



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

December 14, 2020

Specialist's Report

METEOROLOGY

CEN21LA075

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A. ACCIDENT

Location: Windom, MN
Date: December 6, 2020
Time: 0624 central standard time (1224 UTC)¹
Aircraft: Type – Piper PA32; Registration – N8178Y

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 6, 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 (msl). The accident site was located at about: 43.95639° north latitude; 95.11833° west longitude at an elevation of about 1,440 feet.

This report provides information on the weather conditions and forecasts applicable to the accident location around the accident time.

D. WEATHER INFORMATION

1.0 Surface Observations

An Automated Weather Observing System (AWOS) was located at Windom Municipal Airport (MWM) in Windom, Minnesota, which was located about 3 miles north of the accident location at an elevation of about 1,410 feet and had a magnetic variation of about 2° east. Automated longline² reports from the MWM AWOS between 0200 and 1500 CST are presented here. Only four observations were issued longline during this period.

¹ UTC – abbreviation for Coordinated Universal Time

² “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.

[0203 CST] METAR KMWM 060803Z AUTO 35007KT 10SM CLR M01/M03 A3012
RMK AO2=

[0302 CST] METAR KMWM 060902Z AUTO 34009KT 10SM BKN009 M01/M02
A3013 RMK AO2=

**[0642 CST] METAR KMWM 061242Z AUTO 01007KT 5SM BR OVC004 M02/M02
A3014 RMK AO2=**

[0822 CST] METAR KMWM 061422Z AUTO 01004KT 2 1/2SM BR OVC004
M02/M02 A3013 RMK AO2=

At 0642 CST, the MWM AWOS reported a wind from 010° at 7 knots, visibility of 5 statute miles, mist, ceiling overcast at 400 feet above ground level (agl), temperature of -2° Celsius (C) and a dew point temperature of -2°C, altimeter setting of 30.14 inches of mercury; remarks: automated station with a precipitation discriminator.

Archived observations were retrieved from the MWM AWOS by the AWOS' Field Service Engineer for times that included the accident time. The archived observation closest to the accident time, which was not disseminated longline but whose information would have been broadcast by the MWM AWOS via Very High Frequency at the time of the observation, indicated that at 0621 CST, the MWM AWOS reported ceiling overcast at 400 feet agl, visibility of 7 statute miles, wind from 350° at 6 knots, temperature of -1°C, dew point temperature of -2°C and an altimeter of 30.13 inches of mercury. The raw archived observations are presented in Attachment 1 to this report. Email dialogue with the MWM AWOS' Field Service Engineer is also found in Attachment 1.

2.0 HRRR Model Sounding

A High-Resolution Rapid Refresh (HRRR) model³ sounding (figure 1) for the accident site at 0600 CST was retrieved from the National Oceanic and Atmospheric Administration's Air Resources Laboratory. Near the surface the wind was from the north at 7 knots and remained generally from the north at magnitudes at or below 15 knots through about 4,100 feet. No layers of significant turbulence were identified by the Rawinsonde Observation Program (RAOB) though several shallow layers of light low-level wind shear were noted below 2,000 feet. The relative humidity was 94 percent or greater from near the surface to about 3,600 feet, and the RAOB identified an overcast cloud layer between about 1,900 and 3,700 feet. Freezing fog was identified up to 1,900 feet. Temperature inversions⁴ were noted in layers centered around 2,900 and 4,300 feet. RAOB identified the potential for light rime icing from the surface to about 3,300 feet.

³ 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.

⁴ A temperature inversion is a thin layer of the atmosphere where the normal decrease in temperature with height switches to the temperature increasing with height.

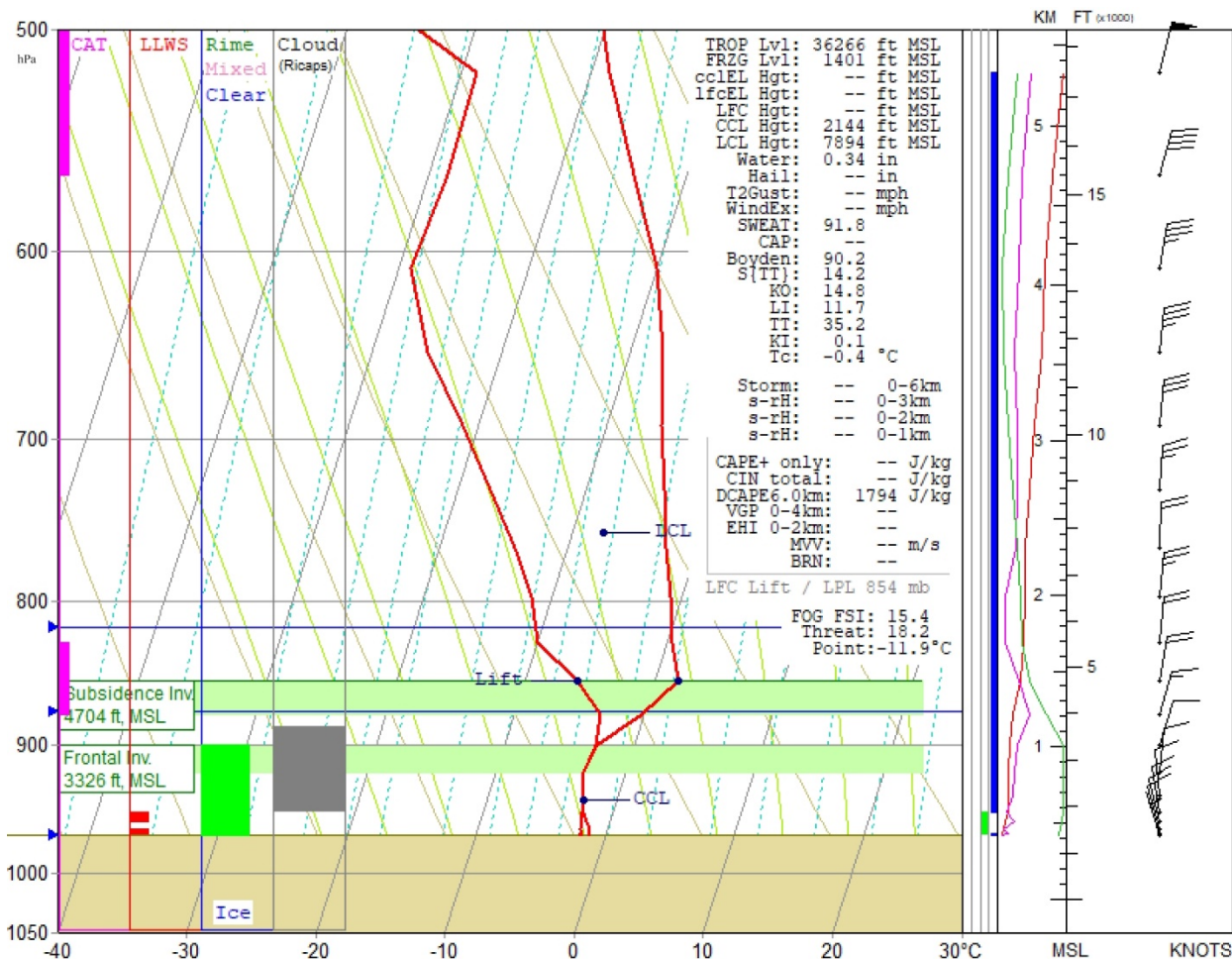


Figure 1 – HRRR model sounding data in SkewT/LogP format for 0600 CST at the accident site, surface to 500 hectopascals.

3.0 Pilot Reports

There were no publicly longline-disseminated pilot reports⁵ (PIREP) made between 0400 and 0800 CST within about 50 miles of the accident location.

4.0 Satellite Imagery

Geostationary Operational Environmental Satellite (GOES)-16 infrared (10.3 μ m) data were obtained from an archive at the Space Science Engineering Center at the University of Wisconsin-Madison. An image from 1621 CST is presented in figure 2 and infrared brightness temperatures over the accident location were -6°C.

⁵ These do not include pilot reports only broadcast via radio.

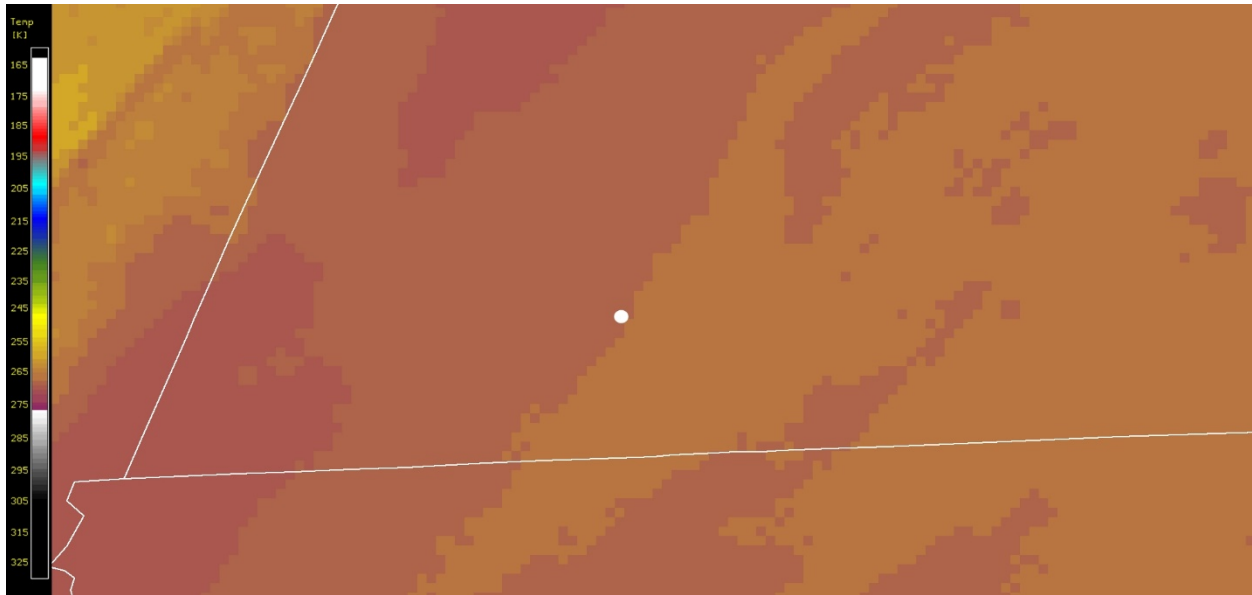


Figure 2 – GOES-16 infrared brightness temperature imagery from 0621 CST. Accident location is denoted by the white circle. This image has not been corrected for any parallax error.

5.0 Weather Radar

A review of weather radar imagery did not identify any pertinent reflectivity in the accident region around the accident time.

6.0 Area Forecast Discussion

Presented here is the “Aviation” section of the Area Forecast Discussion issued at 0531 CST by the National Weather Service (NWS) Sioux Falls, South Dakota, Weather Forecast Office.

FXUS63 KFSD 061131

AFDFSD

AREA FORECAST DISCUSSION

National Weather Service Sioux Falls SD

531 AM CST Sun Dec 6 2020

.AVIATION...(For the 12Z TAFS through 12Z Monday morning)

Issued at 522 AM CST Sun Dec 6 2020

Fog and stratus continue through mid to late morning for areas along and east of I-29, with MVFR and IFR conditions. Some areas across southwestern MN and northwestern IA are experiencing brief LIFR conditions, with very low stratus within the cloud deck. Expect fog and stratus to decrease in coverage from west to east with ceilings lifting by afternoon, leading to VFR conditions later in the day. Winds remain light.

For areas west of I-29, expect VFR conditions with some cirrus moving through this morning. Expect light winds for this region as well.

7.0 AIRMETs

The NWS Aviation Weather Center issued Airmen's Meteorological Information (AIRMET) SIERRA advisories at 0245 and 0614 CST for instrument meteorological conditions (IFR) that were applicable to the accident location. There were no other AIRMET advisories active for the accident location at the accident time below 10,000 feet.

WAUS43 KKCI 060845

WA3S

-CHIS WA 060845

AIRMET SIERRA UPDT 4 FOR IFR AND MTN OBSCN VALID UNTIL 061500

*.
AIRMET IFR...ND SD NE MN IA WI LS*

*FROM 90ESE YWG TO 40ENE INL TO 40W YQT TO 60SSE DLH TO 50SE MSP TO
50ESE MCW TO 20N DSM TO 50WNW OVR TO 40NE OBH TO 60N ONL TO 30SSE
ABR TO 50SSW FAR TO GFK TO 60SSE YWG TO 90ESE YWG*

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

WAUS43 KKCI 061214 AAA

WA3S

-CHIS WA 061214 AMD

AIRMET SIERRA UPDT 5 FOR IFR AND MTN OBSCN VALID UNTIL 061500

*.
AIRMET IFR...ND SD NE MN IA WI LS MI...UPDT*

*FROM 70SE YWG TO 20SSE YQT TO 30ESE MSP TO 30NE DSM TO 30W OVR TO
40NE OBH TO 40NE ONL TO 40SE ABR TO GFK TO 70SE YWG*

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

8.0 SIGMETs

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

9.0 CWSU Products

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

10.0 Astronomical

According to the Federal Aviation Administration, at the accident location civil twilight began at 0708 CST and sunrise began at 0741 CST.⁶

E. LIST OF ATTACHMENTS

Attachment 1 - Archived observations from the MWM AWOS and email correspondence with the MWM AWOS technician.

Submitted by:

Mike Richards
Senior Meteorologist

⁶ https://avcams.faa.gov/sunrise_sunset.php