Use of AVSET at RAH during the 16 November 2011 Tornado Event

The KRAX WSR-88D was upgraded to RDA build 11.8 and RPG build 12.3 on 02 November. An EF-2 tornado moved across Davidson and Randolph Counties between 2305 UTC and 2325 UTC on 16 November 2011 and produced two fatalities. This event marked the first significant severe weather event to utilize the AVSET functionality at WFO RAH.

Tornado Watch 891 was issued at 2130 UTC on 16 November and covered much of the Carolinas. Other than some low topped convection that moved from northern NC into VA, almost all of the convection during the early and mid-evening hours was along and ahead of a cold front that was draped along the higher elevations of the southern Appalachians. Based on the mesoscale environment and radar data from KGSP, KRAX, and TCLT, along with an upstream warning from GSP, RAH issued a tornado warning at 2236 UTC for Davidson County. A second tornado warning was issued for the same cell at 2308 UTC for central/eastern Davidson and Randolph Counties. KRAX was using VCP 212 during the event and AVSET was enabled at 2240 UTC, around 25 minutes before the tornado touch down and took effect at the beginning of the 2244 UTC volume scan.

From the KRAX WSR-88D perspective, this was an ideal setup to use the AVSET functionality since the convection was located at a great distance from the KRAX RDA (see figure 1). The chart (figure 3) and table 1 were largely assembled by Brandon Vincent and they provide a full set of metrics on the volume scan duration, the volume scan time savings, and the maximum elevation angle noted during each volume scan.

During the majority of the first tornado warning, AVSET truncated the VCP at 6.4 degrees which is the maximum allowed by the software. This shortened the volume scan time by 1:07 or 24%. Even during the second tornado warning, when the storm was getting closer to the RDA, AVSET reduced the volume scan time by 28 to 55 seconds.

Forecasters during the event found the functionality very helpful and they were appreciative of the new capability. AVSET allowed the radar operators to monitor and examine the mesocyclone more closely. I believe they issued more frequent and likely more correct SVS's updates in part because of AVSET. The radar operators viewed this favorably and we have noted its benefits for future events. I don't think there were any issues: all-tilts worked normally, WarnGen appeared to be unaffected, and no communications issues were noted. We communicated the enabling of AVSET to our users through the FTM and NWSChat.

We are a little concerned that the AVSET defaults to “disabled” and that this will result in some events where it is not enabled because of oversight. We will be adding an AVSET check to our radar checklist for each shift and adding it to our convective watch checklist. Finally we plan on briefing our users during the next URC meeting.

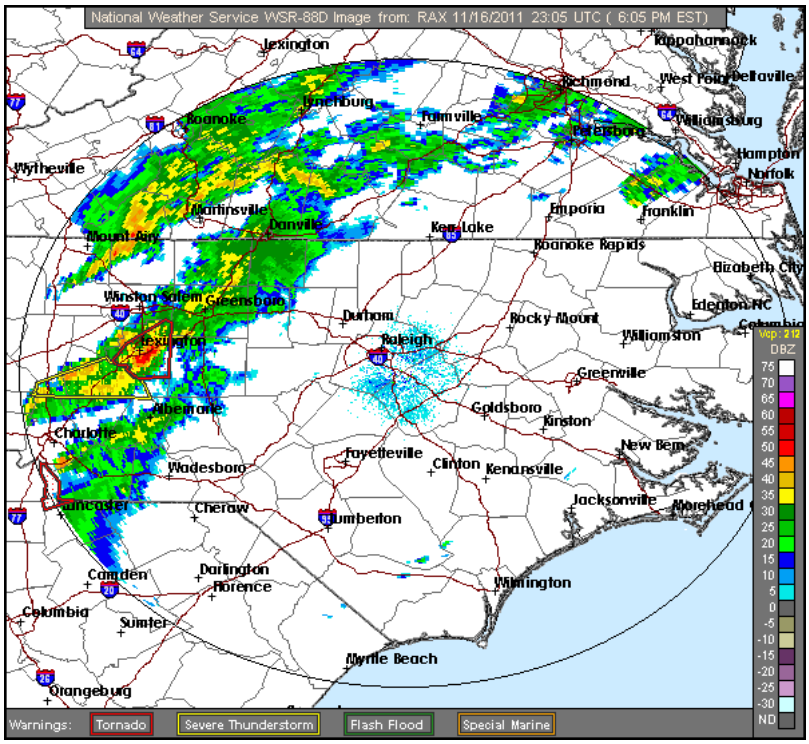

Figure 1 – KRAX base reflectivity with warning polygons from 2305 UTC on 16 November 2011 when the tornado first touched down. The KRAX RDA is at the center of the range ring, about 20 km southeast of Raleigh.

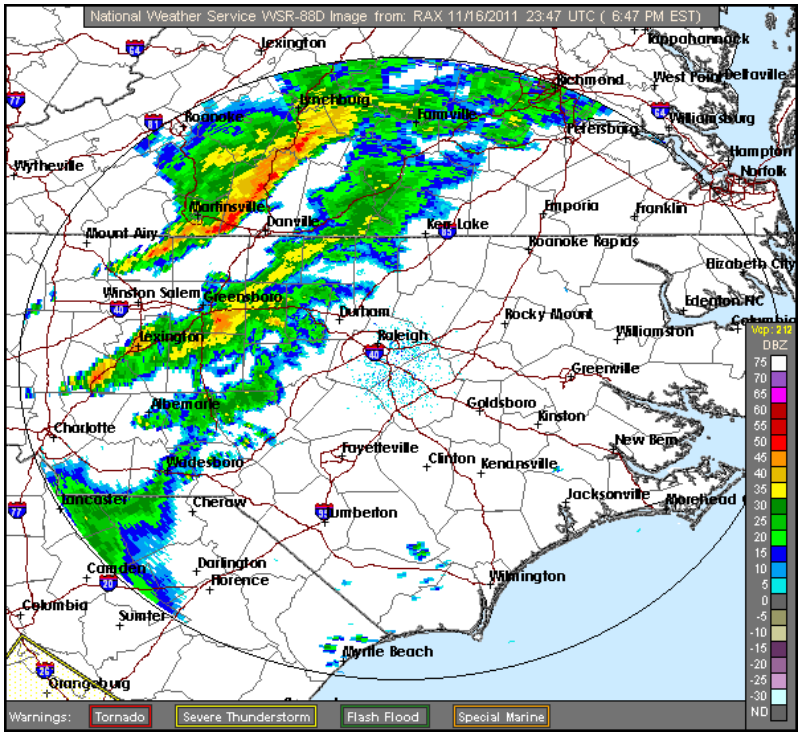

Figure 2 – KRAX base reflectivity from 2347 UTC on 16 November 2011 just after the second tornado warning expired. The KRAX RDA is at the center of the range ring, about 20 km southeast of Raleigh.

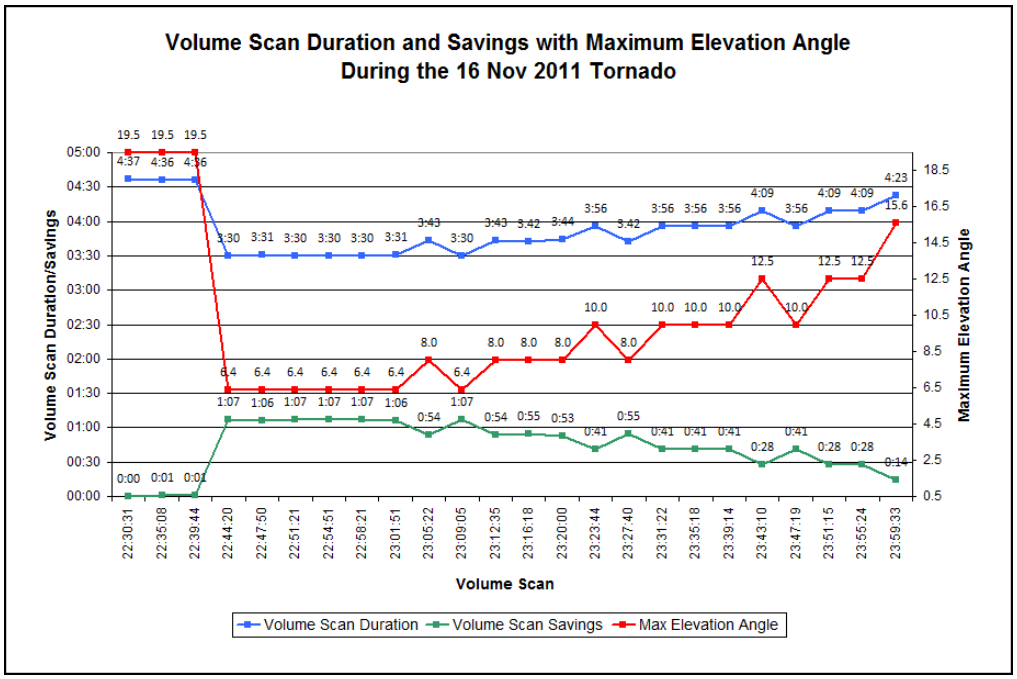

Figure 3 – Chart of the volume scan duration (blue), the volume scan time savings (green), and the maximum elevation angle (red) for KRAX during each volume scan between 2230 UTC and 2359 UTC on 16 November 2011.

Table 1

Date (UTC)	VCP	Vol Scan Start Time (UTC)	Vol Scan Duration	VST Time Savings	Max Elev
16-Nov	212	22:30:31	04:37.0	00:00.0	19.5
16-Nov	212	22:35:08	04:36.0	00:01.0	19.5
16-Nov	212	22:39:44	04:36.0	00:01.0	19.5
16-Nov	212	22:44:20	03:30.0	01:07.0	6.4
16-Nov	212	22:47:50	03:31.0	01:06.0	6.4
16-Nov	212	22:51:21	03:30.0	01:07.0	6.4
16-Nov	212	22:54:51	03:30.0	01:07.0	6.4
16-Nov	212	22:58:21	03:30.0	01:07.0	6.4
16-Nov	212	23:01:51	03:31.0	01:06.0	6.4
16-Nov	212	23:05:22	03:43.0	00:54.0	8.0
16-Nov	212	23:09:05	03:30.0	01:07.0	6.4
16-Nov	212	23:12:35	03:43.0	00:54.0	8.0
16-Nov	212	23:16:18	03:42.0	00:55.0	8.0
16-Nov	212	23:20:00	03:44.0	00:53.0	8.0
16-Nov	212	23:23:44	03:56.0	00:41.0	10.0
16-Nov	212	23:27:40	03:42.0	00:55.0	8.0
16-Nov	212	23:31:22	03:56.0	00:41.0	10.0
16-Nov	212	23:35:18	03:56.0	00:41.0	10.0
16-Nov	212	23:39:14	03:56.0	00:41.0	10.0
16-Nov	212	23:43:10	04:09.0	00:28.0	12.5
16-Nov	212	23:47:19	03:56.0	00:41.0	10.0
16-Nov	212	23:51:15	04:09.0	00:28.0	12.5
16-Nov	212	23:55:24	04:09.0	00:28.0	12.5
16-Nov	212	23:59:33	04:23.0	00:14.0	15.6