National Transportation Safety Board

Office of Aviation Safety
Washington, D.C. 20594-2000
October 24, 2013

WEATHER STUDY

ERA13FA253

A. Accident

Location: Johnstown, New York
Date: May 24, 2013
Time: 1710 eastern daylight time (2110 UTC[1])
Aircraft: Piper PA-34-200T, registration: N31743

B. Meteorological Specialist

Mike Richards
Senior Meteorologist
National Transportation Safety Board
Operational Factors Division, AS-30
Washington, DC 20594-2000

C. Details of the Investigation

The National Transportation Safety Board's meteorological specialist was not on scene and gathered weather data for this investigation from the Washington D.C. office from official National Oceanic and Atmospheric Administration (NOAA)'s National Weather Service (NWS) sources including the National Climatic Data Center (NCDC), except where noted. All times are in eastern daylight time (EDT) on May 24, 2013 - based upon the 24-hour clock. Directions are referenced to true north and distances in nautical miles. Heights are above mean sea level (msl) unless otherwise noted. Distances along the surface of the earth are calculated using the "Great Circle" formula.

Coordinates used for the accident location: 43.03609° North latitude, 74.52571° West longitude.

[1] UTC – abbreviation for Coordinated Universal Time

Synoptic Conditions

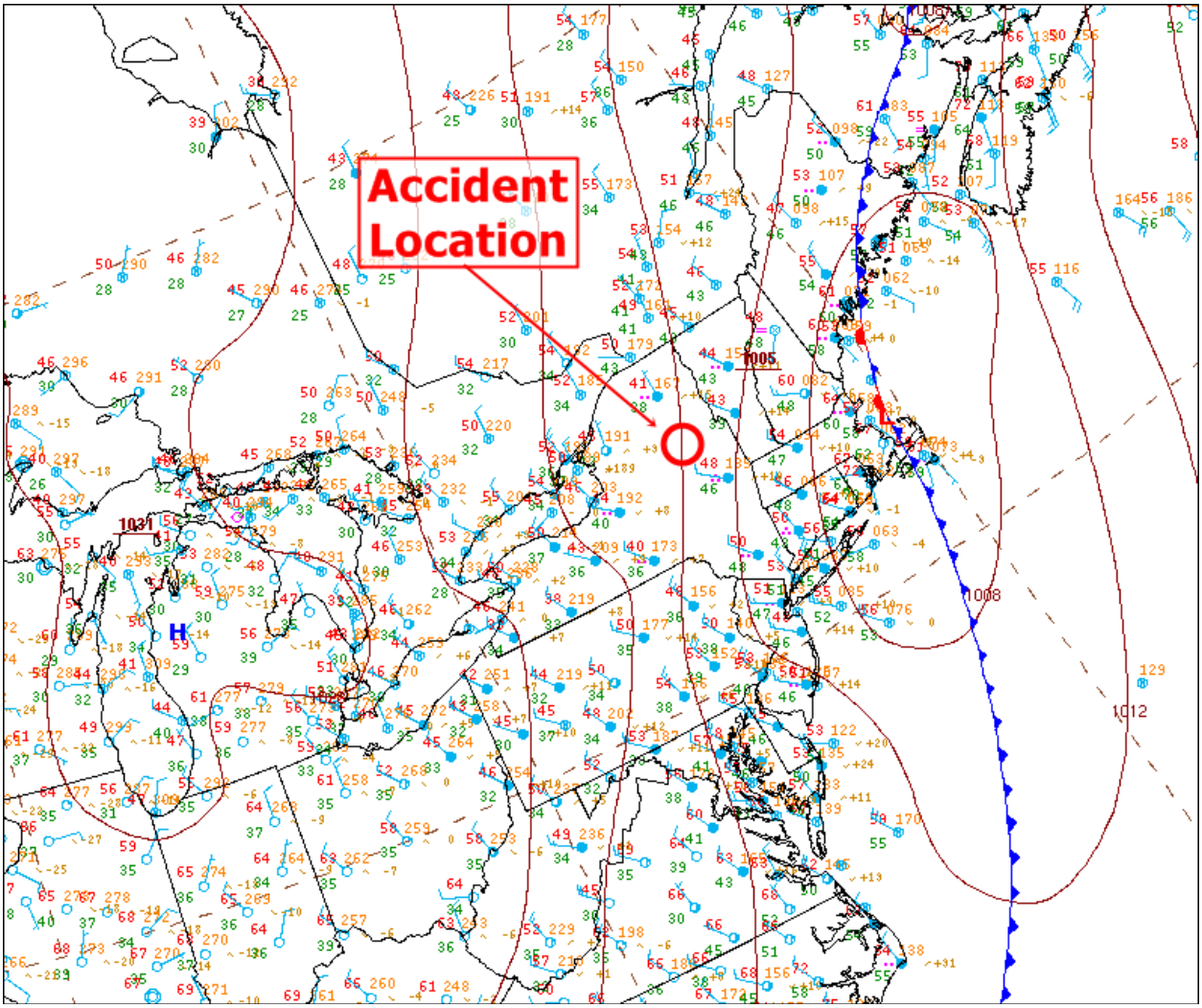

Figure 1 – NWS Surface Analysis Chart for 1700 EDT.

The NWS Surface Analysis Chart for 1700 EDT (figure 1) depicted a low-pressure center along the Massachusetts coast. A cold front extended south from the low pressure center, and a stationary front extended north toward Maine. A high pressure center was depicted over Michigan.

Surface temperatures in New York State were generally in the 40's° Fahrenheit (F), with dew point depressions less than 5°F in the central and eastern portion of the state. Station models depicted the wind to be from the north and northwest with magnitudes near and below 10 knots. Overcast skies prevailed and light to moderate rain was depicted in the eastern and central portions of the state.

An NWS 700-hectopascals (hPa) chart for 2000 EDT is presented in figure 2. This chart identified a mid-level trough in the area of the accident location, which can be associated with increased vertical motion, clouds and precipitation.

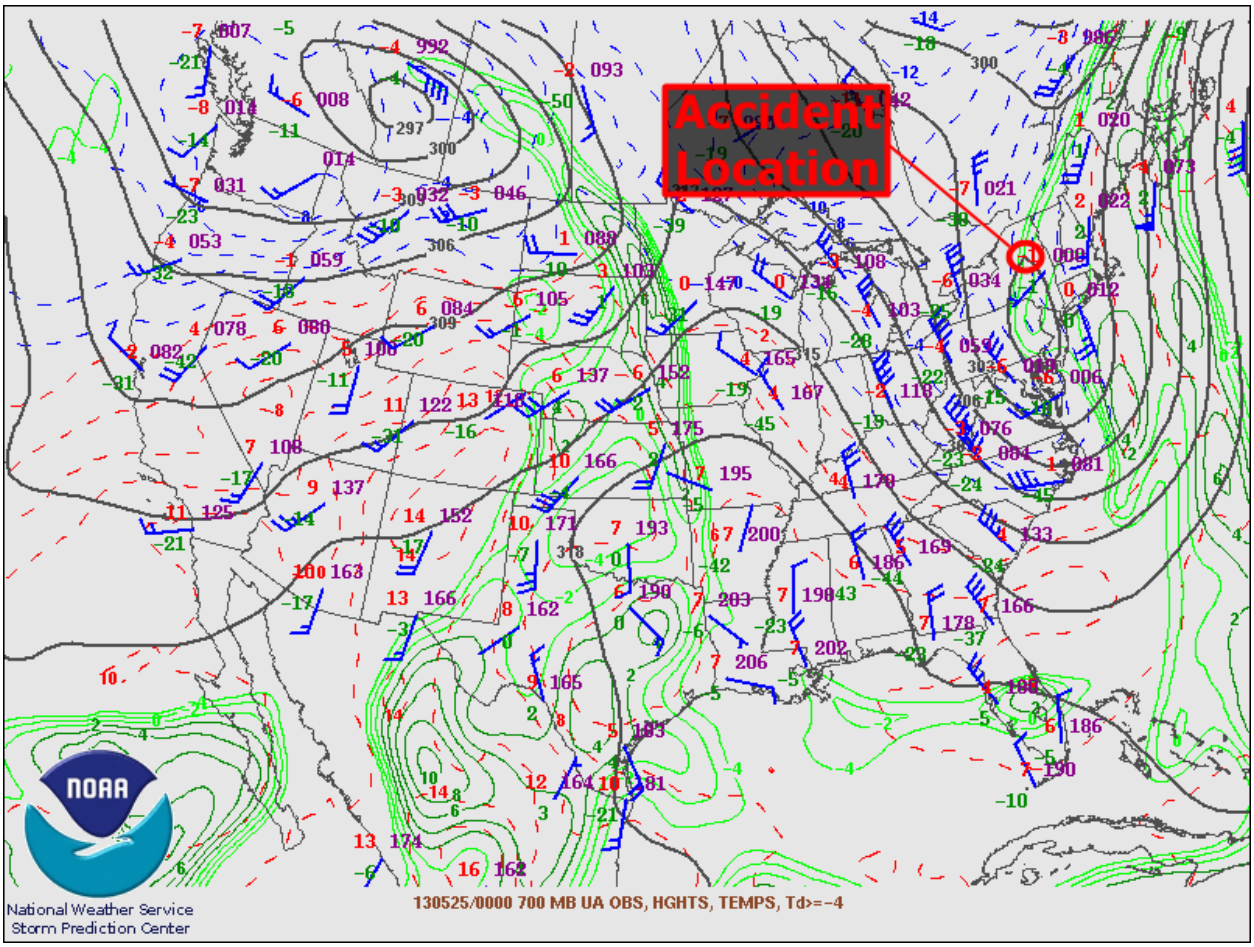

Figure 2 – NWS 700-hPa Analysis Chart for 2000 EDT.

A regional Next-Generation Radar (NEXRAD) mosaic (figure 3) obtained from the NCDC for 1710 EDT identified light and moderate values of reflectivity across much of western New York, including in the immediate vicinity of the accident site.

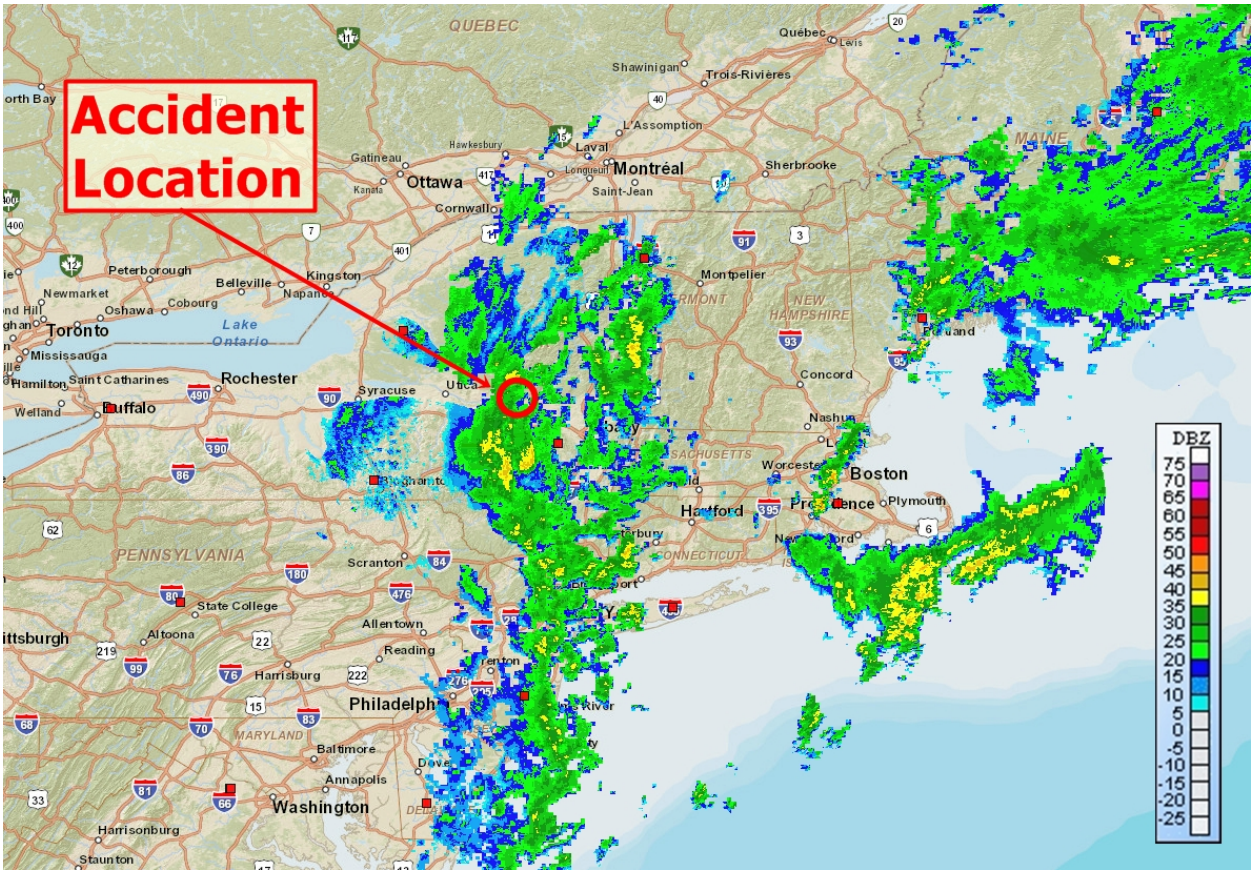

Figure 3 – NCDC NEXRAD mosaic from 1710 EDT.

Surface Observations

Schenectady County Airport (KSCH) in Schenectady, New York, was located approximately 28 miles to the east-southeast of the accident site at an elevation of 378 feet. The following human-augmented reports were issued from KSCH during the time period surrounding the accident time:

[1346 EDT] KSCH 241746Z 30011G16KT 2 1/2SM DZ OVC022 09/08 A2990=

[1550 EDT] KSCH 241950Z 30005KT 4SM -RA OVC008 09/07 A2994=

[1750 EDT] KSCH 242150Z 32008KT 4SM -DZ BKN008 OVC020 09/07 A2995=

[1845 EDT] KSCH 242245Z 32008G16KT 7SM OVC026 08/07 A2996=

Albany International Airport (KALB) in Albany, New York, was located approximately 36 miles to the east-southeast of the accident site at an elevation of 285 feet. The following human-augmented reports were issued from KALB during the time period surrounding the accident time:

[1351 EDT] KALB 241751Z 33009KT 2SM -RA BR SCT009 BKN014 OVC021 09/08 A2990 RMK AO2 SLP126 P0007 60007 T00940083 10106 20089 53009=

[1451 EDT] KALB 241851Z VRB03KT 1 1/2SM R01/5500VP6000FT +RA BR OVC009 09/08 A2993 RMK AO2 CIG 005V011 SLP134 VIS 1V2 P0008 T00940083=

[1551 EDT] KALB 241951Z 36005KT 1 1/2SM -RA BR BKN009 OVC015 09/08 A2993 RMK AO2 SFC VIS 2 SLP135 CIG 006V012 P0020 T00890078=

[1651 EDT] KALB 242051Z 31009KT 1 1/2SM R01/5000V6000FT RA BR OVC008 09/08 A2993 RMK AO2 SLP135 CIG 005V011 P0013 60041 T00890078 51010=

[1751 EDT] KALB 242151Z 02008KT 1 1/2SM R01/6000VP6000FT -RA BR BKN008 OVC015 08/07 A2995 RMK AO2 SLP141 VIS 1V2 CIG 005V011 P0009 T00830072=

At 1651 EDT, KALB reported a wind from 310° at 9 knots, visibility of one and one-half miles, runway visual range along runway 01 variable between 5,000 and 6,000 feet, rain and mist, ceiling overcast at 800 feet above ground level (agl), temperature of 9º Celsius (C) and dew point temperature of 8°C, altimeter setting 29.93 inches of mercury. Remarks: station with a precipitation discriminator, sea-level pressure of 1013.5 hPa, ceiling variable between 500 and 1,100 feet agl, hourly liquid-equivalent precipitation of 0.13 inches, 3-hour liquid-equivalent precipitation of 0.41 inches, hourly temperature of 8.9°C and hourly dew point temperature of 7.8°C, 3-hour surface pressure increase of 1 hPa.

Upper Air Data

Atmospheric data were retrieved from a rawinsonde launch at 2000 EDT from Albany, New York (ALB; station identifier 72518). ALB was located approximately 103 miles east-southeast of the accident site. These data are presented in figure 4.

The ALB sounding indicated the majority of the troposphere was stable or conditionally unstable. A temperature inversion was noted between 5,700 and 7,400 feet. The relative humidity (RH) was greater than 88 percent below 16,000 feet. The freezing level was approximately 4,300 feet, however due to the presence of a temperature inversion, additional 0ºC measurements were taken at 7,200 and 9,100 feet. Assessments of icing made by the Universal RAwinsonde OBservation program (RAOB) for this sounding yielded the potential for moderate icing near 10,000 and 14,000 feet.

The ALB wind profile identified a generally northerly wind between 1,000 and 7,500 feet with magnitudes ranging between 12 and 24 knots. Above 7,500 feet, the wind decreased in magnitude and *backed*[2] and became southerly at about 11,000 feet. Above this level, the wind remained generally southerly and increased in magnitude through 20,000 feet. Calculations by RAOB indicated the potential for significant turbulence near 7,500 feet.

[2] A backing wind is a wind that turns counter-clockwise with height.

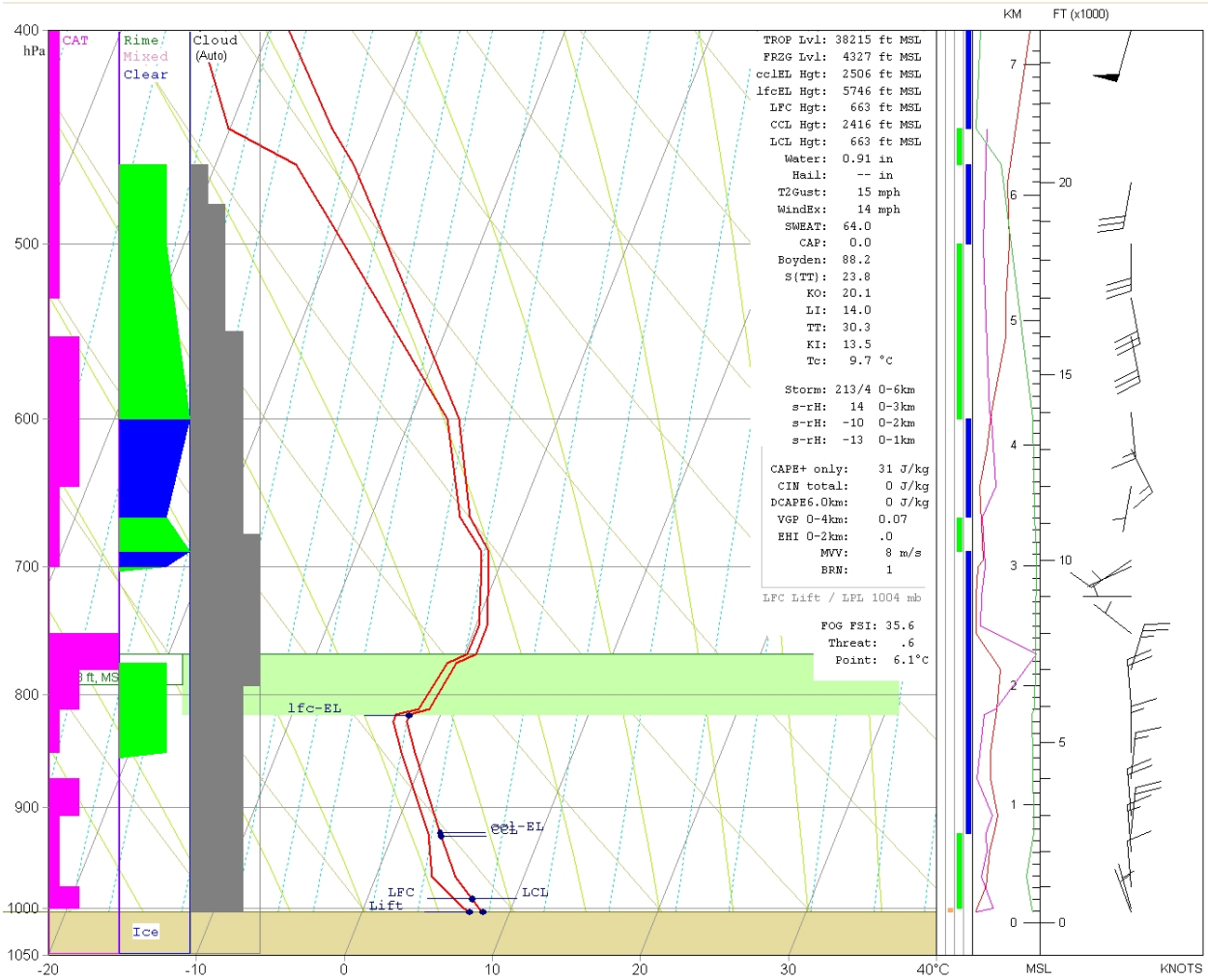

Figure 4 – Rawinsonde sounding from ALB in SkewT/LogP format for 2000 EDT, surface to 400 hPa.

Meteorological data from an AMDAR-reporting[3] aircraft departing KALB is presented in Figure 5. Figure 6 presents the flight path for this aircraft through FL280[4]. This data was collected between 1645 EDT (departure) through 1655 EDT (ascent to FL280).

The AMDAR sounding indicated that the majority of the troposphere was stable or conditionally unstable, and that the atmosphere was saturated below 18,500 feet. A sharp temperature inversion was noted between 6,000 and 7,000 feet. The freezing level was approximately 3,800 feet, however due to the presence of a temperature inversion, additional 0ºC measurements were taken at 6,600 and 8,700 feet. Assessments of icing made by the RAOB for this sounding yielded the potential for light icing below 14,000 feet.

The AMDAR wind profile identified a westerly wind near the surface that veered to the northeast through 8,000 feet. Wind magnitudes below 8,000 feet were retrieved to be 13 knots or less. Above 8,000 feet, the wind remained northeasterly or northerly and increased in

[3] *AMDAR* is the generally-accepted worldwide term for automated weather reports from commercial aircraft.
[4] Flight Level (FL) - standard nominal altitude of an aircraft, in hundreds of feet. This altitude is calculated from the International standard atmosphere using 1013.25 hPa (29.92 in Hg) for surface pressure.

magnitude to 19 knots at 14,000 feet. Calculations by RAOB did not indicate the potential for significant turbulence in this atmosphere.

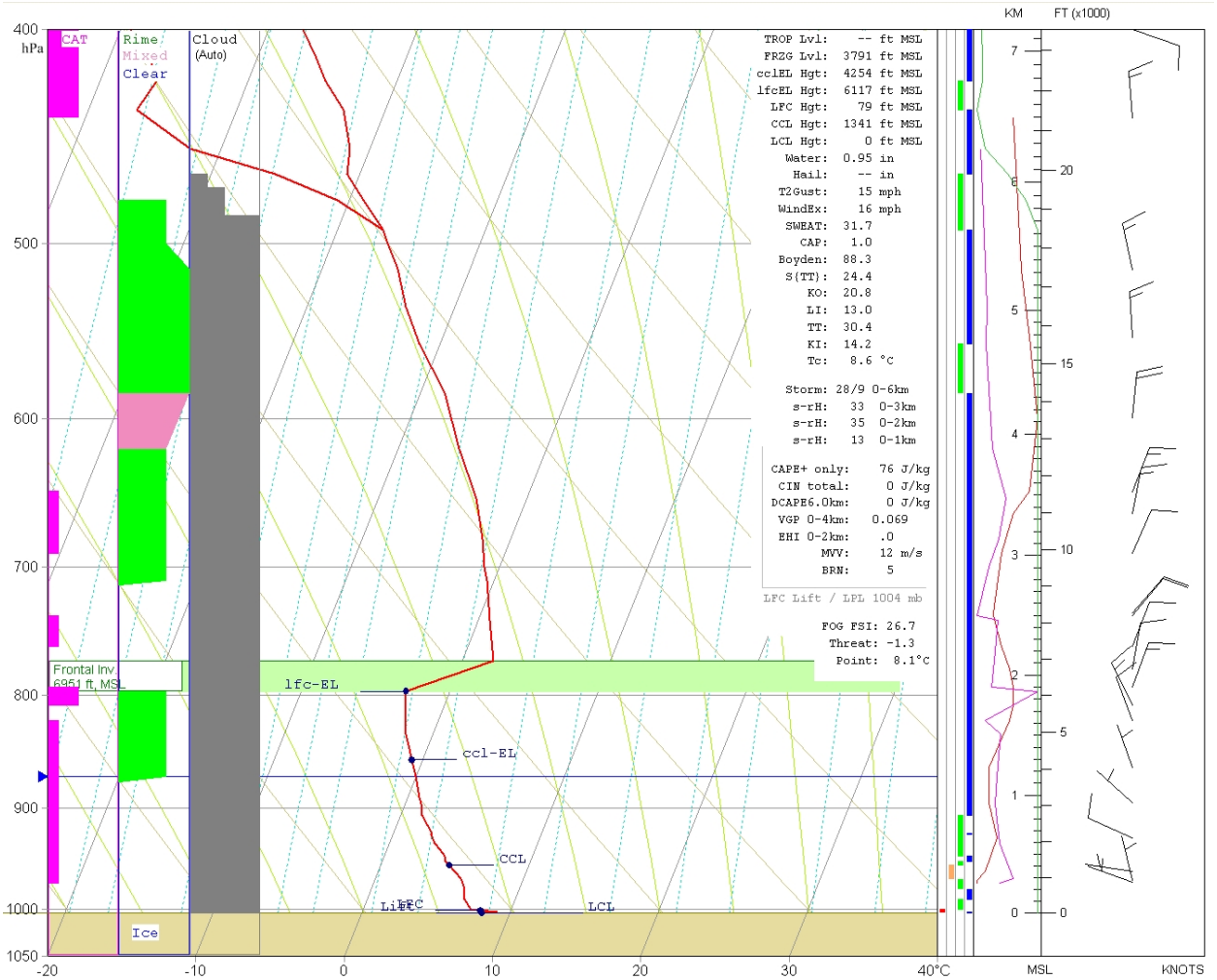

Figure 5 – AMDAR sounding in SkewT/LogP[5] format, surface to 400 hPa.

[5] SkewT/LogP - A thermodynamic diagram, using the temperature and the logarithm of pressure as coordinates, which allows the plotting of the vertical profile of the temperature, humidity, and atmosphere above a particular point on the earth's surface.

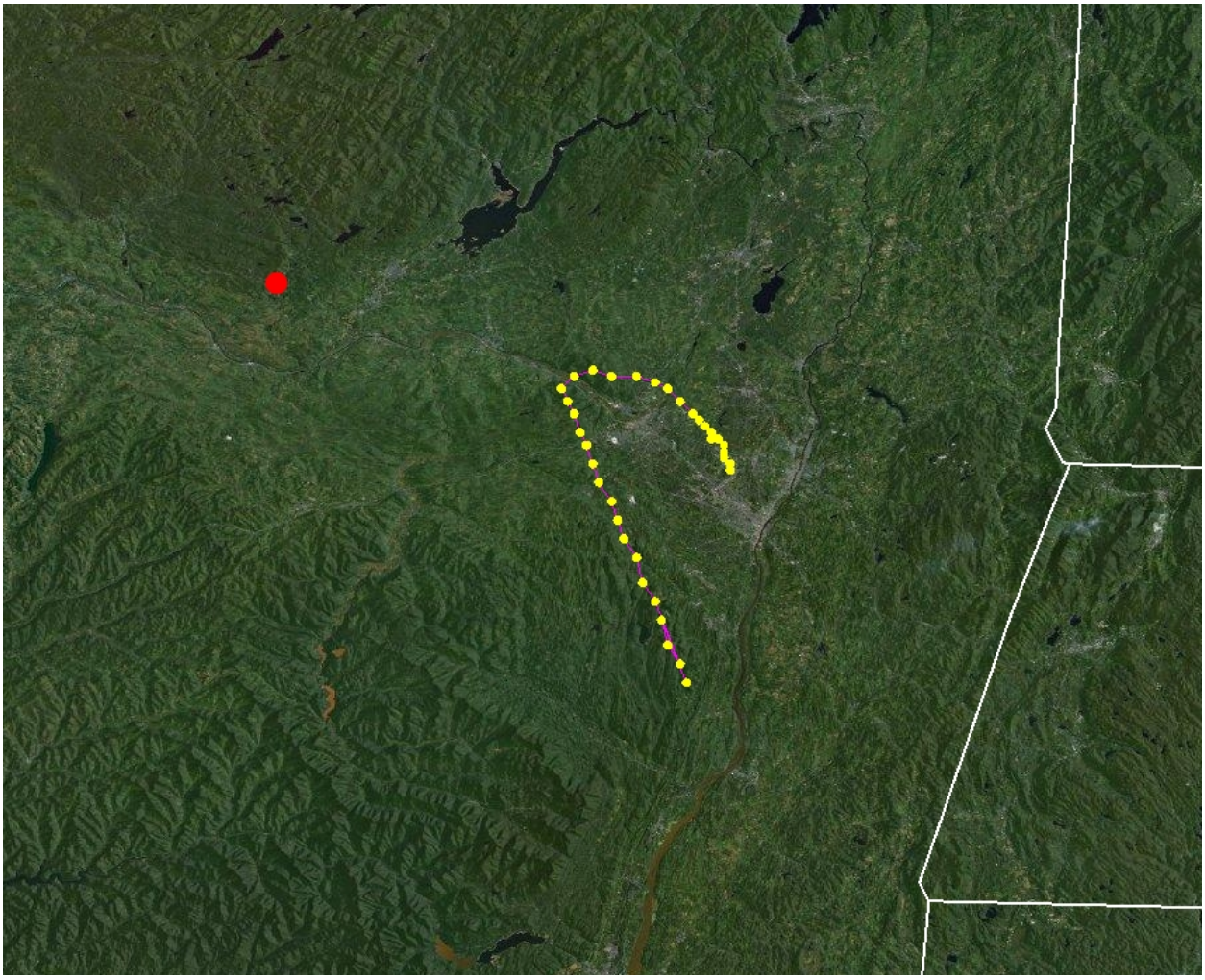

Figure 6 – Flight path for AMDAR reporting aircraft. Yellow dots represent reporting points through FL280. Red dot denotes accident location.

Pilot Reports

Publically disseminated pilot reports[6] made within about three hours of the accident time and about 100 miles of the accident location are presented here.

BGM UA /OV BGM235014 /TM 1803 /FL050 /TP TBM7 /TA M03 /IC LGT RIME /RM DURD=

BGM UA /OV HNK330015 /TM 1807 /FL210 /TP E45X /TB LGT-MOD 170-250=

SYR UA /OV K5B2-SYR /TM 1850 /FL010 /TP C195 /SK OVC015 /WX FV03SM /TA 04 /RM FV 3SM -10SM BTN K5B2/SYR=

POU UA /OV POU /TM 1901 /FL023 /TP S76 /SK OVC024=

[6] Only pilot reports distributed with the UBNY**, UBVT**, UBNH**, YBMA**, UBCT** and UBPA** headers were considered.

ALB UA /OV ALB /TM 1905 /FL150 /TP C525 /TA M03 /IC MOD RIME 120-150=

MSV UA /OV HUO360030 /TM 1906 /FL100 /TP PA46 /TA 00 /IC MOD RIME=

BAF UA /OV CTR060008 /TM 1920 /FL110 /TP C402 /TA 01 /WV 16624KT /TB NEG /IC NEG /RM BTWN LYRS TOP100=

SYR UA /OV SYR314031/TM 2102/FL080/TP C421/TA M02/IC LGT RIME=

SYR UA /OV SYR /TM 2103 /FLUNKN /TP CRJ7 /TB MOD CHOP 340-360=

RME UA /OV SYR135040 /TM 2134 /FL110 /TP CRJ7 /TA M05 /IC LGT RIME=

ROC UA /OV SYR270010/TM 2217/FL050/TP DH8A/SK TOPS FL100/TA M04/IC LGT CLR ICING/RM FL050 - FL080=

AVP UA /OV LHY066030/TM 2218/FL170/TP BE20/TA M07/IC LGT RIME=

POU UA /OV PWL /TM 2221 /FLUNKN /TP E170 /TB LGT-MOD 170-210=

POU UA /OV POU225006 /TM 2230 /FLUNKN /TP S76 /SK OVC028-TOPUNKN /WX FV06SM RA=

GFL UA /OV GFL046015 /TM 2302 /FL050 /TP C414 /TA 00 /IC LGT-MOD RIME=

Current Icing Product

Images presenting output from the Current Icing Product (CIP) at 1700 EDT at 8,000 feet msl were provided by the National Center for Atmospheric Research's (NCAR) Inflight Icing Product Development Team. These images may be found in Attachment 1 to this report.

The CIP indicated that at 1700 EDT, icing probabilities at 8,000 feet at the accident location were zero. Significant icing probabilities at 8,000 feet existed along a north-south oriented thick "line" immediately to the west of the accident location, which included the central and western part of the state of New York. CIP identified areas of light and moderate icing severity in this region, super-cooled liquid droplet potential, and an area of greater than 0.25 grams per cubic meter of super-cooled liquid water content. Additional CIP output can be found in Attachment 1.

Communication with NCAR revealed that model temperatures driving the CIP were above freezing at 8,000 feet at the accident location. Some icing did show up at higher and lower altitudes in the CIP products, however. Presented here is the temperature column for the 1700 EDT CIP run at the accident location.

Flight Level	Temperature (°C)
040	0.4
050	-0.3
060	-0.7
070	0.0
080	0.4
090	-0.3

100	-1.4
110	-3.1
120	-4.8

Weather Radar

WSR-88D Level-II and Level III weather radar imagery from Albany, New York (KENX), is presented in figures 7-16. The times for these images indicate the start time for the individual tilt (sweep). KENX was located approximately 34 miles to the southeast of the accident site. Assuming standard refraction and considering the 0.95° beam width[7] for the WSR-88D radar beam, the KENX 1.44° tilt would have "seen" altitudes between about 6,175 and 9,600 feet msl at the accident aircraft's final plotted position, and the KENX 2.41° tilt would have seen altitudes between about 9,675 and 13,100 feet msl at the accident aircraft's final plotted position. The range rings overlaid on the images show the location on the ground below the radar centerbeam's crossing of the 0°C levels according to the atmosphere retrieved by the AMDAR-reporting aircraft.

Figure 7 depicts light values of reflectivity[8] over much of the area, with moderate values immediately to the west and to the southwest of the accident aircraft's final plotted position. Velocity measurements from KENX (figure 8) indicate wind magnitudes less than 5 knots in the area of the accident aircraft's final position.

WSR-88D Level-III dual-polarization imagery from KENX is presented in figures 9-11 and 14-16 and includes differential reflectivity (ZDR), hydrometeor classification algorithm (HCA) and correlation coefficient (CC) products. Considering the 1.50° dual-polarization products, ZDR values for the area near the final portion of the accident aircraft's flight path range from near 1 to about 3, with some values around 4, and CC values in this area are generally greater than 0.90, with isolated areas approaching 0.80.

ZDR is the logarithm ratio of the horizontal power return to the vertical power return. Positive values of ZDR indicate that there is more horizontal power return than vertical power return. A negative value of ZDR indicates that there is more vertical power return than horizontal power return, which means that the dominant hydrometeors are larger in the vertical than in the horizontal. Near zero values of ZDR indicate that both the horizontal and vertical power return from with the volume scanned are of similar values, meaning the dominant hydrometeors are similar in size in both the vertical and horizontal.

CC is a measure of how similar the horizontal and vertical returned pulse characteristics are among all pulses in the sampled WSR-88D volume. CC provides information about the diversity of hydrometeors within the volume and its values range from 0 to 1. Meteorological echoes tend to have CC values greater than 0.80, with values greater than 0.96 indicating that the

[7] Beam width - the angular separation between the half power points on the antenna radiation pattern, where the gain is one half the maximum value.

[8] Reflectivity - The sum of all backscattering cross-sections (e.g., precipitation particles) in a pulse resolution volume divided by that volume. In order for the radar to calculate the reflectivity, it sends out a small burst of energy. This energy strikes the particles located in the volume. For simplification sake, it is assumed that these particles are evenly spread throughout the volume. The more of these particles located in the volume, the greater the return of energy returned back to the radar. One will see a greater reflectivity return from heavy rain than light rain.

meteorological targets within the volume are all very similar in size, shape, type (liquid versus solid), and orientation. CC values between 0.80 and 0.96 indicate that the meteorological targets within the volume have a higher diversity of sizes, shapes, types, and orientations (as the CC trends lower). Non-meteorological echoes have CC values less than 0.80 and these non-meteorological echoes can include but are not limited to bugs, chaff, smoke, and birds.

Figures 10 and 15 present HCA, which attempts to discriminate between multiple classes of radar echo by considering radar products and model data. For the accident region, the 1.50° HCA product identified "big drops" (liquid) in the area of the accident aircraft's final plotted position, along with "wet snow" and "graupel" immediately to the west of this position. Figure 17 presents threshold guidance for these, and other, hydrometeor classifications. The HCA was not well-informed of the unique temperature profile (i.e., multiple melting layers) characterizing the region as depicted in the ALB and AMDAR soundings. The HCA tends to be much more reliable when a single meting layer is present. For this HCA output, there is lower confidence in the presence of "big drops" near the final portion of the accident aircraft's flight path, located in the higher melting layer. This may be an area more appropriately characterized as "melting snow." However if big drops did exist, they likely would not have been super-cooled. There is, however, more confidence in the classification of graupel further to the west of the flight path, which is also located (in general) amidst the higher melting layer. Graupel forms when super-cooled water attaches itself to a falling snowflake, and may be indicative of relatively stronger vertical air motion.

In this situation, a significant icing hazard is not immediately identified along the final portion of the accident aircraft's flight path, which looked to occur at an altitude in the higher melting layer. The presence of icing in this layer cannot entirely be ruled out, however, due to the (likely correct) identification of graupel elsewhere in this layer. Though it should be emphasized that graupel was not identified coincident with the final portion of the accident aircraft's flight path

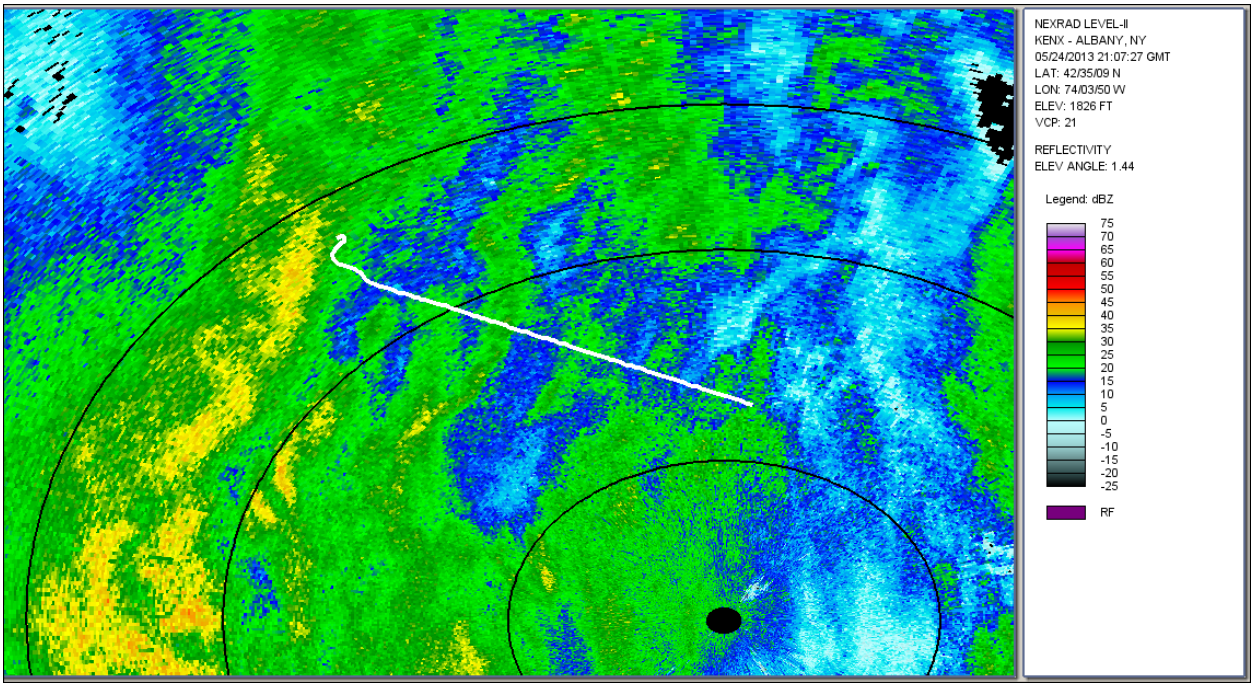

Figure 7 – KENX Level-II 1.44° reflectivity product from the sweep initiated at 1708:28 EDT. Final portion of the accident aircraft's flight path presented in white, with direction of travel to the west-northwest.

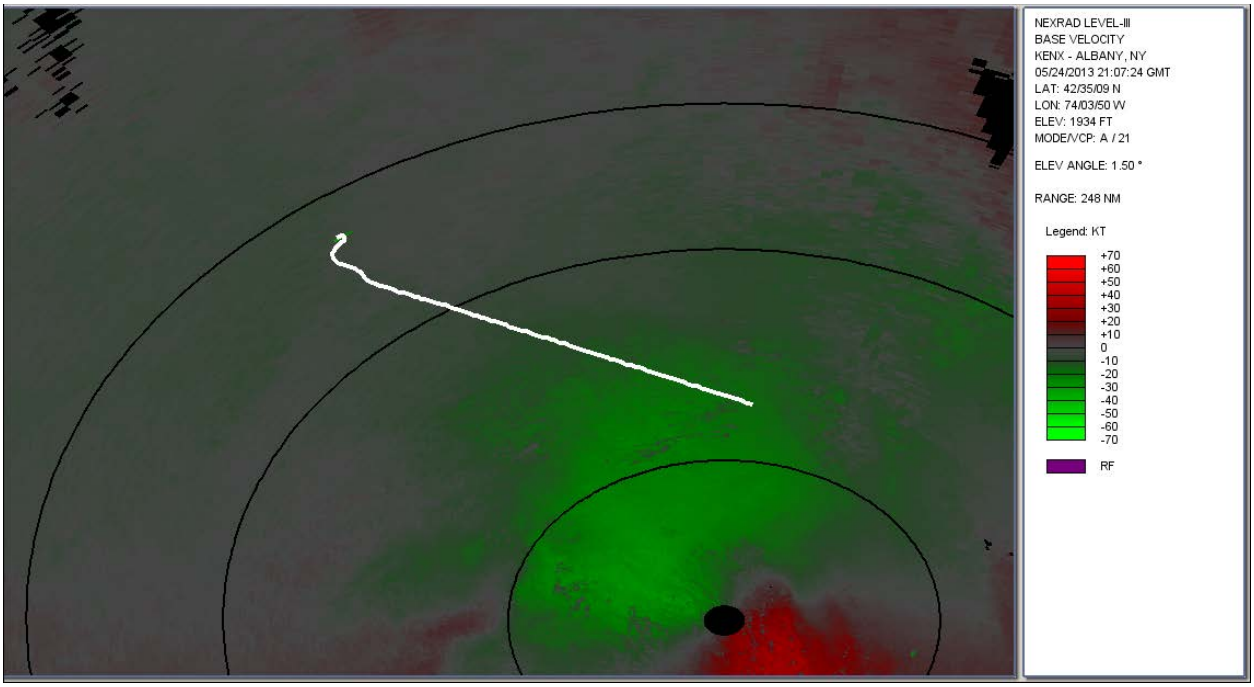

Figure 8 – KENX Level-III 1.50° velocity product from the sweep initiated at 1708:28 EDT. Final portion of the accident aircraft's flight path presented in white, with direction of travel to the west-northwest.

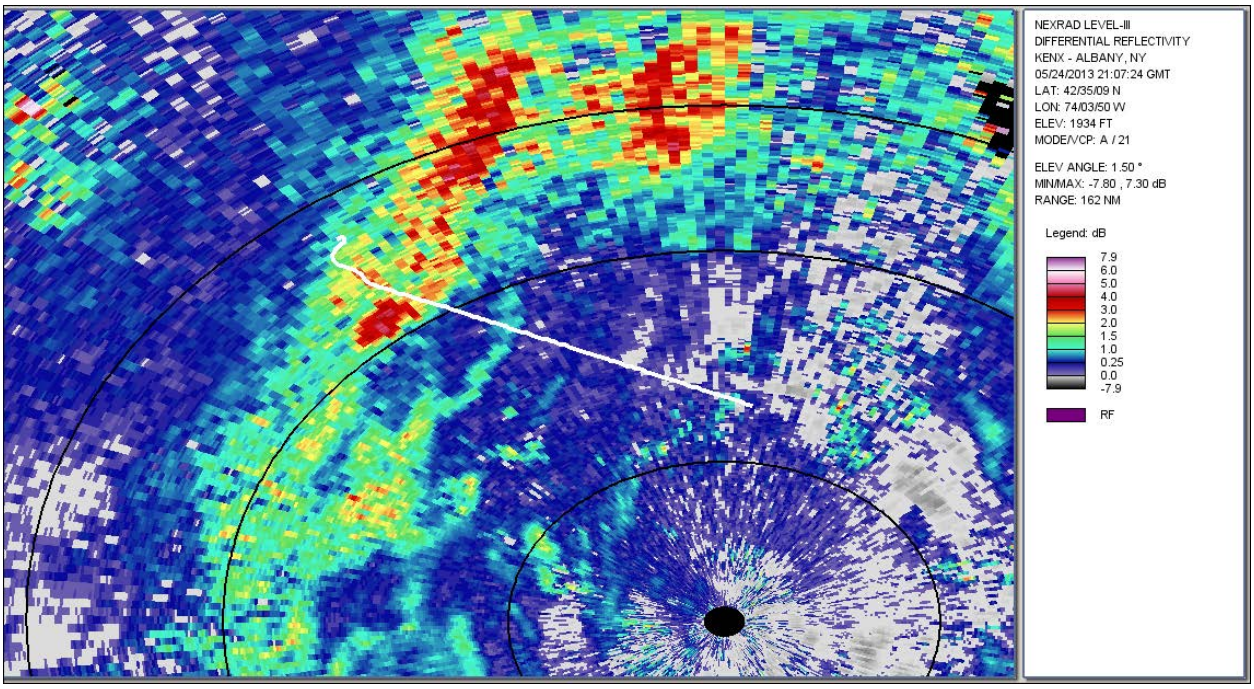

Figure 9 – KENX Level-III 1.50° differential reflectivity product from the sweep initiated at 1708:28 EDT. Final portion of the accident aircraft's flight path presented in white, with direction of travel to the west-northwest.

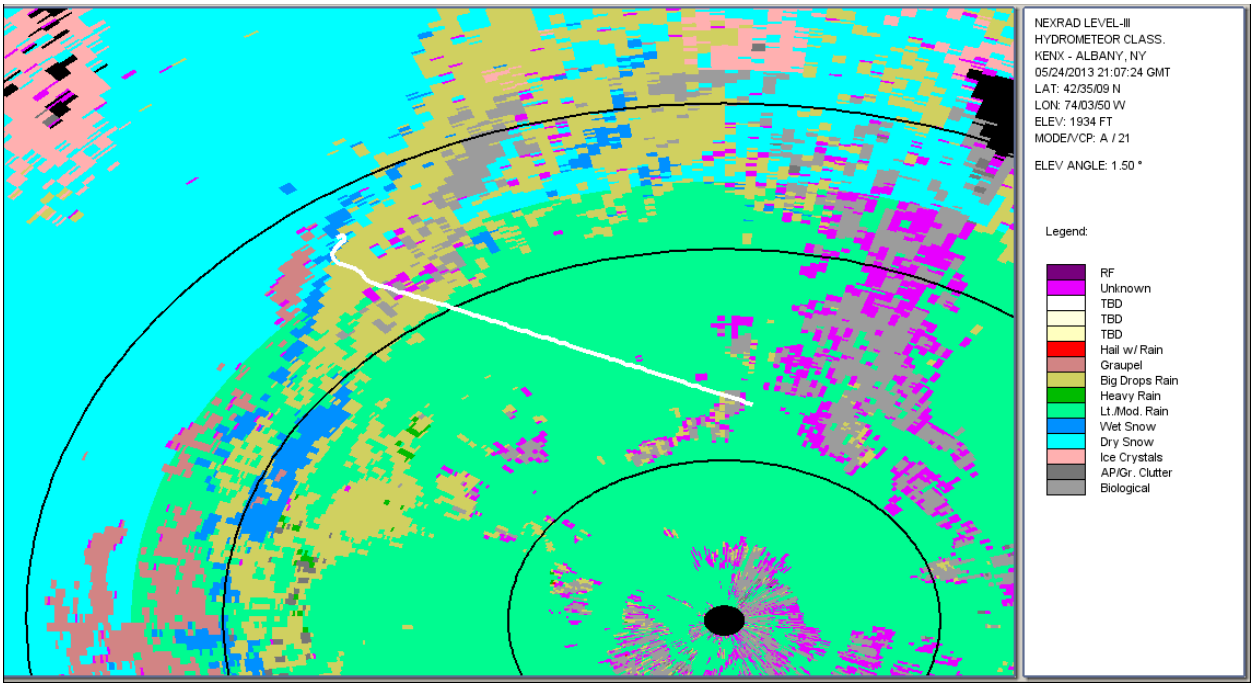

Figure 10 – KENX Level-III 1.50° hydrometeor classification product from the sweep initiated at 1708:28 EDT. Final portion of the accident aircraft's flight path presented in white, with direction of travel to the west-northwest.

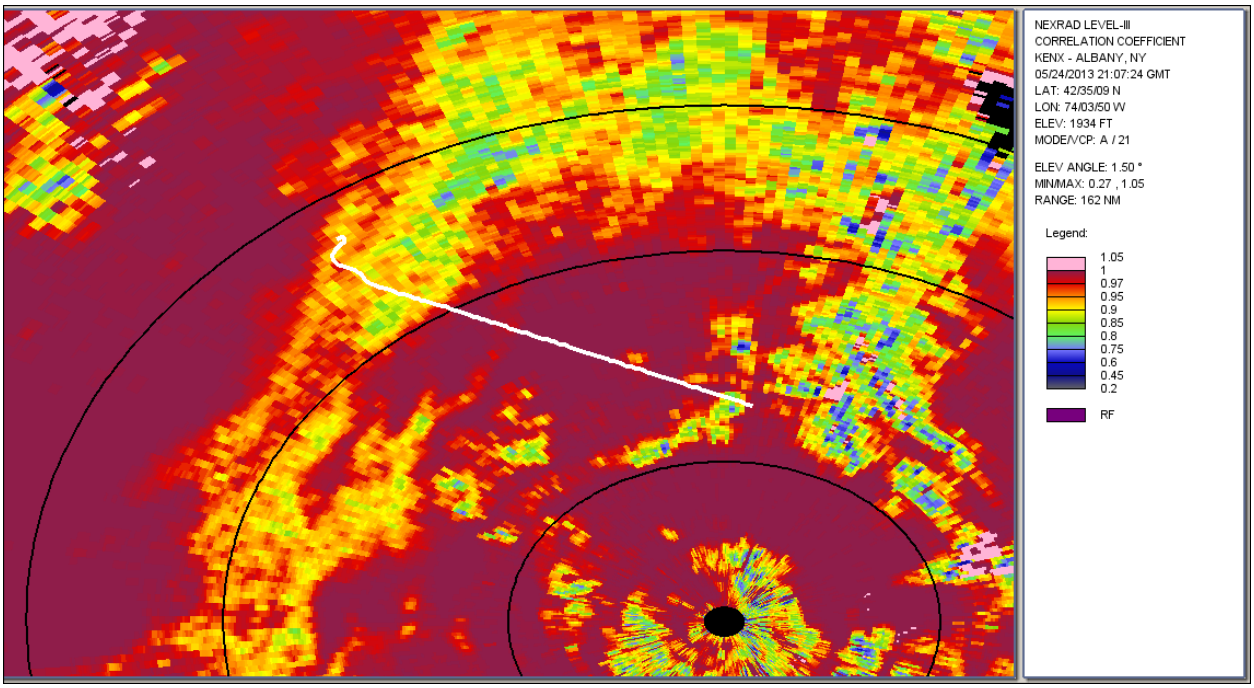

Figure 11 – KENX Level-III 1.50° correlation coefficient product from the sweep initiated at 1708:28 EDT. Final portion of the accident aircraft's flight path presented in white, with direction of travel to the west-northwest.

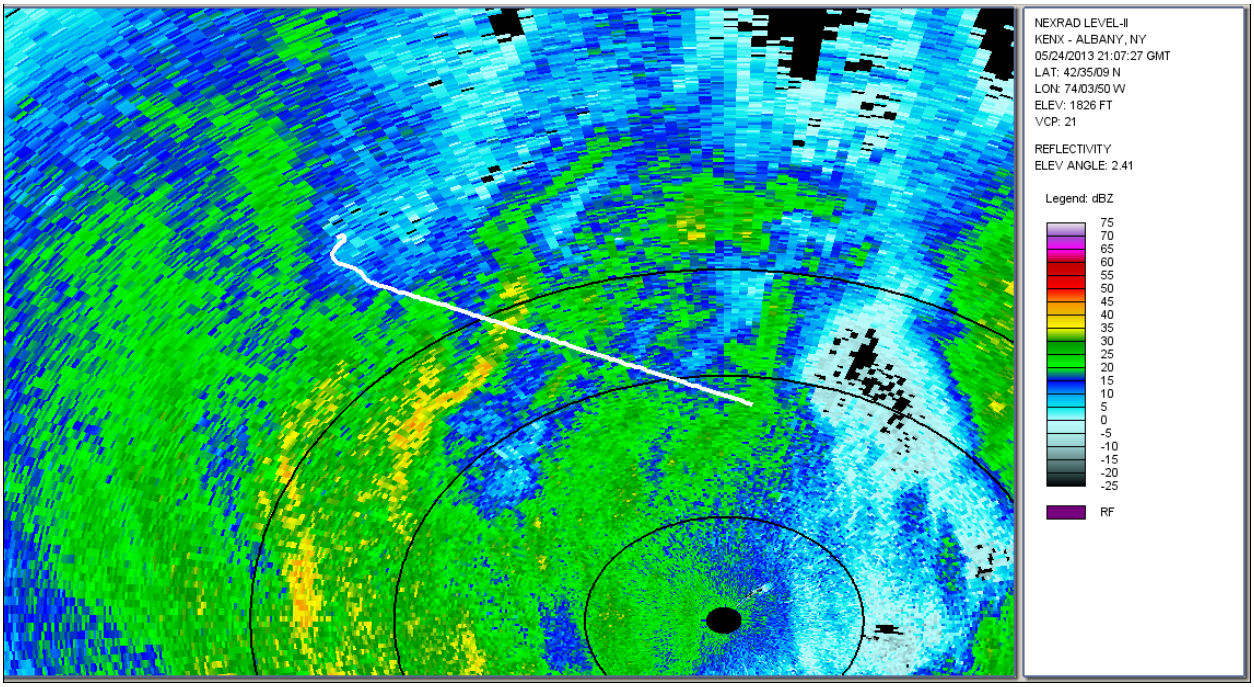

Figure 12 – KENX Level-II 2.41° reflectivity product from the sweep initiated at 1709:32 EDT. Final portion of the accident aircraft's flight path presented in white, with direction of travel to the west-northwest.

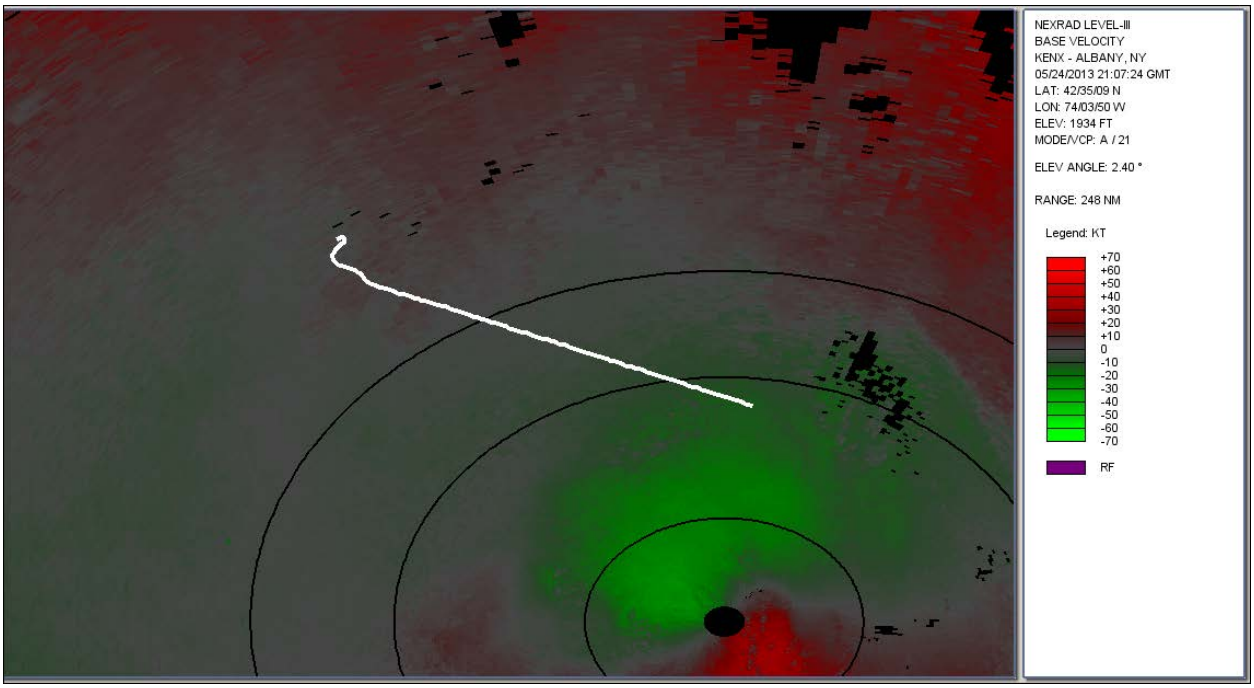

Figure 13 – KENX Level-III 2.40° velocity product from the sweep initiated at 1709:32 EDT. Final portion of the accident aircraft's flight path presented in white, with direction of travel to the west-northwest.

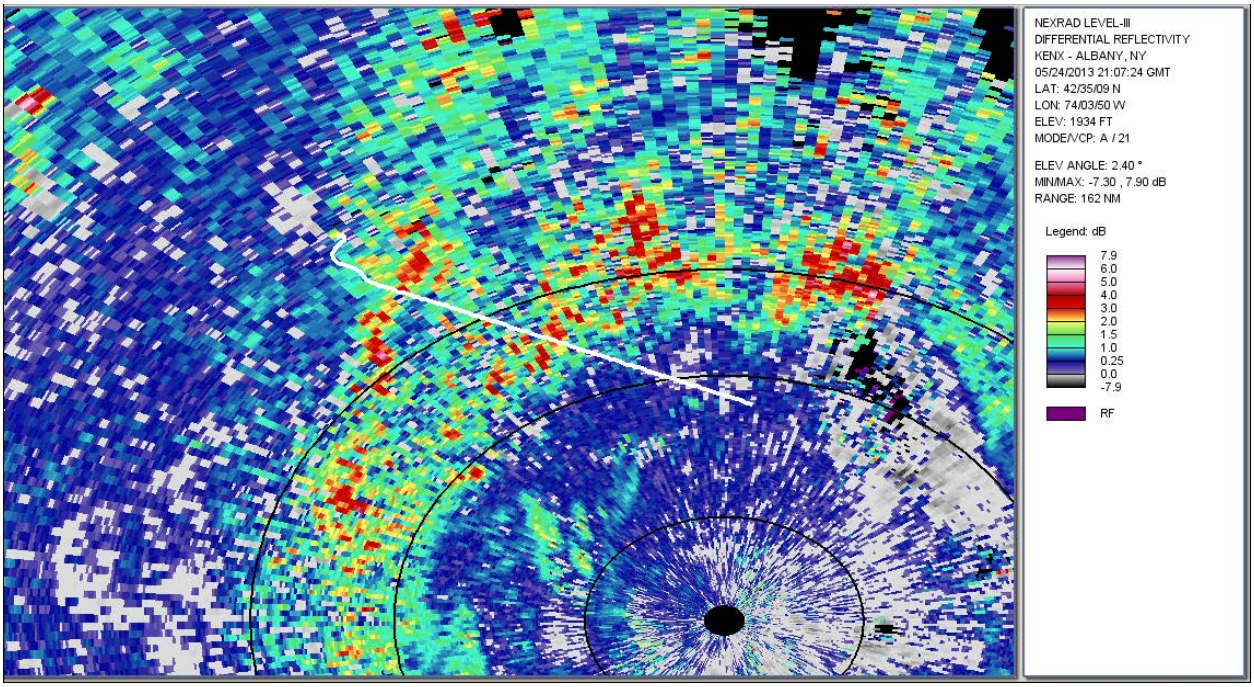

Figure 14 – KENX Level-III 2.40° differential reflectivity product from the sweep initiated at 1709:32 EDT. Final portion of the accident aircraft's flight path presented in white, with direction of travel to the west-northwest.

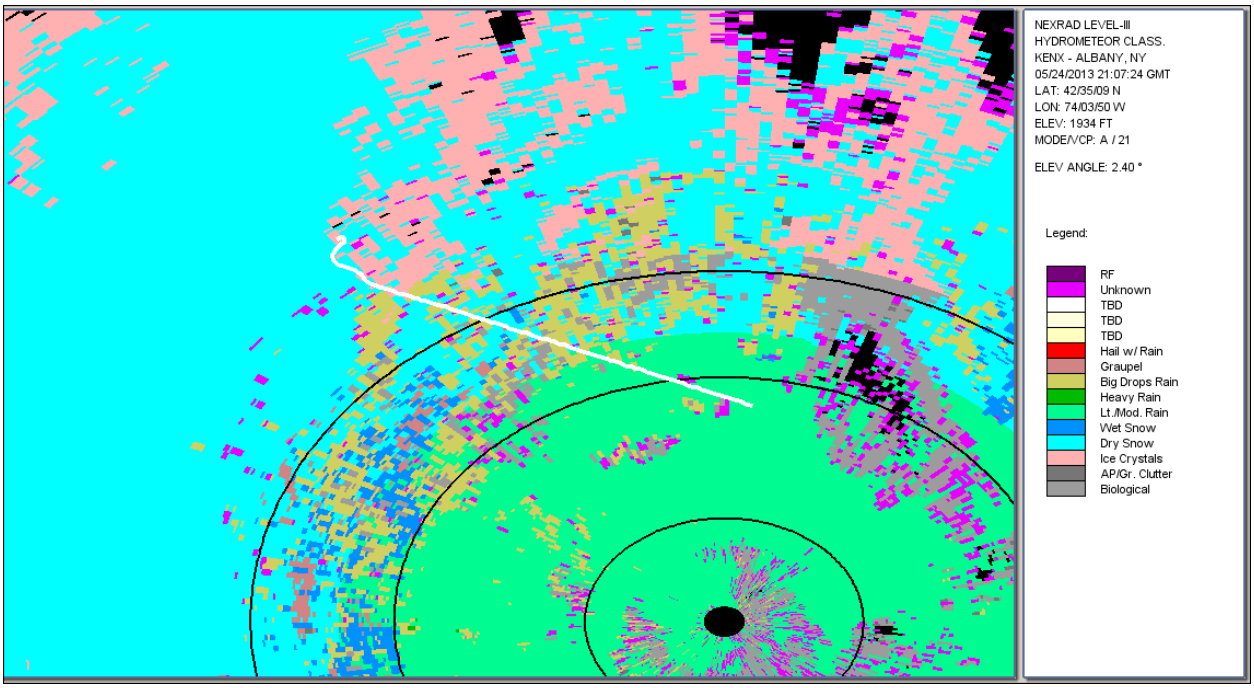

Figure 15 – KENX Level-III 2.40° hydrometeor classification product from the sweep initiated at 1709:32 EDT. Final portion of the accident aircraft's flight path presented in white, with direction of travel to the west-northwest.

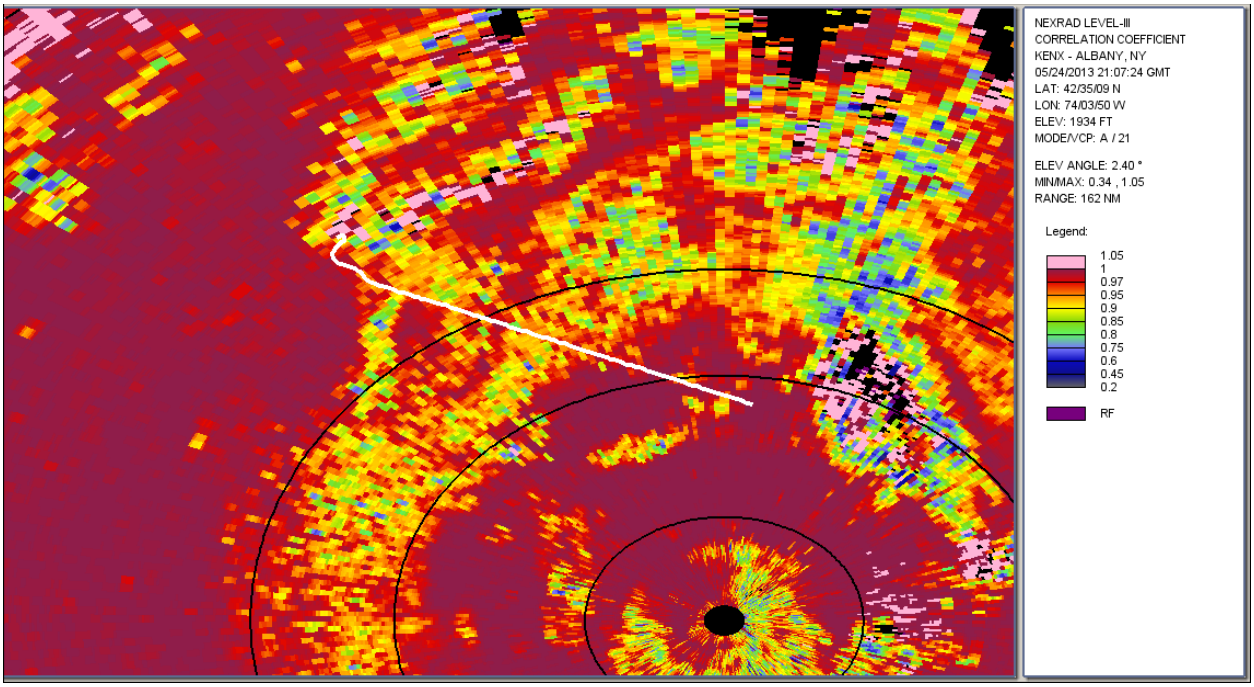

Figure 16 – KENX Level-III 2.40° correlation coefficient product from the sweep initiated at 1709:32 EDT. Final portion of the accident aircraft's flight path presented in white, with direction of travel to the west-northwest.

BI	GC	IC	DS	WS	RA	HR	BD	GR	HA	UK	RF

HCA	
Biological Scatterers	Birds, Bats, Insects: Low reflectivity (Z), very high ZDR, very low CC
Ground Clutter/AP	High Z, low CC and ZDR. Velocity must be less than +/- 2 kts
Ice Crystals	Plates, Columns, Needles: Low reflectivity, very high CC, positive ZDR
Dry Snow	Aggregated Crystals: Similar dual-pol values as with Ice Crystals but with a lower ZDR
Wet Snow	Bright band/melting snow: Much lower CC, higher Z and ZDR than Dry Snow
Light/Mod. Rain	Rain rates less than 1.1 in/hr. Positive KDP, ZDR, Z < 45 dBZ
Heavy Rain	Rain rates greater than 1.1 in/hr. Positive KDP, ZDR, Z > 45 dBZ
Big Drops	Large drops in small concentrations. Very high ZDR, low Z. Seen along storm edges.
Graupel	Round or conical snow pellets < 5 mm diameter. High CC and ZDR < 2 dB
Hail-Rain	Hail Possibly Mixed with Rain: High Z, Low ZDR, Lower CC
Unknown	Confidence in any particular classification is too low to make a guess
Range Folding	Unlikely to show up in dual-pol products

Figure 17 – HCA classification types and threshold guidance.

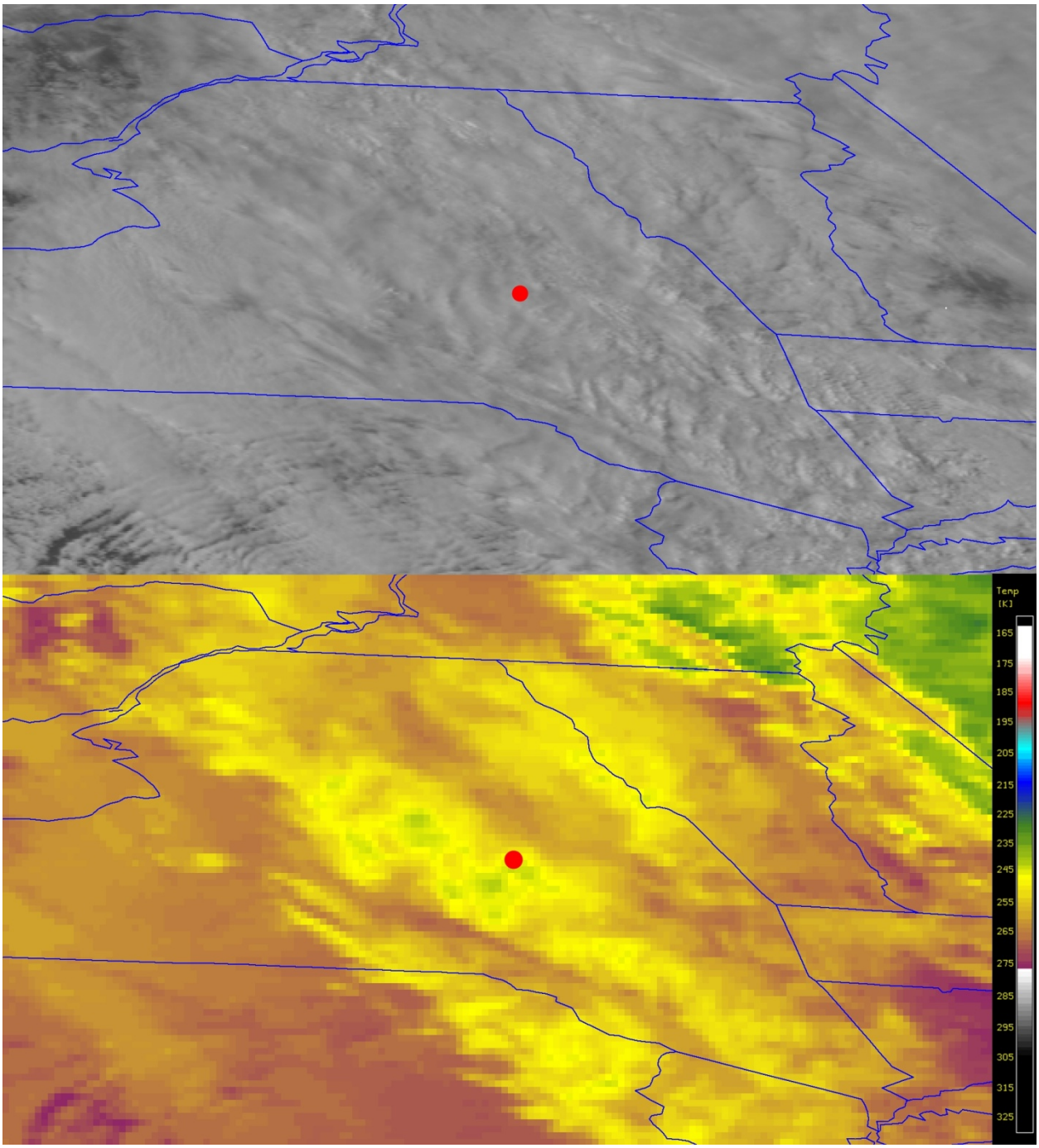

Figure 18 – GOES-14 imagery from 1715 EDT. Top: 0.65µm (visible) grayscale. Bottom: 10.7µm (infrared) color-enhanced. Red dots denote accident location.

Lightning

Total lightning data from Earth Networks did not indicate the presence of any lightning in the accident area within 15 minutes of the accident time.

Satellite Imagery

Geostationary Operational Environmental Satellite (GOES)-14 visible (0.65µm) and infrared (10.7µm) data were obtained from an archive at the Space Science Engineering Center (SSEC) at the University of Wisconsin-Madison (UW) in Madison, Wisconsin, and processed using the Man computer Interactive Data Access System (McIDAS). Imagery from 1715 EDT is presented in figure 18. The GOES-14 visible imagery identified cloudy conditions across the state of New York. Cloud-top temperatures from the GOES-14 infrared data varied between approximately -12°C and -32°C in the accident region. When considering the AMDAR data, these temperatures corresponded to heights of approximately 15,800 feet and 26,000 feet, respectively. It should be noted that all satellite data presented here have not been corrected for any parallax error.

Area Forecast

An Area Forecast that included New York was issued at 1345 EDT. The portion of the Area Forecast directed toward northeastern New York forecasted for times until 2300 EDT: ceiling overcast at 1,000-2,000 feet msl with cloud tops to FL180, surface visibility 3-5 miles, light rain and mist. The portion of the Area Forecast directed toward southeastern New York and Long Island forecasted for times until 2000 EDT: ceiling overcast at 1,500-2,500 feet msl with cloud tops to FL180, occasional surface visibility 3 miles, scattered light rain showers and mist. The portion of the Area Forecast directed toward central New York and eastern Lake Ontario forecasted for times until 2000 EDT: ceiling overcast at 2,000-3,000 feet msl with cloud tops to FL200, occasional surface visibility 3 miles, scattered light rain showers and mist, a northwest wind gusting to 25 knots.

FAUS41 KKCI 241745
FA1W
_BOSC FA 241745
SYNOPSIS AND VFR CLDS/WX
SYNOPSIS VALID UNTIL 251200
CLDS/WX VALID UNTIL 250600...OTLK VALID 250600-251200
ME NH VT MA RI CT NY LO NJ PA OH LE WV MD DC DE VA AND CSTL WTRS
.
SEE AIRMET SIERRA FOR IFR CONDS AND MTN OBSCN.
TS IMPLY SEV OR GTR TURB SEV ICE LLWS AND IFR CONDS.
NON MSL HGTS DENOTED BY AGL OR CIG.
.
SYNOPSIS...LOW PRES OVR RI CST WITH STNR THRU SERN NH-SRN ME AND CDFNT THRU VA CSTL SWD. BY 12Z LOW NRN MA WTRS WITH STNR FNT NEWD AND CDFNT SWD THRU ATLC WTRS.
.
NY LO
NERN NY...OVC010-020 TOP FL180. VIS 3-5SM -RA/BR. 03Z OVC035. VIS 3SM -RA/BR. OTLK...N CNTRL NY VFR NERN NY MVFR CIG RA BR.
SERN NY-LONG ISLAND...OVC015-025 TOP FL180. OCNL VIS 3SM SCT -SHRA/BR. 00Z OVC025 TOP FL200. OCNL VIS 3SM SCT -SHRA/BR.

OTLK...MVFR CIG SHRA BR.
CNTRL NY/ERN LO...OVC020-030 TOP FL200. OCNL VIS 3SM SCT -SHRA/BR. WND NW G25KT. BECMG 0002 OVC050 TOP 160. ISOL -SHRA. OTLK...VFR SHRA.
WRN NY/WRN LO...BKN030 TOP 120. WND NW G25KT. BECMG 2200 SCT-BKN050. TIL 01Z WND NW G25KT. OTLK...VFR.

Aviation Section of the Area Forecast Discussion

An Area Forecast Discussion (AFD) was issued at 1331 EDT by the NWS Weather Forecast Office (WFO) in Albany, New York (KALY). The aviation portion of the AFD is presented here.

FXUS61 KALY 241731
AFDALY
AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
131 PM EDT FRI MAY 24 2013

.AVIATION /18Z FRIDAY THROUGH WEDNESDAY/...
STEADIER RAIN HAS MOVED ACROSS THE TAF SITES EXCEPT AT KPSF AS AS LOW PRESSURE ALONG THE NEW ENGLAND COAST CONTINUED TO STRENGTHEN. EXPECT MVFR/IFR CIGS AND VSBYS FOR MUCH OF THE TAF PERIOD THROUGH THE OVERNIGHT HOURS. MUCH UNCERTAINTY EXISTS WITH THE TAFS FOR SATURDAY SO HAVE GENERALLY GONE WITH VFR VSBYS AND MVFR CIGS FM 12Z TO 18Z SATURDAY.
WINDS WILL GENERALLY BE NORTHWEST TO NORTH AT AROUND 10 KT WITH GUSTS 15 KT TO 20 KT...THEN JUST BECOME STEADY AT AROUND 10 KT TONIGHT. WINDS WILL THEN INCREASE AGAIN ON SATURDAY OUT OF THE NORTH AT 10 TO 15 KTS WITH GUSTS UP TO 25 KTS.

An AFD was issued at 1704 EDT by KALY. The aviation portion of this AFD is identical to the one issued at 1331 EDT.

FXUS61 KALY 242104
AFDALY
AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
504 PM EDT FRI MAY 24 2013

.AVIATION /21Z FRIDAY THROUGH WEDNESDAY/...
STEADIER RAIN HAS MOVED ACROSS THE TAF SITES EXCEPT AT KPSF AS AS LOW PRESSURE ALONG THE NEW ENGLAND COAST CONTINUED TO STRENGTHEN. EXPECT MVFR/IFR CIGS AND VSBYS FOR MUCH OF THE TAF PERIOD THROUGH THE OVERNIGHT HOURS. MUCH UNCERTAINTY EXISTS WITH THE TAFS FOR SATURDAY SO HAVE GENERALLY GONE WITH VFR VSBYS AND MVFR CIGS FM 12Z TO 18Z SATURDAY.

WINDS WILL GENERALLY BE NORTHWEST TO NORTH AT AROUND 10 KT WITH GUSTS 15 KT TO 20 KT...THEN JUST BECOME STEADY AT AROUND 10 KT TONIGHT. WINDS WILL THEN INCREASE AGAIN ON SATURDAY OUT OF THE NORTH AT 10 TO 15 KTS WITH GUSTS UP TO 25 KTS.

AIRMETs

Airmen's Meteorological Information (AIRMET) advisories issued for the northeastern portion of the United States for altitudes below 15,000 feet and active for the accident time are presented here (see Figure 19).

AIRMETs for IFR conditions and mountain obscuration were issued at 1645 EDT for regions that included the accident location.

WAUS41 KKCI 242045
WA1S
_BOSS WA 242045
AIRMET SIERRA UPDT 3 FOR IFR AND MTN OBSCN VALID UNTIL 250300
.
AIRMET IFR...ME NH VT MA RI CT NY NJ PA AND CSTL WTRS
FROM 70NW PQI TO 60NE PQI TO 140ESE ACK TO 170S ACK TO 160SE SIE TO 90ESE SIE TO 30S HTO TO 30SE BDL TO 30W BDL TO 20E SAX TO 50SSW SYR TO 30ENE MSS TO YSC TO 70NW PQI
CIG BLW 010/VIS BLW 3SM PCPN/BR. CONDS CONTG BYD 03Z THRU 09Z.
.
AIRMET MTN OBSCN...ME NH VT MA NY PA WV MD VA
FROM 70NW PQI TO MLT TO 20SSW CON TO HAR TO 30NNW LYH TO 30NNE BKW TO 30SE EWC TO JHW TO SYR TO MSS TO YSC TO 70NW PQI
MTNS OBSC BY CLDS/PCPN/BR. CONDS CONTG BYD 03Z THRU 09Z.

An AIRMET for moderate turbulence below 8,000 feet was issued at 1645 EDT for a region that included the accident location. AIRMETs for strong surface winds and low-level wind shear (LLWS) were also issued at 1645 EDT for regions that did not include the accident location.

WAUS41 KKCI 242045
WA1T
_BOST WA 242045
AIRMET TANGO UPDT 6 FOR TURB STG WNDS AND LLWS VALID UNTIL 250300
.
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 40SSW PVD TO 20ENE SIE TO 20NE ECG TO HMV TO HNN TO 30SE YYZ TO MSS TO YSC TO 70NW PQI
MOD TURB BLW 080. CONDS CONTG BYD 03Z THRU 09Z.
.
AIRMET STG SFC WNDS...ME NH MA RI NY NJ DE AND CSTL WTRS
FROM 90SSW YSJ TO 200SE ACK TO 210SSE HTO TO 50SE ACK TO 110ESE ENE TO 90SSW YSJ

SUSTAINED SURFACE WINDS GTR THAN 30KT EXP. CONDS CONTG BYD 03Z THRU 09Z.

.

LLWS POTENTIAL...ME NH MA CSTL WTRS
BOUNDED BY 70SW YSJ-150ESE ACK-80ESE ACK-90NE ACK-70SW YSJ
LLWS EXP. CONDS ENDG 21-00Z.

An AIRMET for moderate ice between the freezing level and FL220 feet was issued at 1645 EDT for a region that included the accident location.

WAUS41 KKCI 242045
WA1Z
_BOSZ WA 242045
AIRMET ZULU UPDT 3 FOR ICE AND FRZLVL VALID UNTIL 250300

.

AIRMET ICE...ME NH VT MA RI CT NY NJ PA AND CSTL WTRS
FROM 70NW PQI TO 60NE PQI TO 200SE ACK TO 160SE SIE TO 110E ECG TO 70SSE SBY TO CYN TO 20SW SAX TO 20W ETX TO 50E SLT TO MSS TO YSC TO 70NW PQI
MOD ICE BTN FRZLVL AND FL220. FRZLVL 050-120. CONDS CONTG BYD 03Z THRU 09Z.

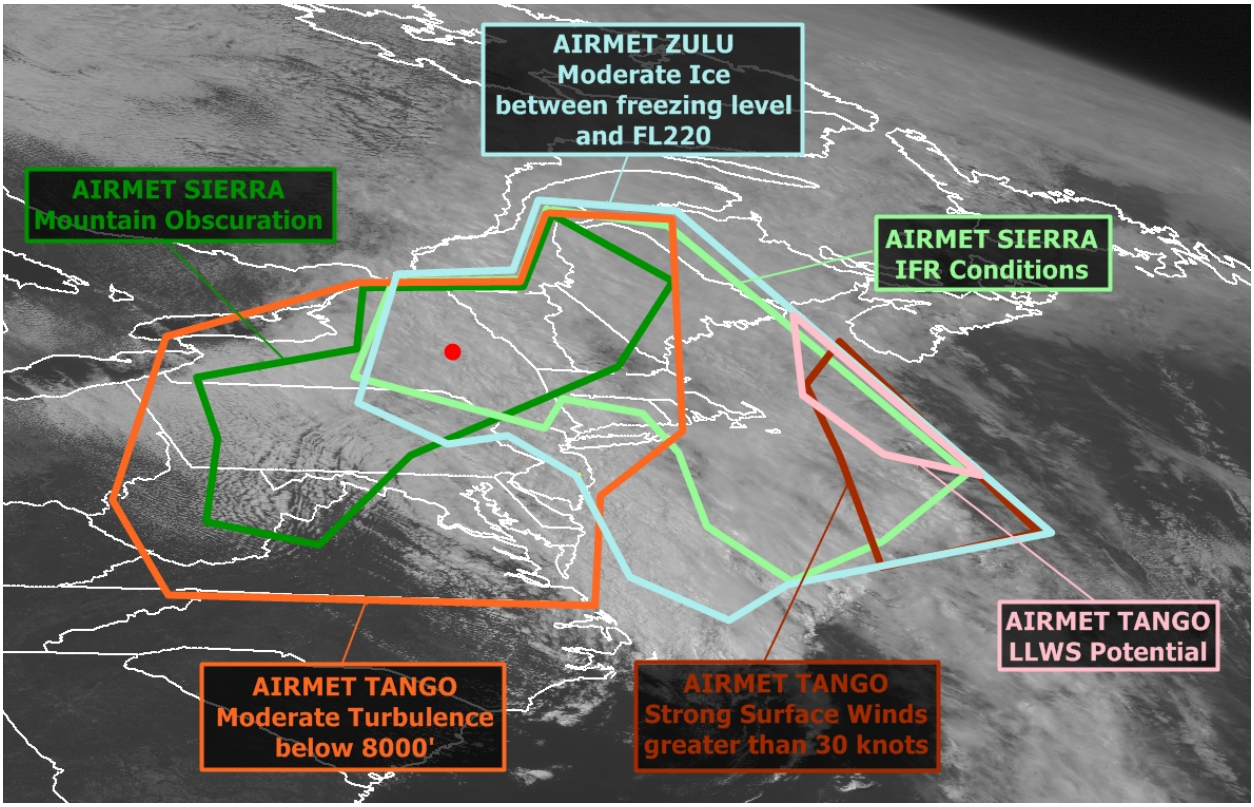

Figure 19 – Graphical depiction of AIRMET boundaries in presented in this section. Products overlaid onto GOES-14 0.65µm image from 1615 EDT (about one hour prior to the accident). Red dot denotes accident location.

SIGMETs

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

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 location at the accident time.

Pilot Weather Briefing

There were no records of a pre-flight weather briefing through Lockheed Martin Flight Services, DUAT or DUATs. The only pre-flight weather information the pilot is known to have accessed consisted of a radar summary through *fltplan.com*.

Astronomical Data

The astronomical data obtained from the United States Naval Observatory for 43.0°N and 74.5°W, indicated the following:

SUN	
Sunrise	0526 EDT
Sunset	2024 EDT
MOON	
Moonset	0458 EDT
Moonrise	2002 EDT

Submitted by: Mike Richards
NTSB, AS-30