Subject: Re: Your Experiences With Constand Directivety Horns
Posted by Todd W. White on Tue, 26 Dec 2006 01:11:48 GMT
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ALL constant-directivity (actually a misnomer, but I digress) horns have, as do all things in general, some flaws that must be understood and compensated for (or, at least, tolerated) in order to get the most out of them.1. The most noticeable problem with them is that they suffer from what Mark Ureda describes as an problem with "Apparent Apex." Simply stated, this means that ALL constant-directivity have at least TWO locations within the driver/horn assembly from whence the sound appears to originate. In the vertical plane, the apparent origin to the listener's ear of where the sound starts is at the comrpession driver. HOWEVER, in the horizontal plane, it appears to originate at the point where the diffraction slot (or curve, for you EV and JBL fans) opens into the bell flare.The ultimate result is that the sound appears to originate somewhere between the two points.But it doesn't stop there. That's only at ONE frequency - the horizontal apex shifts with frequency, resulting in a really interesting, and sometimes difficult to listen to, phenomena.With the WE/Altec multicellular horns, this problem did not exist - the origin (apex) of the sound source on a multicellular horn start AT EXACTLY THE SAME PLACE: where the horn bolts to the throat. That's why they were hand-filed to almost razor-sharp: to eliminate any reflections back into the throat area, AND to make SURE that the sound emanated from the same spot in the vertical AND the horizontal planes.As my old friend Don Davis likes to say, "Those guys in the Bell Labs really knew their math - they understood what was going on, acoustically, and made sure they found a way to do it right!"To solve this problem in multiple horn arrays, Mark Ureda came up with an interesting compromise which actually worked quite well, although the arrays ended up looking pretty strange at times - nothing at all as beautiful as the symmetry we used to see in the big 210/211 clusters with multicellular horns.Our friend Ted Uzzle teamed up with Mark to write an Altec Technical Letter about this called, "TL-262 = Coverage Of Multiple MANTARAY® Horns." This is a paper whose concepts are still not understood by most modern acoustical consultants, sound system designers, and sound contractors, and is a MUST READ for anyone interested in how to cover large areas with multiple constant-directivity horns while minimizing phase interference, and maintaining apparent apex. You can find it here:http://alteclansingunofficial.nlenet.net/publications/techletters/TL_262.pdf2. All that said, these horns DO work well. Quite well, in fact. BUT it must be remembered that, for all their detractors, multicellular horns do not exhibit the beaming problems nearly as bad as Thomlinson Holman and his ilk liked to say they did. John K. Hilliard said that he had to slow the turntable down in the anechoic chamber to it's lowest setting and speed the recording pen up to full in order to even be able to MEASURE the lobing problems mentioned in Leo Baranek's book "Acoustics", which is where those who hate multicell's (and Altec) got a lot of their fuel.But hey - in real life, you can't hear it, unless you're listening to pink noise, and who listens to THAT for any length of time at all unless they have to?3. The only really CD horns from the "Big 3" who brought them to prominence are the MANTARAY ones designed and built by Altec. They have precise coverage patterns, unlike the ones from EV & JBL, which were far less accurate - not really "constant". While you could walk in or out of the MANTARAY coverage pattern, with the others, you kind of faded into or out of theirs....All told, CD horns are, like everything else, a compromise. If they do what you want and sound good, use them. If not, keep searching, but don't bypass some of the better older designs - you might be surprised at how well they work.