



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

October 26, 2021

Specialist's Factual Report

METEOROLOGY

CEN21LA384

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A. ACCIDENT

Location: Lansing, Michigan
Date: August 24, 2021
Time: 1858 eastern daylight time (2258 UTC)¹
Aircraft: Type – Cirrus SF50; Registration – N1GG

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 eastern daylight time (EDT) for August 24, 2021 (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: 42.778514° north latitude; 84.564772° west longitude at an elevation of about 840 feet.

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

D. WEATHER INFORMATION

1.0 Surface Observations

An Automated Surface Observing System (ASOS) was located at Capital Region International Airport (LAN²), in Lansing, Michigan, which was the site of the accident at a nominal elevation of 860 feet and with a magnetic variation of about 6° west.³ Augmented longline⁴ reports from the LAN ASOS during the times surrounding the accident time are presented here.

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 The ASOS was located at coordinates: 42.77610, -84.59970.

⁴ “Longline” refers to the dissemination of weather observations with the intent that they are available in near-real

[1653 EDT] METAR KLAN 242053Z 23010KT 9SM SCT034 32/24 A2997 RMK AO2 SLP143 T03220244 58007=

[1753 EDT] METAR KLAN 242153Z 22007KT 9SM SCT037 SCT045 32/24 A2996 RMK AO2 LTG DSNT W SLP138 T03170239=

[1824 EDT] SPECI KLAN 242224Z 25010KT 9SM VCTS SCT035 31/24 A2997 RMK AO2 LTG DSNT ALQDS T03110239=

[1853 EDT] METAR KLAN 242253Z 25008KT 9SM VCTS FEW049 FEW065 31/24 A2998 RMK AO2 LTG DSNT ALQDS SLP146 T03110239=

[1908 EDT] SPECI KLAN 242308Z 29017G30KT 9SM TS SCT025 BKN030 BKN040 26/19 A3006 RMK AO2 PK WND 31030/2303 LTG DSNT ALQDS TSB02 PRESRR T02560194=

[1914 EDT] SPECI KLAN 242314Z 31019G30KT 2 1/2SM -TSRA FEW019 BKN027 BKN039 23/21 A3005 RMK AO2 PK WND 31030/2303 LTG DSNT ALQDS RAB09 TSB02 P0000 T02330206=

At 1853 EDT, the LAN ASOS reported a wind from 250° at 8 knots, visibility of 9 statute miles, thunderstorms in the vicinity⁵, few clouds at 4,900 feet above ground level (agl), few clouds at 6,500 agl, temperature of 31° Celsius (C) and dew point temperature of 24°C, altimeter setting of 29.98 inches of mercury; Remarks: automated station with a precipitation discriminator, distant⁶ lightning in all quadrants, sea level pressure of 1014.6 hectopascals (hPa), temperature of 31.1°C and a dew point temperature of 23.9°C.

At 1908 EDT, the LAN ASOS reported a wind from 290° at 17 knots with gusts to 30 knots, visibility of 9 statute miles, thunderstorms, scattered clouds at 2,500 feet agl, ceiling broken at 3,000 feet agl, broken clouds at 4,000 feet agl, temperature of 26°C and dew point temperature of 19°C, altimeter setting of 30.06 inches of mercury; Remarks: automated station with a precipitation discriminator, peak wind from 310° at 30 knots at 1903 EDT, distant lightning in all quadrants, thunderstorm began at 1902 EDT, pressure rising rapidly, temperature of 25.6°C and a dew point temperature of 19.4°C.

Five-minute data from the LAN ASOS for times surrounding the accident time are provided here.

[1845 EDT] 5-MIN KLAN 242245Z 23005KT 9SM VCTS FEW034 31/24 A2997 820 65 2900 230/05 RMK AO2 LTG DSNT ALQDS T03110239

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.

⁵ "In the vicinity" indicates within 5 to 10 miles of the aerodrome.

⁶ "Distant" indicates more than 10 miles from the aerodrome.

[1850 EDT] 5-MIN KLAN 242250Z 24007KT 9SM VCTS FEW065 31/24 A2998 810 65 2900 250/07 RMK AO2 LTG DSNT ALQDS SLP145 T03110239

[1855 EDT] **5-MIN KLAN 242255Z 27010G21KT 9SM VCTS FEW039 SCT049 SCT065 31/24 A2999 800 65 2900 280/10G21 RMK AO2 LTG DSNT ALQDS PRESRR T03110239**

[1900 EDT] **5-MIN KLAN 242300Z 9SM VCTS FEW025 SCT040 BKN065 27/21 A3003 760 69 2300 M /M RMK AO2 PK WND 32028/2300 LTG DSNT ALQDS PRESRR T02670206**

[1905 EDT] 5-MIN KLAN 242305Z 32016G30KT 10SM TS SCT025 BKN030 BKN040 26/19 A3005 740 68 2200 320/16G30 RMK AO2 PK WND 31030/2303 LTG DSNT ALQDS TSB02 PRESRR T02560194

[1910 EDT] 5-MIN KLAN 242310Z 30019G30KT 8SM -TSRA SCT025 BKN030 BKN040 25/20 A3006 740 73 2100 300/19G30 RMK AO2 PK WND 31030/2303 LTG DSNT

At 1855 EDT, the LAN ASOS five-minute report indicated a wind from 270° at 10 knots with gusts to 21 knots, visibility of 9 statute miles, thunderstorm in the vicinity, few clouds at 3,900 feet agl, scattered clouds at 4,900 feet agl, scattered clouds at 6,500 feet agl, temperature of 31°C and dew point temperature of 24°C, altimeter setting of 29.99 inches of mercury, pressure altitude of 800 feet, relative humidity of 65 percent, density altitude of 2,900 feet, magnetic wind direction of 280° with a wind magnitude of 10 knots with gusts to 21 knots; Remarks included: automated station with a precipitation discriminator, distant lightning in all quadrants, pressure rising rapidly, temperature of 31.1°C and dew point temperature of 23.9°C.

At 1900 EDT, the LAN ASOS five-minute report indicated visibility of 9 statute miles, thunderstorm in the vicinity, few clouds at 2,500 feet agl, scattered clouds at 4,000 feet agl, ceiling broken at 6,500 feet agl, temperature of 27°C and dew point temperature of 21°C, altimeter setting of 30.03 inches of mercury, pressure altitude of 760 feet, relative humidity of 69 percent, density altitude of 2,300 feet, magnetic wind direction missing and wind magnitude missing; Remarks included: automated station with a precipitation discriminator, peak wind from 320° at 28 knots occurred at 1900 EDT, distant lightning in all quadrants, pressure rising rapidly, temperature of 26.7°C and dew point temperature of 20.6°C.

One minute wind data⁷ from the LAN ASOS acquired from NOAA's National Centers for Environmental for times surrounding the accident time are provided here.⁸

<u>Time</u>	<u>W_Dir</u>	<u>W_Mag</u>	<u>G_Dir</u>	<u>G_Mag</u>
1850	241°	7	248°	8
1851	244°	7	249°	8

⁷ These wind data are not necessarily what would have been broadcast by the ASOS via very high frequency.

⁸ W_Dir = Direction of two-minute averaged wind (true); W_Mag = Magnitude of two-minute averaged wind (knots); G_Dir = Direction of maximum three-second wind during minute (true); G_Mag = Magnitude of maximum three-second wind during minute (knots); M = missing data

1852	247°	7	253°	9
1853	251°	8	250°	9
1854	257°	8	262°	10
1855	271°	10	292°	21
1856	M	M	M	M
1857	M	M	M	M
1858	M	M	M	M
1859	M	M	317°	26
1900	M	M	317°	28
1901	319°	20	316°	27
1902	319°	21	327°	28

According to information provided by the National Weather Service (NWS; see Attachment 1), at 1755 eastern standard time (1855 EDT), the ASOS wind sensor became inoperative. At 1800 eastern standard time (1900 EDT), the wind sensor became operational again.

08/24/21 17:55 *ST 1791 WIND 425NWS SENSOR IS INOPERATIONAL

08/24/21 18:00 *ST 1790 WIND 425NWS SENSOR IS OPERATIONAL

According to the NWS:

“...the SENSOR IS INOPERATIVE/OPERATIVE wording probably isn't the best for this condition. The sensor inoperative message appears whenever the winds go missing, and sensor operative message when the winds return. This may be because of an inoperative sensor, or maybe that the wind sensor data is missing because it did not pass internal quality control (as was the case here). This can happen for reasons other than sensor malfunction (birds roosting on it, for example...the winds go missing when the bird lands, and return once it flies away).”

The following data were provided by the Federal Aviation Administration (FAA) and provide the windshear algorithm output data produced by the LAN Low-Level Windshear Alert System-Relocation/Sustainment (LLWAS-RS) that were available to the ribbon displays in the LAN air traffic control tower (ATCT) in 10-second increments immediately before the accident time (time is in UTC). Attachment 2 contains all ribbon display data provided by the FAA as well as 10-second LAN LLWAS-RS wind data. According to the FAA:

“...it was confirmed by looking at the LLWAS maintenance screen that the system was not receiving GPS time updates from the Digital Audio Legal Recorders (DALR). Informal comparisons between the time on the DALR and the LLWAS-RS revealed that at the time the LLWAS-RS was approximately 5 minutes and 50 seconds behind the DALR. It is not possible to determine the exact amount of time lag in the LLWAS-RS at the time of the aircraft incident in Lansing, MI on August 24.”

At 1851:02 EDT (uncorrected time), the LAN ATCT ribbon display indicated that the airport wind (AW)⁹ was from 290° (magnetic) at 8 knots; however, over the next 90 seconds (at 1852:32 EDT) the AW wind magnitudes increased to a wind from 320° at 21 knots with gusts to 30 knots. At that time, the following wind shear alerts were presented to the ribbon display:

Runway 28L (approach) - 20 knot gain - 1 mile from arrival end - threshold wind (30-second average) from 300° of 26 knots - possible wind shear outside of the LAN LLWAS-RS network

Runway 10R (departure) - 20 knot gain - 1 mile from departure end - threshold wind (30-second average) from 300° of 26 knots - possible wind shear outside of the LAN LLWAS-RS network

Runway 28R (approach) - 20 knot gain - 1 mile from arrival end - threshold wind (30-second average) from 300° of 26 knots - possible wind shear outside of the LAN LLWAS-RS network

Runway 10L (departure) - 20 knot gain - 1 mile from departure end - threshold wind (30-second average) from 300° of 26 knots - possible wind shear outside of the LAN LLWAS-RS network

08-24-2021 22:51:02

AW 290 08

10RA 300 11

28LD 300 11

10LA 320 23

28RD 320 23

28LA 280 11

10RD 280 11

28RA 280 11

10LD 280 11

06-A 310 21

24-D 310 21

24-A 300 11

06-D 300 11

08-24-2021 22:51:12

AW 290 09G15

10RA 300 13

28LD 300 13

10LA 320 22

28RD 320 22

28LA 280 12

10RD 280 12

28RA 280 12

10LD 280 12

06-A 310 23

24-D 310 23

⁹ The AW is the 2-minute average wind speed and direction and any gusts calculated from the LAN LLWAS-RS Remote Station (RS) #1

24-A 300 13
06-D 300 13

08-24-2021 22:51:22

AW 290 10G18

10RA 300 15

28LD 300 15

10LA 320 21

28RD 320 21

28LA 280 13

10RD 280 13

28RA 280 13

10LD 280 13

06-A 310 26

24-D 310 26

24-A 300 15

06-D 300 15

08-24-2021 22:51:32

AW 300 11G23

10RA 310 19

28LD 310 19

10LA 330 20

28RD 330 20

28LA 290 14

10RD 290 14

28RA 290 14

10LD 290 14

06-A 310 27

24-D 310 27

24-A 310 19

06-D 310 19

08-24-2021 22:51:42

AW 300 13G27

10RA 310 23

28LD 310 23

10LA 330 19

28RD 330 19

28LA 290 16

10RD 290 16

28RA 290 16

10LD 290 16

06-A 320 25

24-D 320 25

24-A 310 23

06-D 310 23

08-24-2021 22:51:52

AW 300 14G28

10RA 310 26

28LD 310 26

10LA 330 18
28RD 330 18
28LA 290 18
10RD 290 18
28RA 290 18
10LD 290 18
06-A 320 24
24-D 320 24
24-A 310 26
06-D 310 26

08-24-2021 22:52:02

AW 310 16G30
10RA 320 28
28LD 320 28
10LA 330 16
28RD 330 16
28LA 290 19
10RD 290 19
28RA 290 19
10LD 290 19
06-A 320 24
24-D 320 24
24-A 320 28
06-D 320 28

08-24-2021 22:52:12

AW 310 17G30
10RA 330 28
28LD 330 28
10LA 330 14
28RD 330 14
28LA 290 20
10RD 290 20
28RA 290 20
10LD 290 20
06-A 320 25
24-D 320 25
24-A 330 28
06-D 330 28

08-24-2021 22:52:22

AW 310 19G30
10RA 330 29
28LD 330 29
10LA 330 15
28RD 330 15
28LA 290 21
10RD 290 21
28RA 290 21
10LD 290 21
06-A 320 23

```

24-D 320 23
24-A 330 29
06-D 330 29

08-24-2021 22:52:32
AW 320 21G30
10RA 330 28
28LD 330 28
10LA 330 15
28RD 330 15
28LA WSA 20K+ 1MF 300 26 *
10RD WSA 20K+ 1MD 300 26 *
28RA WSA 20K+ 1MF 300 26 *
10LD WSA 20K+ 1MD 300 26 *
06-A 320 21
24-D 320 21
24-A 330 28
06-D 330 28

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2.0 Weather Radar

WSR-88D¹⁰ Level-II base reflectivity weather radar images from the Grand Rapids, Michigan, site (KGRR) are presented in figures 1-4. KGRR was located approximately 44 miles west of the accident location at an elevation of about 875 feet. Assuming standard refraction and considering the 0.95° beam width¹¹ for the WSR-88D radar beam, the KGRR $\approx 0.44^\circ$ tilt would have “seen” altitudes over the accident location of between about 2,000 and 6,400 feet.

¹⁰ Weather Surveillance Radar 88 Doppler (WSR-88D)

¹¹ Here we define the angular width of the radar beam as the region of transmitted energy that is bounded by one-half the maximum power. The maximum power lies along the beam centerline and decreases outward from the radar antenna.

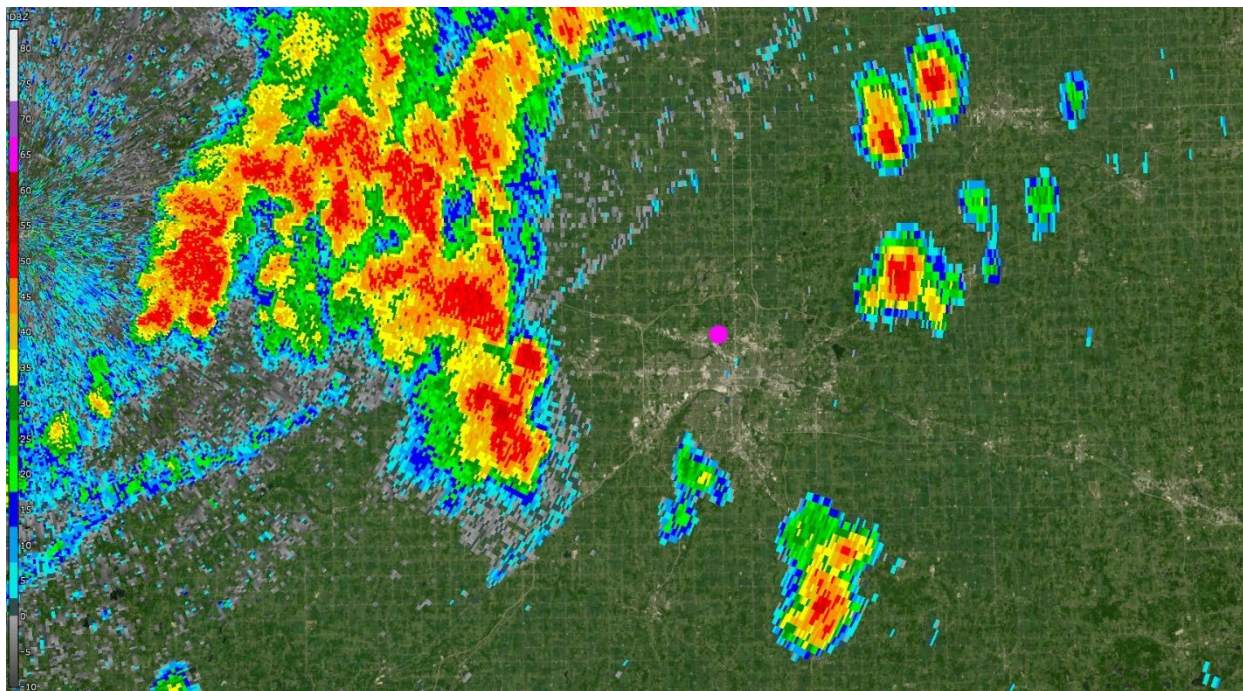


Figure 1 – KGRR $\approx 0.44^\circ$ Level-II base reflectivity product from a sweep initiated at 1836 EDT. Accident location marked by the purple/pink circle.

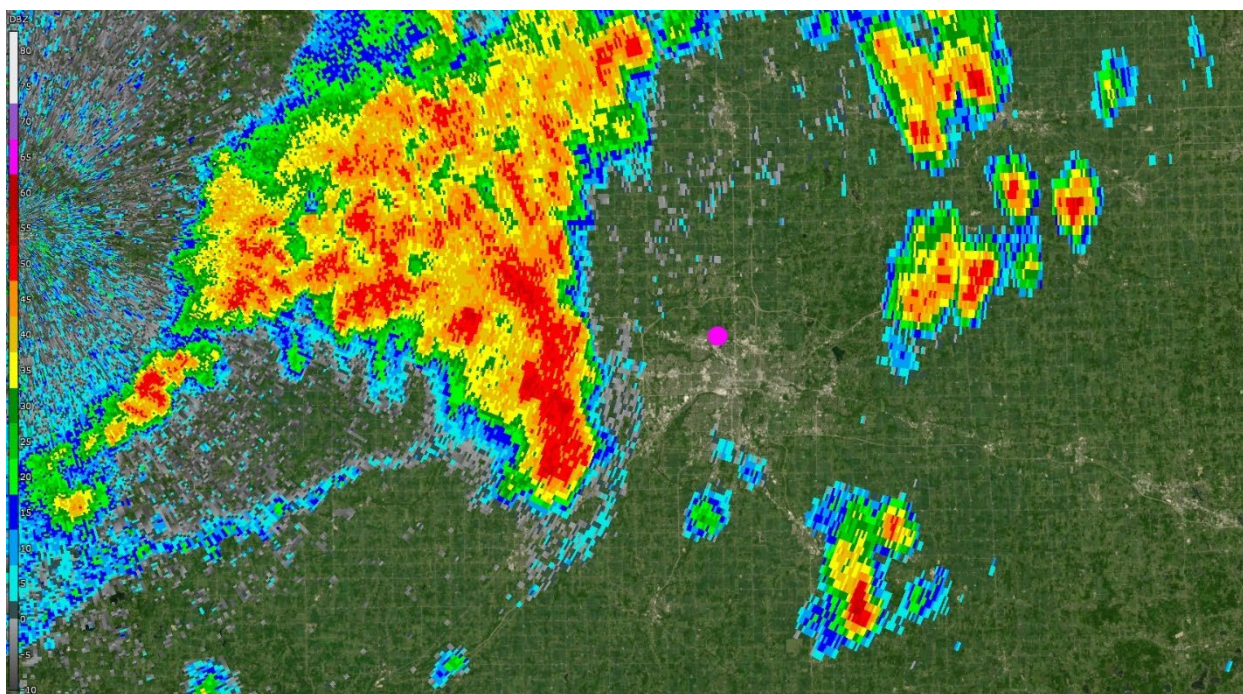


Figure 2 – KGRR $\approx 0.44^\circ$ Level-II base reflectivity product from a sweep initiated at 1847 EDT. Accident location marked by the purple/pink circle.

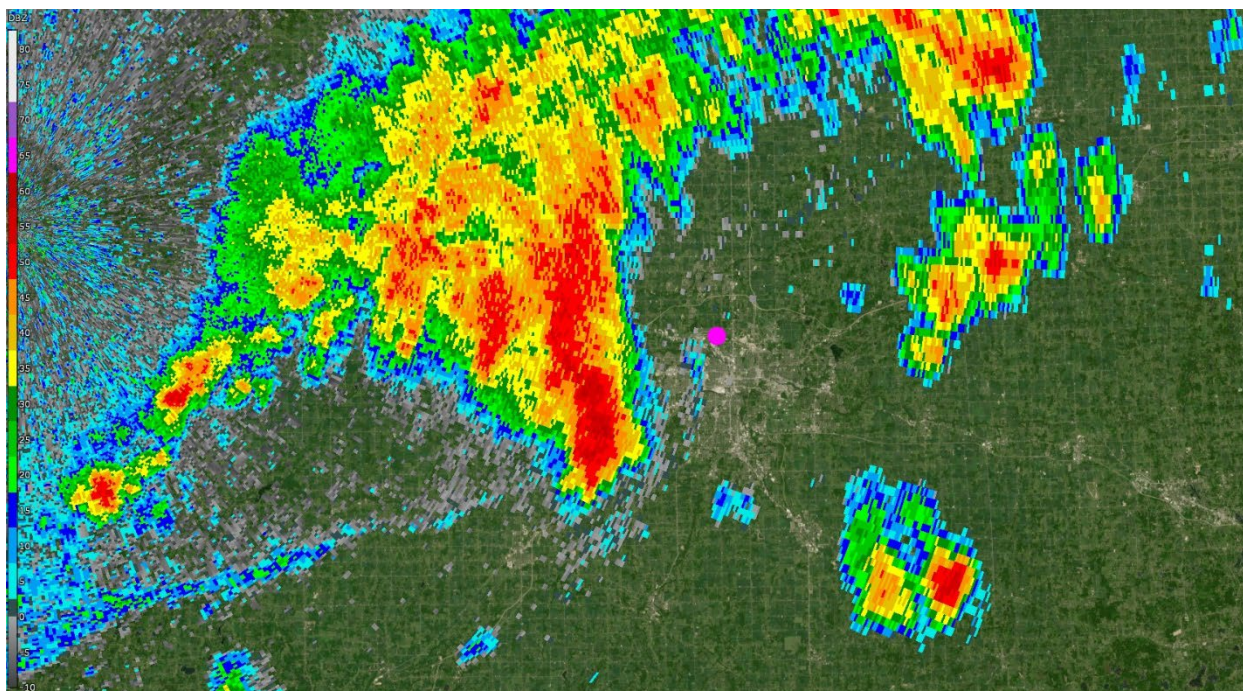


Figure 3 – KGRR $\approx 0.44^\circ$ Level-II base reflectivity product from a sweep initiated at 1856 EDT. Accident location marked by the purple/pink circle.

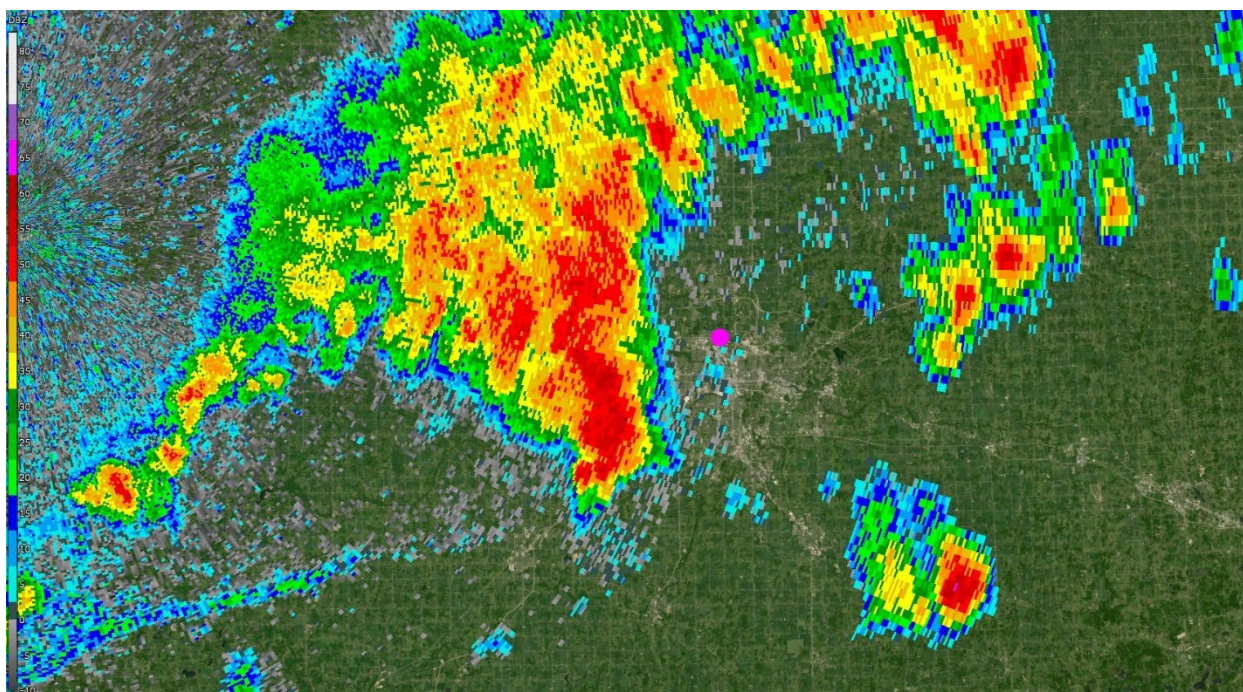


Figure 4 – KGRR $\approx 0.44^\circ$ Level-II base reflectivity product from a sweep initiated at 1858 EDT. Accident location marked by the purple/pink circle.

3.0 HRRR Model Sounding

A High-Resolution Rapid Refresh (HRRR) model¹² sounding (figure 5) for the accident site at 1900 EDT using an elevation of 836 feet was retrieved from the National Oceanic and Atmospheric Administration's Air Resources Laboratory. The wind from near the surface to 5,000 feet was generally from the southwest at magnitudes between 10-17 knots. Analysis by the RAOB program did not identify any clouds or significant turbulence below 30,000 feet. Light low-level wind shear was identified at about 900 feet. The most-unstable Convective Available Potential Energy (CAPE)¹³ parameter was 2,754 Joules/kilogram (from 984 hPa), which according to RAOB was a "strong" value. The Lifting Condensation Level¹⁴ (LCL) was calculated to be 4,664 feet and the Level of Free Convection¹⁵ (LFC) was calculated to be 5,431 feet. Maximum vertical velocity (MVV) for this atmosphere was calculated as 74 meters/second (about 14,600 feet per minute).¹⁶ Downdraft CAPE (DCAPE; 6 kilometers agl)¹⁷ was measured at 1,481 Joules/kilogram, which according to RAOB would be a "strong" value. The freezing level was at about 15,500 feet.

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 Convective Available Potential Energy - A measure of the amount of energy available for convection. CAPE is directly related to the maximum potential vertical speed within an updraft; thus, higher values indicate greater potential for severe weather.

¹⁴ Lifting Condensation Level - The level at which a parcel of moist air lifted dry-adiabatically would become saturated.

¹⁵ Level of Free Convection - The level at which a parcel of air lifted dry-adiabatically until saturated and saturation-adiabatically thereafter would first become warmer than its surroundings in a conditionally unstable atmosphere. On a thermodynamic diagram the level of free convection is given by the point of intersection of the process curve, representing the process followed by the ascending parcel, and the sounding curve, representing the lapse rate of temperature in the environment.

¹⁶ MVV is not usually considered a realistic estimate for maximum vertical velocity in a storm. Anecdotes suggest considering a value of MVV/2; however it is not well understood when or where such a half-value should be applied.

¹⁷ The DCAPE can be used to estimate the potential strength of rain-cooled downdrafts within thunderstorm convection, and is similar to CAPE. Larger DCAPE values are associated with stronger downdrafts.

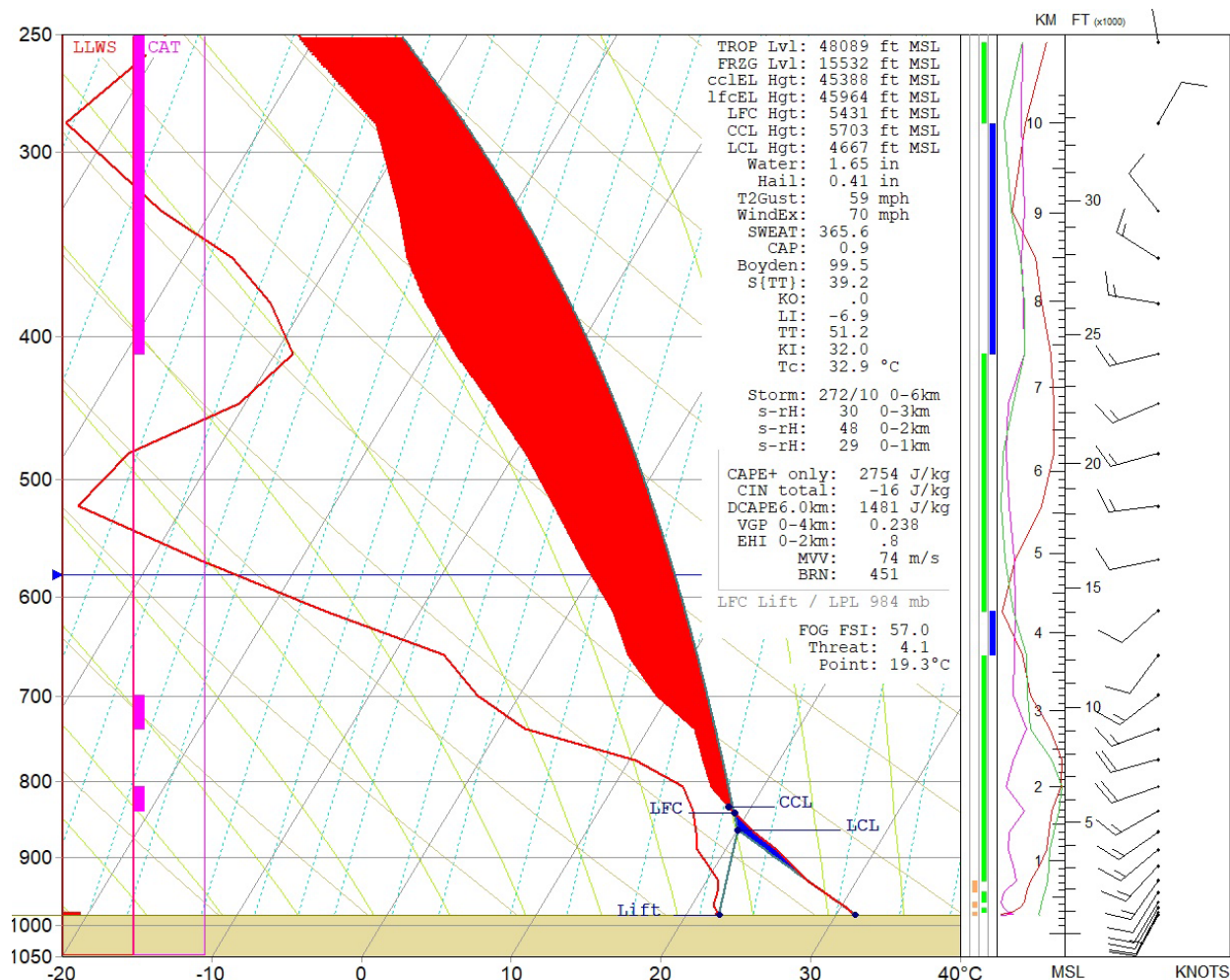


Figure 5 – HRRR model sounding data in SkewT/LogP format for 1900 EDT at the accident site, surface to 250 hPa).

4.0 Satellite Imagery

Geostationary Operational Environmental Satellite (GOES)-16 visible (0.64 μ m) and infrared (10.3 μ m) data were obtained from an archive at the Space Science Engineering Center at the University of Wisconsin-Madison. Images from 1856 EDT are presented in figures 6 and 7. Minimum infrared cloud-top temperatures to the west of the accident site were -65°C.

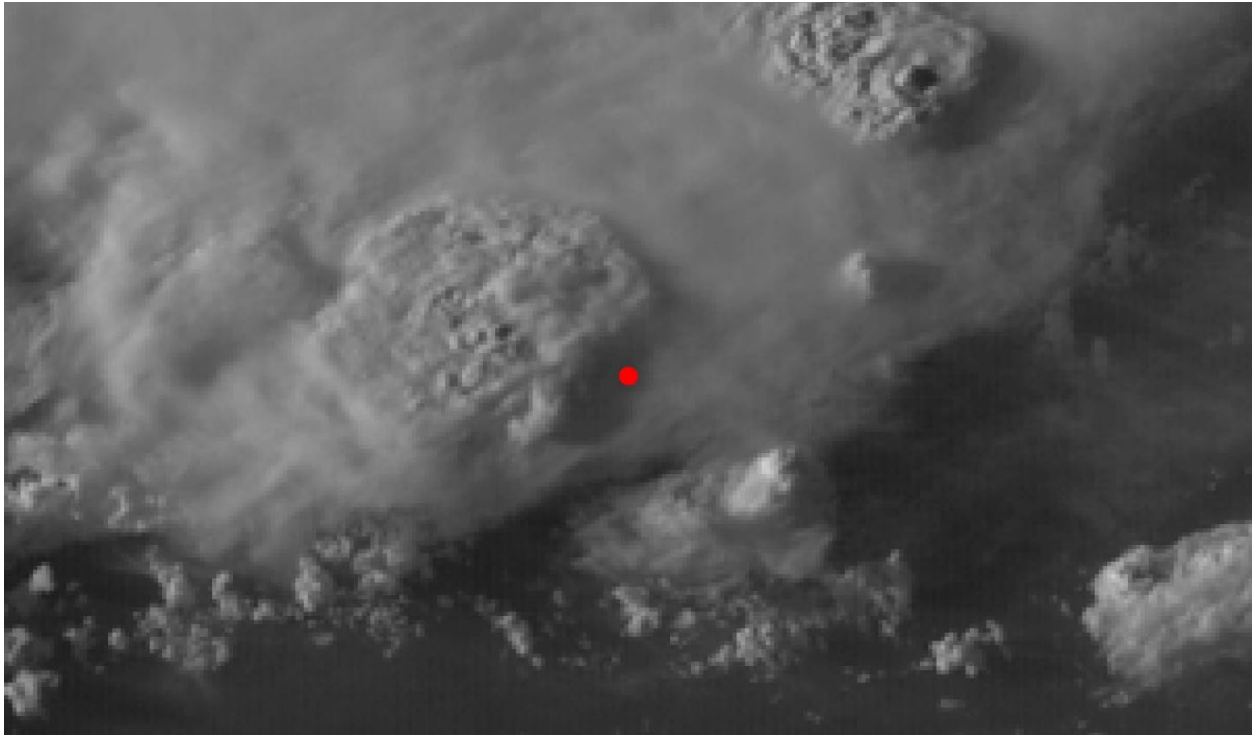


Figure 6 – GOES-16 visible imagery from 1856 EDT. Accident location denoted by red dot. Image is not corrected for parallax error.

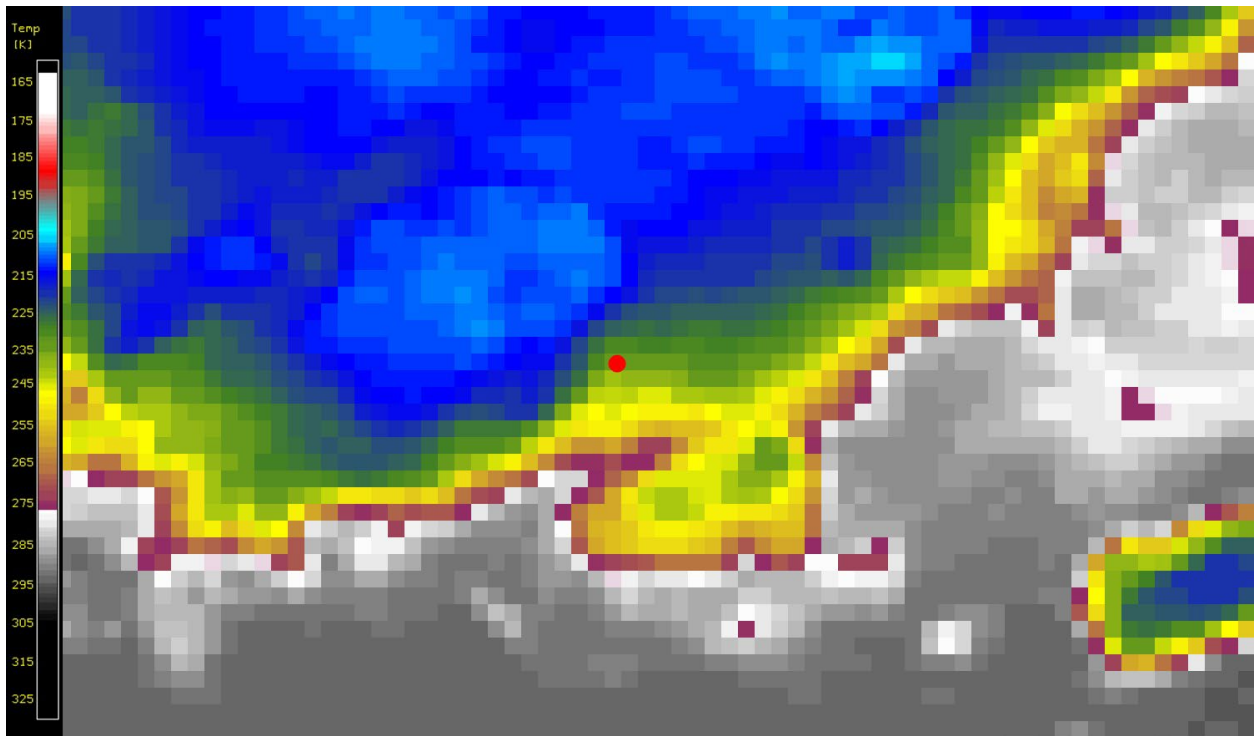


Figure 7 – GOES-16 infrared imagery from 1856 EDT. Accident location denoted by red dot. Image is not corrected for parallax error.

5.0 Pilot Reports

There were no publicly longline-disseminated pilot reports¹⁸ (PIREPs) within 25 miles of the accident location for altitudes below 8,000 feet between 1700 and 2100 EDT.

6.0 Terminal Aerodrome Forecasts

The NWS produced Terminal Aerodrome Forecasts (TAF) for LAN. According to NWS Instruction 10-813: “A 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.”¹⁹

At 1813 EDT a TAF was issued by the NWS for LAN that forecasted for the accident time: a wind from 200° at 9 knots, visibility greater than 6 statute miles, thunderstorms in the vicinity²⁰, ceiling broken at 5,000 feet agl with clouds of cumulonimbus type.

KLAN 242213Z 2422/2518 **20009KT** P6SM BKN035
FM242240 22011KT **P6SM VCTS BKN050CB**
TEMPO 2423/2424 29020G30KT 3SM TSRA BR OVC025CB
FM250100 35010KT P6SM SCT100
FM251400 19009KT P6SM SCT050 BKN100=

At 1840 EDT a TAF was issued by the NWS for LAN that forecasted for a period beginning two minutes after the accident time (1900 EDT): wind from 220° at 11 knots, visibility greater than 6 statute miles, thunderstorms in the vicinity, ceiling broken at 5,000 feet agl with clouds of cumulonimbus type; temporary conditions²¹ of wind from 290° at 28 knots with gusts to 38 knots, visibility of 2 statute miles, thunderstorms with moderate rain, mist, ceiling broken at 2,500 feet agl with clouds of cumulonimbus type

KLAN 242240Z 2423/2518 **22011KT P6SM VCTS BKN050CB**
TEMPO 2423/2424 29028G38KT 2SM TSRA BR OVC025CB
FM250100 35010KT P6SM VCSH OVC070
FM251400 19009KT P6SM SCT050 BKN100=

¹⁸ These do not include pilot reports only broadcast via radio.

¹⁹ www.nws.noaa.gov/directives/sym/pd01008013curr.pdf

²⁰ “Vicinity” indicates between 5 and 10 miles away from the airport.

²¹ Temporary conditions - fluctuations to forecast conditions which are expected to last less than one hour in each instance and, in the aggregate, to cover less than half of the indicated period.

7.0 Severe Thunderstorm Warning

At 1848 EDT the NWS issued the following Severe Thunderstorm Warning that advised of wind gusts up to 60 miles-per-hour (mph) for an area that including the accident site. The warning identified a severe thunderstorm located near Grand Ledge, or 9 miles north of Charlotte, moving east at 25 mph.

WUUS53 KGRR 242248

SVRGRR

MIC015-037-045-065-067-242330-

/O.NEW.KGRR.SV.W.0063.210824T2248Z-210824T2330Z/

BULLETIN - IMMEDIATE BROADCAST REQUESTED

Severe Thunderstorm Warning

National Weather Service Grand Rapids MI

648 PM EDT Tue Aug 24 2021

The National Weather Service in Grand Rapids has issued a

** Severe Thunderstorm Warning for...*

Ingham County in south central Michigan...

Southern Ionia County in south central Michigan...

Eastern Barry County in southwestern Michigan...

Southern Clinton County in south central Michigan...

Eaton County in south central Michigan...

** Until 730 PM EDT.*

** At 648 PM EDT, a severe thunderstorm was located near Grand Ledge, or 9 miles north of Charlotte, moving east at 25 mph.*

HAZARD...60 mph wind gusts.

SOURCE...Radar indicated.

IMPACT...Expect damage to roofs, siding, and trees.

** Locations impacted include...*

Lansing... Charlotte... Mason...

Hastings... Eaton Rapids... Portland...

East Lansing... Grand Ledge... Williamston...

Pottersville... Lake Odessa... Leslie...

Nashville... Bellevue... Stockbridge...

Edgemont Park... DeWitt... Aurelius...

Onondaga... Bunker Hill...

PRECAUTIONARY/PREPAREDNESS ACTIONS...

For your protection move to an interior room on the lowest floor of a building.

&&

LAT...LON 4243 8414 4242 8530 4290 8530 4290 8437 4278 8436 4278 8416

TIME...MOT...LOC 2248Z 273DEG 22KT 4269 8477

*HAIL THREAT...RADAR INDICATED
MAX HAIL SIZE...<.75 IN
WIND THREAT...RADAR INDICATED
MAX WIND GUST...60 MPH*

\$\$

8.0 Area Forecast Discussion

The NWS produced the following “Aviation” section that was included in an Area Forecast Discussion that was issued at 1515 EDT (the Aviation section had originally been included in an AFD that been issued at 1353 EDT).

*FXUS63 KGRR 241915
AFDGRR
Area Forecast Discussion
National Weather Service Grand Rapids MI
315 PM EDT Tue Aug 24 2021*

*.AVIATION...(For the 18Z TAFS through 18Z Wednesday afternoon)
Issued at 153 PM EDT Tue Aug 24 2021*

Low confidence in tstm potential and timing over the next 24 hours. The storms currently moving east from WI, or new storms triggered from their outflow, may impact the TAF sites later this afternoon and evening so have include a 4 hr period of VCTS for this potential. If storms do end up impacting the terminals, brief IFR or low vsbys in heavy rain may occur along with a wind gust in excess of 30 kts.

Beyond 06Z tonight into Wednesday, tstm potential will still exist. However given the low confidence will not include thunder in later periods until a risk is more apparent.

There are a few MVFR cigs around early this afternoon but those should lift into VFR category in the next couple hours.

9.0 AIRMETs

There were no Airmen’s Meteorological Information (AIRMET) advisories active for the accident location at the accident time.

10.0 SIGMETs

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

At 1755 EDT, a convective SIGMET was issued for an area that included the accident location that advised of an area of severe thunderstorms with tops above FL450²² with hail to 1 inch and wind gusts to 60 knots possible. The convective SIGMET polygon was moving from 250° at 25 knots.

WSUS32 KPCI 242155

SIGC

-MKCC WST 242155

CONVECTIVE SIGMET 08C

VALID UNTIL 2355Z

MI LM

FROM 60SE SAW-50SSW SSM-50W DXO-20W GRR-50E GRB-60SE SAW

AREA SEV TS MOV FROM 26025KT. TOPS ABV FL450.

HAIL TO 1 IN...WIND GUSTS TO 60KT POSS.

11.0 CWSU Products

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

E. LIST OF ATTACHMENTS

- Attachment 1 – Email correspondence with the National Weather Service. Capital Region International Airport ASOS data and logs from the National Weather Service's ASOS Monitoring Center
- Attachment 2 – Email correspondence with the Federal Aviation Administration; LAN ribbon display data; LAN LLWAS-RS wind data

Submitted by:

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Senior Meteorologist

²² Flight Level (FL) - a standard nominal altitude of an aircraft, in hundreds of feet. This altitude is calculated from the international standard pressure datum of 1013.25 hPa (29.92 inches of mercury), the average sea-level pressure, and therefore is not necessarily the same as the aircraft's true altitude either above msl or agl.