



## MEMORANDUM FOR RECORD

**Jay Neylon**  
**Air Safety Investigator**  
**Eastern Region Aviation**

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**Date: January 16, 2013**  
**NTSB Accident Number: ERA13FA115**  
**Weather Report: Donald Eick, NTSB Senior Meteorologist**

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### **Weather Conditions on January 16, 2013 in the vicinity of Burlington, North Carolina**

**Synoptic Conditions** – The National Weather Service (NWS) Surface Analysis Chart for 0400 EST (0900Z) on January 16, 2013 depicted a low pressure system over Georgia at 1012-hectopascals (hPa) along a frontal wave with a cold front extending southwest and a stationary front across northern Georgia into South Carolina to another low pressure system at 1015-hPa with a warm front extending east-northeast across North Carolina and into the Atlantic. The accident site was located north of the warm front in the cool air mass side of the front. The station models surrounding the accident site indicated light northerly winds at 5 knots or less, overcast clouds, visibility restricted in light rain and mist, with temperature from 39° to 50° Fahrenheit (F) and dew point temperature spreads of 1° F or less.

The NWS Weather Depiction Chart for 0500 EST (1000Z) depicted an extensive area of IFR conditions extending along the frontal systems from the Gulf Coast through the Tennessee and Kentucky Valley's into the mid-Atlantic and northeastern United States, or along the entire planned route of flight.

**Observations** – Burlington-Alamance Regional Airport (KBUY), Burlington, North Carolina at an elevation of 616 feet, and a magnetic variation of 8 W, had an Automated Surface Observation System (ASOS) installed and reported the following conditions at the approximate time of the accident:

Burlington weather at 0554 EST (1054Z) automated, wind from 040° at 4 knots, visibility 10 statute miles, ceiling broken at 700 feet agl, overcast at 1,700 feet, temperature 4° Celsius (C), dew point 3° C, altimeter 30.02 inches of mercury. Remarks: automated observation system, rain ended at 0538 EST, ceiling 400 variable 900 feet agl, sea level pressure 1016.6-hPa, hourly precipitation 0.01 inches, temperature 3.9° C, dew point 3.3° C, thunderstorm sensor inoperative.

LIFR to IFR Conditions were reported throughout the day at Burlington, NC, the raw observations surrounding the period were as follows:

*METAR KBUY 160754Z AUTO VRB03KT 2SM BR OVC003 05/05 A3006 RMK AO2 SLP181*  
*SPECI KBUY 160811Z AUTO 35006KT 3SM BR OVC003 05/05 A3006 RMK AO2 TSNO*  
*METAR KBUY 160854Z AUTO VRB04KT 3SM -RA BR OVC003 05/04 A3004 RMK AO2 RAB50 SLP176 P0001*  
*60001 T00500044 58003 TSNO*  
*SPECI KBUY 160902Z AUTO 35005KT 2 1/2SM -RA BR OVC003 05/04 A3005 RMK AO2 P0000 TSNO*  
*SPECI KBUY 160910Z AUTO 34009KT 3SM -RA BR OVC003 04/04 A3005 RMK AO2 P0000 TSNO*  
*METAR KBUY 160954Z AUTO 36007KT 5SM -RA BR BKN005 OVC011 04/03 A3003 RMK AO2 SLP171 P0004*  
*T00390033 TSNO*  
*SPECI KBUY 161012Z AUTO 02004KT 6SM -RA BR BKN007 OVC011 04/03 A3002 RMK AO2 P0000 TSNO*  
*METAR KBUY 161054Z AUTO 04004KT 10SM BKN007 OVC017 04/03 A3002 RMK AO2 RAE38 CIG 004V009*  
*SLP166 P0001 T00390033 TSNO*  
***ACCIDENT 1057Z***  
*SPECI KBUY 161102Z AUTO 03005KT 10SM SCT007 OVC017 04/03 A3002 RMK AO2 TSNO*  
*SPECI KBUY 161117Z AUTO 02005KT 10SM BKN007 OVC017 04/03 A3002 RMK AO2 TSNO*  
*METAR KBUY 161154Z AUTO 02003KT 10SM BKN007 OVC013 04/04 A3002 RMK AO2 CIG 005V010 SLP169*  
*60006 70011 T00440039*  
*10056 20039 55003 TSNO*  
*SPECI KBUY 161224Z AUTO 05003KT 9SM -RA OVC011 04/03 A3003 RMK AO2 RAB22 P0000*  
*SPECI KBUY 161242Z AUTO 02003KT 5SM -RA BR OVC009 04/04 A3003 RMK AO2 RAB22 P0001*  
*METAR KBUY 161254Z AUTO 00000KT 10SM -RA OVC009 04/04 A3003 RMK AO2 RAB22 SLP170 P0001*  
*T00440039 TSNO*

**Sounding** – The Greensboro-High Point, NC, 0700 EST (1200Z) upper air sounding depicted a frontal inversion extending immediately above the surface to 3,533 feet agl. While the surface temperature was 4° C, the freezing level was identified at 11,553 feet. The lifted condensation level (LCL) and level of free convection (LFC) were both identified at the surface, and the sounding had a relative humidity of 100 percent from the surface to approximately 12,000 feet indicating saturated conditions. The precipitable water value was 1.14 inches. No icing was indicated on the sounding due to the strong frontal inversions.

The wind profile indicated a surface wind from 060° at 6 knots, the wind rapidly shifted to the west-southwest above the surface and increased in speed. A low-level wind shear condition existed due to the warm frontal inversion extending over the area. The mean 0 to 6 kilometer (18,000 feet) wind was from 240° at 50 knots, with the level of maximum wind from 250° at 111 knots at 47,000 feet. The tropopause was identified at 46,200 feet.

**Satellite Imagery** - The GOES-13 infrared image for 0602 EST (1102Z) indicated an extensive area of low stratiform clouds over North Carolina with several areas of cumulonimbus embedded over central North Carolina to the east of the accident site near the frontal position, which has been superimposed on the image. The radiative cloud top temperature over the last radar target was 273° kelvin or -0.16° C, which corresponded to cloud tops near 12,000 feet.

**Weather Radar Imagery** – The Greensboro WSR-88D data was reviewed and plotted (attached) the aircraft flight track is outside of all-weather echoes, and there were no significant echoes greater than 35 dBZ identified in the vicinity of the accident site.

**Pilot Reports (UA/UUA)** – the following pilot reports were recorded surrounding the period:

ILM UA /OV ILM /TM 0343 /FL002 /TP CRJ2 /SK OVC002-TOPUNKN=  
RDU UA /OV RDU /TM 1131 /FLUNKN /TP E135 /SK OVC008 /RM DURC=  
GSO UA /OV GSO145010 /TM 1355 /FL042 /TP AT43 /SK OVC002-TOP042 /RM DURC=  
RDU UA /OV RDU045010 /TM 1357 /FL120 /TP CRJ2 /SK TOP065 /RM DURC=  
GSO UA /OV GSO315040/TM 1417/FL170/TP C560/TA M12/IC MOD RIME 170-180/RM ZTL CWSU=

**Area Forecast (FA)** – issued immediately prior to the accident at 0445 EST (0945Z) the Piedmont section of North Carolina expected overcast clouds at 1,000 feet layered to 25,000 feet, with visibility 3 miles in light rain and mist. The forecast was amended by AIRMET Sierra for IFR conditions over the area.

FAUS42 KNCI 160945 2013016 0930  
FA2W  
-MIAC FA 160945  
SYNOPSIS AND VFR CLDS/WX  
SYNOPSIS VALID UNTIL 170400  
CLDS/WX VALID UNTIL 162200...OTLK VALID 162200-170400  
NC SC GA FL AND CSTL WTRS E OF 85W  
.  
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.  
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SYNOPSIS...QUASI-STNRY FNT WRN NC-NW SC-NRN GA-FAR WRN FL PNHDL.  
04Z QUASI-STNR FNT NERN NC-NW SC-SW GA-FL PNHDL-NERN GLFMEX.  
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NC  
WRN...OVC030-050 LYRD FL230. VIS 3-5SM -RA BR. OTLK...IFR CIG RA BR.  
PIEDMONT...OVC010 LYRD FL250. VIS 3SM -RA/-DZ BR. OTLK...IFR CIG BR FG.  
RMNDR..  
NRN...OVC010 TOP 100 BKN CI. OTLK...IFR CIG BR.  
SRN...BKN010 TOP 030 BKN CI. VIS 3-5SM BR. 18Z SCT020 BKN080  
LYRD FL250. OTLK...VFR.  
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**In-Flight Weather Advisory** – the NWS had an AIRMET for IFR conditions and for low-level wind shear current over the region at the time of the accident. There were no Convective SIGMETs, SIGMETs, or Weather watches current during the period over North Carolina. The advisories were as follows:

WAUS42 KNCI 160845 2013016 0846  
WA2S  
-MIAS WA 160845  
AIRMET SIERRA UPDT 1 FOR IFR AND MTN OBSCN VALID UNTIL 161500  
.  
AIRMET IFR...NC SC GA FL AND CSTL WTRS  
FROM 150SE SIE TO 80SE ECG TO 20NNE CHS TO 50WNW SAV TO 90WSW  
PIE TO 130ESE LEV TO 40W CEW TO 50SW PZD TO GQO TO HMY TO ECG TO 150SE SIE  
CIG BLW 010/VIS BLW 3SM PCPN/BR/FG. CONDS CONTG BYD 15Z THRU 21Z.  
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*AIRMET IFR...GA FL AND CSTL WTRS  
FROM 30S SAV TO OMN TO 20SSE RSW TO SRQ TO 20NNW CTY TO 30S AMG TO 30S SAV  
CIG BLW 010/VIS BLW 3SM BR/FG. CONDS ENDG 12-15Z.*

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AIRMET MTN OBSCN...NC SC GA  
FROM 40SE PSK TO CLT TO ATL TO GQO TO HNV TO 40SE PSK  
MTNS OBSC BY CLDS/PCPN/BR. CONDS CONTG BYD 15Z THRU 21Z.*

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WAUS42 KPCI 160845 2013016 0856  
WA2T  
-MIAT WA 160845  
AIRMET TANGO UPDT 1 FOR TURB AND LLWS VALID UNTIL 161500*

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NO SGFNT TURB EXP OUTSIDE OF CNVTV ACT.*

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LLWS POTENTIAL...NC SC MA RI CT NY NJ PA WV MD DC DE VA AND CSTL WTRS  
BOUNDED BY PVD-150E ACK-200SE ACK-150SE SIE-50S GSO-SPA-HNV-30SE EKN-JFK-PVD  
LLWS EXP. CONDS CONTG BYD 15Z THRU 21Z.*

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WAUS42 KPCI 160845 2013016 0843  
WA2Z  
-MIAZ WA 160845  
AIRMET ZULU UPDT 1 FOR ICE AND FRZLVL VALID UNTIL 161500*

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NO SGFNT ICE EXP OUTSIDE OF CNVTV ACT.*

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FRZLVL...RANGING FROM 095-170 ACRS AREA  
120 ALG 20NE LGC-CLT-20S ORF  
160 ALG 30SSE EYW-50ENE PBI-190ENE PBI*

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**Astronomical Data** – from the Naval Observatory’s website indicated beginning of civil twilight occurred at 0700 EST, and Sunrise at 0727 EST in Burlington, Alamance County, North Carolina on January 16, 2013. At the time of the accident both the Sun and the Moon were more than 15° below the horizon.