



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

November 9, 2021

Specialist's Factual Report

METEOROLOGY

CEN21LA089

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A. ACCIDENT

Location: Bossier City, Louisiana
Date: December 16, 2020
Time: 0439 central standard time (1039 UTC)¹
Aircraft: Type – Piper PA28; Registration – N55168

B. METEOROLOGIST

Mike Richards
Senior Meteorologist
Operational Factors Division (AS-30)
National Transportation Safety Board

C. DETAILS OF THE INVESTIGATION

The National Transportation Safety Board’s meteorological specialist did not travel in support of this accident investigation and gathered all weather data remotely. Unless otherwise noted, all times are in central standard time (CST) for December 16, 2020 (based upon the 24-hour clock), directions are referenced to true north, distances are in nautical miles and heights are above mean sea level. The accident site was located at about: 32.506187° north latitude; 93.639911° west longitude at an elevation of about 160 feet.

This report provides information on the ceiling and visibility conditions and relevant forecasts applicable to the accident flight.

D. WEATHER INFORMATION

1.0 Surface Observations

Automated weather observing equipment was located at Barksdale Air Force Base (BAD²), in Bossier City, Louisiana, which was about 1 mile west of the accident location at an elevation of about 165 feet and had a magnetic variation of about 1° east. Automated longline³ reports from the

¹ UTC – abbreviation for Coordinated Universal Time

² This report uses the 3-digit International Air Transport Association format for airport identification, which does not use the geographic designating digit (e.g., “K” for stations in the continental U.S. and “P” for U.S. stations in Alaska and the Pacific region) as found in the 4-digit International Civil Aviation Organization (ICAO) identifier format. Weather observations from airports in this report are referenced by their reporting station’s identifier (using ICAO format that includes the geographic designating digit), not by the airport at which the reporting station is located.

³ “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.

BAD weather observing equipment during the times surrounding the accident time are presented here.

[0356 CST] METAR KBAD 160956Z AUTO 34008KT 10SM OVC005 04/03 A3000
RMK AO2 CIG 004 RWY15 SLP163 T00380026=
[0406 CST] SPECI KBAD 161006Z AUTO 33009KT 10SM OVC004 04/03 A3001
RMK AO2 SLP166=
[0416 CST] SPECI KBAD 161016Z AUTO 34007KT 10SM OVC005 04/03 A3001
RMK AO2 CIG 004 RWY15 SLP166=
[0426 CST] **SPECI KBAD 161026Z AUTO 33009KT 7SM OVC004 04/03 A3001**
RMK AO2 CIG 003 RWY15 SLP166=
[0446 CST] **SPECI KBAD 161046Z AUTO 34009KT 6SM BR OVC003 04/03 A3001**
RMK AO2 SLP166=

At 0426 CST, the BAD weather observing equipment reported a wind from 330° at 9 knots, visibility of 7 statute miles, ceiling overcast at 400 feet above ground level (agl), temperature of 4° Celsius (C) and dew point temperature of 3°C, altimeter setting of 30.01 inches of mercury; Remarks: automated station with a precipitation discriminator, ceiling at 300 feet agl at runway 15, sea level pressure of 1016.6 hectopascals (hPa).

At 0446 CST, the BAD weather observing equipment reported a wind from 340° at 9 knots, visibility of 6 statute miles, ceiling overcast at 300 feet agl, temperature of 4°C and dew point temperature of 3°C, altimeter setting of 30.01 inches of mercury; Remarks: automated station with a precipitation discriminator, sea level pressure of 1016.6 hPa.

An Automated Surface Observing System (ASOS) was located at Shreveport Downtown Airport (DTN), in Shreveport, Louisiana, which was about 6 miles west-northwest of the accident location at an elevation of about 180 feet and had a magnetic variation of about 1° east. Automated longline reports from the DTN ASOS during the times surrounding the accident time are presented here.

[0253 CST] METAR KDTN 160853Z AUTO 34004KT 10SM OVC004 04/03 A3001
RMK AO2 SLP161 T00440033 58004=
[0353 CST] **METAR KDTN 160953Z AUTO 31006KT 8SM OVC003 04/03 A3002**
RMK AO2 SLP164 T00440033=
[0453 CST] **METAR KDTN 161053Z AUTO 30009KT 10SM OVC005 04/03 A3003**
RMK AO2 CIG 002V009 SLP169 T00440028=

At 0353 CST, the DTN ASOS reported a wind from 310° at 6 knots, visibility of 8 statute miles, ceiling overcast at 300 feet agl, temperature of 4°C and dew point temperature of 3°C, altimeter setting of 30.02 inches of mercury; Remarks: automated station with a precipitation discriminator, sea level pressure of 1016.4 hPa, temperature of 4.4° and dew point temperature of 3.3°.

At 0453 CST, the DTN ASOS reported a wind from 300° at 9 knots, visibility of 10 statute miles or greater, ceiling overcast at 500 feet agl, temperature of 4°C and dew point temperature of 3°C, altimeter setting of 30.03 inches of mercury; Remarks: automated station with a precipitation discriminator, ceiling variable between 200 and 900 feet agl, sea level pressure of 1016.9 hPa, temperature of 4.4° and dew point temperature of 2.8°.

5-minute data from the DTN ASOS for times surrounding the accident time are provided here.

[0415 CST] 5-MIN KDTN 161015Z AUTO 33005KT 6SM BR OVC003 04/03 A3002 90
92 -1100 330/05 RMK AO2 T00440033

[0420 CST] 5-MIN KDTN 161020Z AUTO 32007KT 5SM BR OVC003 04/03 A3002 90
92 -1100 320/07 RMK AO2 T00440033

[0425 CST] 5-MIN KDTN 161025Z AUTO 32006KT 5SM BR OVC003 04/03 A3002 90
89 -1100 320/06 RMK AO2 T00440028

[0430 CST] 5-MIN KDTN 161030Z AUTO 32006KT 5SM BR OVC003 04/03 A3002 90
89 -1100 310/06 RMK AO2 T00440028

[0435 CST] 5-MIN KDTN 161035Z AUTO 32008KT 5SM BR OVC003 04/03 A3002 90
89 -1100 320/08 RMK AO2 T00440028

**[0440 CST] 5-MIN KDTN 161040Z AUTO 32007KT 6SM BR OVC003 04/03 A3003
80 89 -1100 320/07 RMK AO2 T00440028**

[0445 CST] 5-MIN KDTN 161045Z AUTO 30008KT 8SM OVC003 04/03 A3003 80 89
-1100 300/08 RMK AO2 CIG 002V008 T00440028

At 0440 CST, the DTN ASOS 5-minute report indicated a wind from 320° at 7 knots, visibility of 6 statute miles, mist, ceiling overcast at 300 feet agl, temperature of 4°C and dew point temperature of 3°C, altimeter setting of 30.03 inches of mercury, pressure altitude of 80 feet, relative humidity of 89 percent, density altitude of -1,100 feet, magnetic wind direction of 320° with a wind magnitude of 7 knots; Remarks included: automated station with a precipitation discriminator, temperature of 4.4°C and dew point temperature of 2.8°C.

2.0 Pilot Reports

There was one publicly longline-disseminated pilot report⁴ (PIREP) within 50 miles of the accident location between 0200 and 0700 CST.

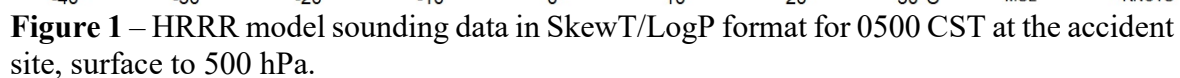
*SHV UA /OV SHV/TM 1235/FL006/TP CRJ7/SK OVC/RM BASES 600' AND TOPS
3200'*

At 0635 CST, a CRJ-700 type aircraft at 600 feet over Shreveport Regional Airport in Shreveport, Louisiana, report overcast skies with cloud bases at 600 feet and cloud tops at 3,200 feet.

⁴ This does not consider pilot reports only broadcast via radio.

A review of weather radar imagery did not identify any pertinent areas of reflectivity near the accident location at the accident time.

A High-Resolution Rapid Refresh (HRRR) model⁵ sounding (figure 1) for the accident site at 0500 CST using an elevation of 157 feet was retrieved from the National Oceanic and Atmospheric Administration's Air Resources Laboratory. Cloudy conditions were identified from the surface to about 4,200 feet, with wet fog identified below 350 feet. The freezing level was noted at about 1,900 feet and the RAOB identified rime icing potential between about 2,000 and 4,400 feet. any clouds in the lower atmosphere. The wind below 4,000 feet was from the northwest at magnitudes at or below 20 knots.



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5.0 Satellite Imagery

Geostationary Operational Environmental Satellite (GOES)-16 satellite data were obtained from an archive at the Space Science Engineering Center at the University of Wisconsin-Madison. Figure 2 presents the GOES-16 infrared cloud-top temperatures over the accident site, which were about -2°C , which, when considering the 0500 CST HRRR sounding, corresponded to cloud top heights of about 3,400 feet. Figure 3 presents a red-green-blue ($12.3\mu\text{m}$ - $10.3\mu\text{m}$ – $10.3\mu\text{m}$ - $3.9\mu\text{m}$ – $10.3\mu\text{m}$; RGB) nighttime microphysics GOES-16 band combination product for 0441 CST. This product assists in visually identifying cloud level and type at night. Figure 4 presents a guide on interpreting these types of images.

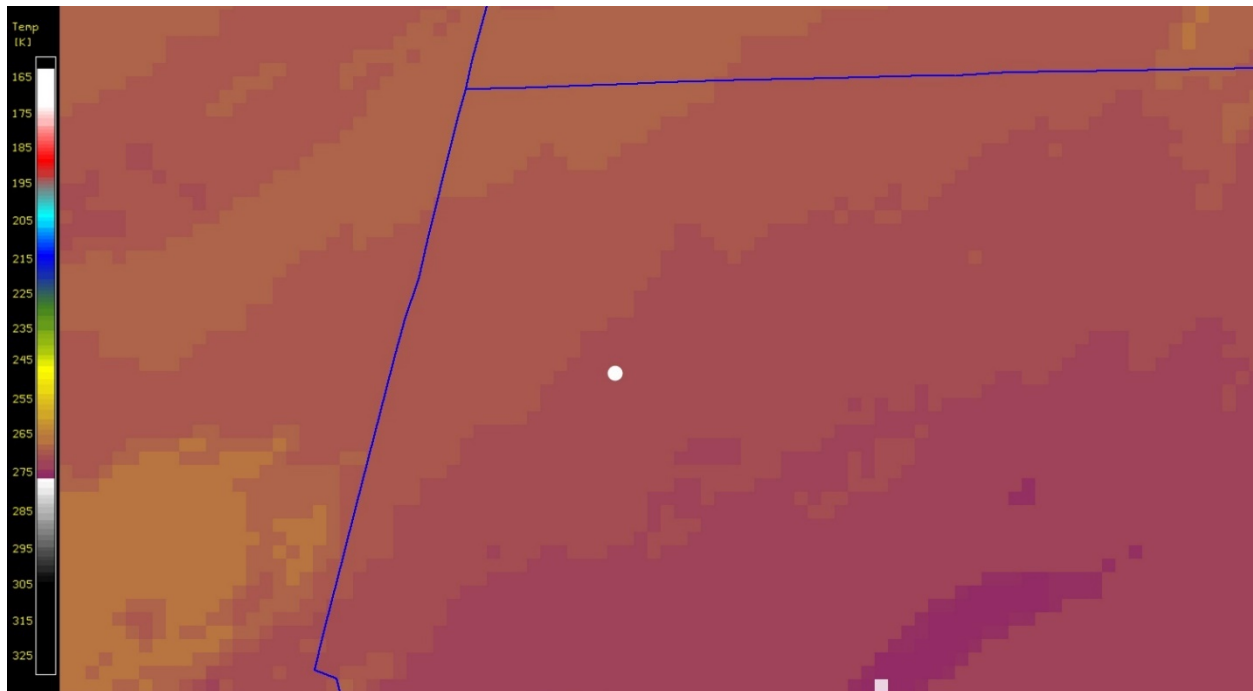


Figure 2 – GOES-16 infrared imagery from 0441 CST. Accident location denoted by the white dot. Image is not corrected for parallax error.

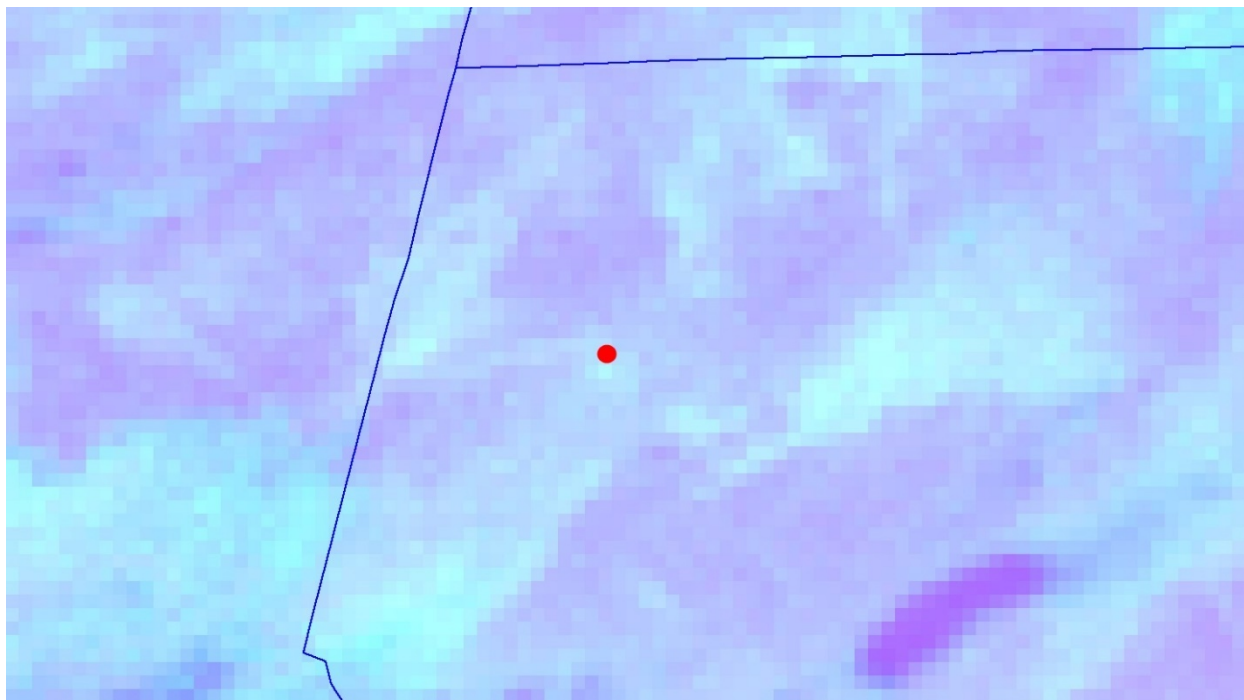


Figure 3 – GOES-16 RGB nighttime microphysics image for 0441 CST. Accident location denoted by the red circle. This image has not been corrected for any parallax error.

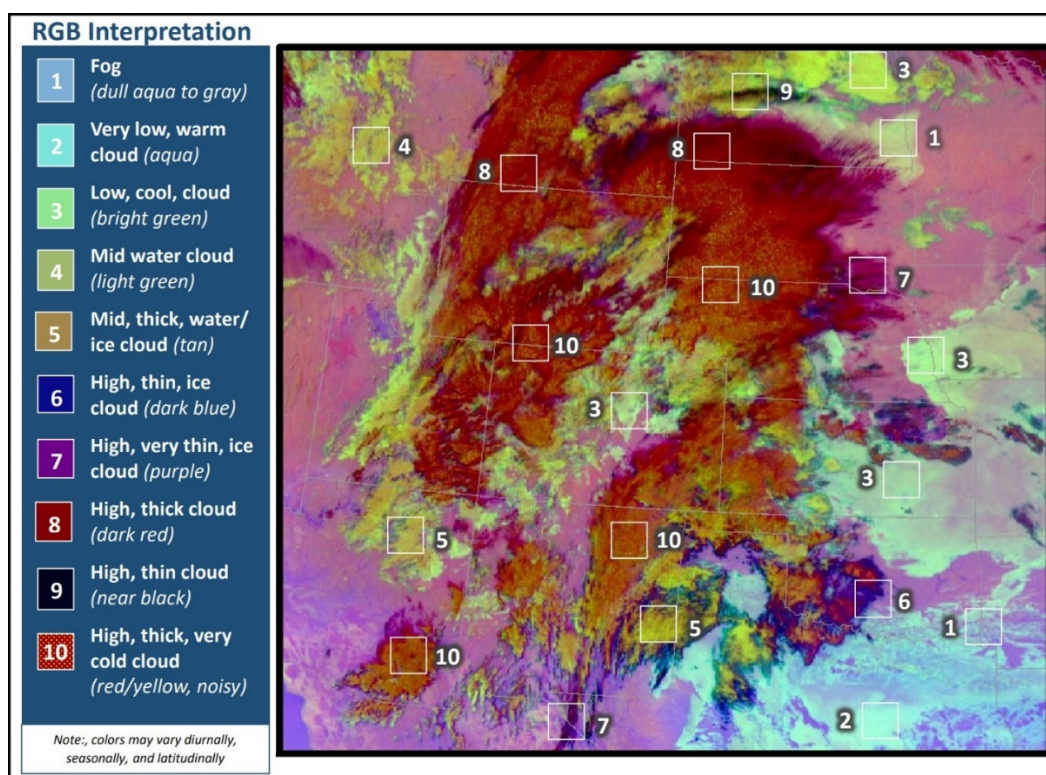


Figure 4 – Interpretation aid for the GOES-16 RGB nighttime microphysics image found in Figure 3. Taken from:

https://www.star.nesdis.noaa.gov/GOES/documents/QuickGuide_GOESR_NtMicroRGB_final.pdf

6.0 Terminal Aerodrome Forecasts

At 2225 CST on the evening before the accident, a Terminal Aerodrome Forecast (TAF) was issued for BAD that forecasted for the accident time: a wind from 330° at 5 knots, visibility greater than six statute miles, ceiling overcast at 200 feet agl, minimum altimeter setting of 30.02 inches of mercury.

*TAF AMD KBAD 160425Z 1604/1708 36003KT 9999 OVC004 QNH3001INS
BECMG 1608/1609 33005KT 9999 OVC002 QNH3002INS
BECMG 1614/1615 33010G15KT 9999 OVC007 QNH3012INS
BECMG 1617/1618 32012G18KT 9999 SCT025 QNH3011INS
BECMG 1705/1706 30003KT 9999 SKC QNH3022INS
TX06/1621Z TNM01/1613Z=*

At 0400 CST on the accident day, a TAF was issued for BAD that forecasted for the accident time: a wind from 310° at 5 knots, visibility greater than six statute miles, ceiling overcast at 500 feet agl, minimum altimeter setting of 30.01 inches of mercury.

*TAF KBAD 161000Z 1610/1716 31005KT 9999 OVC005 QNH3001INS
BECMG 1614/1615 32010KT 9999 OVC007 QNH3008INS
BECMG 1619/1620 32010KT 9999 BKN015 QNH3008INS
BECMG 1701/1702 31003KT 9999 SKC QNH3017INS
TX06/1621Z TNM01/1612Z=*

7.0 Area Forecast Discussion

The National Weather Service (NWS) Weather Forecast Office (WFO) in Shreveport, Louisiana, issued the following “Aviation” sections of an Area Forecast Discussion at 2247 CST the evening before the accident. This was the last AFD issued from this WFO prior to the accident aircraft’s departure.

*FXUS64 KSHV 160447
AFDSHV
Area Forecast Discussion
National Weather Service Shreveport LA
1047 PM CST Tue Dec 15 2020*

.AVIATION...

A mix of MVFR/IFR and LIFR ceilings remain across our airspace this evening with areas of light rain and drizzle. There has also been a brief mixture of -SN/-IP at KTXK this evening, but not expecting this overnight. However, reduced flight conditions to continue through sunrise with IFR/LIFR ceilings trying to transition to MVFR conditions by late morning. VFR conditions to move into the region from west to east late in period. Current ENE winds will back around to the North and Northwest late tonight through the day Wednesday with speeds near 10kts. Some higher gusts will be possible by tomorrow afternoon at our East TX terminals. /20/

8.0 AIRMETs SIERRA

An Airmen's Meteorological Information (AIRMET) SIERRA advisory for instrument flight rule (IFR) conditions, identifying ceilings below 1,000 feet, visibility below 3 statute miles, precipitation and mist, was issued at 0245 CST and was valid for the accident site at the accident time.

WAUS44 KKCI 160845

WA4S

-DFWS WA 160845

AIRMET SIERRA UPDT 2 FOR IFR AND MTN OBSCN VALID UNTIL 161500

AIRMET IFR...OK TX AR TN LA MS AL AND CSTL WTRS

FROM OSW TO RZC TO HNV TO GQO TO 50SW PZD TO 40W CEW TO 130SSE SJI

TO 90SE LEV TO 30SW LEV TO 80WSW LEV TO 90SE IAH TO 40ENE PSX TO 60SE

ACT TO 30SW SPS TO 50NNE MMB TO OSW

CIG BLW 010/VIS BLW 3SM PCPN/BR. CONDS CONTG BYD 15Z THRU 21Z.

9.0 SIGMETs

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

10.0 CWSU Products

At 0410 CST, the NWS Center Weather Service Units at the Fort Worth Air Route Traffic Control Center issued the following Center Weather Advisory that was active for the accident location at the accident time and advised of an area of widespread IFR⁶ and low IFR (LIFR)⁷ conditions with ceilings at or below 500 feet agl and visibility at or below one statute mile with mist and fog.

FAUS21 KZFW 161010

ZFW1 CWA 161010

ZFW CWA 101 VALID UNTIL 161210

ZFW CWA 101 VALID UNTIL 161210Z

FROM 40N TXK-20ENE MLU-60NW LFK-50NW GGG-40N TXK

AREA WDSPRD IFR/LIFR. CIGS AOB 005. VIS AOB 1SM BR/FG. =

⁶ IFR conditions - Ceilings less than 1,000 feet agl and/or visibility less than three statute miles.

⁷ LIFR conditions - Ceilings less than 500 feet agl and/or visibility less than one statute miles.

Submitted by:

Mike Richards
Senior Meteorologist