National Transportation Safety Board

Office of Aviation Safety
Washington, D.C. 20594-2000
July 14, 2009

WEATHER STUDY

ERA09LA392

A. ACCIDENT

Location: Sanderson, Florida
Date: July 8, 2009
Time: 0905 eastern daylight time (1305 UTC[1])
Aircraft: RV7, registration N774US

B. METEOROLOGICAL SPECIALIST

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C. DETAILS OF INVESTIGATION

The National Transportation Safety Board's (NTSB) meteorologist specialist was not on scene for this investigation and gathered all the weather data for this investigation from the Washington D.C. office from official National Weather Service (NWS) sources including the National Climatic Data Center (NCDC). 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 site was located at latitude 30.1838° N and longitude 82.3147° W..

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) located in Camp Springs, Maryland. These are the base products used in

[1] UTC – is an abbreviation for Coordinated Universal Time.

describing weather features and in the creation of forecasts and warnings. Reference to these charts can be found in the joint NWS and Federal Aviation Administration (FAA) Advisory Circular "Aviation Weather Services", AC 00-45.

1.0.1 Surface Analysis Chart

The NWS Surface Analysis Chart for 0800 EDT (1200Z) on July 8, 2009, is provided as figure 1. The chart depicted a low pressure system at 1010-hectopascals over southern Georgia with a stationary front extending eastward across Georgia into the Atlantic. A trough of low pressure extended southwest of the low into the Florida panhandle and the Gulf of Mexico. A ridge of high pressure extended over southern Florida. A warm moist tropical airmass prevailed over Florida with a general southwesterly wind flow.

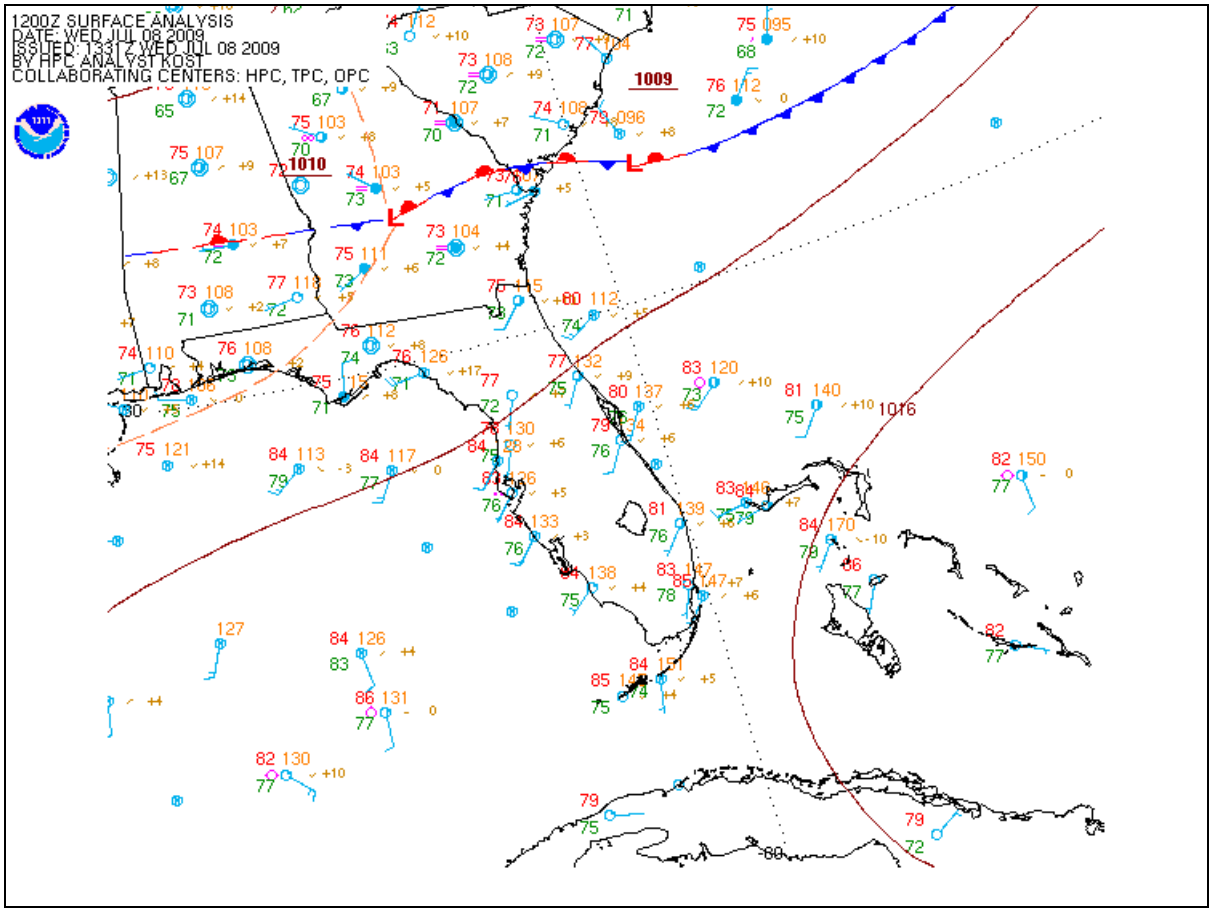

Figure 1 – NWS Surface Analysis Chart for 0800 EDT

2.0 Weather Radar Information

The closest NWS Weather Surveillance Radar-1988, Doppler (WSR-88D) was located at Jacksonville (KJAX), approximately 36 miles east-northeast of the accident site. The level II archive data was obtained from the National Climatic Data Center (NCDC) utilizing the Hierarchical Data Storage System (HDSS) and displayed using the NWS NEXRAD Interactive Viewer and Data Exporter software.

Reflectivity is normally displayed in decibels (dBZ[2]), 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 1 2	< 5 5 to 9 10 to 14	
1 Very Light	3 4 5	15 to 19 20 to 24 25 to 29	.01 in/hr .02 in/hr .04 in/hr
2 Light to Moderate	6 7	30 to 34 35 to 39	.09 in/hr .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 12 13 14 15	55 to 59 60 to 64 65 to 69 70 to 74 > 75	>5.67 in/hr

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.

[2] dBZ - 10 log Ze

Air traffic control (ATC) weather display systems also use radar weather processors with the ability to determine precipitation intensity, with controllers instructed to describe the intensity to pilots based on the following scale:

(a) "Light" (< 30 dBZ)
(b) "Moderate" (30 to 40 dBZ)
(c) "Heavy" (> 40 to 50 dBZ)
(d) "Extreme" (> 50 dBZ)

Figures 2 through 4 are the KJAX WSR-88D base reflectivity image for the 0.5 degree elevation scan completed at 0854[3], 0859[4], and 0903 EDT respectively with the accident airplanes flight track overlaid. Figures 5 and 6 are the zoomed images around the time of the accident, which depicts the accident airplane penetrating into echoes of 45 dBZ or "heavy" intensity.

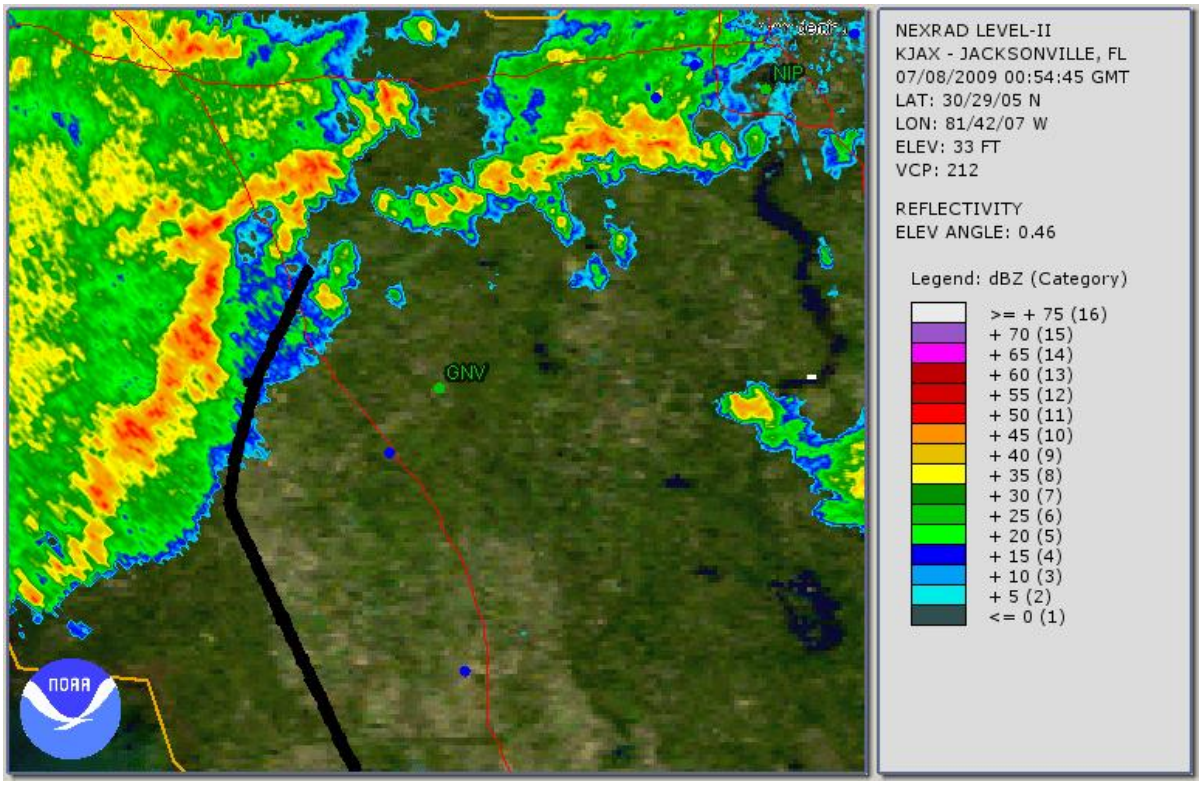

Figure 2 – KJAX WSR-88D base reflectivity image at 0854 EDT

[3] The date/time stamp on the image is incorrect and should display "07/08/2009 12:54:45 GMT".
[4] Same error on the date/time stamp, which should display "07/08/2009 12:59:21 GMT".

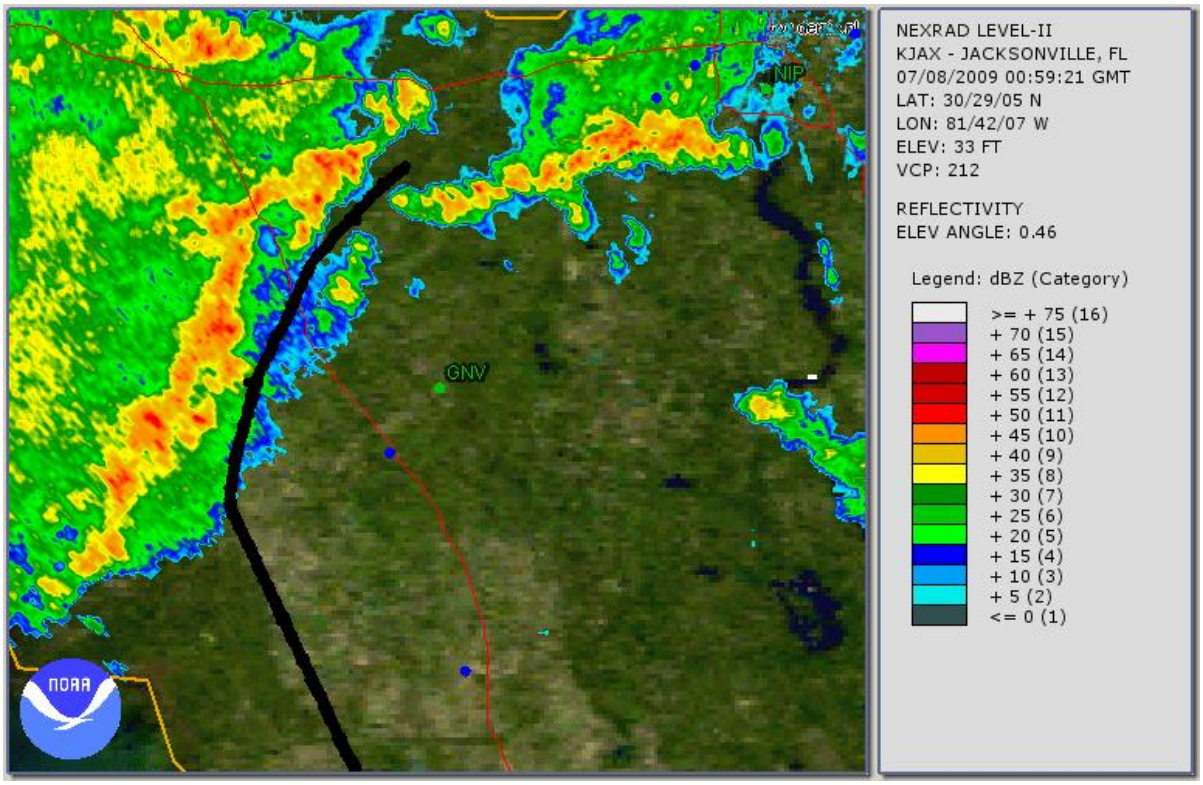

Figure 3 – KJAX WSR-88D base reflectivity image at 0859 EDT

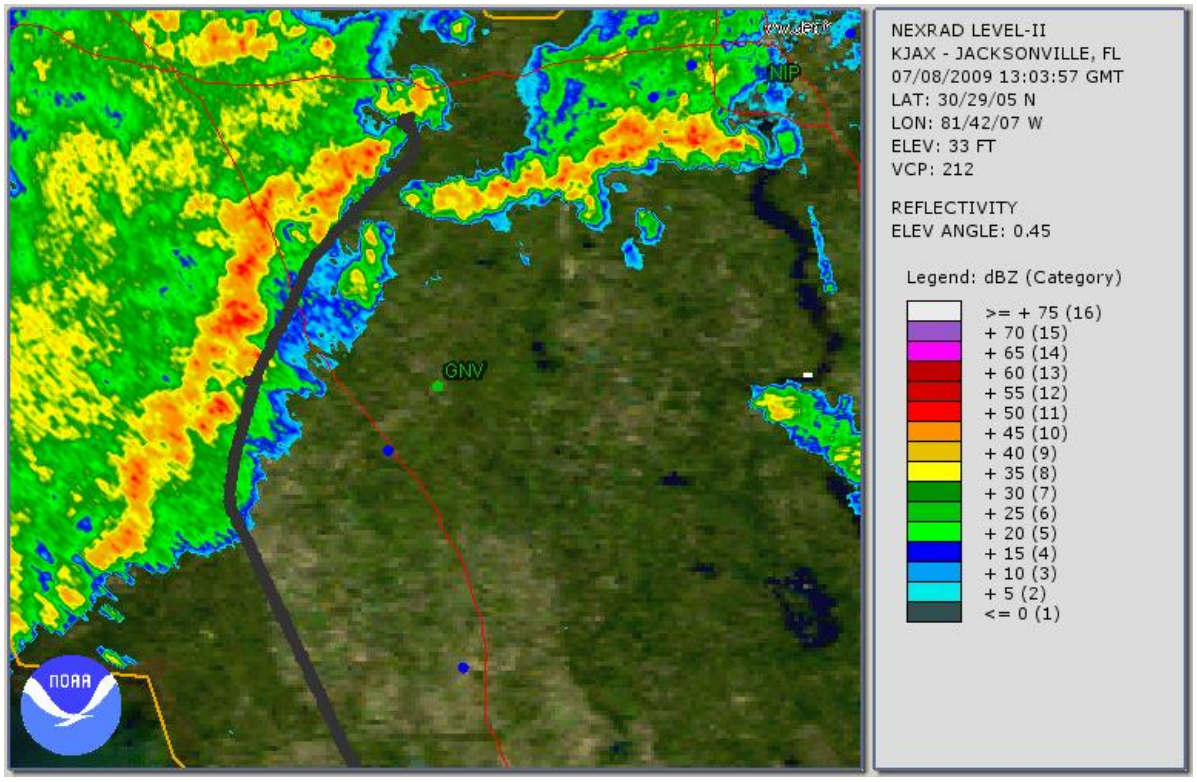

Figure 4 – KJAX WSR-88D base reflectivity image at 0903 EDT

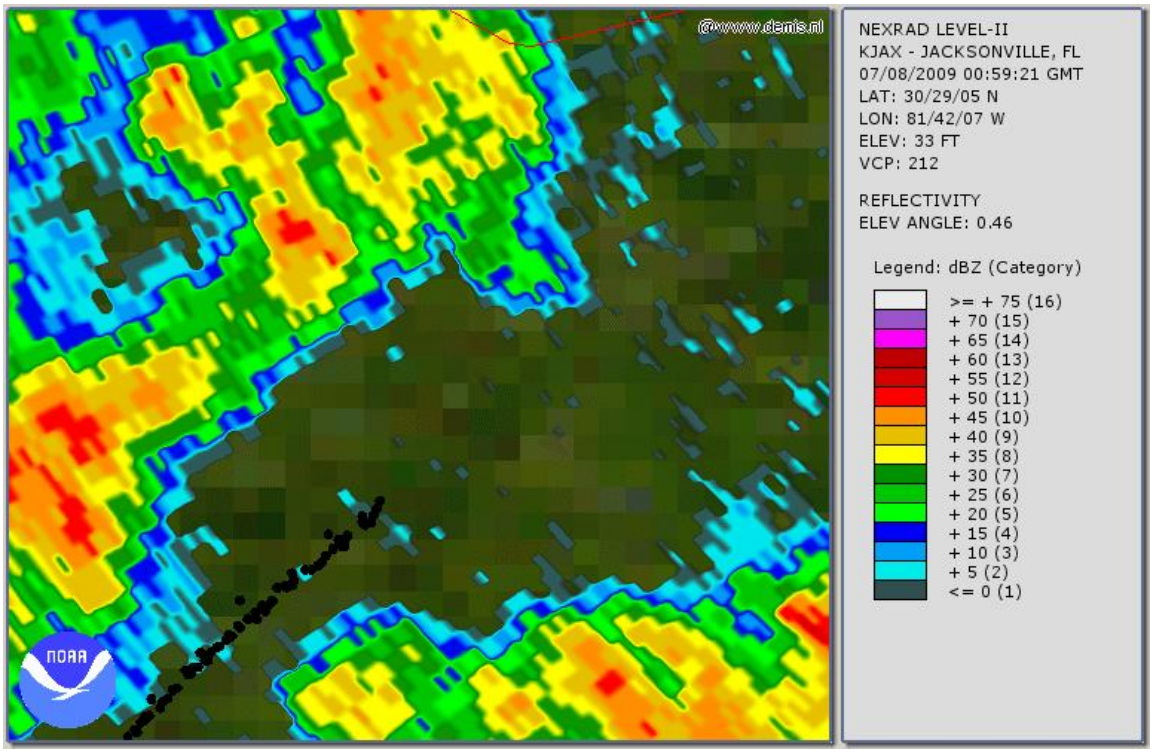

Figure 5 – KJAX WSR-88D base reflectivity close up image at 0859 EDT

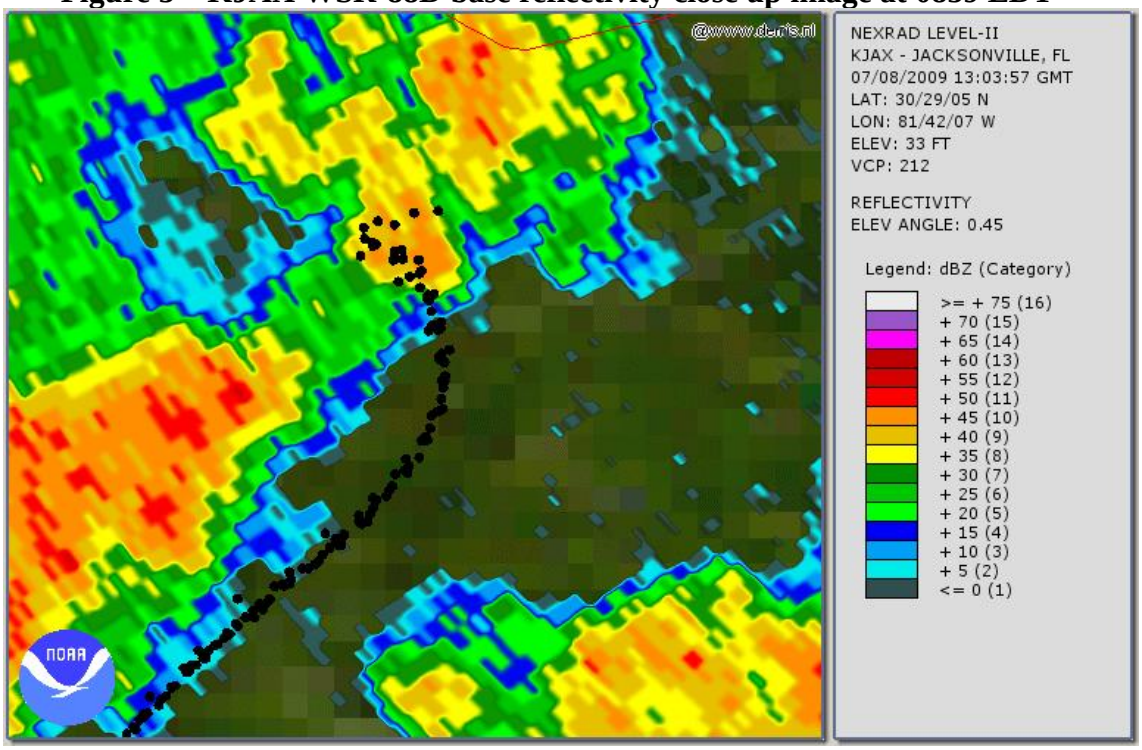

Figure 6 – KJAX WSR-88D base reflectivity close up image at 0903 EDT

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