 EST with the approximate location of the accident site marked within a red circle. The image depicted no precipitation echoes above the accident site at the accident time.

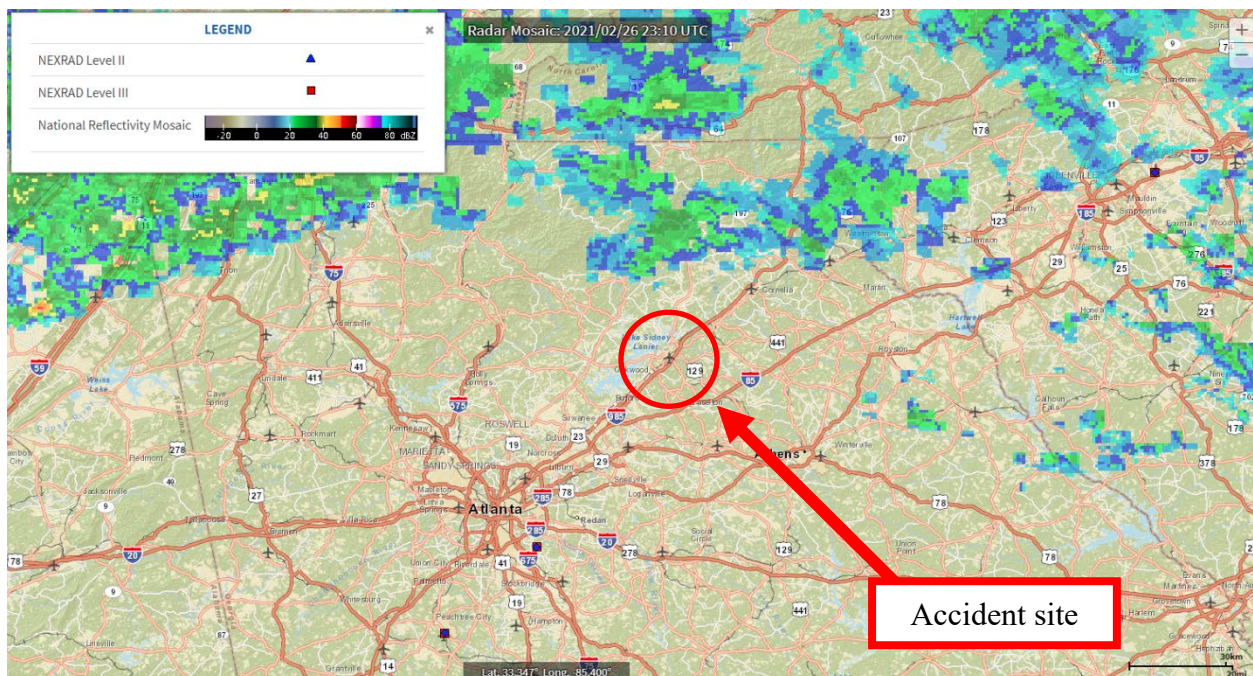


Figure 10 – Regional Composite Reflectivity image for 1810 EST.

## 7.0 Pilot Reports

The longline-disseminated pilot reports<sup>17</sup> (PIREPs) distributed into the national airspace (NAS) were reviewed from about two hours prior to the accident time to two hours after the accident time and the PIREPs within 100 miles of the accident site below 18,000 ft msl are shown below:

PDK UA /OV PDK/TM 2106/FL005/TP C56X/SK OVC005/RM DURD RWY 21L

ATL UA /OV RWY 10 FINAL/TM 2107/FLDURD/TP CRJ9/SK OVC007

LZU UA /OV LZU250001/TM 2132/FL015/TP BE40/SK OVC004

ATL UA /OV RWY 10 FINAL/TM 2224/FLDURD/TP CRJ9/SK OVC010/WV 180/14

LZU UA /OV LZU070001/TM 2232/FL013/TP E55P/SK OVC002

PDK UA /OV PDK/TM 2235/FLUNKN/TP CL30/SK OVC015/RM DURC

LZU UA /OV LZU070001/TM 2245/FL013/TP P180/SK OVC002

PDK UA /OV PDK/TM 2259/FLDURGD/TP C172/SK OVC005

LZU UA /OV LZU070001/TM 2311/FL012/TP C550/SK OVC002

ATL UA /OV RWY 10 FINAL/TM 2332/FLDURD/TP A319/SK BKN006/WX 1SM

LZU UA /OV LZU070001/TM 2344/FL012/TP PC12/SK OVC001

ATL UA /OV CNI/TM 2358/FLSFC/TP BE20/RM CIG AT MINIMUMS RNAV 5

ATL UA /OV RWY 8L FINAL/TM 0008/FLDURD/TP E190/SK OVC 008

PDK UA /OV KPDK/TM 0044/FLDURGD/TP PC12/SK BASES 100 FT ABV MINS/RM DURD ILS 21L APCH

## 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.

## 9.0 Center Weather Service Advisories

The Atlanta (ZTL) Air Route Traffic Control Center (ARTCC) Center Weather Service Unit (CWSU) was responsible for the accident region. There were no Meteorological Impact Statements (MIS) valid at the accident time. The ZTL CWSU issued Center Weather Advisory (CWA) 105 at 1610 EST valid for the accident site through 1810 EST which warned of an area of patchy LIFR to IFR conditions in fog, rain, and drizzle, with conditions expected to continue beyond the end of the valid time:

FAUS21 KZTL 262126

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<sup>17</sup> Only pilot reports with the World Meteorological Organization headers UBSC\*\*, UBNC\*\*, and UBGA\*\* were considered. These do not include pilot reports only broadcast via radio.



ZTL1 CWA 262110  
ZTL CWA 105 VALID UNTIL 262310  
FROM 40W VXV-40S CLT-40S ATL-40NW VUZ-40W VXV  
**AREA PATCHY LIFR/IFR CIGS BLW 005 AND VIS BLW 1SM IN FG/RA/DZ. EXP  
CONDS TO CONT BYD END OF PD. AL GA TN NC SC**

=

## 10.0 Airmen's Meteorological Information

Airmen's Meteorological Information (AIRMET) advisories Sierra and Tango were valid for the accident site at the accident time (issued at 1545 EST). The AIRMETs warned of IFR conditions due to precipitation and mist, mountain obscuration conditions due to clouds, precipitation, and mist, moderate turbulence between 3,000 ft and 18,000 ft, and LLWS conditions.

WAUS42 KPCI 262045  
WA2S  
-MIAS WA 262045  
AIRMET SIERRA UPDT 7 FOR IFR AND MTN OBSCN VALID UNTIL 270300

.  
**AIRMET IFR...NC SC GA PA OH WV MD DC DE VA AND CSTL WTRS  
FROM 50NE ROD TO 30S ETX TO 60E ORF TO 50SE ILM TO 20ESE LGC TO  
GQO TO HNV TO HNN TO CVG TO 20S FWA TO 50NE ROD  
CIG BLW 010/VIS BLW 3SM PCPN/BR. CONDS CONTG BYD 03Z THRU 09Z.**

.  
AIRMET IFR...FL AND CSTL WTRS  
FROM 40W CEW TO 50WNW TLH TO 40SSW TLH TO 90SSE CEW TO 50SSE SJI  
TO 40W CEW  
CIG BLW 010/VIS BLW 3SM BR. CONDS DVLPG AFT 00Z. CONDS CONTG BYD  
03Z THRU 09Z.

.  
**AIRMET MTN OBSCN...NC SC GA PA WV MD VA  
FROM EWC TO 20E HAR TO CLT TO ATL TO GQO TO HNV TO HNN TO EWC  
MTNS OBSC BY CLDS/PCPN/BR. CONDS CONTG BYD 03Z THRU 09Z.**

.  
OTLK VALID 0300-0900Z  
AREA 1...IFR GA FL AND CSTL WTRS  
BOUNDED BY 20E LGC-20NE MCN-30S MCN-50NNE CTY-50W CTY-120SSE SJI-  
40W CEW-50SW PZD-20E LGC  
CIG BLW 010/VIS BLW 3SM BR. CONDS CONTG THRU 09Z.

.  
AREA 2...IFR NC SC GA CT NY NJ PA OH LE WV MD DC DE VA AND CSTL  
WTRS  
BOUNDED BY 50WNW ALB-30ENE JFK-80ESE SIE-50ESE ILM-30N SAV-20E  
LGC-GQO-HNV-HNN-CVG-FWA-20ENE DXO-40WSW ERI-20E BUF-50WNW ALB  
CIG BLW 010/VIS BLW 3SM PCPN/BR. CONDS CONTG THRU 09Z.

.  
AREA 3...MTN OBSCN NC SC GA ME NH VT MA NY PA WV MD VA  
BOUNDED BY 50ESE YSC-50SW BGR-20SSW HAR-CLT-ATL-GQO-HNV-HNN-  
20ENE JHW-20NNE SYR-50SSW MPV-50ESE YSC  
MTNS OBSC BY CLDS/PCPN/BR. CONDS CONTG THRU 09Z.

....

WAUS42 KPCI 262045

WA2T  
 -MIAT WA 262045  
 AIRMET TANGO UPDT 3 FOR TURB STG WNDZ AND LLWS VALID UNTIL 270300  
 .  
 AIRMET TURB...NC ME NH VT MA RI CT NY LO NJ PA OH LE WV MD DC DE  
 VA AND CSTL WTRS  
 FROM YOW TO 30SW YSC TO 40ENE BOS TO 130E ACK TO 200SE ACK TO  
 160SE SIE TO 210ESE ECG TO 20ESE VXV TO HNV TO HNN TO FWA TO  
 30SE ECK TO YOW  
 MOD TURB BTN FL180 AND FL390. CONDS CONTG BYD 03Z ENDG 06-09Z.  
 .  
**AIRMET TURB...NC SC GA PA OH WV MD VA AND CSTL WTRS**  
**FROM 20WSW EWC TO 30WSW JST TO 20NNE CSN TO 90SE ECG TO LGC TO**  
**GQO TO HNV TO HNN TO CVG TO 40WSW ROD TO 20WSW EWC**  
**MOD TURB BTN 030 AND FL180. CONDS CONTG BYD 03Z THRU 09Z.**  
 .  
 AIRMET STG SFC WNDZ...NC AND CSTL WTRS  
 FROM 50SSE ECG TO 170SE ECG TO 130SE ILM TO 90S ECG TO 50SSE ECG  
 SUSTAINED SURFACE WINDS GTR THAN 30KT EXP. CONDS DVLPG 00-03Z.  
 CONDS CONTG BYD 03Z THRU 09Z.  
 .  
 LLWS POTENTIAL...NC SC GA NY LO PA OH LE WV MD DC VA AND CSTL  
 WTRS  
 BOUNDED BY YYZ-50NE SLT-RIC-70SE ECG-30SSE CAE-IRQ-HNV-HNN-40WSW  
 ROD-FWA-30SE ECK-YYZ  
 LLWS EXP. CONDS DVLPG 21-00Z. CONDS CONTG BYD 03Z THRU 09Z.  
 .  
**LLWS POTENTIAL...NC SC GA**  
**BOUNDED BY HNV-20SSW SPA-20E ATL-20NNE LGC-GQO-HNV**  
**LLWS EXP. CONDS DVLPG AFT 21Z. CONDS CONTG BYD 03Z THRU 09Z.**  
 .  
 OTLK VALID 0300-0900Z...TURB NC SC GA NY NJ PA OH WV MD DC DE VA  
 AND CSTL WTRS  
 BOUNDED BY 40NE SLT-30E CYN-90SE ECG-20ENE IRQ-20NE LGC-GQO-HNV-  
 HNN-CVG-30WSW ROD-40NE SLT  
 MOD TURB BTN 030 AND FL180. CONDS CONTG THRU 09Z.  
 ....

## 11.0 Graphical Forecasts for Aviation

The Graphical Forecasts for Aviation (GFA) products issued before the accident flight and valid at 1900 EST are shown in attachment 2. The GFA surface forecast products indicated VFR surface visibilities with a chance (between 30 to 60 percent) of rain or rain showers, and a surface wind from the east at 10 knots. The GFA cloud forecast valid before departure for around the accident time indicated few clouds at 1,400 ft msl with ceilings broken at 3,500 ft msl and cloud tops at 7,000 ft msl. The Graphical AIRMETs<sup>18</sup> (G-AIRMET) Sierra for IFR and mountain obscuration conditions valid for the accident site were overlaid on the GFA surface and cloud forecast graphics. The only human-generated information reflected in the two GFA products are the G-AIRMETs and the GFA is “human-over-the-loop.” For more information, please see attachment 2.

<sup>18</sup> <https://aviationweather.gov/gairmet>

## 12.0 Terminal Aerodrome Forecast

There were no airports with an NWS<sup>19</sup> Terminal Aerodrome Forecast (TAF) within 30 miles of the accident site.

## 13.0 NWS Area Forecast Discussion

The NWS office in Peachtree City, Georgia, (WFO FFC) issued an Area Forecast Discussion (AFD) at 1450 EST. The aviation section of the AFD discussed MVFR to IFR conditions during the afternoon with occasional showers and ceilings dropping LIFR during the overnight timeframe:

848  
FXUS62 KFFC 261950  
AFDFFC

Area Forecast Discussion  
National Weather Service Peachtree City GA  
250 PM EST Fri Feb 26 2021

.SHORT TERM /Tonight through Saturday Night/...

The upper flow gradually becomes more southwest through the short term. This should eventually push the surface boundary currently across central GA northward. At this time...the boundary looks to be generally from Columbus to Macon and east...with wedge like conditions north of the boundary. A couple of short waves travel across the boundary...keeping the bulk of the rain over north GA through the period. This surface front could still be lingering over far north GA through Saturday night...finally moving into TN just beyond the end of the period. Mostly stable conditions prevail tonight...but an isolated thunderstorm may be possible during the remainder of the afternoon. Better instability available on Saturday so have kept a mention of thunder for the far north. Storm totals for the short term do not seem to point to any hydrologic issues but will continue to monitor. Temperatures still warm except north of the frontal boundary.

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.LONG TERM /Sunday through Friday/...

Sunday will be the first taste of the promise of summer for most of Georgia. Widespread mid to upper 70s are likely with low 80s possible south of I-85. Rain and a possible rumble of thunder is likely across far northern GA most of the day on Sunday, before expanding to across northern GA Sunday night and into Monday morning.

On Monday, showers and thunderstorms will continue across the CWA as

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<sup>19</sup> 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](http://www.nws.noaa.gov/directives/sym/pd01008013curr.pdf)

the stationary front finally begins to drag south. From here the models continue to differ, as the GFS brings dry air back for a rain free Tuesday while the EURO brings another system through that clears the remains of the stationary front away from the SE. The EURO's solution brings nearly an additional 1.5 inches of rain to parts of the north and central GA Tuesday and into Wednesday. The difference in the two models has remained stubbornly in place for the past couple of days, and we have kept PoPs at chance as we wait to see how the upper level dynamics unfold.

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**.AVIATION... 18Z Update...**

**Ceilings varying from MVFR to IFR this afternoon with occasional showers. Ceilings should settle into LIFR overnight with some IFR visibility also possible. Showers overnight mainly north of KCSG to KMCN with overall higher ceilings. Winds mainly on east side 8-12 kts this afternoon and diminishing overnight. Late period SSW wind shift after about 15z Saturday along with ceilings starting to improve.**

**//ATL Confidence...18Z Update...**

**Medium on overall cig trends and precip coverage.  
High on all else.**

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**.PRELIMINARY POINT TEMPS/POPS...**

Athens	47	74	58	78	/	50	10	10	20
Atlanta	53	75	61	76	/	20	10	10	20
Blairsville	45	67	55	70	/	70	30	40	40
Cartersville	52	74	60	76	/	50	20	30	30
Columbus	57	78	61	81	/	20	5	5	20
Gainesville	46	69	57	75	/	60	20	20	30
Macon	55	79	60	82	/	20	5	5	20
Rome	52	74	60	77	/	60	30	30	40
Peachtree City	54	76	59	78	/	20	10	10	20
Vidalia	56	82	62	83	/	10	5	5	10

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**.FFC WATCHES/WARNINGS/ADVISORIES...**

**NONE.**

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## 14.0 Winds and Temperature Aloft Forecast

The NWS 1455 EST Winds and Temperature Aloft forecast valid for the closest point to the accident site is included below:

```
FBUS31 KWN0 261955
FD1US1
- DATA BASED ON 261800Z
VALID 270000Z   FOR USE 2000-0300Z. TEMPS NEG ABV 24000

FT  3000    6000    9000   12000   18000   24000   30000   34000   39000
ATL 1825 2437+10 2644+05 2745+00 2756-13 2750-24 277440 289048 770955
```

The closest forecast point to the accident site was Atlanta, Georgia, (ATL). The 1455 EST ATL forecast for use between 1500 EST and 2200 EST indicated a wind at 3,000 ft from 180° at 25 knots, a wind at 6,000 ft from 240° at 37 knots with a temperature of 10°C, and a wind at 9,000 ft from 260° at 44 knots with a temperature of 5°C.

## 15.0 Pilot Weather Briefing

The accident pilot did request weather information<sup>20</sup> from Leidos Flight Service at 1715 EST. During the weather briefing the Leidos weather briefer provided all the standard weather information valid at 1715 EST including AIRMETs, PIREPs, GFA, and CWA 105. The accident pilot asked questions of the Leidos weather briefer about cloud tops and icing forecast information. The accident pilot called Leidos at 1759 EST for a weather update on icing. The Leidos weather briefer provided the standard weather information valid at 1759 EST including CWA 105, AIRMETs, and freezing level information. For more information, please see attachments 3 through 6.

A search of archived ForeFlight information indicated that the accident pilot did request and receive weather information from ForeFlight at 1745 EST. For more information see attachment 7.

## 16.0 Astronomical Data

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

<b>SUN</b>	
Begin civil twilight	0642 EST
Sunrise	0707 EST
Sun transit	1248 EST
<b>Accident time</b>	<b>1811 EST<sup>21</sup></b>
Sunset	1830 EST
End civil twilight	1855 EST

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<sup>20</sup> [https://www.faa.gov/documentLibrary/media/Advisory\\_Circular/AC\\_91-92.pdf](https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_91-92.pdf)

<sup>21</sup> Inserted accident time for reference and context.

At the time of the accident the Sun was located at an altitude of 3.11° and azimuth of 257.86°.

#### **E. LIST OF ATTACHMENTS**

Attachment 1 – GOES-16 visible satellite animation from 1711 to 1831 EST

Attachment 2 – GFA valid for the accident site at accident time

Attachment 3 – Leidos accident flight plan information

Attachment 4 – Leidos accident flight text weather briefing information from 1715 EST

Attachment 5 – Leidos contact with accident pilot at 1715 EST

Attachment 6 – Leidos contact with accident pilot at 1759 EST

Attachment 7 – ForeFlight weather briefing information provided to accident pilot at 1745 EST

Submitted by:

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