



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

November 18, 2020

Specialist's Report

METEOROLOGY

ERA21LA003

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A. ACCIDENT

Location: Corfu, New York
Date: October 2, 2020
Time: 1145 eastern daylight time (1545 UTC)¹
Aircraft: Type – Socata TBM700; Registration – N965DM

B. METEOROLOGIST

Mike Richards
Senior Meteorologist
Operational Factors Division (AS-30)
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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 October 2, 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: 42.971879° north latitude, 78.382376° west longitude, at an elevation of about 900 feet.

This report provides information on the weather conditions and information products applicable to the accident aircraft's position at it descended through FL190² (approximated by a ground position of 42.95356° north latitude and 78.34883° west longitude; about 2 miles southeast of the accident location).

D. WEATHER INFORMATION

1.0 Synoptic Conditions

A northeastern section of the National Weather Service (NWS) Surface Analysis Chart for 1100 EDT is presented in figure 1. The surface analysis chart identified a low-pressure center over eastern Lake Erie with a stationary front extending northeast from this low-pressure center along the New York/Canada border. A trough was depicted stretching from northeastern New York south into Pennsylvania. A 500 hectopascal³ (hPa) chart from the Storm Prediction Center (SPC) for 0800 EDT is presented in figure 2 and depicted a trough over western New York. The wind over Buffalo, New York, was from the west at 15 knots with an ambient temperature of -27° Celsius (C) and a dew point temperature of -22°C.

¹ UTC – abbreviation for Coordinated Universal Time

² Flight Level - a standard nominal altitude of an aircraft, in hundreds of feet. This altitude is calculated from the International standard pressure datum of 1013.25 hectopascals (29.92 in Hg), the average sea-level pressure, and therefore is not necessarily the same as the aircraft's true altitude either above msl or above ground level (agl).

³ 500 hPa is at about FL180.

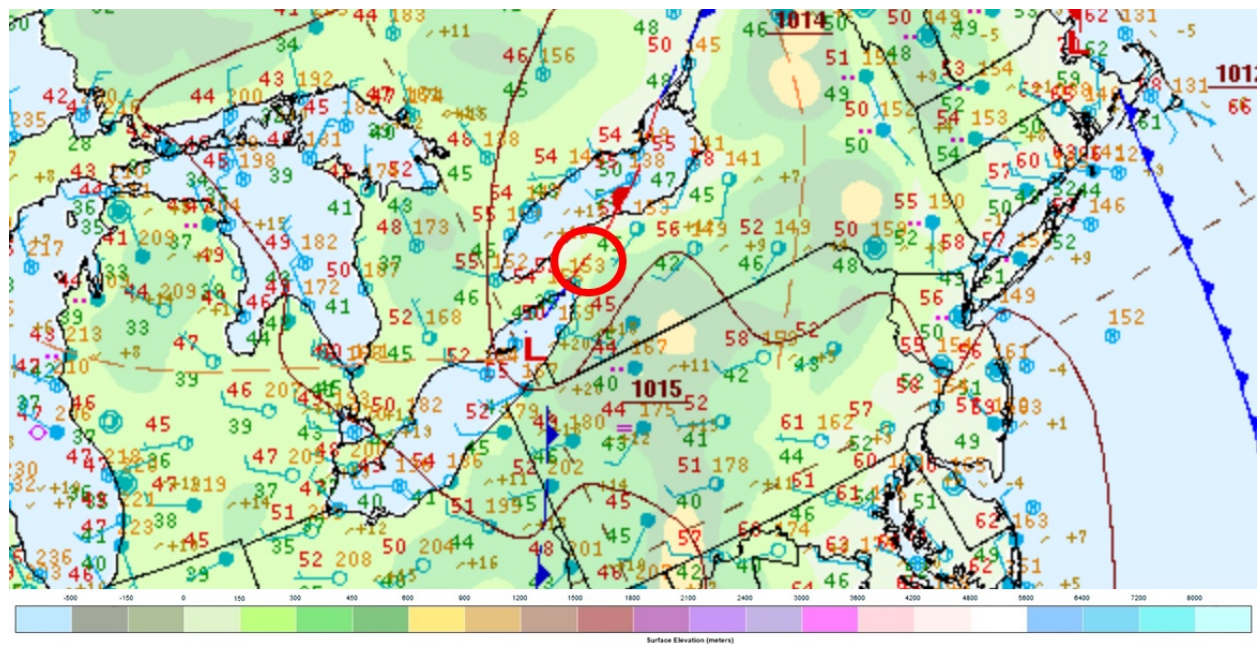


Figure 1 – Northeast section of the NWS Surface Analysis Chart for 1100 EDT. Accident aircraft's ground position at it descended through FL190 is located within the red circle.

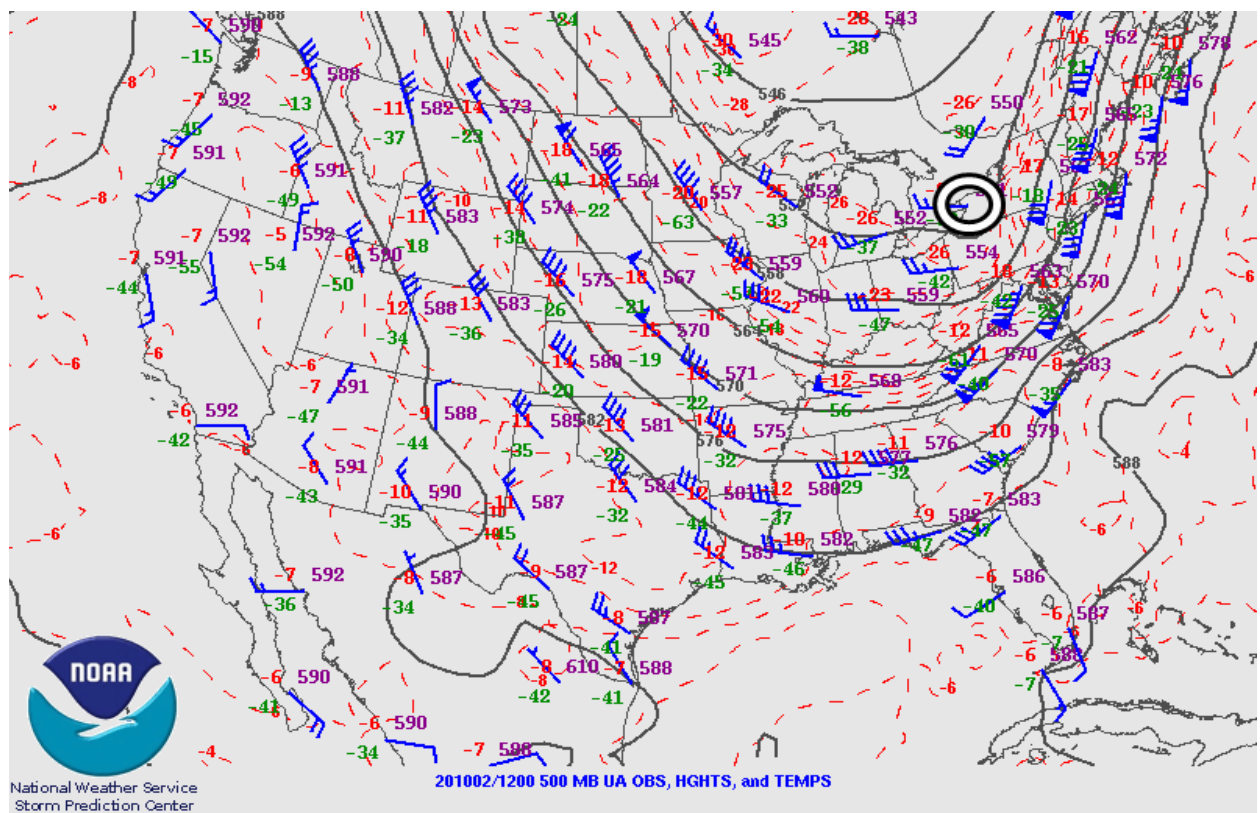


Figure 2 – SPC 500 hPa chart 0800 EDT. Accident aircraft's ground position at it descended through FL190 is inside the white/black circle.

2.0 Weather Radar

WSR-88D⁴ Level-II base reflectivity weather radar images from Buffalo (site KBUF) and Ft. Drum (site KTYX), New York, are presented in figures 3 and 4, respectively. KBUF was located approximately 17 miles west of the accident aircraft's ground position as it descended through FL190, and was at an elevation of about 790 feet. Assuming standard refraction and considering the 0.95° beam width⁵ for the WSR-88D radar beam, the KBUF 0.308 tilt would have "seen" altitudes above the accident aircraft's ground position as it descended through FL190 of between about 700 and 2,400 feet above msl. KTYX was located approximately 127 miles east-northeast of the accident aircraft's ground position as it descended through FL190, and was at an elevation of about 1,960 feet. Assuming standard refraction and considering the 0.95° beam width for the WSR-88D radar beam, the KTYX 0.485 tilt would have "seen" altitudes above the accident aircraft's ground position as it descended through FL190 of between about 12,400 and 25,200 feet above msl.

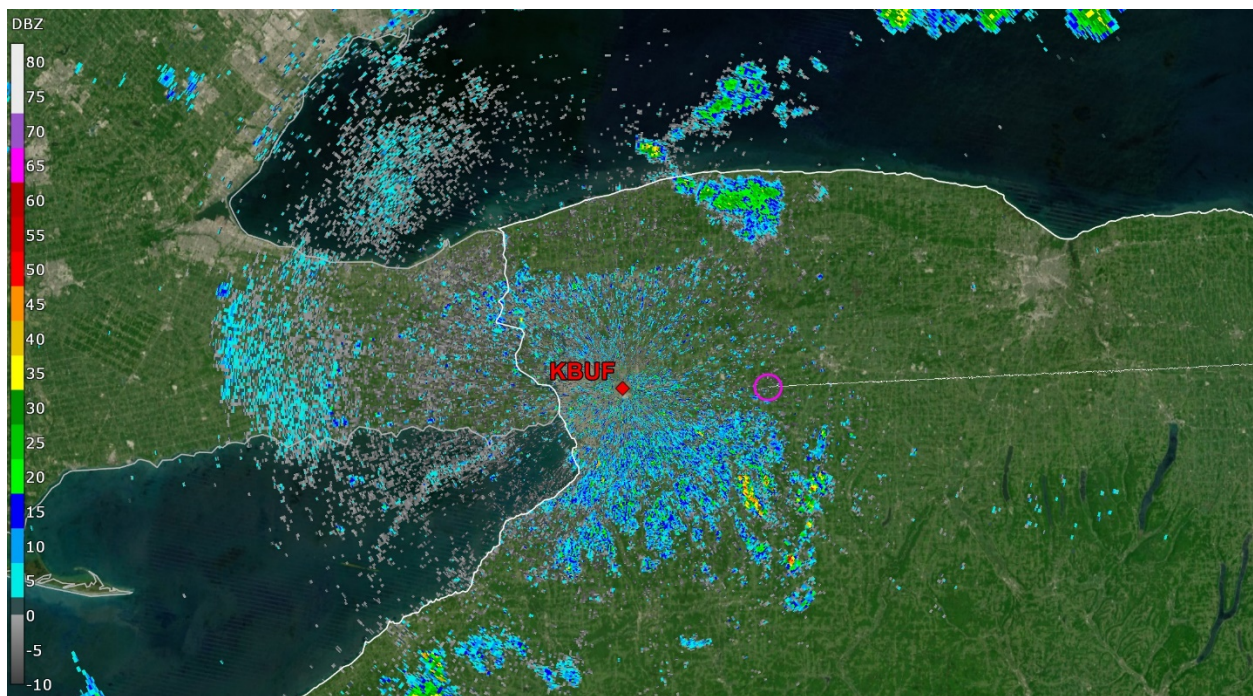


Figure 3 – KBUF 0.308° Level-II base reflectivity product from a sweep initiated at 1142:57 EDT. Accident aircraft's ground position as it descended through FL190 is denoted by the purple circle with the accident aircraft's ground track through that time displayed as a white line.

⁴ Weather Surveillance Radar 88 Doppler (WSR-88D)

⁵ 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.

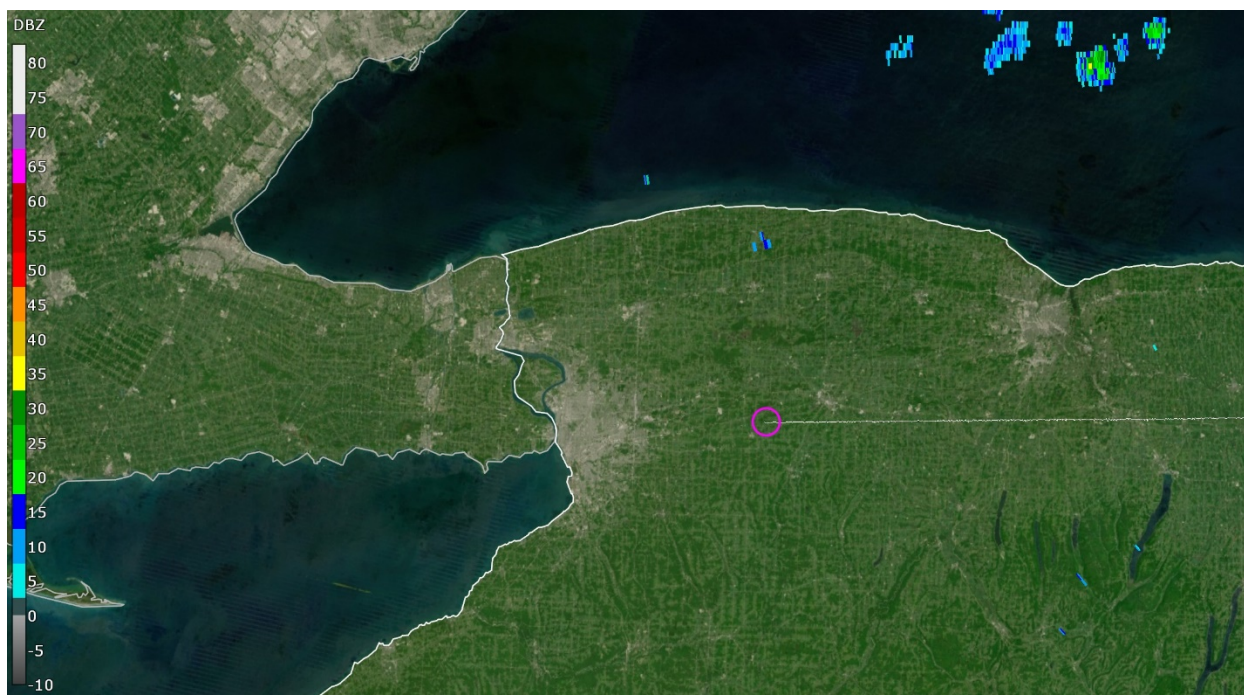


Figure 4 – KTYX 0.485° Level-II base reflectivity product from a sweep initiated at 1141:38 EDT. Accident aircraft's ground position as it descended through FL190 is denoted by the purple circle with the accident aircraft's ground track through that time displayed as a white line.

3.0 Lightning

Total lightning flash data retrieved from the Earth Networks Total Lightning Network for the period 1130-1200 EDT revealed there were no lightning flashes within a box bounded by latitudes 43.2532 and 42.5854 and longitudes -78.9368 and -77.8052.

4.0 HRRR Model Sounding

A High-Resolution Rapid Refresh (HRRR) model⁶ sounding (figure 5) for the accident site at 1200 EDT was retrieved from the National Oceanic and Atmospheric Administration's Air Resources Laboratory. At FL190 the wind was from the west at about 25 knots. Relative humidity at about FL190 was 33 percent and the relative humidity was above 90 percent for the entire atmosphere above about 9,000 feet. The freezing level was identified as about 5,200 feet. Calculations made by the Rawinsonde OBservation Program (RAOB) did not identify any potential for icing, clouds or significant turbulence between about 9,000 and 27,000 feet.

⁶ 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.

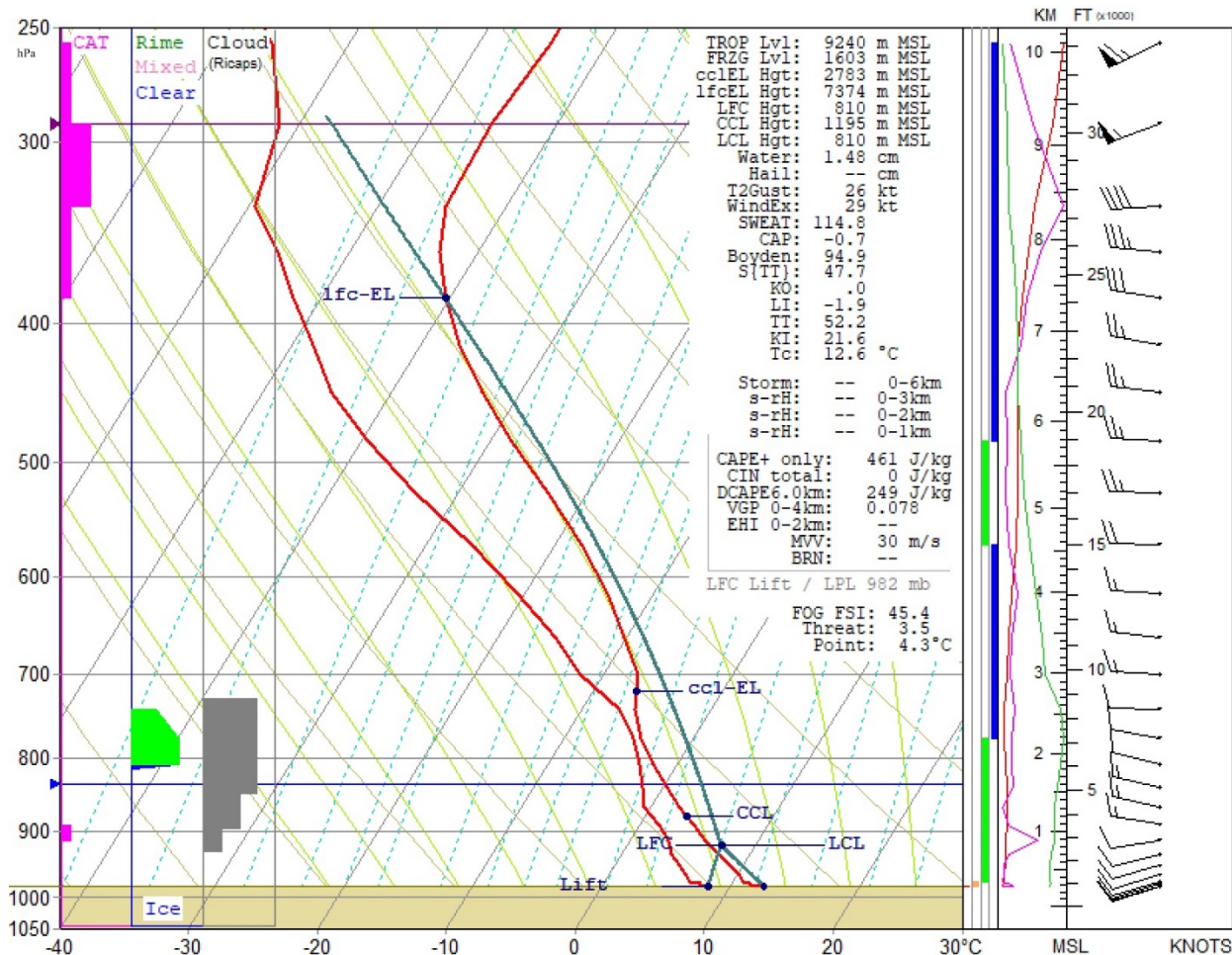


Figure 5 – HRRR model sounding data in SkewT/LogP format for 1200 EDT at the accident site, surface to 250 hPa.

5.0 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 1141 EDT are presented in figures 6 and 7. The GOES-16 visible imagery depicted partly cloudy conditions over the accident region. Infrared brightness temperatures over the location where the accident aircraft descended through about FL190 were about 9°C.

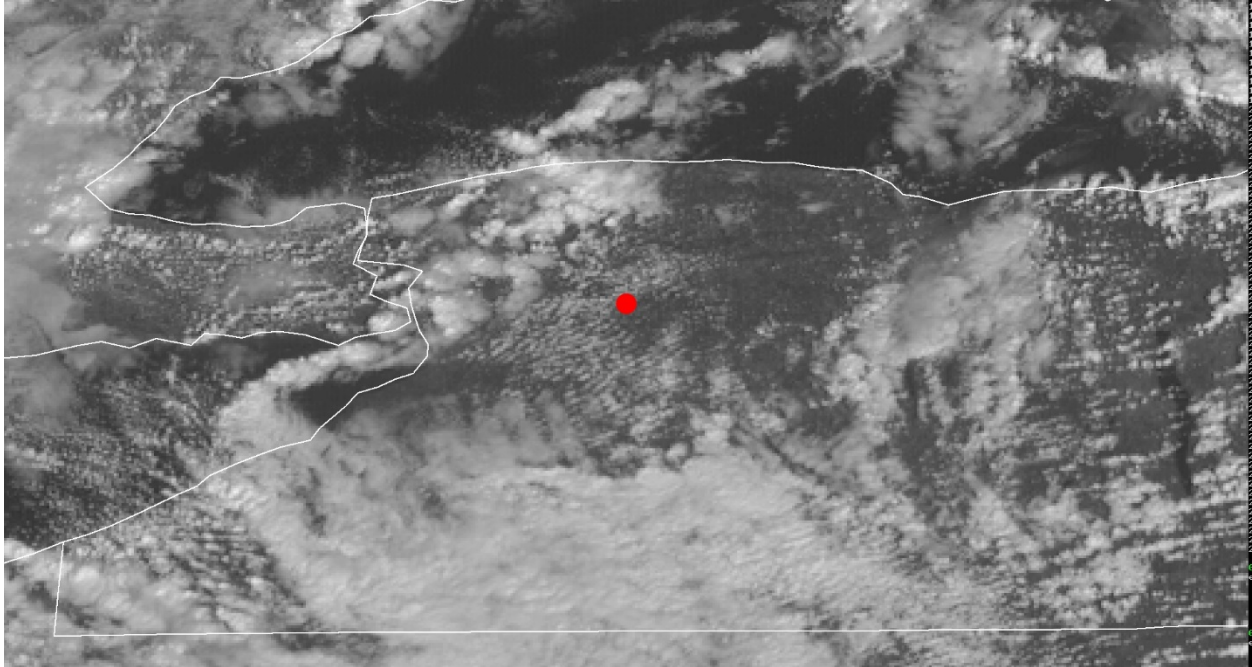


Figure 6 – GOES-16 visible imagery from 1141 EDT. Accident aircraft's ground position as it descended through FL190 is denoted by the red dot. This image has not been corrected for any parallax error.

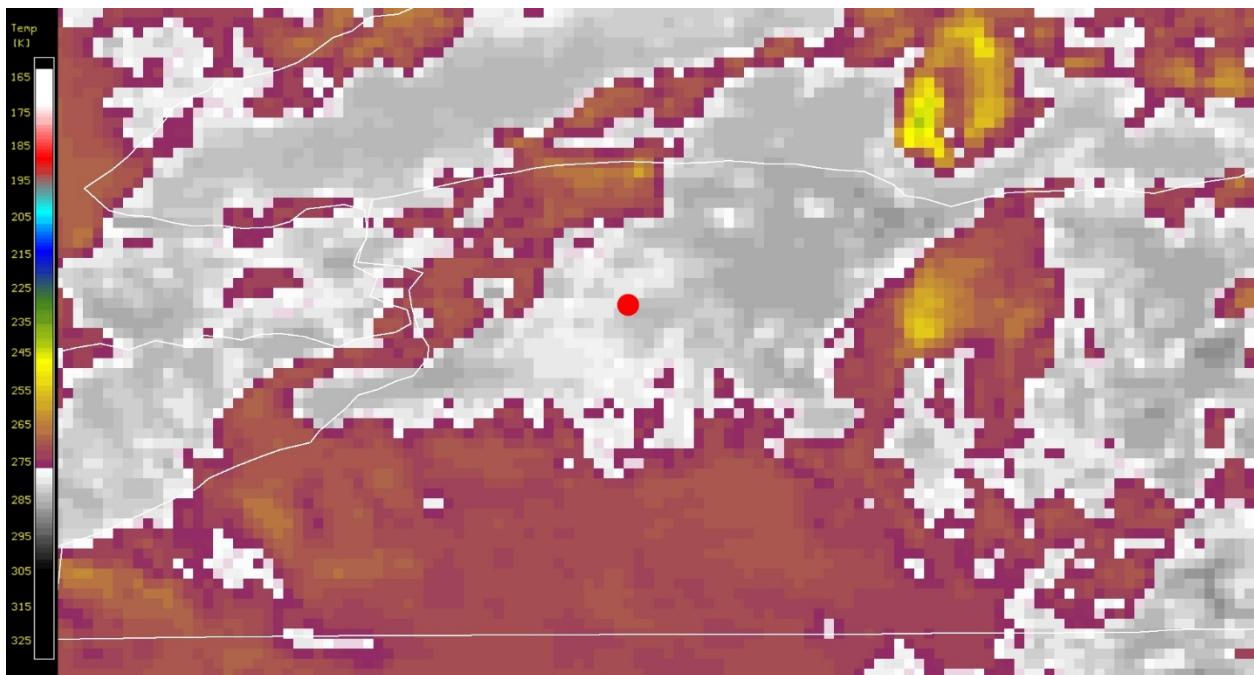


Figure 7 – GOES-16 infrared imagery from 1141 EDT. Accident aircraft's ground position as it descended through FL190 is denoted by the red dot. This image has not been corrected for any parallax error.

6.0 Pilot Reports

There were no publicly longline-disseminated pilot reports⁷ (PIREPs) made within two hours of the accident time within 75 miles of the accident aircraft's position as it descended through FL190.

7.0 Area Forecast Discussion

Presented here is the "Aviation" section of the Area Forecast Discussion issued by the NWS Weather Forecast Office in Buffalo, New York, at 1012 EDT.

*FXUS61 KBUF 021412
AFDBUF*

*Area Forecast Discussion
National Weather Service Buffalo NY
1012 AM EDT Fri Oct 2 2020*

.AVIATION /14Z FRIDAY THROUGH TUESDAY/...

Lake effect rain showers and storms will continue to move onshore this morning and persist east-northeast of the Lakes. The best chance of thunder will be confined to near KART through early afternoon. Northwest flow will move into the region behind a departing low and cigs will fall to MVFR by this evening. There will be brief periods of MVFR conditions in lake bands/showers today and tonight.

8.0 AIRMETs

The NWS Aviation Weather Center (AWC) issued two Airmen's Meteorological Information (AIRMET) advisories applicable to the time and location of the accident aircraft's ground position as it descended through FL190.

At 1133 EDT, the AWC issued an AIRMET TANGO for moderate turbulence between FL180 and FL390.

*WAUS41 KKCI 021533 AAA
WA1T
-BOST WA 021533 AMD
AIRMET TANGO UPDT 3 FOR TURB VALID UNTIL 022100

AIRMET TURB...ME NH VT MA RI CT NY LO NJ PA OH LE WV MD DC DE VA
AND CSTL WTRS
FROM 70NW PQI TO 60NE PQI TO 50SE HUL TO 30SSW SIE TO 50SSE LYH
TO HNV TO HNN TO CVG TO FWA TO DXO TO 30NW CLE TO 30SW BUF TO
30ESE YYZ TO 40NW SYR TO 30ESE YOW TO 20SW YSC TO 70NW PQI
MOD TURB BTN FL180 AND FL390. CONDS CONTG BYD 21Z THRU 03Z.*

⁷ These do not include pilot reports only broadcast via radio.

At 1045 EDT, the AWC issued an AIRMET ZULU for moderate icing between the freezing level and 16,000 feet. This AIRMET was not active for FL190.

WAUS41 KKCI 021445

WA1Z

-BOSZ WA 021445

AIRMET ZULU UPDT 3 FOR ICE AND FRZLVL VALID UNTIL 022100

AIRMET ICE...VT NY LO PA LE

*FROM 60WSW YSC TO 30NW ALB TO 20NW SAX TO 30SE SYR TO 20SW BUF TO
20ESE YYZ TO 50NNW SYR TO 20S YOW TO 60WSW YSC*

MOD ICE BTN FRZLVL AND 160. FRZLVL 050-070. CONDS ENDG 18-21Z.

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 0627 EDT a Meteorological Impact Statement was issued by the Cleveland Air Route Traffic Control Center (ZOB), which was valid until 1400 EDT, that identified patchy moderate turbulence between FL180 and FL410 over the eastern two-thirds of ZOB's airspace and patchy light icing between 4,000 and 13,000 feet over the northeastern quarter of ZOB's airspace. Isolated thunderstorms were also identified as possible over ZOB's airspace.

FAUS20 KZOB 021027

ZOB MIS 01 VALID 021027-021800

...FOR ATC PLANNING PURPOSES ONLY...

***E 2/3 ZOB.. PTCHY MOD TURB FL180-410.. DCRG. NE 1/4 ZOB.. PTCHY LGT
ICE 040-130. ISOL TS POSS.. MOV FROM W 15-20KT.. TOP TO FL250. N
OH/NW PA/W NY.. ISOL IFR ENDG BY 14Z.***

11.0 Surface Observations

An Automated Weather Observing System (AWOS) was located at Genesee County Airport (GVQ⁸) in Batavia, New York, which was located about nine miles northeast of the accident aircraft's ground position as it descended through FL190. GVQ was at an elevation of 913 feet and

⁸ The National Weather Service uses the 4-digit International Civil Aviation Organization (ICAO) format for station identifiers (as seen in the body of some formatted weather observations). This report uses the 3-digit International Air Transport Association format for station identification, which does not use the geographic designating digit ("K" for stations in the continental U.S. and "P" for U.S. stations in Alaska and the Pacific region) as found in the ICAO format.

had a magnetic variation of about 11° west. Automated longline⁹ reports from the GVV AWOS during the times surrounding the accident time are presented here.

[0956 EDT] METAR KGVQ 021356Z AUTO 25008KT 10SM SCT065 10/07 A2996
RMK AO2 SLP148 P0001 T01000067=

[1056 EDT] METAR KGVQ 021456Z AUTO 25009KT 10SM FEW035 11/07 A2997
RMK AO2 SLP149 60001 T01110067 53011=

**[1156 EDT] METAR KGVQ 021556Z AUTO 26009KT 10SM BKN025 12/07 A2997
RMK AO2 SLP151 P0001 T01220067=**

[1248 EDT] SPECI KGVQ 021648Z AUTO 29008KT 10SM FEW025 SCT035 BKN042
13/07 A2998 RMK AO2=

At 1156 EDT, the GVV AWOS reported a wind from 260° at 9 knots, visibility greater than 10 statute miles, ceiling broken at 2,500 feet above ground level, temperature of 12°C and a dew point temperature of 7°C, altimeter setting of 29.97 inches of mercury; remarks: automated station with a precipitation discriminator, sea level pressure of 1015.1 hPa, 0.01 inches of liquid-equivalent precipitation since 1056 EDT, temperature of 12.2°C and a dew point temperature of 6.7°C.

Submitted by:

Mike Richards
Senior Meteorologist

⁹ “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.