

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA24FA283

METEOROLOGY

Specialist's Factual Report

June 18, 2024

TABLE OF CONTENTS

A. ACCIDENT.....	3
B. METEOROLOGY INVESTIGATOR	3
C. DETAILS OF THE INVESTIGATION	3
D. WEATHER INFORMATION.....	4
1.0 WEATHER RADAR.....	4
2.0 CIWS.....	5
3.0 LIGHTNING.....	6
4.0 HRRR MODEL SOUNDING.....	6
5.0 SATELLITE IMAGERY	7
6.0 PILOT REPORTS	9
7.0 SURFACE OBSERVATIONS	9
8.0 AREA FORECAST DISCUSSION.....	10
9.0 SIGMETs.....	12
10.0 CWSU PRODUCTS.....	12
11.0 G-AIRMETs.....	13

A. ACCIDENT

Location: Trout Creek, New York

Date: 30 June 2024

Time: 1355 eastern daylight time (1755 UTC¹)

Aircraft: Type - Piper PA46; Registration - N85PG

B. METEOROLOGY INVESTIGATOR

Mike Richards

Senior Meteorologist

Office of Aviation Safety

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 for 30 June 2024 (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: 42.238795° north latitude; 75.264537° west longitude; at an elevation of about 1,965 feet.

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

¹ UTC - abbreviation for Coordinated Universal Time

D. WEATHER INFORMATION

1.0 Weather Radar

WSR-88D² Level-II base reflectivity weather radar imagery from the Binghamton, New York, (site KBGM) is presented in Figures 1 and 2. KBGM was located approximately 32 miles west of the accident location with an antenna elevation of about 1,700 feet. Assuming standard refraction and considering the 0.95° beam width³ for the WSR-88D radar beam, the KBGM 2.415° and 0.483° tilts would have “seen” altitudes above the accident location of between about 9,000 and 12,200 feet, and between about 2,400 and 5,600 feet, respectively. Figures 1 and 2 indicate that the accident occurred in a region characterized by light to heavy or extreme values⁴ of reflectivity.

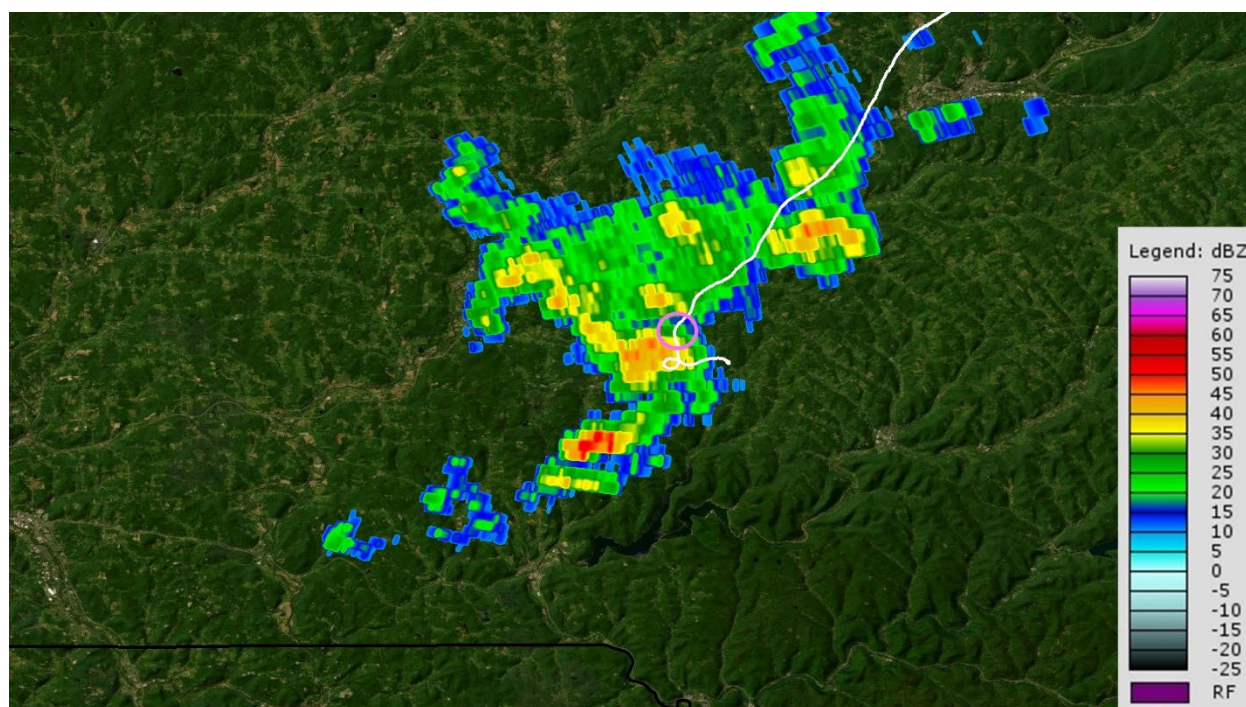


Figure 1 - “Smoothed” KBGM 2.415° Level-II base reflectivity product from a sweep initiated at 1352:32 with dBZ value less than 10 masked out. The accident aircraft’s flight track is marked by the white line and the accident aircraft’s approximate position at the applicable time for this radar image is identified by the thin purple circle.

² Weather Surveillance Radar 88 Doppler (WSR-88D)

³ 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.

⁴

https://www.faa.gov/sites/faa.gov/files/other_visit/aviation_industry/airline_operators/airline_safety/in_FO07008.pdf

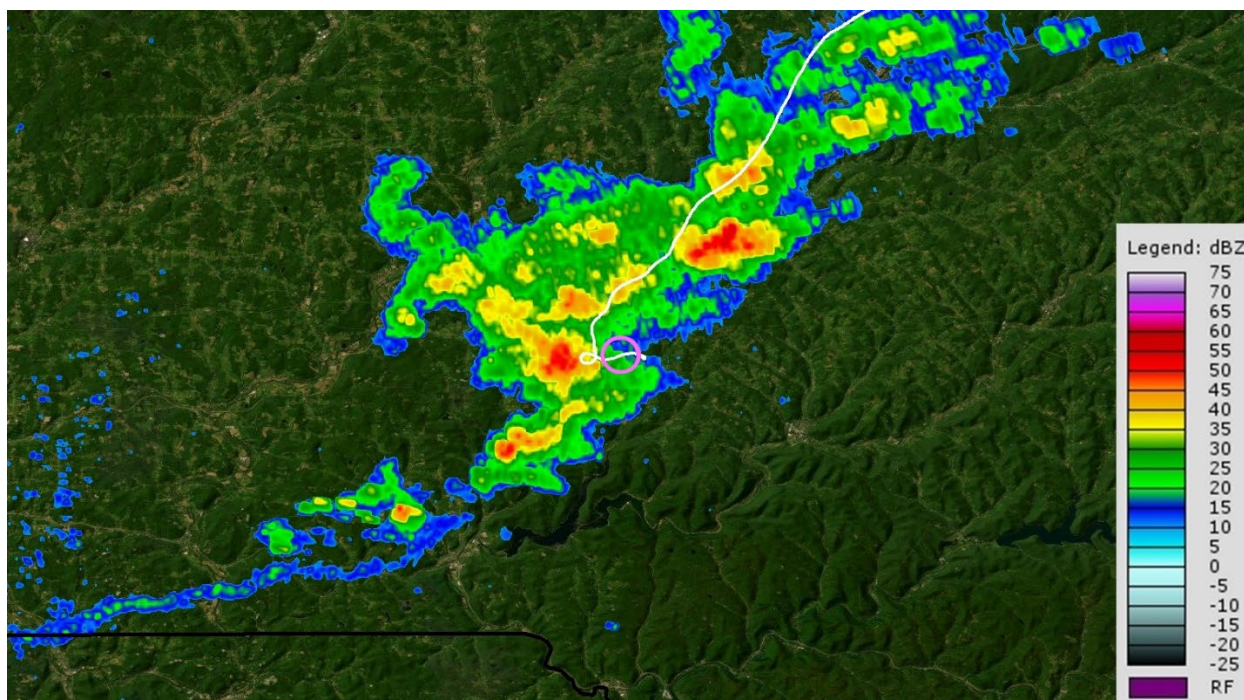


Figure 2 - "Smoothed" KBGM 0.483° Level-II base reflectivity product from a sweep initiated at 1354:03 with dBZ value less than 10 masked out. The accident aircraft's flight track is marked by the white line and the accident aircraft's approximate position at the applicable time for this radar image is identified by the thin purple circle.

2.0 CIWS

Archive data from the Federal Aviation Administration's Corridor Integrated Weather System (CIWS) for the accident region at 1355 are presented in Figure 3. This image presents echo tops with convective growth and decay (brown and blue hatched areas, respectively) overlaid. Figure 3 indicates that the area of reflectivity found in Figures 1 and 2 that was coincident with the accident location generally had echo tops around 15,000 feet, with maximum echo top values identified as 20,000 feet. There were no indications of convective growth or decay in this area.

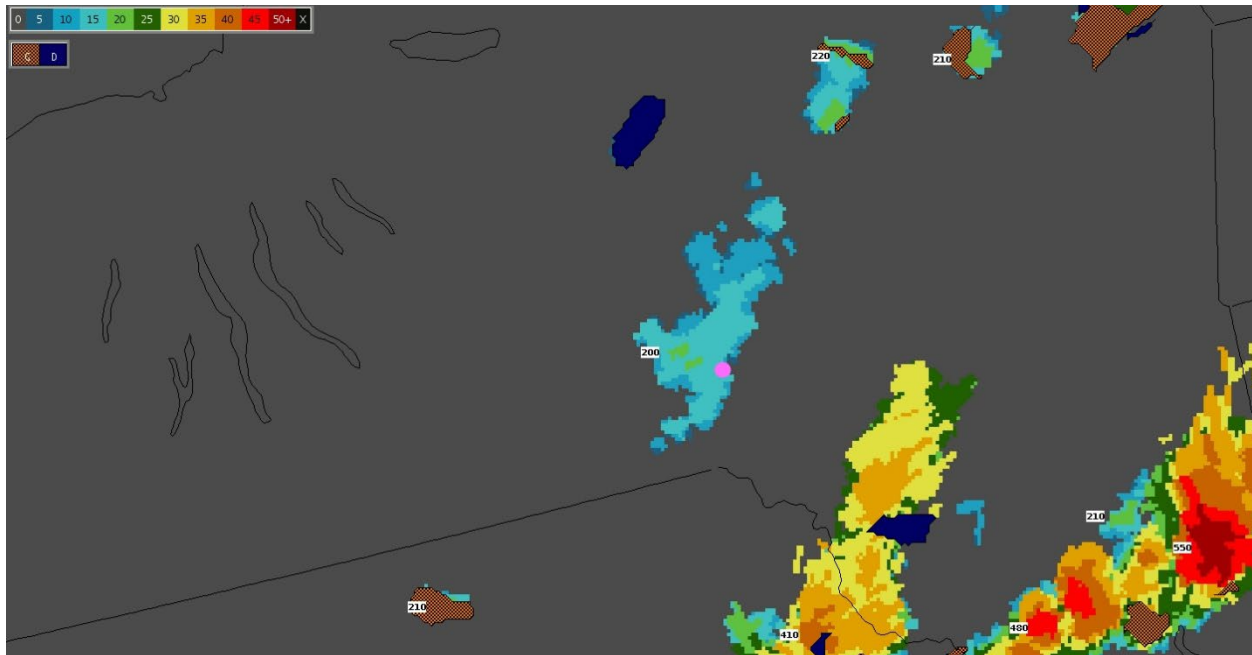


Figure 3 – Archive CIWS echo tops display from 1355. Areas of convective growth and decay are overlaid by brown and blue hatched areas, respectively. Accident location is denoted by the purple dot.

3.0 Lightning

A review of the Earth Networks Total Lightning Network (ENTLN) lightning database did not yield any flash total lightning activity near the accident location between 1340 and 1400.⁵

4.0 HRRR Model Sounding

A High-Resolution Rapid Refresh (HRRR) model⁶ sounding (Figure 4) for near the accident site⁷ at 1400 using an elevation of about 1,800 feet was retrieved from the National Oceanic and Atmospheric Administration's (NOAA) Air Resources Laboratory and analyzed by the RAwinsonde OBservation (RAOB) program. Broken or overcast clouds were identified by RAOB from about 4,400 through 8,900 feet with few clouds above that to roughly 12,500 feet. The freezing level was at about 14,700 feet.

⁵ The ENTLN was queried for a geographic area bounded by latitudes 42.5308°N and 41.9615°N, and longitudes 75.8331°W and 74.7537°W.

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.

⁷ Coordinates used for the model were latitude: 42.24; longitude: -75.26.

Moderate clear air turbulence was identified between about 6,200 and 8,400 feet. The wind profile below 15,000 feet presented a generally westerly wind at magnitudes of 5-10 knots nearest the surface and increasing in magnitude to about 50 knots near 15,000 feet.

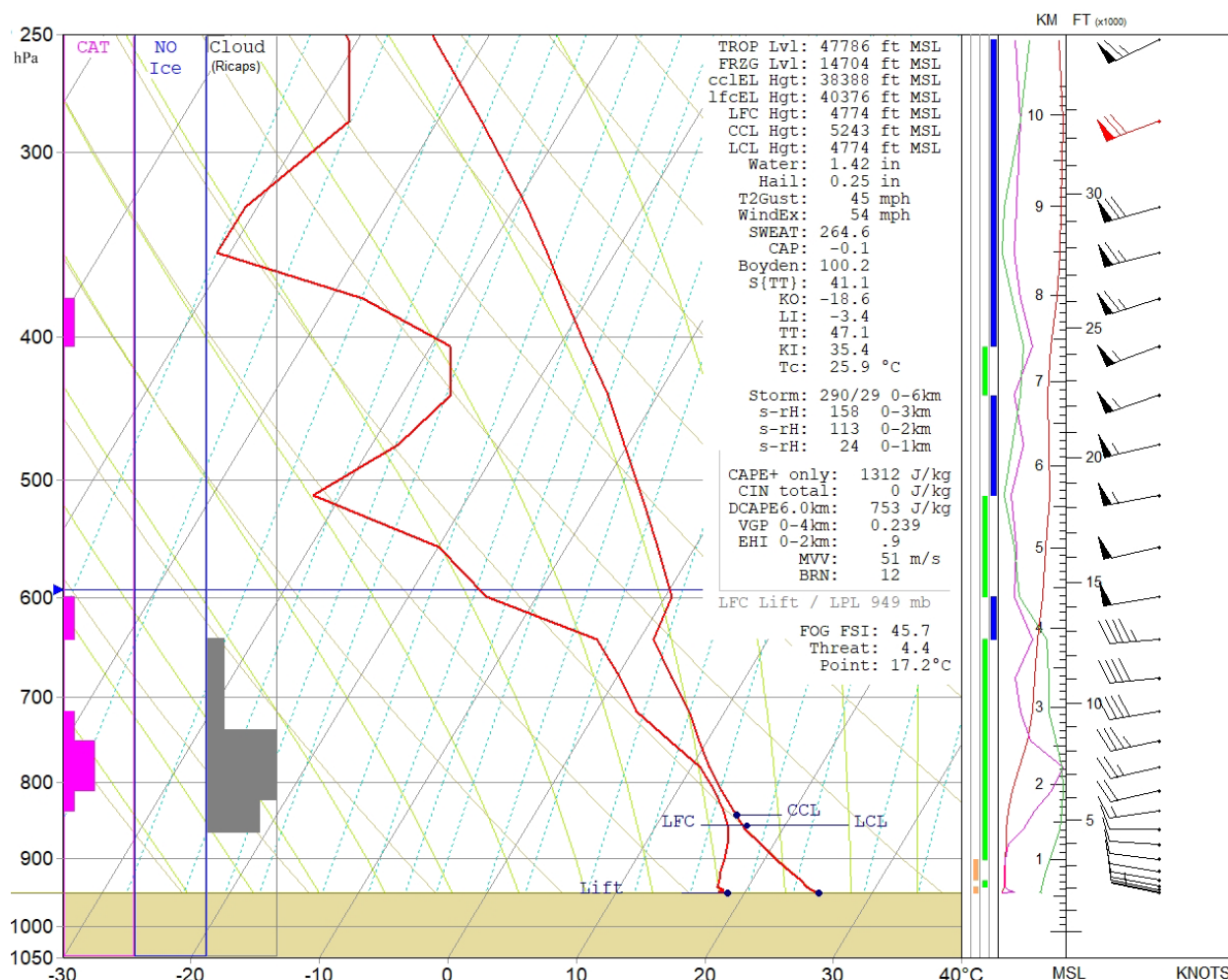


Figure 4 - HRRR model sounding data in SkewT/LogP format for 1400 near the accident site, surface to 250 hectopascals (hPa).

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. Imagery from these data is presented in Figures 5 and 6. The visible imagery depicted clouds over the accident region. The minimum brightness temperature over the final portion of the accident aircraft's flight path was 256 Kelvin (-17°C), which, when considering the 1400 HRRR

sounding, corresponded to cloud top heights of about 24,000 feet. However, thin high cloud looked to be present over the accident location in the visible imagery. This would contaminate the brightness temperature estimation of cloud top heights of the underlying opaque cloud. Brightness temperatures of the underlying opaque cloud close to the accident location not potentially contaminated by higher thin cloud was closer to 273 Kelvin (0°C), which, when considering the 1400 HRRR sounding, corresponded to cloud top heights between roughly 12,500 and 14,500 feet.

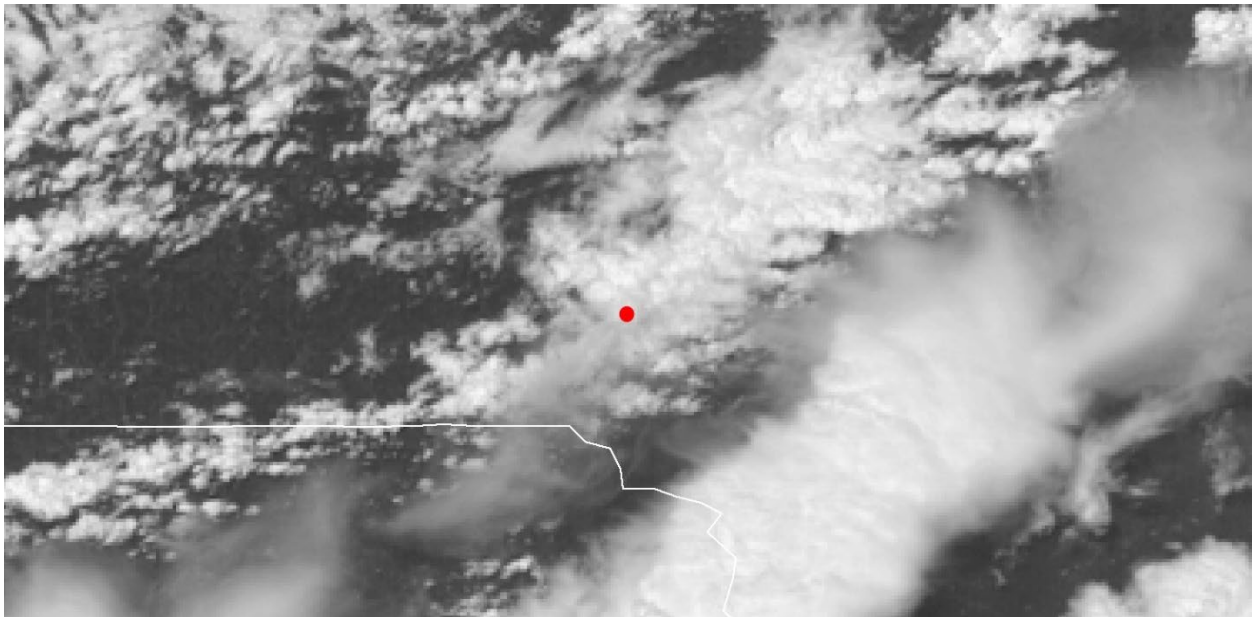


Figure 5 - GOES-16 visible imagery from 1356. Image is not corrected for parallax error. The accident location is denoted by the red dot.

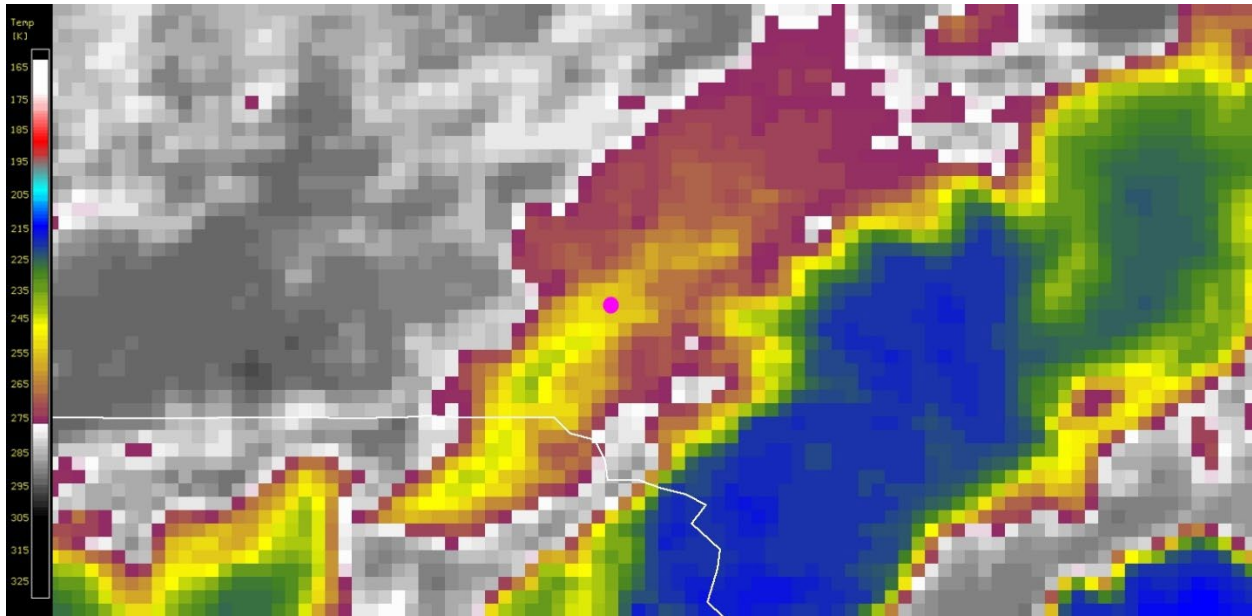


Figure 6 - GOES-16 infrared imagery from 1356. Image is not corrected for parallax error. The accident location is denoted by the purple dot.

6.0 Pilot Reports

The following longline-disseminated pilot reports⁸ (PIREPs) were reported within 25 miles of the accident location and within 30 minutes of the accident time.

*BGM UA /OV BGM130020/TM 1730/FL040/TP BL17/SK BKN040/TB MOD
CHOP*

BGM UA /OV HNK/TM 1805/FL090/TP FA7X/RM UPDRAFTS

7.0 Surface Observations

An Automated Surface Observing Station (ASOS) was located at Greater Binghamton Airport (BGM⁹) in Binghamton, New York, which was located about 32 miles west of the

⁸ These do not include pilot reports only broadcast via radio.

⁹ 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.

accident site at an elevation of 1,635 feet. Augmented longline¹⁰ reports from the BGM ASOS during the times surrounding the accident time are presented here.

[1153] KBGM 301553Z VRB05KT 10SM FEW034 27/18 A2993 RMK AO2 SLP122 T02720178

[1253] KBGM 301653Z 25010G17KT 10SM SCT042 SCT050 BKN065 27/18 A2991 RMK AO2 SLP115 T02670178

[1353] KBGM 301753Z 31011G15KT 10SM SCT045 BKN055 25/19 A2990 RMK AO2 PK WND 29026/1704 RAB07E16 SLP114 P0000 60000 T02500194 10278 20217 56012

[1453] KBGM 301853Z AUTO 29009G17KT 10SM CLR 27/18 A2989 RMK AO2 SLP110 T02720183

At 1353, BGM reported a wind from 310° at 11 knots with gusts to 15 knots, visibility of 10 statute miles or greater, scattered clouds at 4,500 feet above ground level (agl), ceiling broken at 5,500 feet agl, temperature of 25°C and dew point temperature of 19°C, altimeter setting of 29.90 inches of mercury; Remarks: automated station with a precipitation discriminator, peak wind from 290° at 26 knots at 1304, rain began at 1307 and ended at 1316, sea level pressure of 1011.4 hPa, trace amount of precipitation since 1253, trace amount of precipitation over previous 6 hours, temperature of 25.0°C and dew point temperature of 19.4°C, 6-hour maximum temperature of 27.8°C, 6-hour minimum temperature of 21.7°C, pressure has decreased 1.2 hPa over previous 3 hours.

8.0 Area Forecast Discussion

The National Weather Service's (NWS) Binghamton, New York, Weather Forecast Office (WFO) issued the following Synopsis and Aviation sections of an Area Forecast Discussion (AFD) at 1121, applicable for a region that included the accident location.

*FXUS61 KBGM 301521
AFDBGM
Area Forecast Discussion
National Weather Service Binghamton NY
1121 AM EDT Sun Jun 30 2024*

¹⁰ "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.

.SYNOPSIS...

A cold front pushes through today with scattered severe thunderstorms, especially in Northeast Pennsylvania and from the Interstate 88 corridor southward in New York. Things shift mainly east by early evening, with dry weather Monday and Tuesday as high pressure takes over.

.AVIATION /15Z SUNDAY THROUGH THURSDAY/...

Cold front pushes through the region this morning through this afternoon with restrictions likely in showers and possibly a thunderstorm, especially KAVP. Conditions gradually improve to VFR later this afternoon. However, low stratus behind the front will likely produce some MVFR ceilings overnight and into Monday morning.

Outlook...

Monday through Wednesday...Mainly VFR.

Wednesday night into Thursday...Restrictions with showers and thunderstorms possible.

&&

After the AFD issuance at 1121, the NWS Binghamton WFO issued the following AFD (Aviation section) at 1347.

FXUS61 KBGM 301747

AFDBGM

Area Forecast Discussion

National Weather Service Binghamton NY

147 PM EDT Sun Jun 30 2024

.AVIATION /18Z SUNDAY THROUGH FRIDAY/...

Storm threat has cleared the NY terminals as of 18Z, and cluster of nearby storms will exit KAVP area shortly after. Associated front which has already cleared NY terminals will pass through KAVP during midafternoon, which will allow it to join the rest of the terminals with a postfrontal northwesterly wind. Winds veer north-northwest or north late tonight into Monday, with a gustiness that should prevent fog from forming though there will probably be minor ceiling restrictions. KBGM-KITH are more likely to manage fuel alternate required levels, below 2000 feet, for a time during the predawn hours. Ceilings will gradually lift and/or scatter during the day.

Outlook...

Monday night through early Tuesday morning...VFR except for valley fog development likely for KELM.

Late Tuesday morning through Wednesday daytime...VFR.

Wednesday evening through Friday...Chances of showers and thunderstorms with associated restrictions.

&&

9.0 SIGMETs

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

At 1255, Convective SIGMET 03E was issued for an area that included the accident location. The Convective SIGMET warned of an area of severe thunderstorms with tops to FL450¹¹, hail to 1.5 inches and surface wind gusts to 65 knots possible. The convective SIGMET polygon was moving from 270° at 20 knots. Any Convective SIGMET implies severe or greater turbulence, severe icing, and low-level wind shear.¹²

WSUS31 KPCI 301655

SIGE

-MKCE WST 301655

CONVECTIVE SIGMET 03E

VALID UNTIL 1855Z

MA CT NY NJ PA

FROM 10NW ALB-30ENE BDL-SAX-30SE EWC-10NW ALB

AREA SEV TS MOV FROM 27020KT. TOPS TO FL450.

HAIL TO 1.5 IN...WIND GUSTS TO 65KT POSS.

At 1355 (the accident time), Convective SIGMET 11E was issued that superseded Convective SIGMET 11E but was valid for an area that did not include the accident location.

10.0 CWSU Products

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

¹¹ 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.

¹² FAA Aeronautical Information Manual section 7-1-6-e-2.

https://www.faa.gov/air_traffic/publications/atpubs/aim_html/chap7_section_1.html

11.0 G-AIRMETS

A Graphical-Airmen's Meteorological Information (G-AIRMET) is a graphical advisory of weather that may be hazardous to aircraft but are less severe than what would be advised by a SIGMET. G-AIRMETS are only valid at discrete time "snapshots" that are three hours apart for a period of up to 12 hours into the future (i.e., 00-, 03-, 06-, 09- and 12-hour forecasts). They are issued at 0300 UTC, 0900 UTC, 1500 UTC and 2100 UTC (with updates issued as necessary).

At about 1045, G-AIRMETS were issued for mountain obscuration in precipitation and mist that were valid at 1100 and 1400 for regions that included the accident location.

Submitted by:

Mike Richards
Senior Meteorologist