Subject: Conical Confusion
Posted by PointSource on Fri, 18 Aug 2006 00:12:13 GMT
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Theories & opinions, please! One reputable designer states that a (square or rectangular) conical horn exhibits little or no pattern control over its chosen frequency band, and that the horn wall angle has almost no impact on the horn's dispersion. Another reputable designer states that a conical horn exhibits pattern control that's tight enough to use in a horizontal array. Any input welcome!

Subject: Constant Directivity
Posted by Wayne Parham on Fri, 18 Aug 2006 02:56:57 GMT
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The guy that says conical horns provide no pattern control is undoubtedly pushing a different kind of horn. It's rubbish. Don't be fooled by credentials. People with credentials have agendas too.The conical horn is actually the only shape that provides constant directivity. It starts to lose pattern control at some low frequency point based on its size but above that point, it has constant directivity through its passband.

Subject: Re: Constant Directivity
Posted by PointSource on Fri, 18 Aug 2006 04:26:44 GMT
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Thanks for responding, Wayne! I suppose I should add some detail: Designer #1's conicals are generally shorter in depth and tend to have less mouth area than Designer #2's horns. Also, #1's crossover points are higher, so maybe the reference is to beaming, as well? Is there a lot of "spillover" within a conical's passband? Does the throat design have any effect on its CD quality or HF cutoff before beaming? At this point, I must express that I have great respect for the authority of each of the two Designers in their own field of influence, although occasionally they have differing opinions which confuses amateurs like myself.

Subject: Re: Constant Directivity
Posted by Wayne Parham on Fri, 18 Aug 2006 06:10:58 GMT
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Well, a lot of what you said is general and not specific enough to really analyze. But there are a

few concrete facts you can get a hold of.If a horn is short, it will not load down to as low a frequency as a longer horn of the same shape. If its mouth area is small, then it won't have as good pattern control as a larger horn.Beaming is another name for collapsing directivity and it occurs when a direct radiator becomes directional because of path length differences between points along its cross-section and listening points out in the environment. It occurs in a curved wall horn because wall angle gets narrower further down the throat.I might suggest for you to study horn theory and learn how things work. The concepts are pretty simple so you can pick it up pretty quickly.

Subject: Re: Constant Directivity
Posted by PointSource on Sat, 19 Aug 2006 02:06:16 GMT
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I've gleaned some basics from various websites (plus a few finer points here & there), but such seemingly disparate conclusions from two reliable sources left me wondering if I'd missed some glaringly simple horn principle. (Of course, the hit-and-miss educational system leaves much to be desired!) I know, I should download the McBean program; it'll have to wait until I can afford to add a PC-type computer.Does the throat area have anything to do with where the horn begins to beam? I've seen a few designs --mostly for 10" cones-- where the throat looked like the CD slot one would find in a 2" horn. Is this a similar diffraction technique?Oops! SG1 200th episode begins, gotta go! Later!

Subject: Re: Constant Directivity
Posted by Wayne Parham on Sat, 19 Aug 2006 05:14:12 GMT
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Throat area sets a lot of things. One of them is when the horn rolls off on top due to path length differences. The phase plug is designed to reduce path length differences, to extend upper frequency response. The throat angle sets the width of the pattern at the highest frequencies. And, yes, diffraction comes into play if some horn feature is at wavelength dimensions. Something that acts as a diffraction slot will widen the pattern.

Subject: Re: Constant Directivity
Posted by PointSource on Sun, 20 Aug 2006 00:34:21 GMT
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Thanks for the input, Wayne. I have a basic grasp of most of your response, though I've never heard of the "throat angle" concept before now. I'm beginning to think that throat geometry has

more impact on a horn design than any other single variable. BTW, if I can avoid mucking about with phase plugs, I won't feel like I've missed anything!