



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

January 7, 2014

Group Chairman's Weather Study Report

METEOROLOGY

ERA14LA006

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A. ACCIDENT

Location: 30 miles southwest of Hampton Roads, Virginia
Date: October 10, 2013
Time: approximately 1209 eastern daylight time (1609 UTC¹)
Aircraft: Cessna 340A, registration: N4TK

B. METEOROLOGY GROUP

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C. SUMMARY

For a summary of the accident, refer to the *Accident Summary* report, which is available in the docket for this investigation.

D. DETAILS OF THE INVESTIGATION

The National Transportation Safety Board's (NTSB) Meteorologist was not on scene for this investigation and gathered all the weather data for this investigation from the NTSB's Washington D.C. office and from official National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) sources including the National Climatic Data Center (NCDC). All times are eastern daylight time (EDT) on October 10, 2013, and are based upon the 24-hour clock, where local time is -4 hours from UTC, and UTC=Z (unless otherwise noted). Directions are referenced to true north and distances in nautical miles. Heights are above mean sea level (msl) unless otherwise noted. Visibility is in statute miles and fractions of statute miles.

The accident location was located at latitude 36.70° N, longitude 76.77° W, elevation: 75 feet.

¹ UTC – is an abbreviation for Coordinated Universal Time.

E. FACTUAL INFORMATION

1.0 Synoptic Situation

The synoptic or large scale migratory weather systems influencing the area were documented using standard NWS charts issued by the National Center for Environmental Prediction (NCEP), and the Weather Prediction Center (WPC) located in College Park, Maryland. These are the base products used in describing synoptic weather features and in the creation of forecasts and warnings for the NWS. Reference to these charts can be found in the, joint NWS and Federal Aviation Administration (FAA) Advisory Circular “Aviation Weather Services”, AC-0045G CHG 1.

1.1 Surface Analysis Chart

The NWS Surface Analysis Chart for 1400 EDT is provided as figure 1, with the approximate location of the accident site marked. The chart depicted a stationary front from eastern Virginia stretching northward into the northeastern United States. A surface low pressure center with a pressure of 1007-hectopascals (hPa) was located off the eastern North Carolina coast. The station models around the accident site depicted air temperatures in the low 60’s to low 70’s Fahrenheit (F), with temperature-dew point spreads of 3° F or less, a north to northeast wind between 10 and 20 knots, and cloudy skies. The accident site was located in a favorable area for clouds and precipitation given the proximity of the stationary front and surface low pressure center. The stationary front and surface low pressure center would have acted as favorable lifting mechanisms to aid in the development of clouds and precipitation.

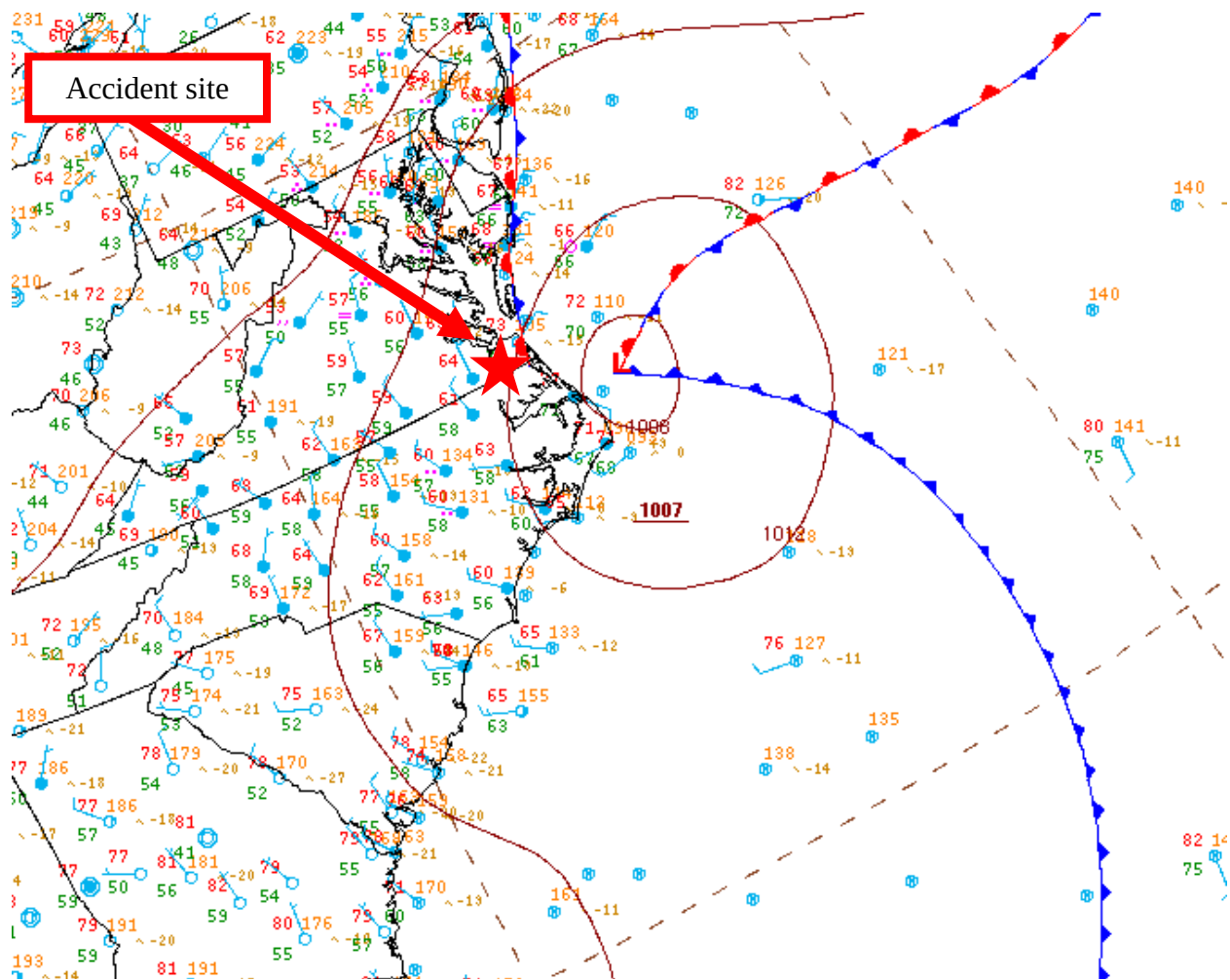


Figure 1 – NWS Surface Analysis Chart for 1400 EDT

1.2 Upper Air Charts

The NWS Storm Prediction Center (SPC) Constant Pressure Charts for 0800 EDT at 925-, 850-, 700-, 500-, and 300-hPa are presented in figures 2 through 6. The 925-, 850-, and 700-hPa chart depicted a closed low-level low pressure system located along the eastern North Carolina coast. This closed low pressure system acted as a lifting mechanism to aid in the formation of clouds and precipitation at and around the accident site. In addition, the wind between 925- and 700-hPa was easterly allowing for the moist low-level air from the Atlantic Ocean to spread westward into North Carolina and Virginia. By 300-hPa the wind was out of the south-southeast near 30 knots. The low and mid-level environment was favorable for the formation of clouds and precipitation at the accident site at the accident time.

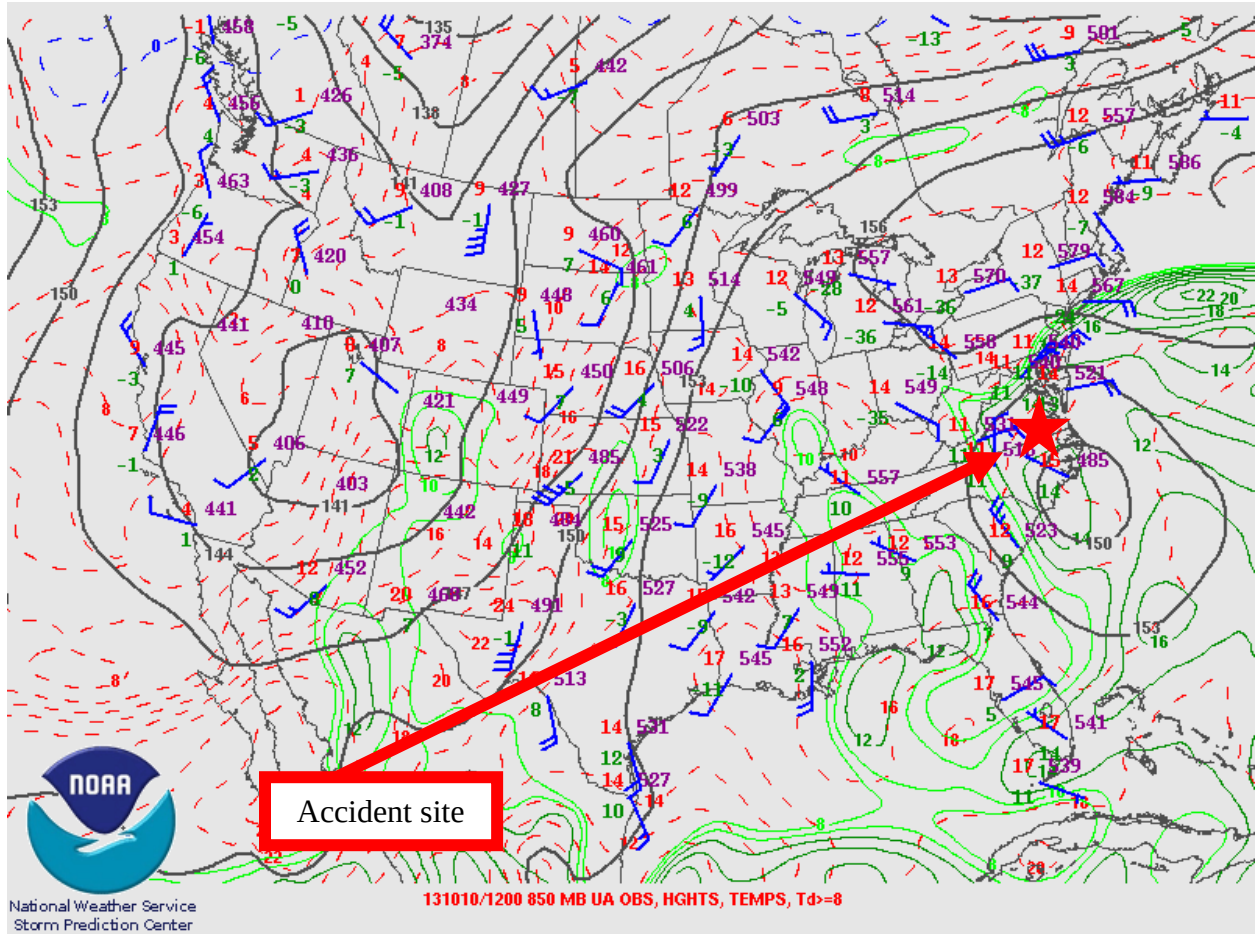


Figure 3 – 850-hPa Constant Pressure Chart for 0800 EDT

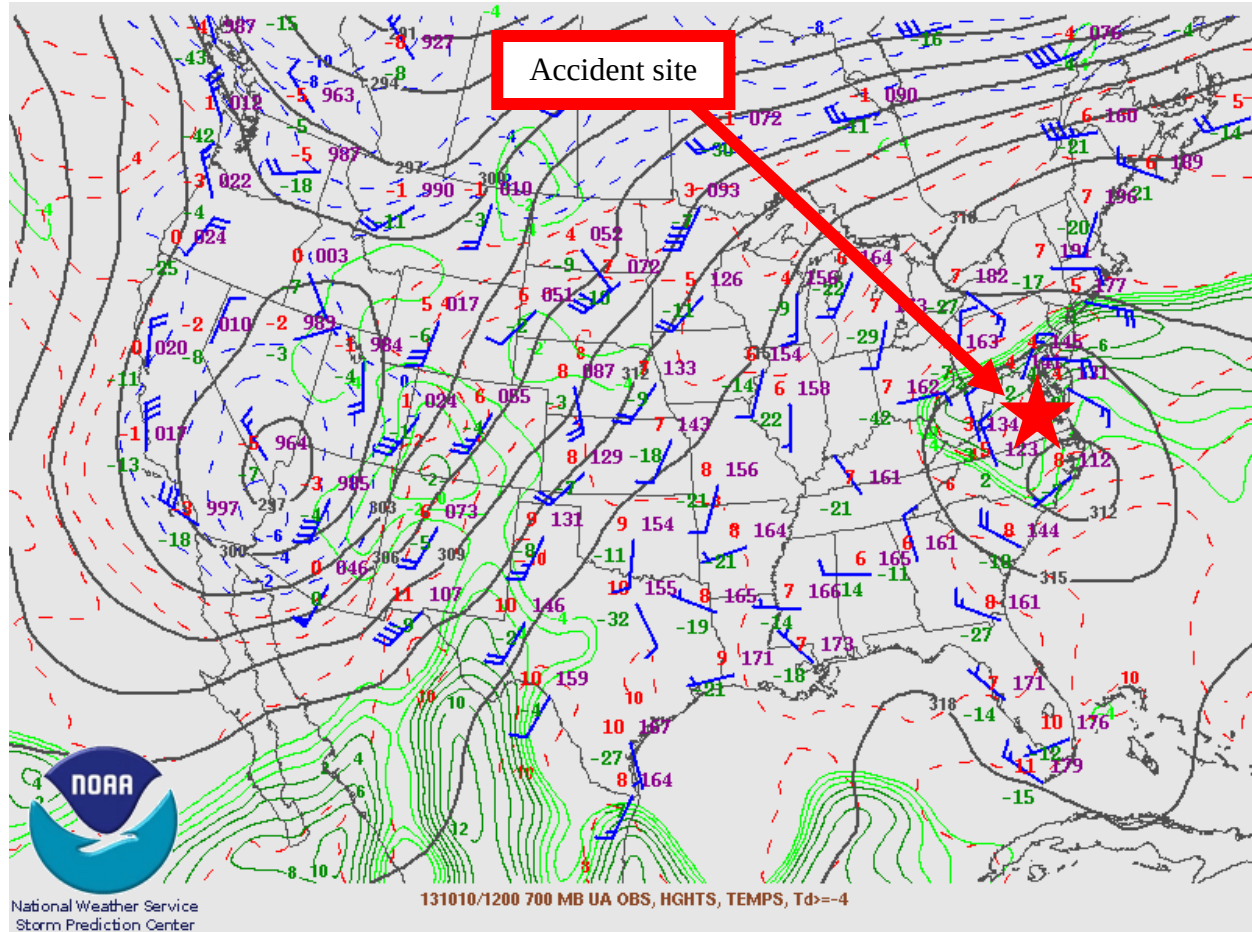


Figure 4 – 700-hPa Constant Pressure Chart for 0800 EDT

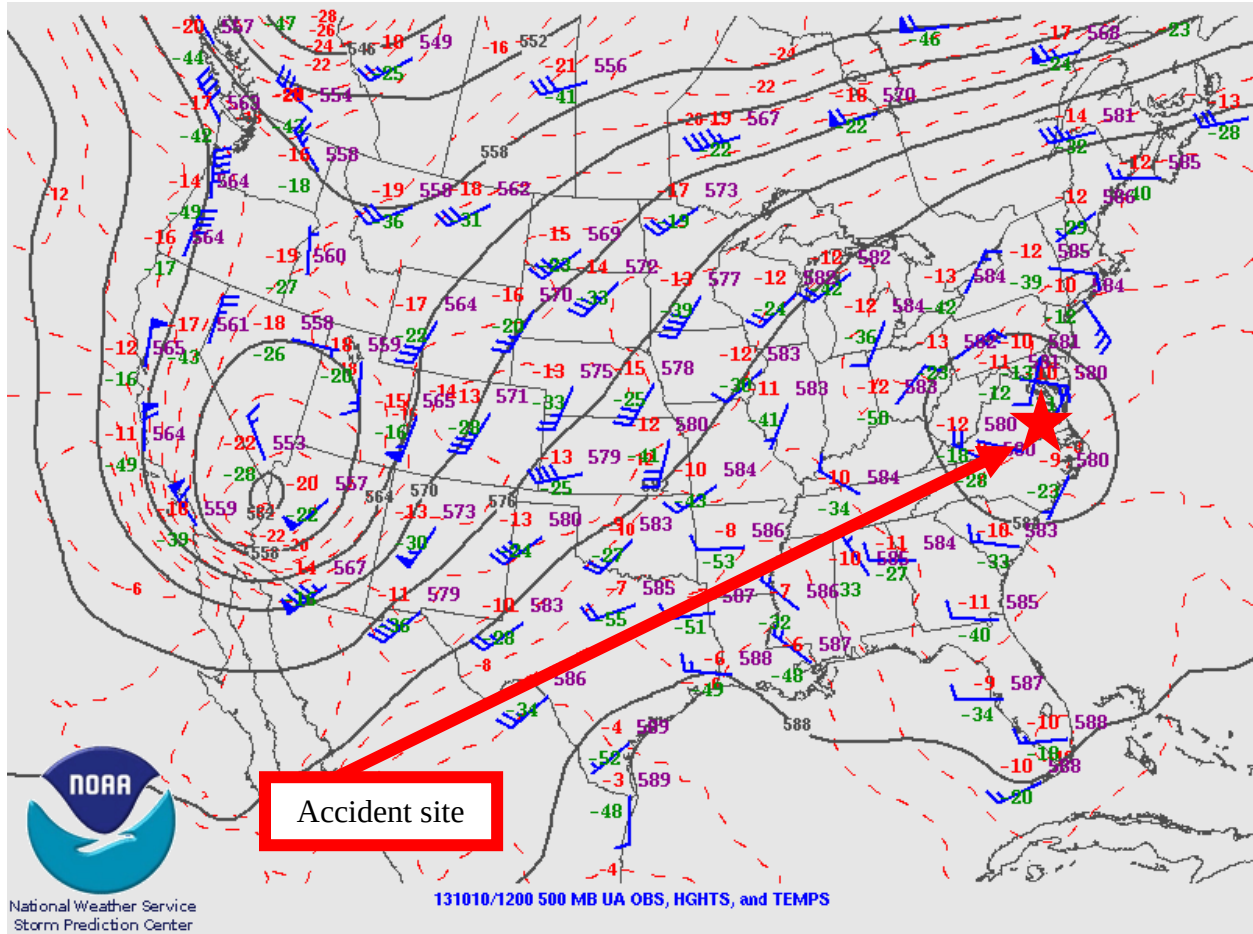


Figure 5 – 500-hPa Constant Pressure Chart for 0800 EDT

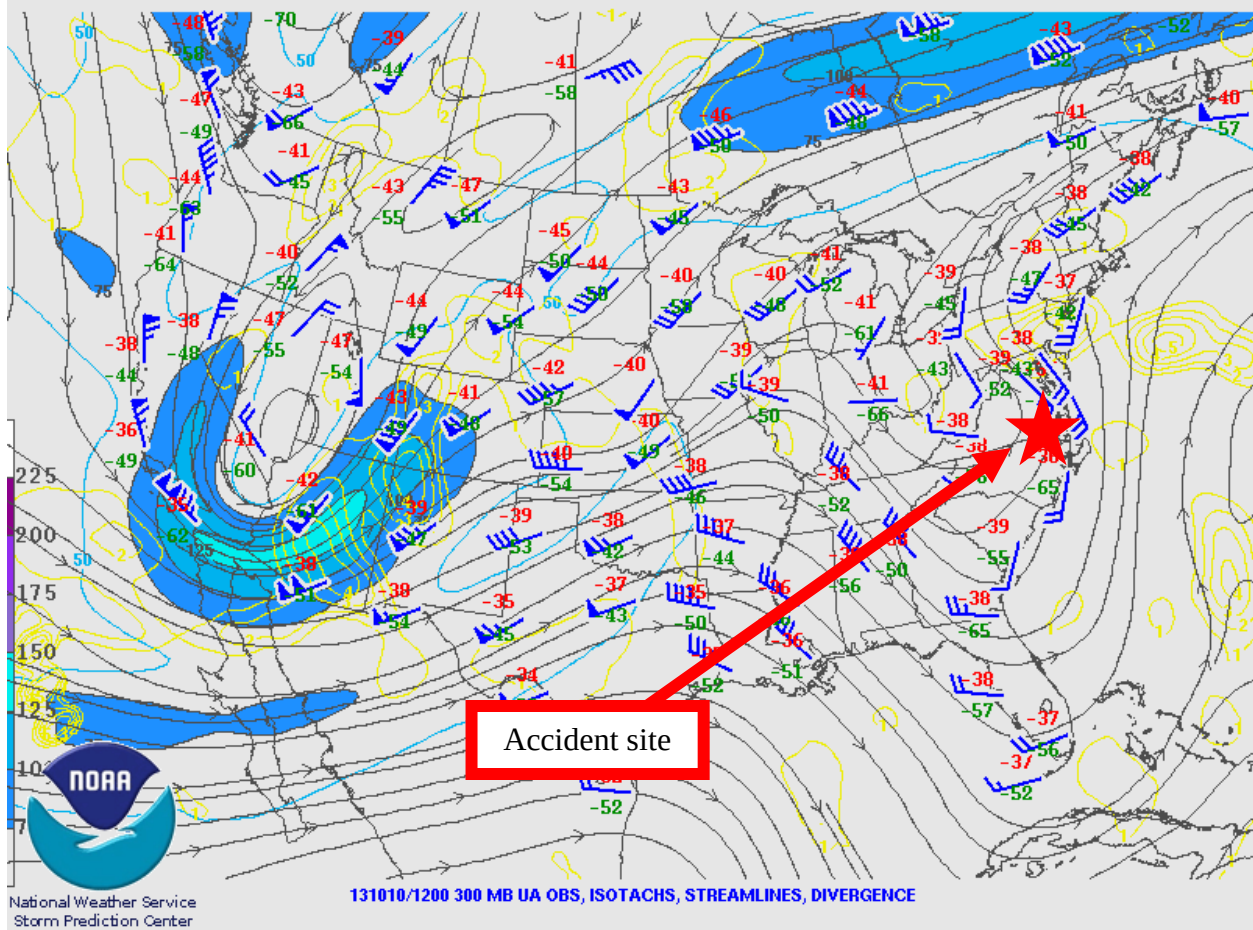


Figure 6 – 300-hPa Constant Pressure Chart for 0800 EDT

2.0 Storm Prediction Center Products

No severe weather SPC products were issued for the accident site at the accident time.

3.0 Surface Observations

The area surrounding the accident site was documented utilizing official NWS Meteorological Aerodrome Reports (METARs) and Specials (SPECIs). The following observations were taken from standard code and are provided in plain language.

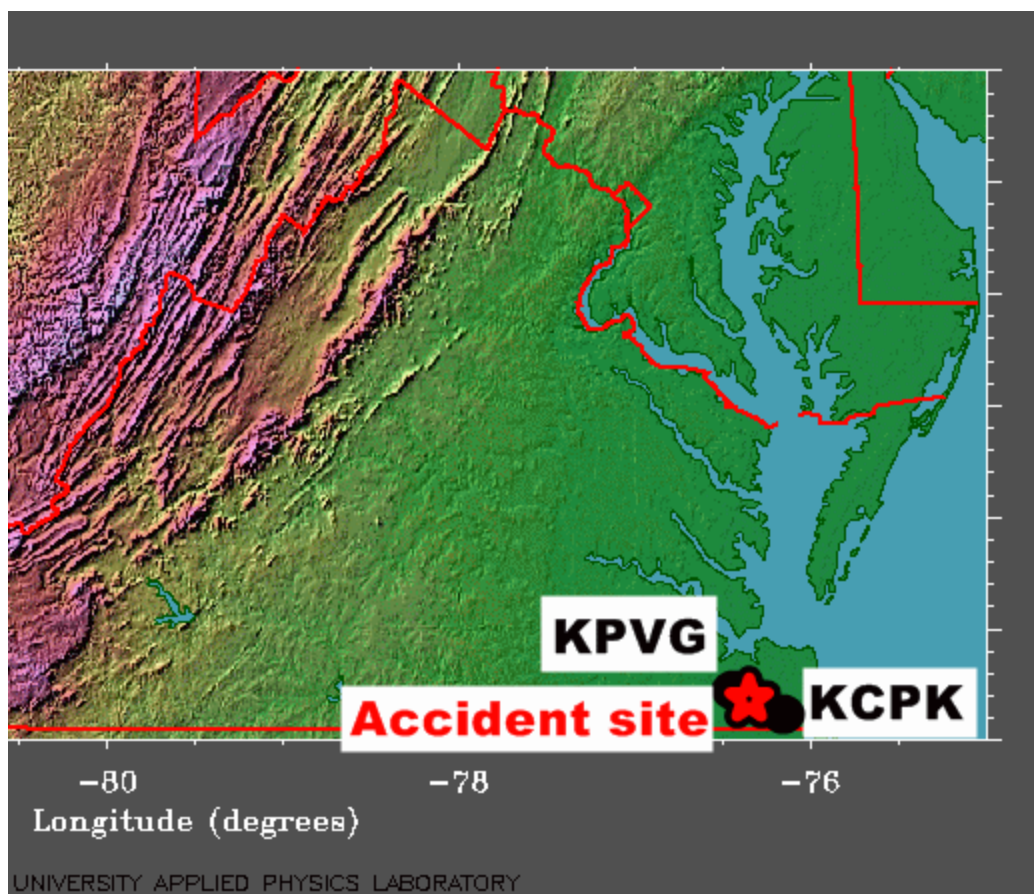


Figure 7 – Map of Virginia with the location of the accident site and surface observation sites

Chesapeake Regional Airport (KCPK) was located 12 miles south of Norfolk, Virginia, and had an Automated Weather Observing System (AWOS²) whose reports were not supplemented by a human observer. KCPK was located 3 miles southeast of the accident site, at an elevation of 19 feet, and had an 11° westerly magnetic variation³ (figure 7). The following observations were taken and disseminated during the times surrounding the accident⁴:

[1015 EDT] KCPK 101415Z AUTO 00000KT 2 1/2SM RA OVC004 21/20 A2990
RMK AO2 P0001=

[1035 EDT] KCPK 101435Z AUTO 02008G16KT 2SM RA OVC004 21/20 A2989
RMK AO2 P0001=

² AWOS – Automated Weather Observing System is equipped with meteorological instruments to observe and report temperature, dewpoint, wind speed and direction, visibility, cloud coverage and ceiling up to twelve thousand feet, and altimeter setting.

³ Magnetic variation – The angle (at a particular location) between magnetic north and true north.

⁴ The bold sections in this NWS product and the rest of products in the weather study report are to highlight the individual sections that directly reference the weather conditions that are or will affect the accident location around the accident time.

[1055 EDT] KCPK 101455Z AUTO 36010G16KT 1 1/4SM +RA OVC004 21/20
A2989 RMK AO2 VIS 1/2V3 P0006=

[1115 EDT] KCPK 101515Z AUTO 34006KT 7SM VCTS OVC006 21/20 A2989
RMK AO2 LTG DSNT E P0006=

**[1135 EDT] KCPK 101535Z AUTO 36005G17KT 7SM -VCTSRA BKN006 OVC011
21/21 A2988 RMK AO2 P0007=**

**[1155 EDT] KCPK 101555Z AUTO 00000KT 7SM -RA BKN006 OVC011 21/20 A2988
RMK AO2=**

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**[1215 EDT] KCPK 101615Z AUTO 00000KT 4SM +RA OVC006 21/20 A2988
RMK AO2 LTG DSNT E P0003=**

**[1235 EDT] KCPK 101635Z AUTO 00000KT 5SM -RA OVC006 21/21 A2987
RMK AO2 LTG DSNT E P0006=**

[1255 EDT] KCPK 101655Z AUTO 00000KT 4SM RA OVC006 21/20 A2986
RMK AO2 P0004=

[1315 EDT] KCPK 101715Z AUTO 34004G16KT 7SM -RA BKN006 OVC011
20/19 A2986 RMK AO2 P0009=

[1335 EDT] KCPK 101735Z AUTO 34012G16KT 3SM +RA OVC006 20/19 A2985
RMK AO2 P0014=

[1355 EDT] KCPK 101755Z AUTO 34008G19KT 2SM +TSRA BKN006 OVC014
19/19 A2984 RMK AO2 VIS 3/4V5 LTG DSNT SW P0015=

KCPK weather at 1135 EDT, wind from 360° at 5 knots with gusts to 17 knots, 7 miles visibility, vicinity⁵ thunderstorms and light rain, a broken ceiling at 600 feet above ground level (agl), overcast skies at 1,100 feet agl, temperature of 21° Celsius (C), dew point temperature of 21° C, and an altimeter setting of 29.88 inches of mercury. Remarks: automated station with a precipitation discriminator, one hourly precipitation of 0.07 inches.

KCPK weather at 1155 EDT, wind calm, 7 miles visibility, light rain, a broken ceiling at 600 feet agl, overcast skies at 1,100 feet agl, temperature of 21° C, dew point temperature of 20° C, and an altimeter setting of 29.88 inches of mercury. Remarks: automated station with a precipitation discriminator.

⁵ Vicinity – Weather phenomena between 5 and 10 statute miles of the point(s) of observation.

KCPK weather at 1215 EDT, wind calm, 4 miles visibility, heavy rain, an overcast ceiling at 600 feet agl, temperature of 21° C, dew point temperature of 20° C, and an altimeter setting of 29.88 inches of mercury. Remarks: automated station with a precipitation discriminator, lightning distant⁶ east, one hourly precipitation of 0.03 inches.

KCPK weather at 1235 EDT, wind calm, 5 miles visibility, light rain, an overcast ceiling at 600 feet agl, temperature of 21° C, dew point temperature of 21° C, and an altimeter setting of 29.87 inches of mercury. Remarks: automated station with a precipitation discriminator, lightning distant east, one hourly precipitation of 0.06 inches.

Hampton Roads Executive Airport (KPVG) was located 7 miles southwest of Norfolk, Virginia, and had an AWOS whose reports were not supplemented by a human observer. KPVG was located 8 miles northwest of the accident site, at an elevation of 23 feet, and had a 10° westerly magnetic variation (figure 7). The following observations were taken and disseminated during the times surrounding the accident:

[1015 EDT] KPVG 101415Z 36007KT 310V010 4SM OVC005 19/18 A2994
RMK AO1=

[1035 EDT] KPVG 101435Z 01006KT 2 1/2SM OVC004 19/18 A2993 RMK
AO1 P0001=

[1055 EDT] KPVG 101455Z 36006KT 3SM OVC003 19/18 A2993 RMK AO1
P0002 60011 54000=

[1115 EDT] KPVG 101515Z 01008G15KT 330V030 3SM OVC004 19/18 A2992
RMK AO1 P0001=

**[1135 EDT] KPVG 101535Z 36008KT 320V030 3SM OVC004 19/18 A2992
RMK AO1 P0003=**

**[1155 EDT] KPVG 101555Z 36008KT 320V020 5SM OVC005 18/18 A2992
RMK AO1 P0004=**

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**[1215 EDT] KPVG 101615Z 36009G15KT 3SM OVC005 18/18 A2992 RMK
AO1 P0001=**

**[1235 EDT] KPVG 101635Z 36007G17KT 330V030 9SM OVC005 18/17 A2991
RMK AO1 P0003=**

[1255 EDT] KPVG 101655Z 36007G15KT 330V040 9SM OVC005 18/18 A2990
RMK AO1 P0005=

⁶ Distant – Weather phenomena beyond 10 statute miles of the point(s) of observation.

[1315 EDT] KPVG 101715Z 34008G15KT 310V020 4SM OVC005 18/17 A2990
RMK AO1=

[1335 EDT] KPVG 101735Z 35010KT 320V020 5SM OVC005 18/17 A2989
RMK AO1 P0002=

[1355 EDT] KPVG 101755Z 35009G15KT 320V020 7SM OVC006 18/17 A2988
RMK AO1 LTG DSNT SW P0006 60026 10190 20180 57017=

KPVG weather at 1135 EDT, wind from 360° at 8 knots, wind variable between 320° and 020°, 3 miles visibility, an overcast ceiling at 400 feet agl, temperature of 19° C, dew point temperature of 18° C, and an altimeter setting of 29.92 inches of mercury. Remarks: automated station without a precipitation discriminator, one hourly precipitation of 0.03 inches.

KPVG weather at 1155 EDT, wind from 360° at 8 knots, wind variable between 320° and 020°, 5 miles visibility, an overcast ceiling at 500 feet agl, temperature of 18° C, dew point temperature of 18° C, and an altimeter setting of 29.92 inches of mercury. Remarks: automated station without a precipitation discriminator, one hourly precipitation of 0.04 inches.

KPVG weather at 1215 EDT, wind from 360° at 9 knots with gusts to 15 knots, 3 miles visibility, an overcast ceiling at 500 feet agl, temperature of 18° C, dew point temperature of 18° C, and an altimeter setting of 29.92 inches of mercury. Remarks: automated station without a precipitation discriminator, one hourly precipitation of 0.01 inches.

KPVG weather at 1235 EDT, wind from 360° at 7 knots with gusts to 17 knots, wind variable between 330° and 030°, 9 miles visibility, an overcast ceiling at 500 feet agl, temperature of 18° C, dew point temperature of 17° C, and an altimeter setting of 29.91 inches of mercury. Remarks: automated station without a precipitation discriminator, one hourly precipitation of 0.03 inches.

The observations from KCPK and KPVG indicated abundant rain at the surface at and around the time of the accident with light and heavy rain reported around the accident time. IFR⁷ ceilings were also present throughout the time surrounding the accident with ceiling around 500 feet agl. The wind was out of the north with some surface wind gusts above 15 knots around the accident time and thunderstorms were also reported near KCPK around the accident time. All of these observations are consistent with the larger scale environment presented in section 1.1 and 1.2. The weather radar data will further describe this rainy environment in time and space around the accident site (section 6.0).

⁷ Instrument Flight Rules – Refers to the general weather conditions pilots can expect at the surface. IFR criteria means a ceiling below 1,000 feet agl and/or less than 3 miles visibility.

4.0 Upper Air Data

The closest official upper air sounding to the accident site was from Wallops Island, Virginia, (KWAL), which was approximately 85 miles north-northeast of the accident site, with a site number 72402, and a station elevation of 10 feet. The 0800 EDT sounding from KWAL was plotted on a standard Skew-T log P diagram⁸ with the derived stability parameters included in figure 8 (with data from the surface to 650-hPa, or 12,000 feet msl). This data was analyzed utilizing the RAOB⁹ software package. The sounding depicted a relatively moist vertical environment with the Lifted Condensation Level (LCL)¹⁰ at 556 feet msl and a Convective Condensation Level (CCL)¹¹ of 397 feet. The freezing level was located at 13,141 feet msl. The precipitable water value was 1.84 inches.

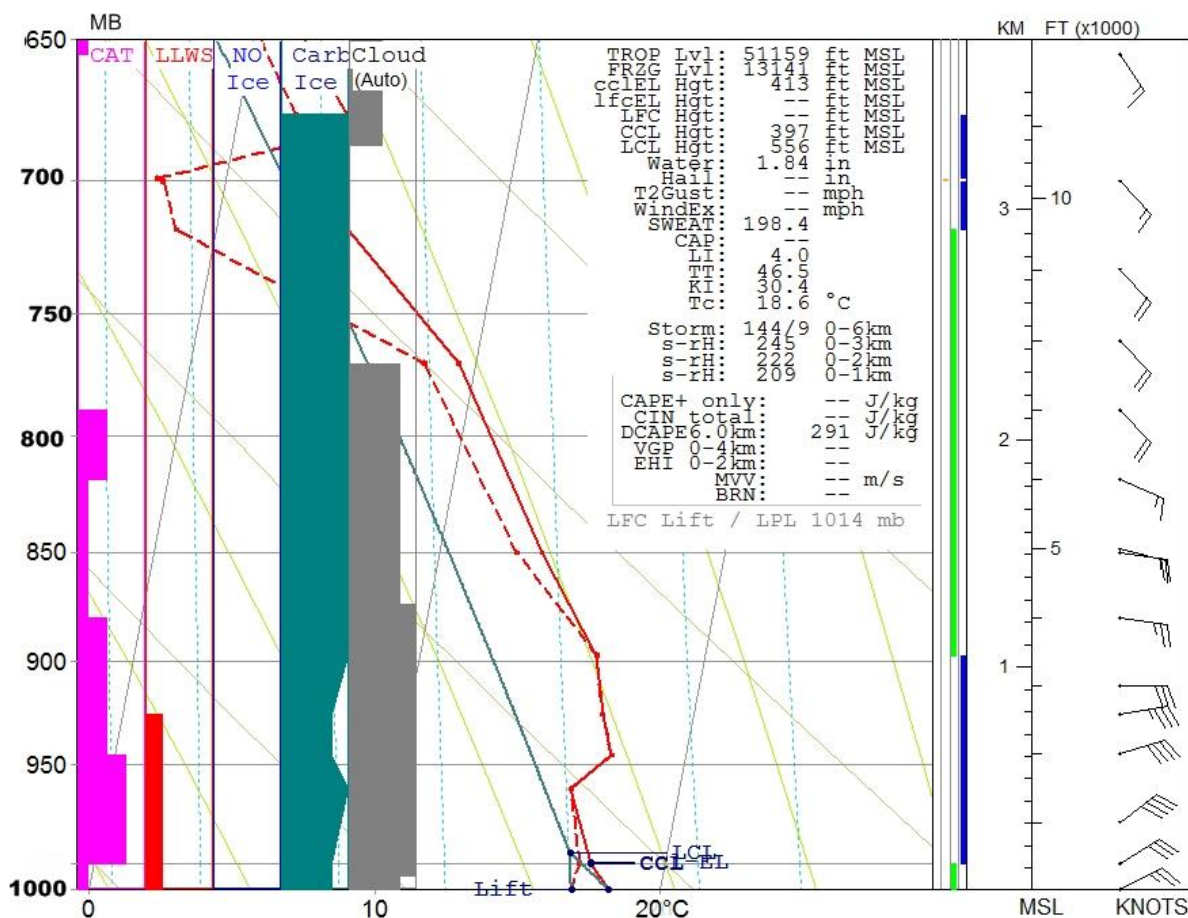


Figure 8 – 0800 EDT KWAL sounding

⁸ Skew T log P diagram – is a standard meteorological plot using temperature and the logarithmic of pressure as coordinates, used to display winds, temperature, dew point, and various indices used to define the vertical structure of the atmosphere.

⁹ RAOB – (The complete Rawinsonde Observation program) is an interactive sounding analysis program developed by Environmental Research Services, Matamoras, Pennsylvania.

¹⁰ Lifting Condensation Level (LCL) - The height at which a parcel of moist air becomes saturated when it is lifted dry adiabatically.

¹¹ Convective Condensation Level (CCL) – The level in the atmosphere to which an air parcel, if heated from below, will rise dry adiabatically, without becoming colder than its environment just before the parcel becomes saturated.

The 0800 EDT KWAL sounding indicated a relatively moist conditionally unstable environment from the surface through 10,000 feet msl. This environment would have been supportive of cloud formation and precipitation. The potential for clouds was indicated by RAOB between the surface and 8,000 feet. No icing conditions were indicated by RAOB below 12,000 feet.

The sounding wind profile indicated a surface wind from 060° at 23 knots that increased to 40 knots by 1,000 feet. The wind then decreased in speed while veering¹² to the southwest through 12,000 feet. Low-level wind shear (LLWS) was identified by RAOB between the surface and 2,000 feet with potential for clear air turbulence from the surface through 7,000 feet. The highest likelihood of turbulence was located in the first 2,000 feet.

5.0 Satellite Data

Visible and infrared data from the Geostationary Operational Environmental Satellite number 13 (GOES-13) data was obtained from the NCDC and processed with the NTSB's Man-computer Interactive Data Access System (McIDAS) workstation. Visible and infrared imagery (GOES-13 band 1 and 4) at wavelengths of 0.65 microns (μm) and 10.7 μm retrieved brightness temperatures for the scene. Satellite imagery surrounding the time of the accident, from 1100 EDT through 1400 EDT at approximately 15-minute intervals, was reviewed and the closest images to the time of the accident are documented here.

Figures 9 and 10 present the GOES-13 visible imagery from 1202 and 1215 EDT at 2X magnification. The visible imagery showed abundant cloud cover moving from east to west across the accident site. Figure 11 presents the GOES-13 infrared imagery from 1215 EDT at 6X magnification. The infrared imagery indicated a large area of high clouds (colder temperatures) just to the east of the accident site at 1215 EDT. Based on the brightness temperatures above the accident site and the vertical temperature profile provided by the 0800 EDT KWAL sounding, the approximate cloud-top heights over the accident site were 29,000 feet at 1215 EDT.

¹² Veering wind – Wind which changes in a clockwise direction with time at a given location, or which changes direction in a clockwise sense with height.

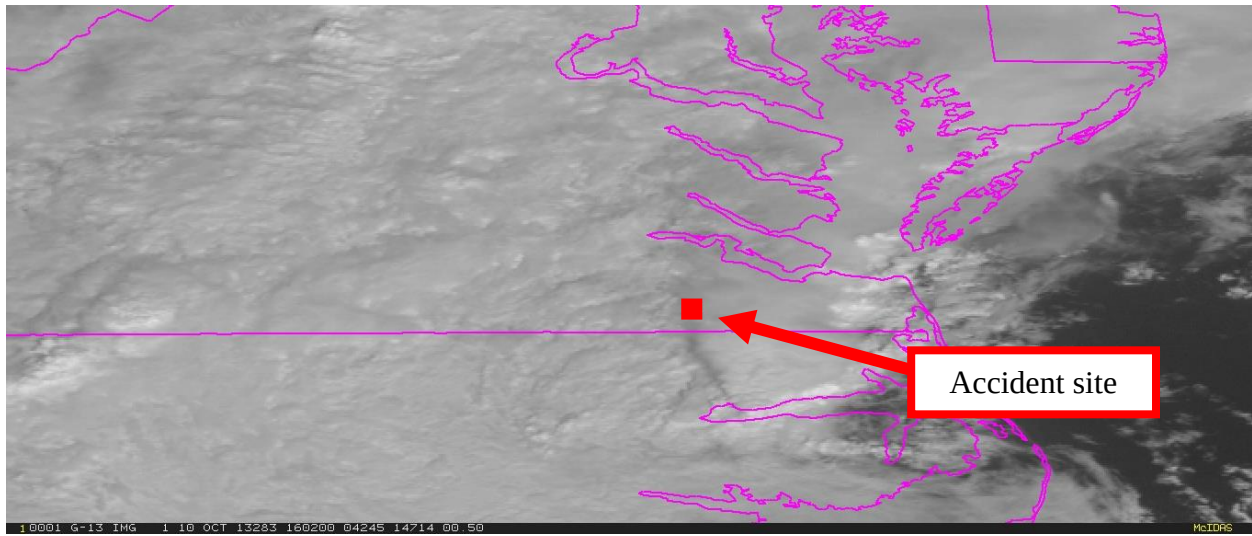


Figure 9 – GOES-13 visible image at 1202 EDT

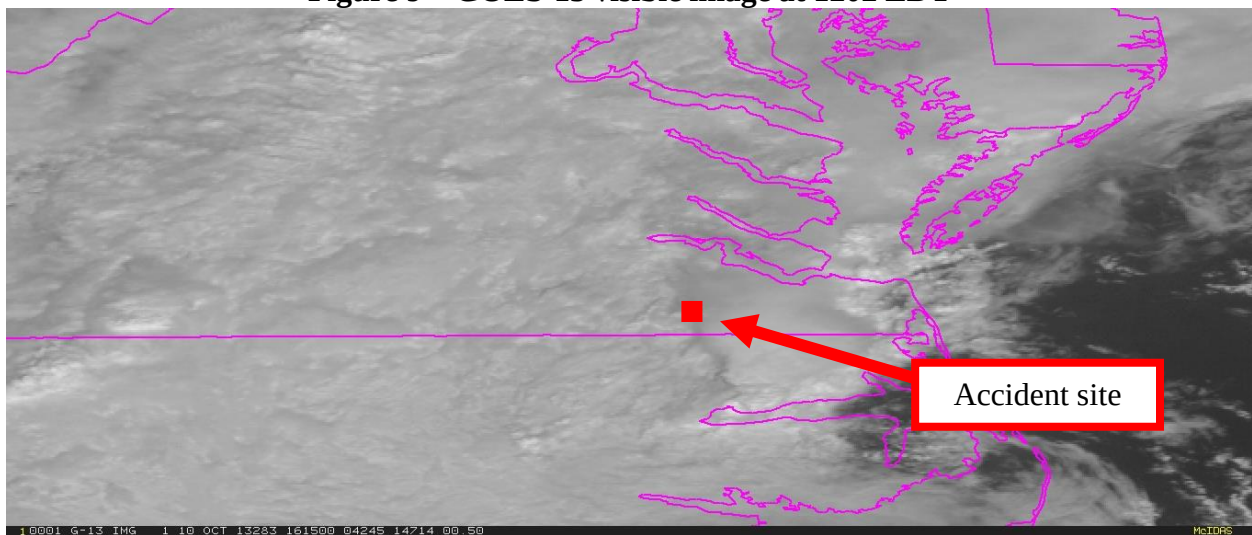


Figure 10 – GOES-13 visible image at 1215 EDT

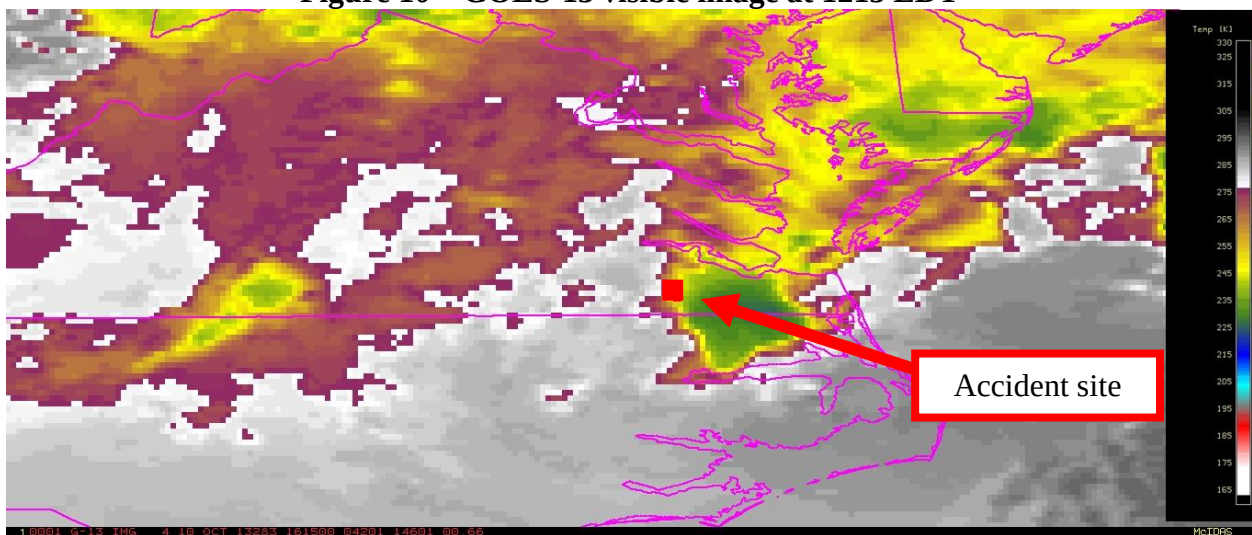


Figure 11 – GOES-13 infrared image at 1215 EDT

6.0 Radar Imagery Information

The closest NWS Weather Surveillance Radar-1988, Doppler (WSR-88D) was KAKQ located near Wakefield, Virginia, approximately 35 miles west-northwest of the accident site at an elevation of 112 feet. Level II and III archive radar data was obtained from the NCDC utilizing the NEXRAD Data Inventory Search and displayed using the NOAA's Weather and Climate Toolkit software.

The WSR-88D is an S-band 10-centimeter wavelength radar with a power output of 750,000 watts, and with a 28-foot parabolic antenna that concentrates the energy between a 0.87° and 0.96° beam width¹³. The radar produces three basic types of products: base reflectivity, base radial velocity, and base spectral width.

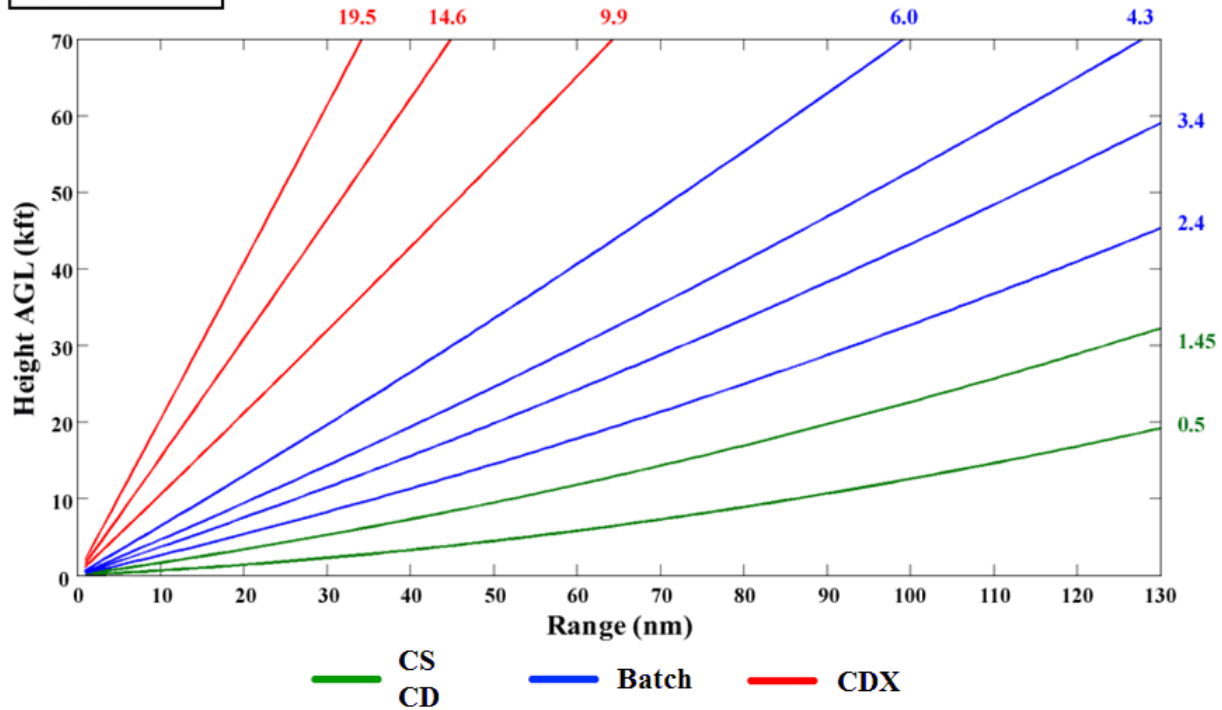
6.1 Volume Scan Strategy

The WSR-88D is a computer-controlled radar system, which automatically creates a complete series of specific scans in a specific sequence known as a volume scan. Individual elevation scans are immediately available on the WSR-88D's Principle Users Processor (PUP). Products that require data from multiple elevation scans are not available until the end of the five to ten minute volume scan.

The WSR-88D operates in several different scanning modes, identified as Mode A and Mode B. Mode A is the precipitation scan and has two common scanning strategies. The most common is where the radar makes 9 elevation scans from 0.5° to 19.5° every six minutes. This particular scanning strategy is documented as volume coverage pattern 21 (VCP-21). Mode B is the clear-air mode, where the radar makes 5 elevation scans during a ten minute period. During the period surrounding the accident, the KAKQ WSR-88D radar was operating in the precipitation mode (Mode A, VCP-21). The following chart provides an indication of the different elevation angles in this VCP, and the approximate height and width of the radar beam with distance from the radar site.

¹³ Beam width – A measure of the angular width of a radar beam.

VCP 21



VCP-21 Precipitation Mode Scan Strategy

6.2 Beam Height Calculation

Assuming standard refraction¹⁴ of the WSR-88D 0.95° wide radar beam, the following table shows the approximate beam height and width information¹⁵ of the radar display over the site of the accident. The heights have been rounded to the nearest 10 feet.

ANTENNA ELEVATION	BEAM CENTER	BEAM BASE	BEAM TOP	BEAM WIDTH
0.5°	2,850 feet	1,130 feet	4,580 feet	3,450 feet

Based on the radar height calculations, the 0.5° elevation scan depicted the conditions between 1,130 feet and 4,580 feet msl over the accident site, and this antenna elevation is the closest to accident aircraft's altitude¹⁶ before the aircraft accident.

¹⁴ Standard Refraction in the atmosphere is when the temperature and humidity distributions are approximately average, and values set at the standard atmosphere.

¹⁵ Beamwidth values are shown for legacy resolution products. Super resolution products would have an effective beamwidth that would be approximately half these values.

¹⁶ For more information see the ATC Data.

6.3 Reflectivity

Reflectivity is the measure of the efficiency of a target in intercepting and returning radio energy. With hydrometeors¹⁷ it is a function of the drop size distribution, number of particles per unit volume, physical state (ice or water), shape, and aspect. Reflectivity is normally displayed in decibels (dBZ¹⁸), and is a general measure of echo intensity. The chart below relates the NWS video integrator and processor (VIP) intensity levels versus the WSR-88D's display levels, precipitation mode reflectivity in decibels, and rainfall rates.

NWS VIP/DBZ CONVERSION TABLE

NWS VIP	WSR-88D LEVEL	PREC MODE DBZ	RAINFALL
0	0	< 5	
	1	5 to 9	
	2	10 to 14	
1 Very Light	3	15 to 19	.01 in/hr
	4	20 to 24	.02 in/hr
	5	25 to 29	.04 in/hr
2 Light to Moderate	6	30 to 34	.09 in/hr
	7	35 to 39	.21 in/hr
3 Strong	8	40 to 44	.48 in/hr
4 Very Strong	9	45 to 49	1.10 in/hr
5 Intense	10	50 to 54	2.49 in/hr
6 Extreme	11	55 to 59	>5.67 in/hr
	12	60 to 64	
	13	65 to 69	
	14	70 to 74	
	15	> 75	

¹⁷ Hydrometeors are any product of condensation or sublimation of atmospheric water vapor, whether formed in the free atmosphere or at the earth's surface; also, any water particles blown by the wind from the earth's surface. Hydrometeors are classified as; (a) Liquid or solid water particles suspended in the air: cloud, water droplets, mist or fog. (b) Liquid precipitation: drizzle and rain. (c) Freezing precipitation: freezing drizzle and freezing rain. (d) Solid (frozen) precipitation: ice pellets, hail, snow, snow pellets, and ice crystals. (e) Falling particles that evaporate before reaching the ground: virga. (f) Liquid or solid water particles lifted by the wind from the earth's surface: drifting snow, blowing snow, blowing spray. (g) Liquid or solid deposits on exposed objects: dew, frost, rime, and glazed ice.

¹⁸ dBZ – A non-dimensional “unit” of radar reflectivity which represents a logarithmic power ratio (in decibels , or dB) with respect to radar reflectivity factor, Z.

The Federal Aviation Administration (FAA) Advisory Circular AC 00-24B titled “Thunderstorms” dated January 2, 1983, also defines the echo intensity levels and potential weather phenomena associated with those levels. If the maximum VIP Level is 1 “weak” and 2 “moderate”, then light to moderate turbulence is possible with lightning. VIP Level 3 is “strong” and severe turbulence is possible with lightning. VIP Level 4 is “very heavy” and severe turbulence is likely with lightning. VIP Level 5 is “intense” with severe turbulence, lightning, hail likely, and organized surface wind gusts. VIP Level 6 is “extreme” with severe turbulence, lightning, large hail, extensive surface wind gusts and turbulence.

6.4 Radar Summary

Figure 12 provides a radar summary image from 1215 EDT with reflectivity values over the eastern United States, with the accident site located in an area near 20 to 30 dBZ values. These reflectivity values indicate very light to moderate echoes near the accident site around the accident time.

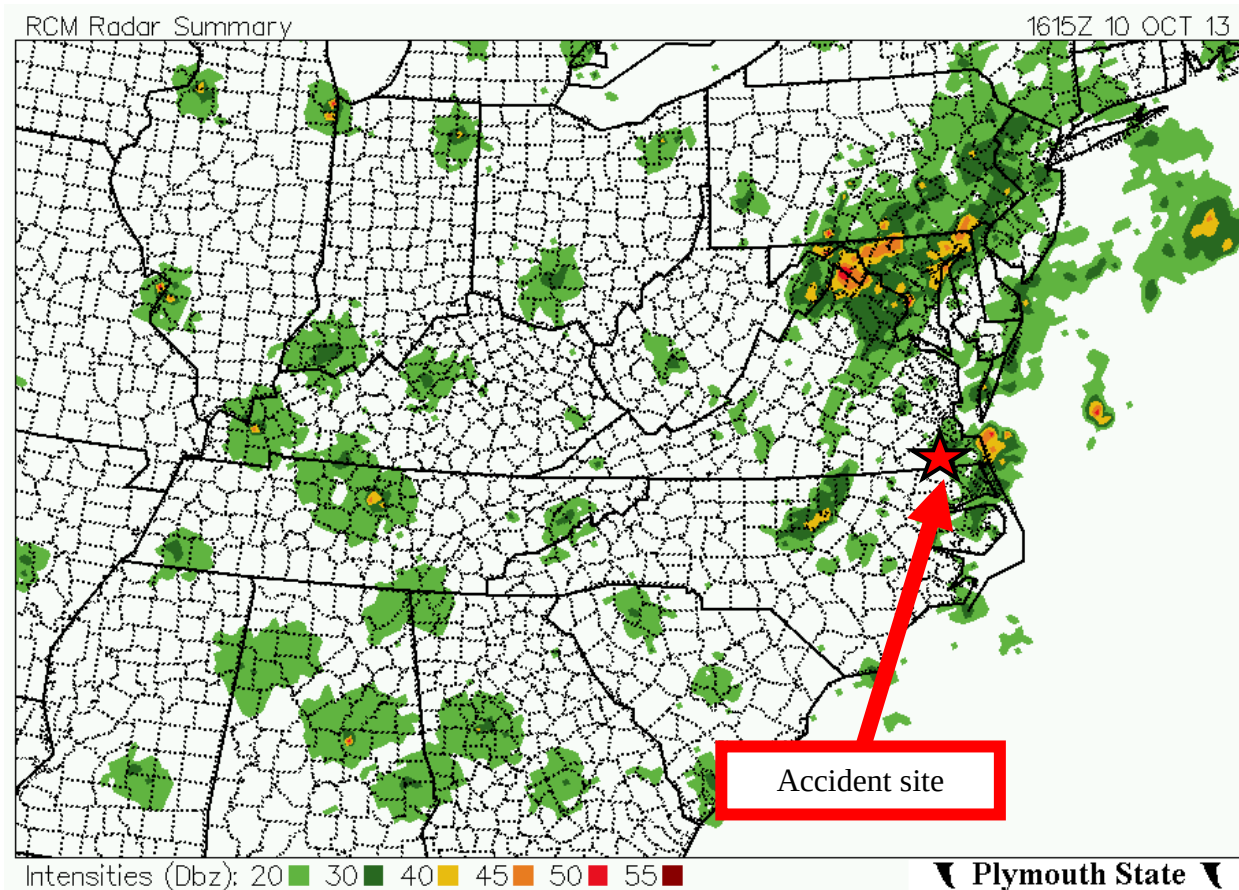


Figure 12 – Radar summary image for 1215 EDT with the accident site

6.5 Base Reflectivity and Lightning Data

Figures 13 through 16 present the KAKQ WSR-88D base reflectivity image for the 0.5° elevation scans initiated at 1159, 1205, 1211, and 1217 EDT with a resolution of 0.5° X 250 m. 20 to 35 dBZ reflectivity values occur and move from east to west across the accident site between 1159 and 1217 EDT. These dBZ values indicated light to moderate echoes in and around the accident site at the accident time. The light to moderate precipitation would have only added a flying hazard to the IFR ceiling and visibility conditions already present along with the gusty surface and low-level wind conditions. Lightning data was reviewed for this case and no lightning strikes occurred near the accident site at the accident time.

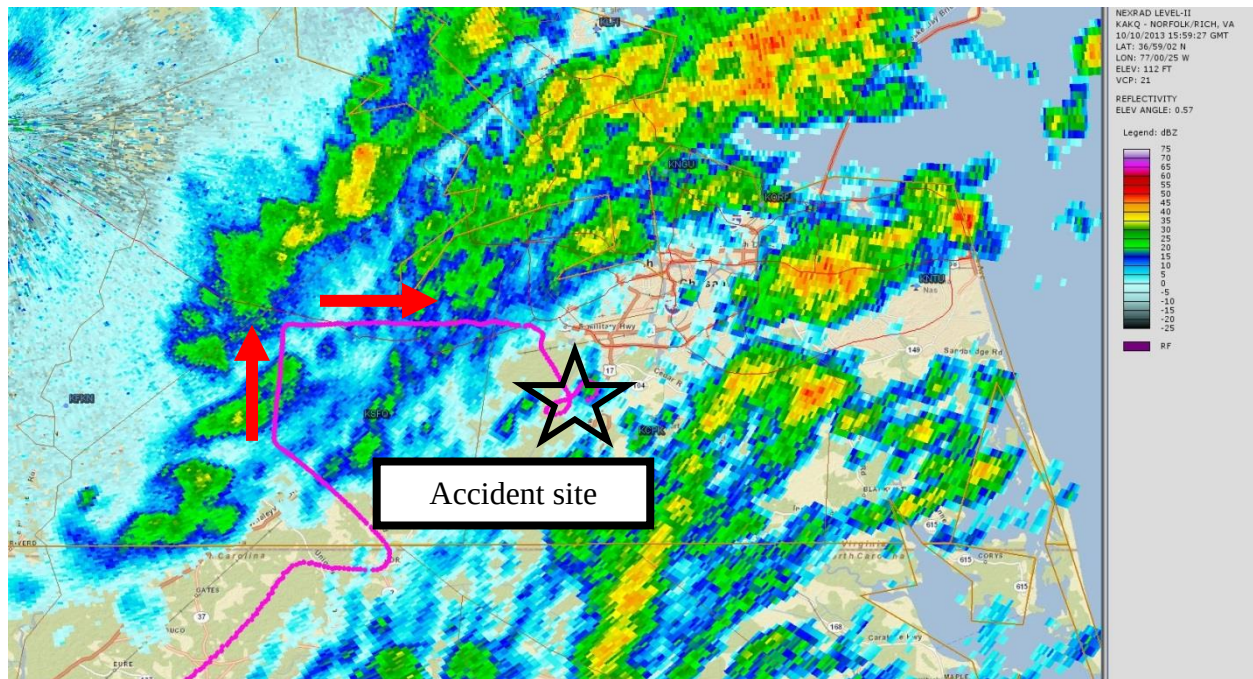


Figure 13 – KAKQ WSR-88D reflectivity for the 0.5° elevation scan initiated at 1159 EDT with ATC flight track points

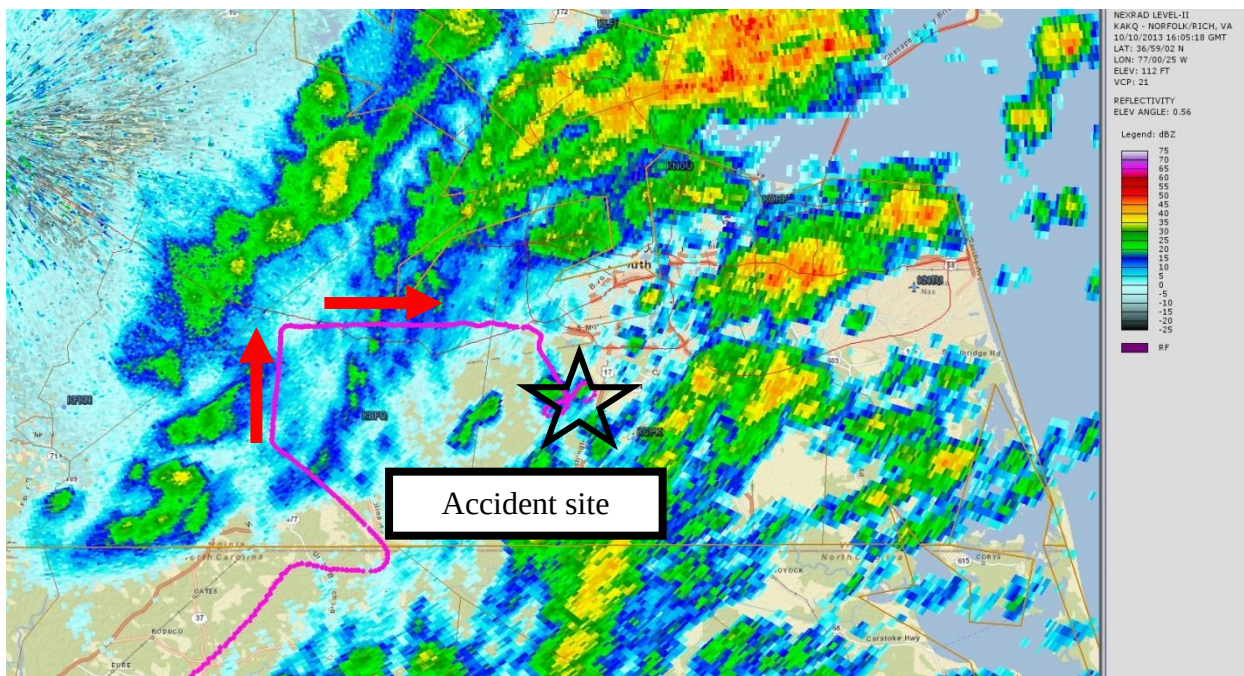


Figure 14 – KAKQ WSR-88D reflectivity for the 0.5° elevation scan initiated at 1205 EDT with ATC flight track points

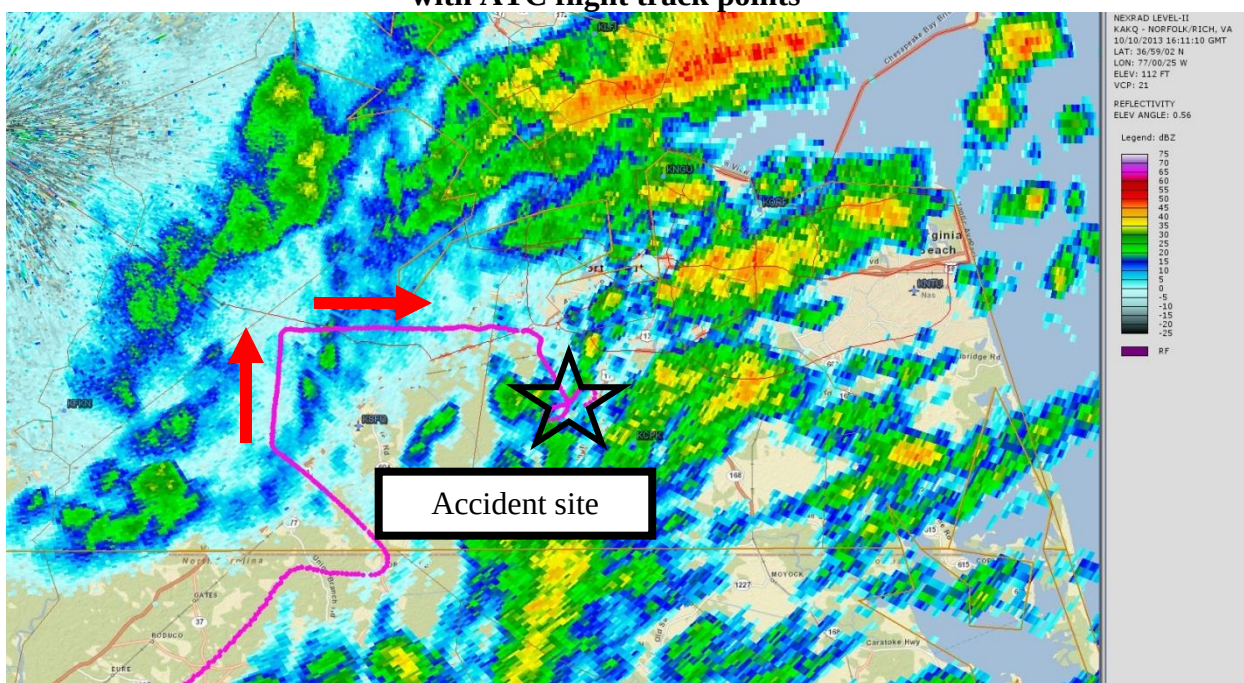


Figure 15 – KAKQ WSR-88D reflectivity for the 0.5° elevation scan initiated at 1211 EDT with ATC flight track points

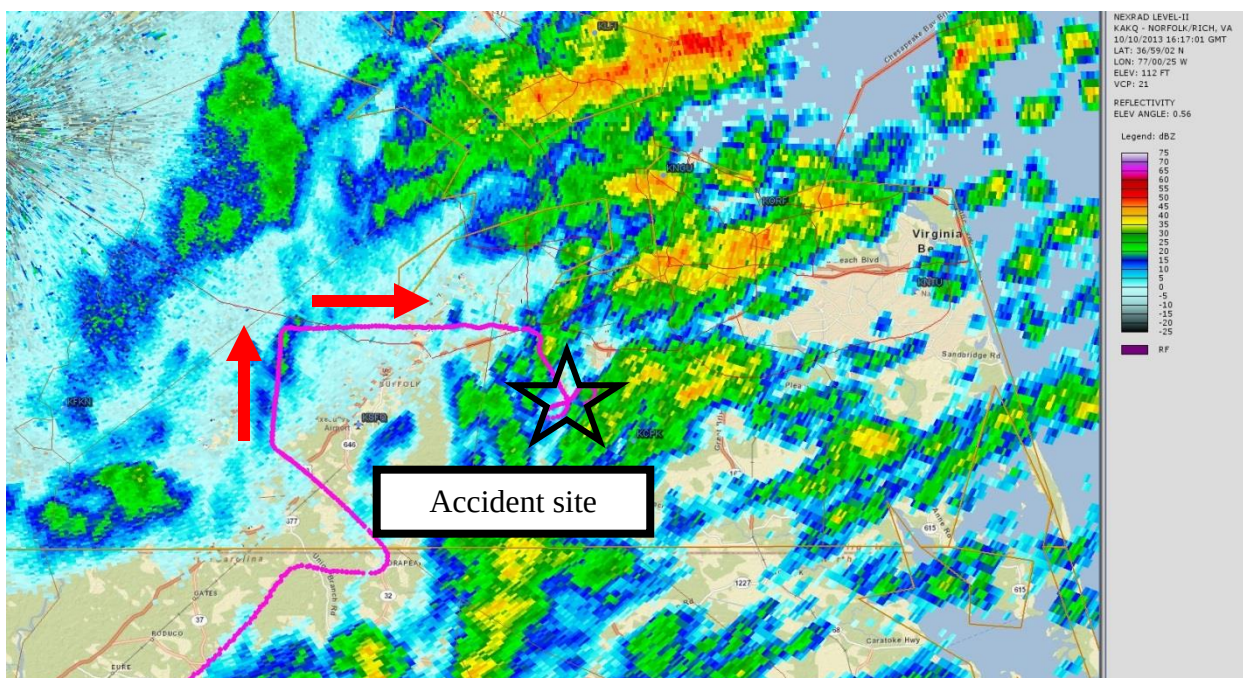


Figure 16 – KAKQ WSR-88D reflectivity for the 0.5° elevation scan initiated at 1217 EDT with ATC flight track points

7.0 Pilot Reports

All pilot reports (PIREPs) were reviewed close to the accident site from around two hours prior to the accident time to around two hours after the accident time near the accident flight level:

RIC UA /OV RIC /TM 1450 /FLUNKN /TP E135 /SK OVC005 /RM FA RY 2=

ORF UA /OV ORF /TM 1513 /FLUNKN /TP CRJ7 /SK OVC003 /RM DURC=

LFI UA /OV ORF360015 /TM 1513 /FLUNKN /TP CRJ7 /SK OVC-TOP110/ SKC /RM DURC=

RIC UA /OV RIC /TM 1538 /FLUNKN /TP BE9L /TB CONS MOD CHOP BLO 040 /RM 8 MILE FINAL RWY 2=

RIC UA /OV HPW /TM 1608 /FL020 /TP E190 /SK BKN-OVCUNKN-TOP050 /TB CONS LGT CHOP BLO 020 /RM DURD NEG TB 090-020=

Routine pilot report (UA); Over Richmond, Virginia; Time – 1050 EDT (1450Z); Altitude – Unknown; Type aircraft – Embraer ERJ-135; Sky – Overcast at 500 feet; Remarks – Final approach to runway 2.

Routine pilot report (UA); Over Norfolk, Virginia; Time – 1113 EDT (1513Z); Altitude – Unknown; Type aircraft – Canadair Regional Jet CRJ-700; Sky – Overcast at 300 feet; Remarks – During climb.

Routine pilot report (UA); 15 miles from Norfolk, Virginia, on the 360° radial; Time – 1113 EDT (1513Z); Altitude – Unknown; Type aircraft – Canadair Regional Jet CRJ-700; Sky overcast with tops at 11,000 feet; Remarks – During climb.

Routine pilot report (UA); Over Richmond, Virginia; Time – 1138 EDT (1538Z); Altitude – Unknown; Type aircraft – Beechcraft King Air 90; Turbulence – Continuous moderate chop below 4,000 feet; Remarks – 8 mile final on runway 2.

Routine pilot report (UA); Over Hopewell, Virginia; Time – 1208 EDT (1608Z); Altitude – 2,000 feet; Type aircraft – Embraer ERJ-190; Sky – Broken-overcast at height unknown with tops at 5,000 feet; Turbulence – Continuous light chop below 2,000 feet; Remarks – During descent negative turbulence between 9,000 and 2,000 feet.

8.0 SIGMET, CWA, and MIS

A Meteorological Impact Statement (MIS) was issued at 0932 EDT and was valid for the accident site at the accident time. The MIS warned of IFR ceilings, visibilities between 1 and 5 miles, rain, and mist for Virginia. It also warned of light to moderate turbulence below FL420¹⁹ with thunderstorms along the Virginia and North Carolina coast:

FAUS20 KZDC 101332
2013283 1332
ZDC MIS 01 VALID 101315-102100
...FOR ATC PLANNING PURPOSES ONLY...
IFR CIG 004-012 SHRA NC INCLUDG RDU...IMPROV MVFR CIG 015
SHRA AFT 16Z. **MVFR/IFR CIG 005-015 OCNL VIS 1-5SM RA BR VA N**
INCLUDG DCA IAD BWI ORF...LGT-MOD ICE 120-FL280 SAME AREA.
OCNL LGT-MOD TURB BLW FL420. TSRA TOPS FL450 VA/NC COAST
MOVG NNW IMPACTG J79 121 174.

There was no SIGMET or CWSU Advisory (CWA) valid for the accident site at the accident time.

9.0 AIRMETs

AIRMETs Tango and Sierra issued at 1045 EDT, and valid at the accident time, forecasted IFR conditions for the accident site with ceilings below 1,000 feet and visibilities below 3 miles with precipitation and mist, and moderate turbulence conditions below 8,000 feet:

WAUS41 KKCI 101445
WA1Z
_BOSZ WA 101445
AIRMET ZULU UPDT 2 FOR ICE AND FRZLVL VALID UNTIL 102100
.
AIRMET ICE...MA RI CT NY NJ PA WV MD DC DE VA AND CSTL WTRS

¹⁹ Flight Level – A Flight Level (FL) is 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 inHg), the average sea-level pressure, and therefore is not necessarily the same as the aircraft's true altitude either above mean sea level or above ground level.

FROM 30E ALB TO 30SE BOS TO 130ESE ACK TO 200SE ACK TO 190S ACK
TO 40ESE SIE TO 30SE DCA TO 50NE RDU TO 40WSW PSK TO 30SSW AIR TO
20E SLT TO 30N HNK TO 30E ALB
MOD ICE BTN 140 AND FL250. CONDS CONTG BYD 21Z THRU 03Z.

.
FRZLVL...RANGING FROM 120-140 ACRS AREA

....
WAUS41 KPCI 101445
WA1T
_BOST WA 101445
AIRMET TANGO UPDT 2 FOR TURB VALID UNTIL 102100

.
AIRMET TURB...ME NH VT MA RI CT NY LO NJ PA LE MD DE AND CSTL
WTRS
FROM 80NW PQI TO 60NE PQI TO 200SE ACK TO 210SSE HTO TO 150SE
SIE TO HTO TO HNK TO 30WNW JHW TO YYZ TO YOW TO YSC TO 80NW PQI
MOD TURB BTN FL180 AND FL400. CONDS CONTG BYD 21Z THRU 03Z.

.
**AIRMET TURB...MA RI CT NY NJ PA WV MD DC DE VA AND CSTL WTRS
FROM 50ESE BOS TO 70SE ACK TO 200SSE ACK TO 70SE SIE TO 40ENE
ORF TO 20S ORF TO 50SSW CSN TO 40NNW CSN TO 40WSW HNK TO 50ESE
BOS
MOD TURB BLW 080. CONDS CONTG BYD 21Z THRU 03Z.**

.
OTLK VALID 2100-0300Z...TURB MA RI CT NY NJ PA MD DC DE VA AND
CSTL WTRS
BOUNDED BY 70SE ENE-40NNE ACK-170SSE ACK-30SE SIE-20S ORF-20SSE
CSN-30WSW HNK-20ESE HNK-20SSW ALB-70SE ENE
MOD TURB BLW 080. CONDS CONTG THRU 03Z.

....
WAUS41 KPCI 101445
WA1S
_BOSS WA 101445
AIRMET SIERRA UPDT 2 FOR IFR AND MTN OBSCN VALID UNTIL 102100

.
**AIRMET IFR...MA RI CT NY NJ PA WV MD DC DE VA NC AND CSTL WTRS
FROM 40ENE SAX TO ACK TO 140S ACK TO 80SE SIE TO 40SSE SBY TO
130ESE ILM TO 110SSE ILM TO 40S ILM TO 40ESE HNV TO 20SSW BKW TO
20NNW EKN TO 40SW HAR TO 20NW HAR TO 40ENE SAX
CIG BLW 010/VIS BLW 3SM PCPN/BR. CONDS CONTG BYD 21Z THRU 03Z.**

.
AIRMET MTN OBSCN...PA WV MD VA
FROM 20S HNK TO CSN TO 20N GSO TO HNV TO JST TO 20S HNK
MTNS OBSC BY CLDS/PCPN/BR. CONDS CONTG BYD 21Z THRU 03Z.

.
OTLK VALID 2100-0300Z
AREA 1...IFR MA RI CT NY NJ PA WV MD DC DE VA NC SC AND CSTL WTRS
BOUNDED BY BOS-80E BOS-130S ACK-60SSE SBY-100SSE ECG-150ESE ILM-
150SSE ILM-60ENE CHS-20ENE GSO-60SSW JST-60ESE SLT-30NNE SAX-
20SW PVD-BOS
CIG BLW 010/VIS BLW 3SM PCPN/BR. CONDS CONTG THRU 03Z.

.
AREA 2...MTN OBSCN MA NY PA WV MD VA
BOUNDED BY 20NNW HNK-40SSW ALB-20N ETX-20ESE HAR-30SW CSN-20NNE
GSO-HNV-20NNE EKN-20NNE JST-20NNW HNK
MTNS OBSC BY CLDS/PCPN/BR. CONDS CONTG THRU 03Z.

....

10.0 Area Forecast

The Area Forecast issued at 0924 EDT, valid at the accident time, forecasted an overcast ceiling at 1,500 feet with tops to FL180, visibilities between 3 and 5 miles, light rain, and mist. Isolated embedded thunderstorms were also forecast with cumulonimbus tops to FL380:

FAUS41 KKCI 101324 AAA

FA1W

_BOSC FA 101324 AMD

SYNOPSIS AND VFR CLDS/WX

SYNOPSIS VALID UNTIL 110300

CLDS/WX VALID UNTIL 102100...OTLK VALID 102100-110300

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...09Z SFC LOW OVR NC CSTL WTRS WITH TROF NWD TO LONG ISLAND. WRMFNT EXTDG EWD FROM SFC LOW. HIGH PRES OVR NEW ENGLAND AND NY. LTL CHANGE THRU 03Z.

.
ME

SWRN...BKN CI. TIL 13Z VIS 3-5SM BR. OTLK...VFR.

RMNDR...SCT-BKN CI. OTLK...VFR.

.
NH VT

BKN CI. TIL 15Z VIS 3-5SM BR. OTLK...VFR.

.
MA RI CT

CAPE COD AND CSTL PTNS OF RI/CT...SCT015 OVC CI. BECMG 1215

BKN020 OVC150 TOP FL260. OCNL -RA. OTLK...MVFR CIG RA.

RMNDR RI/CT...BKN CI. BECMG 1518 SCT020 OVC150 TOP FL260.

OTLK...VFR...BECMG 0103 MVFR CIG RA.

RMNDR MA...BKN CI. TIL 13Z VIS 3-5SM BR. 18Z BKN150 TOP FL260.

OTLK...VFR.

.
NY LO...UPDT

LONG ISLAND...OVC015 LYRD FL280. VIS 3-5SM -RA BR. OTLK...IFR CIG RA BR.

SERN NY...SCT150 BKN CI. 15Z SCT040 BKN150 TOP FL250. ISOL -SHRA.

18Z SCT030 BKN050 OVC100. OCNL -RA. OTLK...VFR...02Z MVFR CIG RA BR.

RMNDR NY/LO...SCT-BKN CI. OTLK...VFR.

.
PA...UPDT

NW QTR...BKN CI. OTLK...VFR.

SW QTR...BKN CI. 16Z SCT100 BKN CI. OTLK...VFR.

NERN QTR...SCT150 OVC CI. ISOL -SHRA. 16Z SCT050 BKN120 TOP

FL260. BECMG 2021 BKN050 OVC120. OCNL -RA. OTLK...MVFR CIG RA BR.

SE QTR...SCT030 OVC080-100 TOP FL260. OCNL -RA. BECMG 1316

OVC030. VIS 5SM -RA. BECMG 1821 OVC020. VIS 3-5SM -RA BR.

OTLK...IFR CIG RA BR.

.
 NJ
 N HLF...SCT020 BKN060 LYRD FL250. BECMG 1114 OVC015 TOP FL260.
 VIS 3-5SM -RA. OTLK...IFR CIG RA BR.
 S HLF...OVC015 TOP FL260. VIS 3-5SM -RA BR. OTLK...IFR CIG RA BR.
 .
 OH LE
 W HLF OH...SKC. TIL 13Z VIS 3-5SM BR. OTLK...VFR.
 NERN QTR OH/LE...SCT CI. OTLK...VFR.
 SE QTR OH...SCT CI. 16Z SCT100 BKN CI. 20Z SCT050 SCT100 BKN CI.
 OTLK...VFR.
 .
 WV
 W HLF...SCT080 SCT-BKN CI. 14Z BKN060 TOP 120 BKN CI. OTLK...VFR.
 E HLF...BKN-OVC080 TOP 150 BKN CI. ISOL -SHRA. BECMG 1113 OVC050
 LYRD FL260. OCNL -RA. OTLK...MVFR CIG RA.
 .
 MD DC DE VA...UPDT
 W 1/3 MD...OVC100 TOP 150 BKN CI. ISOL -SHRA. BECMG 1214 OVC030
 LYRD FL250. VIS 3-5SM -AR. OTLK...MVFR CIG RA BR.
 E 2/3 MD/DC/DE/NERN VA...OVC015 TOP FL250. VIS 3-5SM -RA BR.
 OTLK...IFR CIG RA BR.
 NWRN VA...OVC030 TOP FL250. VIS 3-5SM -RA BR. OTLK...IFR CIG RA
 BR.
 SW VA...OVC050 TOP 150. OCNL -RA. OTLK...MVFR CIG RA.
S CNTRL-SERN VA...OVC015 TOP FL180. VIS 3-5SM -RA BR. ISOL EMBD
-TSRA. CB TOP FL380. OTLK...IFR CIG RA BR.
 .
 CSTL WTRS
 N OF ACK...OVC CI. OTLK...VFR.
 RMNDR N OF CYN...BKN020 OVC150 TOP FL250. ISOL -SHRA. BECMG 1215
 OVC010 TOP FL260. VIS 3-5SM -RA BR. ISOL EMBD -TSRA. CB TOP
 FL400. WND E 25G35KT. OTLK...IFR CIG RA BR WND.
 S OF CYN...BKN010 OVC100 TOP FL260. VIS 3-5SM -RA BR. WDLY SCT
 EMBD -TSRA. CB TOP FL420. OTLK...IFR CIG RA BR.

11.0 Terminal Aerodrome Forecast

Norfolk International Airport (KORF) was the closest site with a NWS TAF located 14 miles northeast of the accident site. The TAF valid at the time of the accident was issued at 0735 EDT and was valid for a 24-hour period beginning at 0800 EDT. The TAF forecast for KORF was as follows:

TAF KORF 101135Z 1012/1112 03023G33KT 4SM -RA BR OVC007
FM101500 04018G26KT 5SM -RA BR OVC006
 FM101800 06014G21KT 5SM -DZ BR OVC009
 FM102100 02010G18KT 5SM -DZ BR BKN009 OVC015=

The forecast expected wind from 040° at 18 knots with gusts to 26 knots, 5 miles visibility, light rain and mist, and an overcast ceiling at 600 feet agl around the time of the accident.

12.0 National Weather Service Area Forecast Discussion

The National Weather Service Office in Wakefield, Virginia, issued the following Area Forecast Discussion at 1023 EDT which discussed the area of showers in northeastern North Carolina and southeastern Virginia with the IFR conditions. Ceiling and visibility conditions were not expected to change through the following day:

FXUS61 KAKQ 101423

AFDAKQ

AREA FORECAST DISCUSSION

NATIONAL WEATHER SERVICE WAKEFIELD VA

1023 AM EDT THU OCT 10 2013

.SYNOPSIS...

LOW PRESSURE OFF THE CAROLINA COAST SLOWLY DRIFTS NORTH THROUGH FRIDAY. MEANWHILE...STRONG HIGH PRESSURE WILL REMAIN ANCHORED OVER THE NEW ENGLAND STATES. LOW PRESSURE WILL CONTINUE TO LINGER OFF THE COAST THROUGH THE WEEKEND.

&&

.NEAR TERM /THROUGH TONIGHT/...

LATEST WATER VAPOR IMAGERY DEPICTS UPPER CLOSED LOW OVER WRN VA AS HIGH PRESSURE RIDGING AMPLIFIES OVER THE TOP OF THE CLOSED LOW. ALSO VISIBLE IS A JET STREAK PUNCHING INTO THE EAST SIDE OF THE UPPER LOW. AT THE SFC...COASTAL LOW (-1 STD DEV MSLP) REMAINS ANCHORED JUST SOUTH OF CAPE HATTERAS NC AS HIGH PRESSURE WEAKENS OVER THE NE. LATEST RADAR TRENDS DEPICT DECREASING RAINFALL COVERAGE OVER INTERIOR VA/NC AS THE BEST COVERAGE REMAINS ALONG THE COAST. **VORT MAX LIFTING OVER THE COASTAL FRONT TRIGGERED ADDITIONAL RAINFALL/ISOLATED THUNDER OVER NE NC/SE VA EARLY THIS MORNING. THIS AREA OF SHOWERS WILL CONTINUE TO LIFT NEWD.** HAVE OPTED TO LOWER POPS OVER INTERIOR VA (LIKELY) AS BEST OMEGA/LIFT WILL REMAIN ALONG THE SE COAST THIS MORNING. WILL STRETCH HIGH END CATEGORICAL POPS (90%) NWD ALONG THE ERN SHORE. FOR THE REST OF TODAY...COOL...CLOUDY AND WET AS ONSHORE (E-NE) FLOW CONTINUES TO ADVECT DEEP MOISTURE OVER THE REGION (10/12Z KWAL SOUNDING PRECIP WATER VALUES WERE IN THE 99TH PERCENTILE). THE AFOREMENTIONED JET STREAK WILL LIKELY RESULT IN A SWD MOTION OF THE UPPER LOW AND LITTLE MOVEMENT OF THE COASTAL LOW. THE COASTAL FRONT WILL BECOME ORIENTED N-S ALONG THE COAST (PER N-S ORIENTED THETA-E). CLOSED LOW WILL CONTINUE TO PROVIDE FORCING FOR ASCENT AS SPOKES OF VORTICITY MAXIMA ROUND THE BASE OF THE LOW. BASED ON OMEGA...PRECIP WILL LIKELY ROTATE FROM NE NC/SE VA AND THE WRN ATLANTIC...NEWD OVER THE ERN SHORE AND INTO NRN VA. TRENDED POP GRIDS TO REFLECT THIS PATTERN. CONFIDENCE DECREASES OVER INTERIOR VA AS BEST LIFT/MOISTURE WILL REMAIN ALONG THE COAST. POSITIVE MID LEVEL DIV Q SUGGESTS LESS LIFT/COVERAGE. WILL MAINTAIN LIKELY POPS ATTM. RAINFALL AMOUNTS TODAY WILL RANGE FROM THREE QUARTERS OF AN INCH TO AN INCH NEAR THE COAST TO AROUND A QUARTER OF AN INCH OVER THE PIEDMONT. HIGH TEMPS EXPECTED TO BE ONLY A FEW DEGS WARMER THAN CURRENT TEMPS (UPPER 50S NW TO LOW 70S SE). TONIGHT...LITTLE CHANGE IN THE OVERALL PATTERN. MID LEVEL DRY AIR WILL BEGIN TO WRAP AROUND THE LOW OVER THE WRN ATLANTIC...PUSHING RAINFALL NEWD...WITH THE BEST CHANCES OVER THE ERN SHORE INTO THE NRN NECK. WILL KEEP LIGHT RAIN/AREAS OF DRIZZLE OVER INTERIOR VA AS ABUNDANT LOW LEVEL MOISTURE PERSISTS. SMALL DIURNAL TREND DUE TO ABUNDANT CLOUDS AND N-NE WINDS (LOW 50S NW TO UPPER 50S SE).

&&

.SHORT TERM /FRIDAY THROUGH SATURDAY/...

THE WX PATTERN REMAINS STAGNANT DURING THE SHORT TERM PERIOD AS THE HIGH REMAINS ANCHORED TO THE NORTH AND THE LOW LINGERS OFF THE COAST. SOME UNCERTAINTY EXISTS WITH RESPECT TO THE LOCATION OF THE SURFACE LOW AND THE PRIMARY STREAM OF MOISTURE TRANSPORT OFF THE OCEAN. IN GENERAL THOUGH...LARGE SCALE FORCING SHOULD DIMINISH...SO THE COVERAGE OF PCPN WILL DIMINISH BY SAT. WILL CONTINUE TO CARRY LIKELY POPS ACROSS ALL BUT FAR SW PORTIONS OF THE FA ON FRIDAY....DIMINISHING TO JUST CHC POPS 30-50% FOR ALL BUT THE MD EASTERN SHORE ON SAT WHERE LIKELY POPS WILL LINGER. HIGHS FRI/SAT IN THE 60S TO LOW 70S. LOWS FRIDAY NIGHT IN THE 50S TO LOW 60S.

&&

.LONG TERM /SATURDAY NIGHT THROUGH WEDNESDAY/...

CUTOFF LOW WILL CONTINUE TO SPIN OFF THE MID ATLANTIC COAST SUNDAY THEN SLOWLY BEGIN TO LIFT NE AND AWAY FROM THE AREA EARLY NEXT WEEK. LATEST GFS/ECMWF KEEPS THE MOIST NE FLOW ALONG WITH PERIODIC VORT SPOKES ROTATING AROUND THE PARENT LOW. THIS KEEPS CLOUDS AND THE CHANCE OF (MAINLY LIGHT) RAIN IN THE FORECAST THROUGH SUNDAY NIGHT. HIGHEST POPS ALONG THE COAST (30-40%) WITH (20-30%) ALONG/WEST OF I95 CORRIDOR. AREAS OF FOG/DRIZZLE AT NIGHT. LOWS SAT AND SUN NIGHT IN THE 50S. HIGH SUNDAY U60S-L70S. DEEPER MOISTURE SHIFTS OFFSHORE MONDAY BUT CONTINUED NORTHERLY FLOW ALONG WITH PLENTY OF MOISTURE SEEN IN TSCTNS KEEPS SKIES MSTLY CLOUDY. LINGERING LIGHT RAIN/DRIZZLE AT THE COAST. MAYBE SOME BINOVACROSS WESTERN HALF OF FA IN THE AFTERNOON. HIGHS 70-75. REGION PROGGED TO BE BETWEEN LOW PRESSURE TO THE EAST & APPROACHING FRONTAL BOUNDARY TO THE WEST TUE. WILL BE OPTIMISTIC AND CALLED IT PT SUNNY. DRY WITH HIGHS 70-75. BROUGHT A LOW CHC SHOWERS IN FOR WED AS MODELS DIFFER ON TIMING OF NEXT COLD FRONT ACROSS THE AREA. LOWS IN THE 50S. HIGH 70-75.

&&

.AVIATION /14Z THURSDAY THROUGH MONDAY/...

GUSTY NNE WND AND PRIMARILY IFR CONDS CONTG THROUGH TDA AS LO PRES NR THE CST WRAPS DP MOISTURE INLAND. LO CONFIDENCE IN CIGS RISING TO MVFR FOR ANY EXTENDED PD OF TIME THROUGH TDA/TNGT/FRI MRNG. LO PRES MEANDERS OVER THE WTRS THRU AT LEAST SUN. OCNL MVFR W/ IFR CIGS/VSBYS XPCD ALG W/ PDS OF RA OR DZ.

&&

.MARINE...

LO PRES OFF CSTL NCA HAS ABOUT REACHED ITS PEAK INTENSITY...AND WILL HOLD STEADY/SLOWING WKN AS IT MEANDERS NR THE MDATLC CST INTO THE WKND. LESS THAN IDEAL BOATING CONDS WILL CONT INTO/THROUGH THE WEEKEND GIVEN A PERSISTENT NNE FETCH BEHIND THE SYSTEM. STARTING OUT W/ GALES OVR SRN PORTION OF BAY...AND ATLC WTRS N OF NC/VA BORDER...SCAS ELSW. ALL AREAS XPCD TO END UP W/ SCAS THROUGH TDA INTO TNGT. MDLS GRADUAL LWR WIND SPEEDS THE NEXT 18-24 HRS...WHILE WAVES/SEAS ARE SLO TO SUBSIDE. MAY NEED TO KEEP SCAS (ESP FOR SEAS AOA 5 FT) ON THE OCN INTO/THROUGH FRI. SCA'S LOOK NECESSARY FOR ALL WATERS THROUGH AT LEAST FRIDAY.

&&

.TIDES/COASTAL FLOODING...

CONTD MINOR TO MODERATE CSTL FLOODING THROUGH TDA...W/ ADVISORIES AND WARNINGS IN PLACE.

HI SURF RMNG UP THROUGH 15Z/10 FOR SEAS OFFSHORE AOA 10-12 FT...W/ NEARSHORE WAVES 7-9 FT.

&&

.AKQ WATCHES/WARNINGS/ADVISORIES...

MD...HIGH SURF ADVISORY UNTIL 1 PM EDT THIS AFTERNOON FOR MDZ025.

COASTAL FLOOD ADVISORY UNTIL 4 PM EDT THIS AFTERNOON FOR
MDZ025.

COASTAL FLOOD ADVISORY UNTIL 10 PM EDT THIS EVENING FOR
MDZ021>023.

NC...HIGH SURF ADVISORY UNTIL 1 PM EDT THIS AFTERNOON FOR NCZ102.

COASTAL FLOOD ADVISORY UNTIL 3 PM EDT THIS AFTERNOON FOR
NCZ102.

VA...COASTAL FLOOD WARNING UNTIL 6 PM EDT THIS EVENING FOR VAZ078-

082-084>086-089>091-093-094-096-097.

COASTAL FLOOD ADVISORY UNTIL 5 PM EDT THIS AFTERNOON FOR
VAZ095-098.

HIGH SURF ADVISORY UNTIL 1 PM EDT THIS AFTERNOON FOR
VAZ098>100.

COASTAL FLOOD ADVISORY UNTIL 4 PM EDT THIS AFTERNOON FOR
VAZ099-100.

COASTAL FLOOD ADVISORY UNTIL 8 PM EDT THIS EVENING FOR VAZ077.

MARINE...SMALL CRAFT ADVISORY UNTIL 6 PM EDT FRIDAY FOR ANZ650-652-654-
656-658.

SMALL CRAFT ADVISORY UNTIL 6 PM EDT THIS EVENING FOR
ANZ635>638.

SMALL CRAFT ADVISORY UNTIL 6 AM EDT FRIDAY FOR ANZ630>632-634.

SMALL CRAFT ADVISORY UNTIL MIDNIGHT EDT TONIGHT FOR ANZ633.

&&

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13.0 Pilot Weather Briefing

The accident pilot did not receive a weather briefing from official sources. There was no record or knowledge of any additional weather information received by the accident pilot.

14.0 Astronomical Data

The astronomical data obtained from the United States Naval Observatory for the accident site on October 10, 2013, indicated the following:

SUN

Begin civil twilight 0643 EDT

Sunrise 0709 EDT

Sun transit 1252 EDT

Sunset 1836 EDT

End civil twilight 1901 EDT

F. LIST OF ATTACHMENTS

None

Paul Suffern
NTSB, AS-30