

**Forensic meteorological investigation of local weather along Florida Highway 301,
near the intersection of N County Road 225.**

PREPARED ON: January 17, 2014
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AFFILIATION: Wilcox and Jennings, P.A.
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INCIDENT DATE: November 18, 2013
INCIDENT LOCATION: 2 mi north of Waldo, FL, along FL Hwy 301
at approximately (29.836N, 82.166W)

SUMMARY:

Blue Skies Meteorological Services was contracted by Wilcox and Jennings, P.A. to perform a detailed meteorological investigation and analysis of weather conditions along Florida Highway 301 near the intersection of N County Road 225 during the early morning hours of November 18, 2013. Of particular interest to this investigation is the occurrence of heavy rainfall, reduced visibility, and the potential for ponding on roadways between 5:45 am and 6:05 am EST.

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DATA

The use of high-quality, reliable data is crucial to ensure the accuracy of forensic meteorological analyses. In the performance of our meteorological investigations and in accordance with industry best practices, Blue Skies Meteorological Services utilizes only quality-controlled data from trusted, official sources that specialize in the collection, quality control, and analysis of meteorological, climatological, and hydrological data for research and operational purposes. Much of the data from the National Oceanic and Atmospheric Administration (NOAA) that was obtained and reviewed for this report can be certified by the Department of Commerce, if necessary.

The following data were reviewed and analyzed during this forensic meteorological investigation. The conclusions drawn in this report are based upon the data that were available at the time of report preparation. Any new, updated, or revised data relevant to these incidents may be incorporated in a later revision of this report.

Surface Weather Observations

- Source: The National Oceanic and Atmospheric Administration (NOAA): National Climatic Data Center (NCDC): Quality Controlled Local Climatological Data (QCLCD)
- Product(s): QCLCD for Station 12816/GNV/Gainesville Regional Airport (29.692, -82.276): Hourly Observations Table for 18 November 2013

Severe Weather Reports

- Note: Archived National Weather Service Preliminary Local Storm Reports were available only through October 2013 at the time that this report was prepared, so they were not included in the analysis of this 18 November 2013 event.

Radar

- Source: The National Oceanic and Atmospheric Administration (NOAA): National Climatic Data Center (NCDC): Radar Data
- Product(s): KJAX- Jacksonville International Airport, FL (30.495N, 81.6936W): Base Reflectivity; Composite Reflectivity; Instantaneous Precipitation Rate; One Hour Precipitation; Digital Storm Total Accumulation

METHODOLOGY

Graphical Representation of Data:

Radar data was preliminarily analyzed and exported via NOAA's Weather and Climate Toolkit. Further analysis and graphical representation of the data was then undertaken using Quantum GIS (QGIS) calculation and visualization features.

Heavy Rainfall Detection:

The Jacksonville, FL, WSR-88D radar site is located approximately 53 miles northeast of the incident location and has been upgraded to dual-polarization operation. Weather radar provides information about the intensity and type of precipitation falling at a given location. Dual polarization radar, in particular, offers an enhanced ability to distinguish hydrometeor type (e.g. large rain drops, hail, sleet, etc.) in complex and/or intense precipitation events, thereby providing more accurate estimates of rainfall rates and totals.

Given that this incident occurred during the darkness of early morning, even moderate precipitation could noticeably reduce visibility. Rainfall intensity was examined both during and immediately preceding the accident to assess the likelihood of reduced visibility, while rainfall totals were examined to assess the likelihood of significantly wet roadways with ponding (standing water).

BACKGROUND/REFERENCE

For detailed information about radar operations and interpretation, please consult "Appendix A: Background and Reference Material" at the end of this report. This information is intended to provide necessary context for the radar analyses performed by Blue Skies Meteorological Services for this forensic meteorological report.

ANALYSIS 18 NOVEMBER 2013

Event Summary:

According to the accident report provided to Blue Skies Meteorological Services by Wilcox and Jennings, P.A., the automobile accident that is the subject of this forensic meteorological investigation occurred shortly before 6:00am EST on 18 November 2013. The driver of the vehicle reported the accident to 911 emergency services at 6:03am and reported that his vehicle had left the paved surface of the road “a few minutes” prior. For the purpose of this report, we will assume a loose interpretation of “a few minutes” and investigate rainfall, visibility, and probable road conditions from 5:45am – 6:05am EST.

Location:

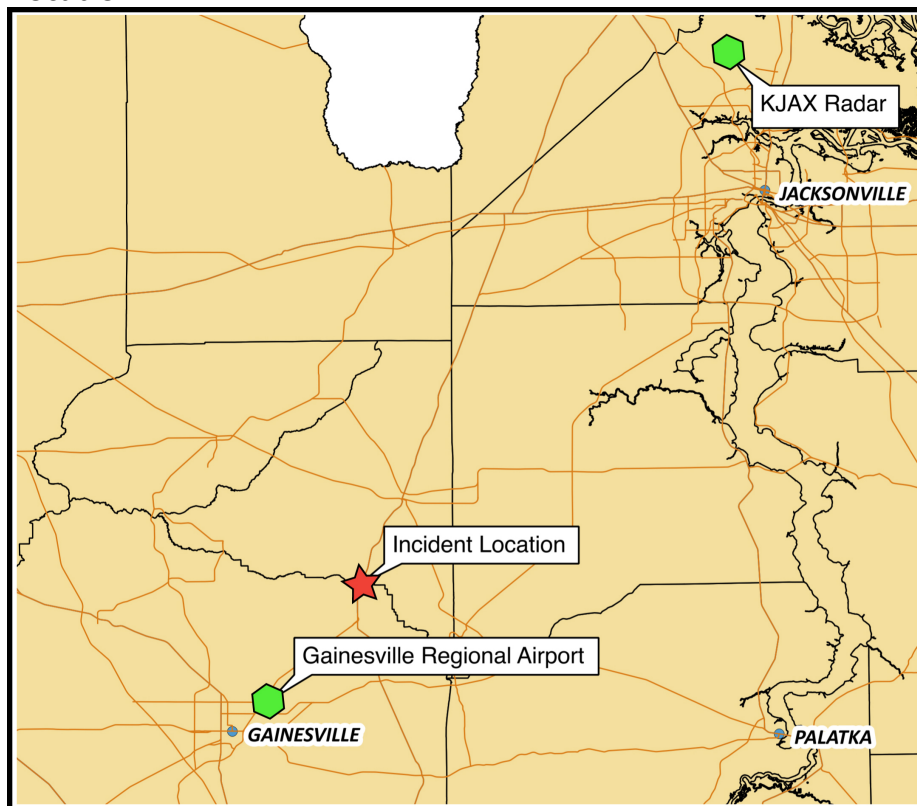


Figure 1: Layout of the incident location and relevant data sources, including the accident site, NEXRAD radar location, and weather reporting stations.

Weather Summary:

A large mesoscale convective system (MCS) intensified and moved across north-central Florida during the overnight hours of 18 November 2013. Although individual thunderstorm cells moved from southwest to northeast, the system as a whole shifted south and eastward during the night.

This MCS brought heavy rainfall, strong winds, and lightning to much of the northern Florida peninsula. The most intense convection was associated with the leading edge of this system, which affected areas to the northwest, north, and northeast of the incident location

from approximately 11:30pm EST on 17 November through 2:30am EST on 18 November. The incident location was affected by moderate to heavy rainfall beginning at approximately 12:45 am EST (0445 UTC) on 18 November and continuing until 2:30 am EST (0630 UTC) that same morning. Light to moderate rainfall with embedded heavier pockets followed until 5:30 am EDT (0930 UTC), with primarily light rain and drizzle continuing from that time until 11:00 am EDT (1500 UTC).

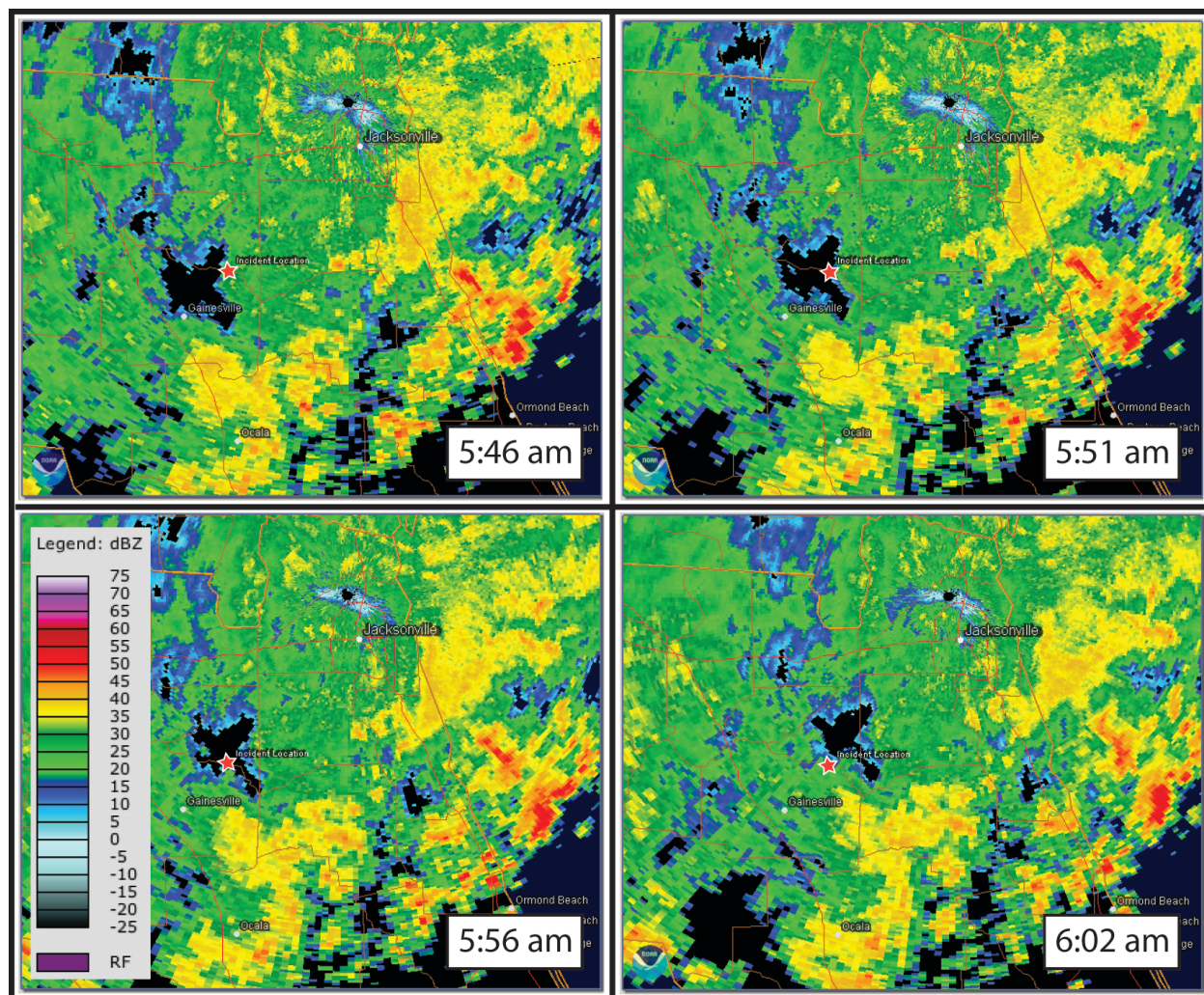


Figure 2: KJAX radar base reflectivity for the 0.5° elevation angle during the time of the accident. By this time, the leading edge of the MCS had weakened and moved offshore. Light stratiform rain was affecting the incident location (marked by a red star).

Ground Observations:

The nearest official weather station to this event is located at Gainesville Regional Airport (GNV), 12 miles southwest of the accident location. Observations taken at GNV at 5:53am EDT, the observation time closest to the time of the accident, indicate a saturated air mass, light winds, rain, mist, and a visibility reduced to 4 statute miles. Based on radar analysis, similar conditions were likely at the incident location at the time of the accident.

Time	Sky Condition	Vis (mi)	Wx Type	Temp (F)	RH	Wind (mph)	Hrly Precip (in)
553	BKN050 OVC065	4	RA BR	60	100	0	0.06

Table 1: Surface weather observations at Gainesville Regional Airport (GNV) at 5:53am EST on 18 Nov.

Radar Indications of Rainfall:

Although this storm event produced 1.20" of rain over the incident location prior to the auto accident on the morning of 18 November, rainfall during the time of the accident itself was quite light, with instantaneous rainfall rates of less than 0.04 inches per hour. During the hour prior to the accident, a total of only 0.04 inches of rain had fallen, as indicated by NEXRAD radar. This hourly rainfall total is corroborated by surface weather observations at Gainesville Regional Airport, where 0.06" of rain were reported during approximately the hour before the accident.

Instantaneous Rainfall Rate	
Time (EST)	Rate (in/hr)
541	0.017
546	0.036
551	0
556	0
602	0.003
607	0.019

Table 2: Instantaneous rainfall rate at the incident location, as indicated by KJAX radar.

Conclusions:

The roadways were certainly wet at the time of the accident, as 1.20" of rain had fallen since the onset of precipitation shortly after midnight on 18 November 2013; however, given the light precipitation during the hour preceding the auto accident, significant ponding on the roadways was unlikely (although possible in areas with poor drainage).

The light rainfall and mist at the time of the accident reduced visibility to approximately 4 statute miles, as indicated at the Gainesville Regional Airport surface weather reporting station, 12 miles southwest of the incident location. While this does not represent a drastic reduction in visibility from the standard clear air visibility of 10 statute miles, headlight and streetlight glare off of wet roadways combined with pre-dawn darkness, light rain, and mist could have created a situation in which visibility was noticeably, although not severely, impaired.

Note: At Blue Skies Meteorological Services, we specialize in providing our forensic meteorology clients with reports that are both rigorous and accessible to non-experts. To that end, we have developed extensive educational background and reference material that we include, as applicable, in each report. This material explains in clear language and with accompanying graphics the tools and methodologies used in our meteorological analyses and investigations. Due to the proprietary nature of this material, we have removed it from our online samples. If you would like to see the full version of this sample report, please contact Blue Skies Meteorological Services at info@blueskiesmeteorology.com. Thank you for your understanding.

APPENDIX A: Background and Reference Material

Radar Basics:

Overview

Radar Beam Characteristics and Resolution

Beam Shape and Spreading:

Beam Altitude:

Measuring Reflectivity

Rainfall Rates and Reflectivity:

Measuring Velocity