# The Meteorology Behind the August 13, 2014 Microbursts

*A Look Behind the Radar and Other Morsels*

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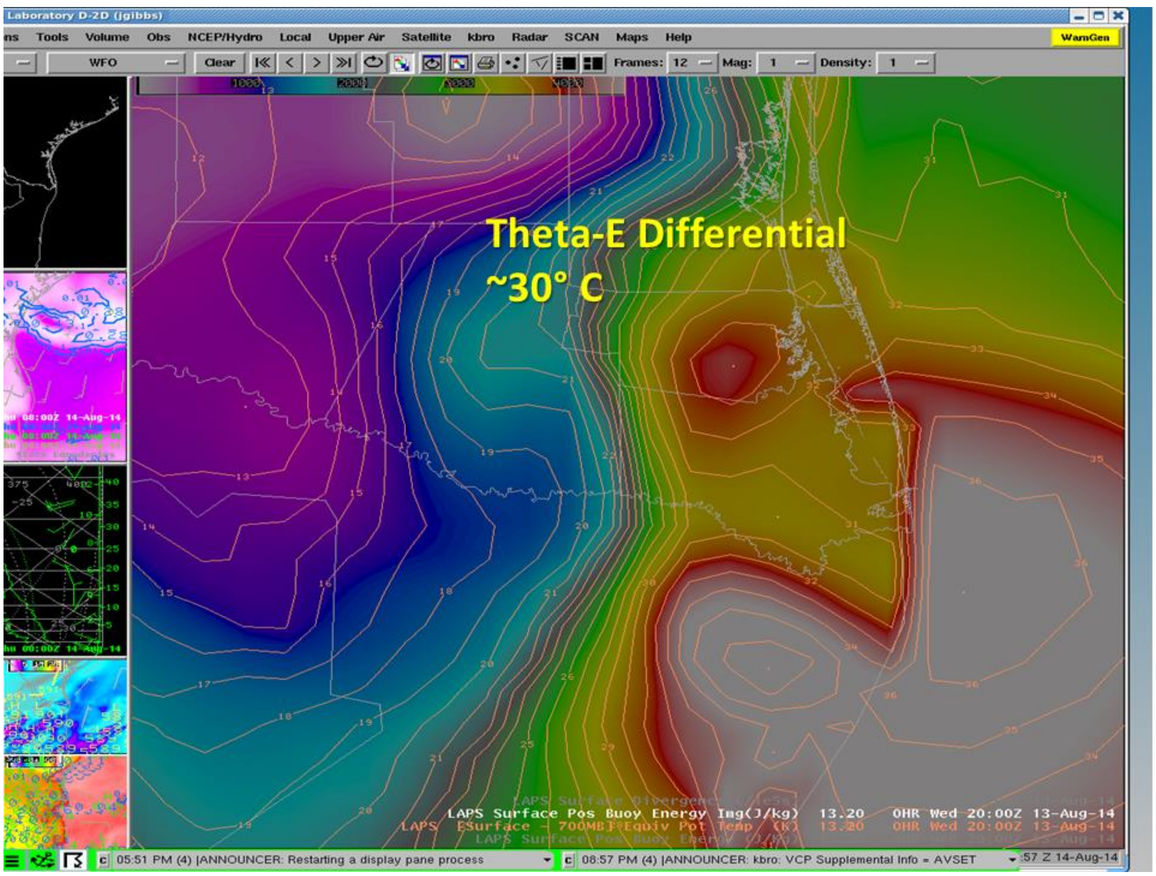
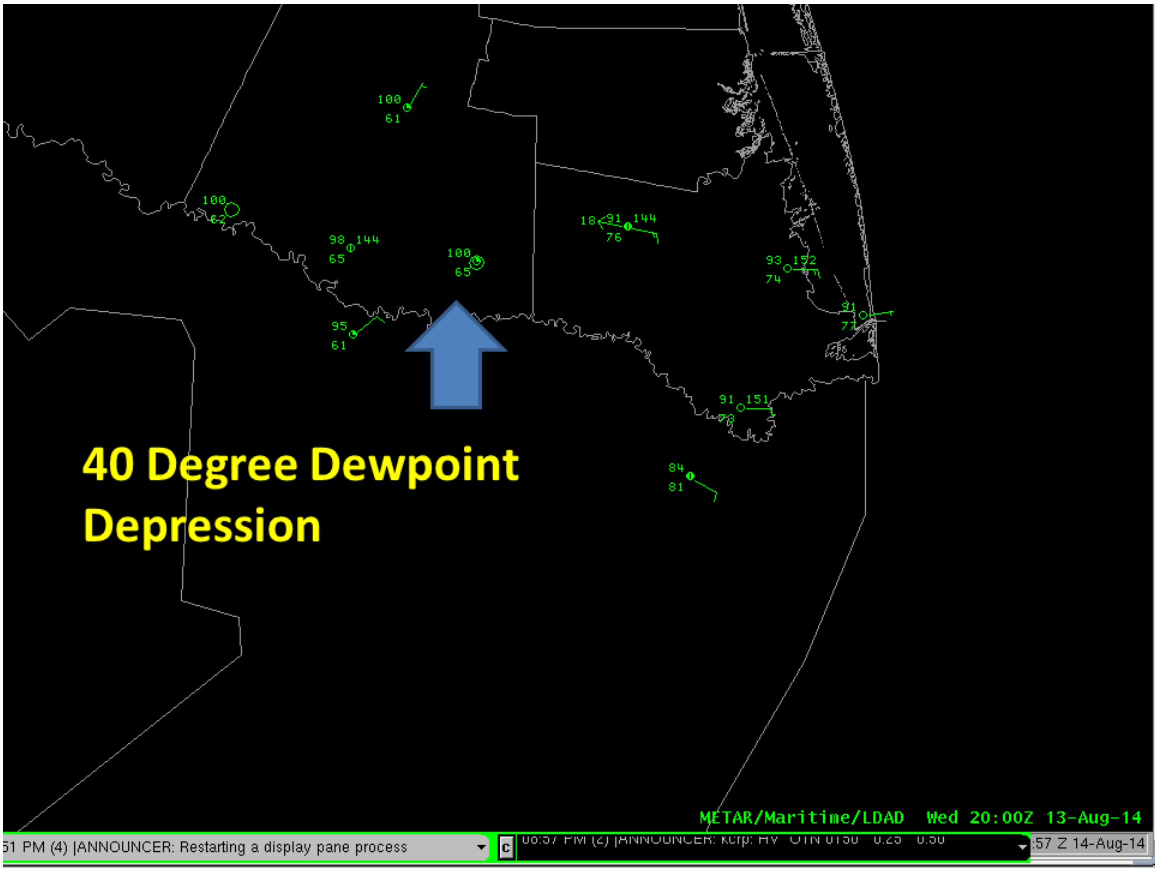
A series of downbursts impacted a good portion of Hidalgo County, Texas, during the afternoon of August 13, 2014. The event – unique given the late time of the season (mid-August) – had some great radar signatures associated with it. These radar signatures go beyond routine severe weather parameters, which would have masked what was really happening – or about to happen – at the ground. The following images describe the compelling story that Doppler radar data told.

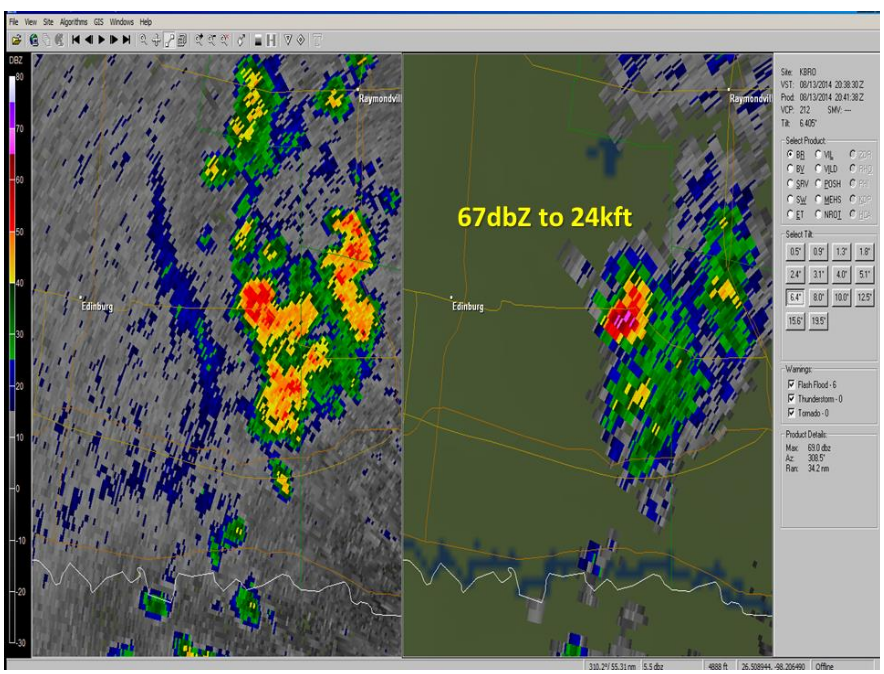
August 13th, as well as August 12th, had a very unique thermodynamic setup for this late in the season. Typically, wet and mixed wet/dry microburst setups in the Valley are seen between April and June, perhaps into early to mid July. Such a late spring setup occurred on August 13th. Note the great ***wet microburst*** setup along the coast; high Conditional Available Potential Energy (CAPE) and an Equivalent Potential Temperature difference of around 30)



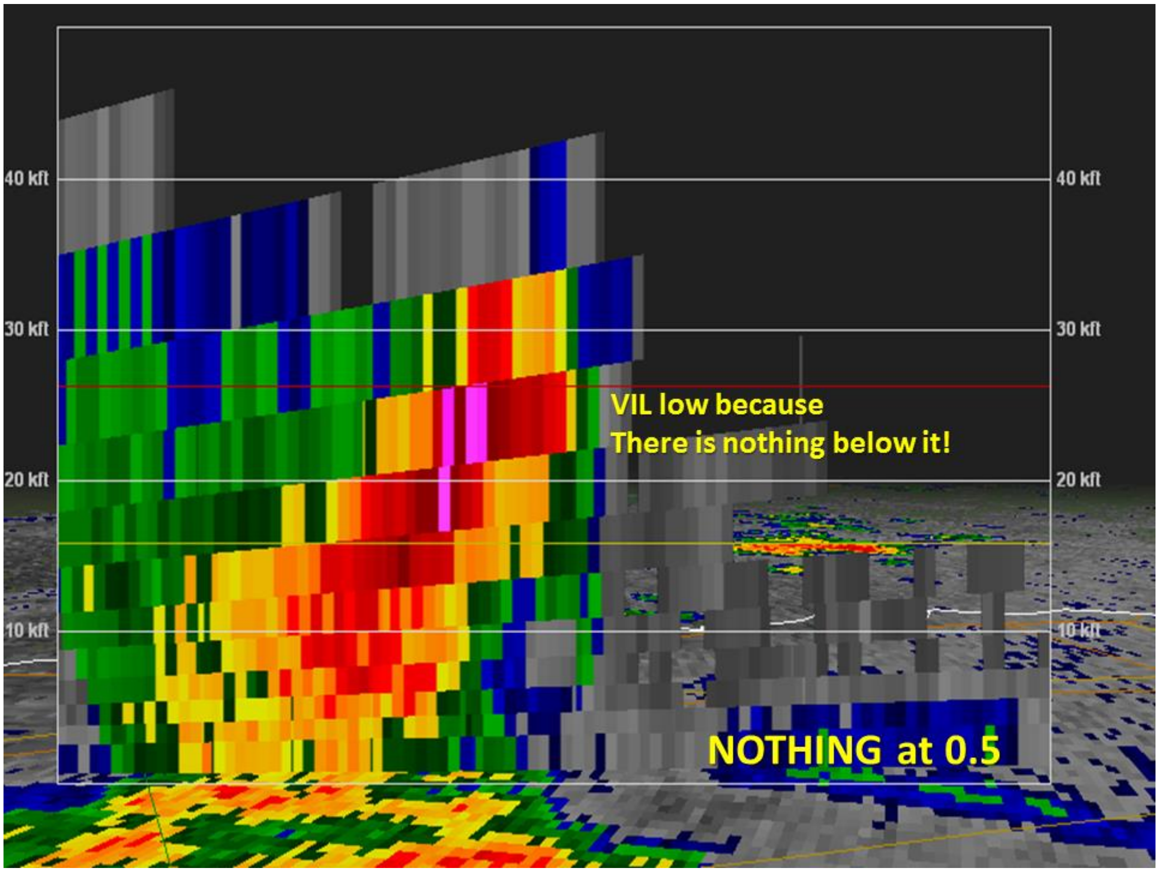

An equally solid ***dry microburst*** setup was underway in the Mid Valley. Dewpoint depressions were above 40°F, and a strong "inverted-V" sounding was present.




This was the first real indication of trouble. A strongly elevated core with very high reflectivities aloft appeared next. The first damage appears to have occurred within 5 to 10 minutes of this image.

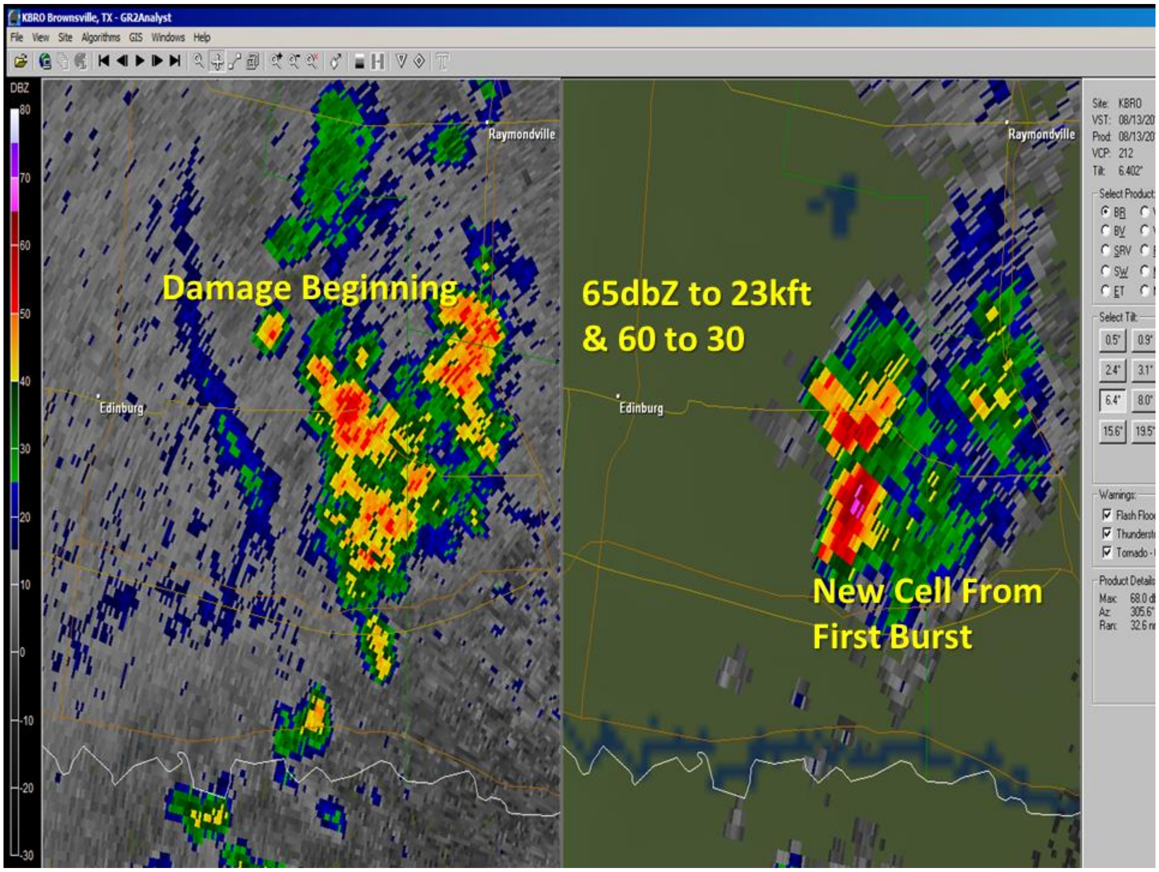


Shown next is a cross section indicating the strongly suspended core was above very little reflectivity. Note that vertically there is not much there; Vertically Integrated Liquid (VIL) values would be ***very*** low with this storm.

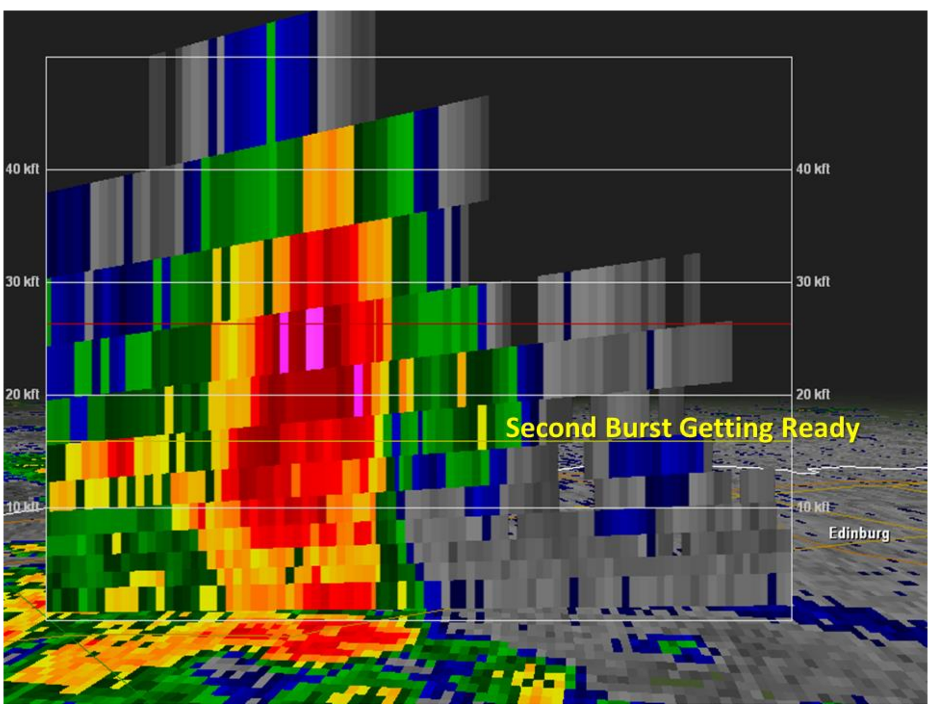



Alas, science does still apply here and we ***did*** get wind damage from this classic downburst signature. Although mid-level convergence was fairly weak, it may have been masked by beam angle, which was strong on both days. An example of beam angle masking is described at  http://www.crh.noaa.gov/lmk/soo/docu/midlevelconv_notes.pdf.

The initial burst developed a new updraft (the southmost storm on the right panel below) within 5 minutes, and produced damage again within 5 to 7 minutes northeast of Weslaco. Note again the poor vertical orientation; 0.5° alone gives no clue to the impending and ongoing damage.

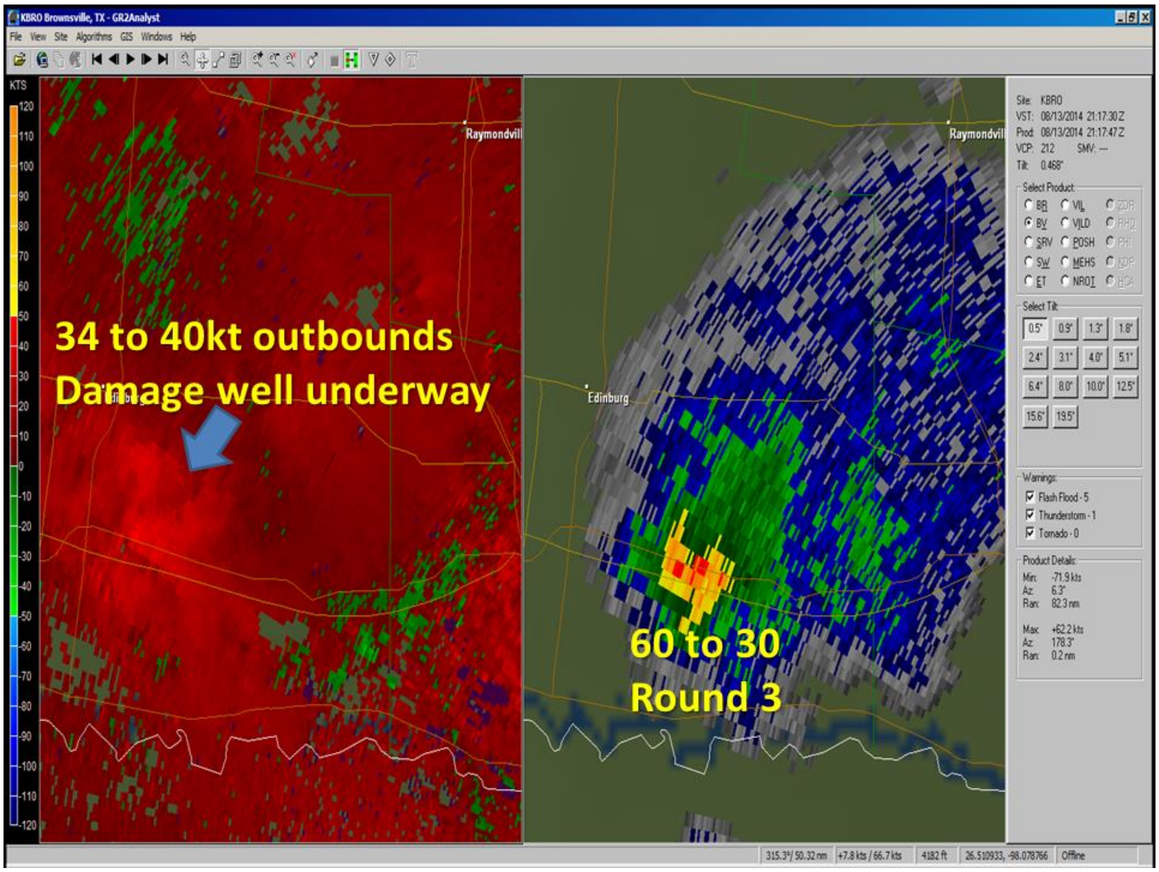



Next, a look at the second microburst (#2) getting ready to destroy mobile homes and knock down trees and power lines.

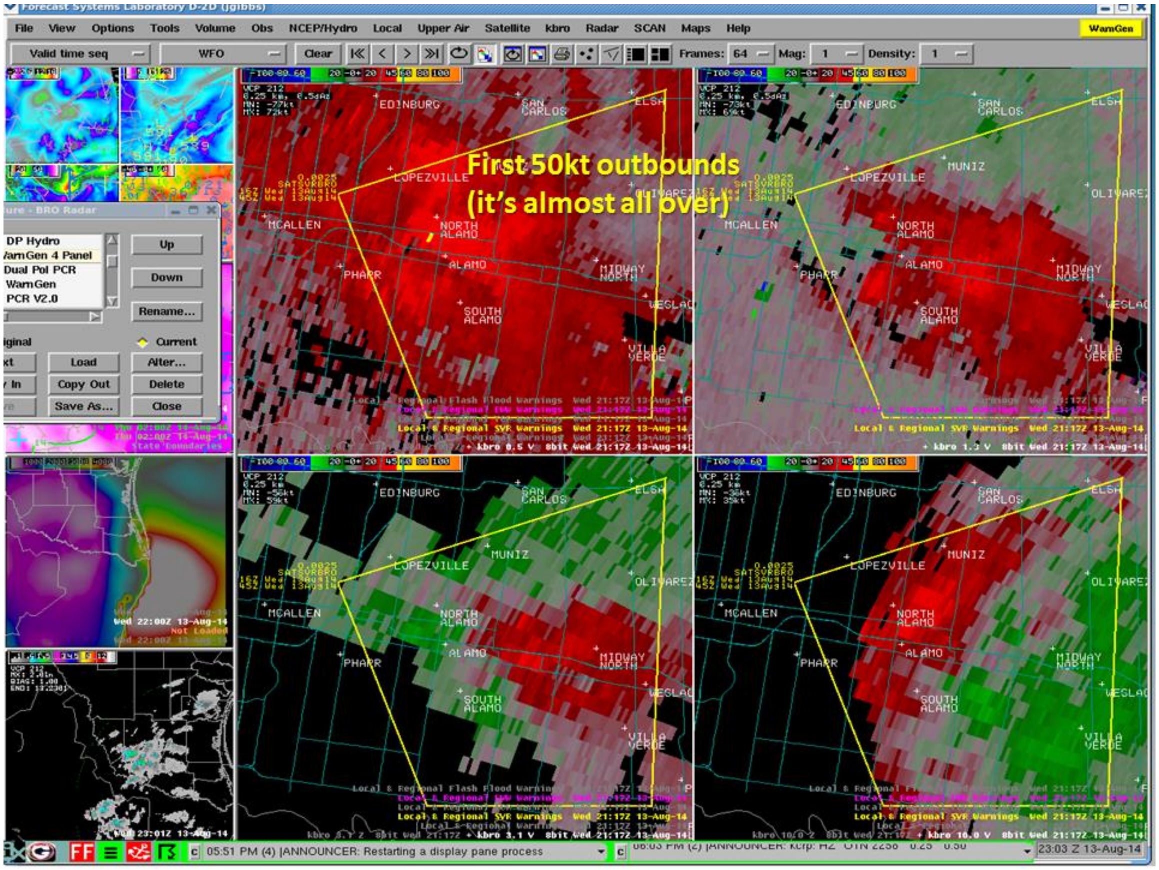


A few minutes later, microburst #3 gets loaded over Donna and Alamo. This is the first time consistent outbound velocity values begin showing up on radar as the first two bursts became a more organized outflow boundary.

Downbursts on radar may not be seen unless they are pretty close to the radar location, and even then it will be well after damage because they are vertical; there is not nearly as much horizontal component involved.




Finally, for the first time, 50kt outbound velocity (yellow pixels) appears about 10 minutes before it was all over. McAllen/Miller gusted to 39 knots, or 45 mph, at this time.




In summary: When assessing wet or dry microbursts once the atmosphere is primed, and high reflectivity develops rapidly aloft, one normally has *about 5 minutes* (one volume scan) before damage begins. Utilizing all-tilts or GR Level 2 Analyst cross sections is the preferred method ks for diagnosing microbursts with lead time.