Subject: Image perception
Posted by Earl Geddes on Sat, 21 May 2005 16:03:55 GMT
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After some early investigations I want to get some other opinions on some imaging tests that I have conducted. Now I can't say that your results will be the same as mine, because the speakers will be different, but that's the kind of input that I am looking for.In my setup the speakers are toed in at 45° about 10 feet appart. The imaging is always central and quite good at all median line seating points, but the subjective effect is profoundly affected by the forward-backward position.First consider 2 channel. At about 12 feet the image is solid but the subjective effect is one where the players appear to be in the room with you. As one moves closer the image locks into a more solid one, far more solid than a real instrument would be in this same room, and at a certain point about 6 feet back it is as if the listener were transported to the recording studio. You are in the room with the artist.Whats happening here is a large change in the direct to reverberant ratio, as well as a surpression of early reflection levels. Of course with oni-directional loudspeakers this is not going to be the same since there are reflections from back walls etc. which get greater at closer positions and the direct to reverb ratio will not change nearly as much as with directional speakers.These are dranmmatically different effects and I have found that different people prefer different ones and this may vary from recording to recording. The question is: do others perceive this same effect? Which is prefered? Please note speaker type and configuration.Now in 5.1 channels, this effect is gone. There is no image change with forward position and further back is, IMO, far more prefered. This is also due to the fact that 5.1 comes with video and a 12 ft. screen at 6 feet is just plain not watchable. 12 feet is even a bit close.Has anyone experinced this effect and what are the opinions? Please note that there is no right or wrong here so please don't take that perspective. Just let me know what you prefer and if you get this effect at all.Earl

Subject: Re: Image perception
Posted by Wayne Parham on Sat, 21 May 2005 17:36:34 GMT
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I surely get your meaning. The illusion of spaciousness created from reflected energy is almost universally perceived. It does make it's own "soundstage" and it is sometimes pleasant, or at least interesting.We've talked about that on my forum a lot over the years. The whole deal Bose did was based on it, and for whatever other things a person may think, I do think that his observation in that regard was genuine. People almost always think the sound made from a system like that with a lot of reflected energies is very spacious sounding. They marvel at the ambience.But while it makes a convincing illusion of spaciousness, it does so at the expense of other qualities. It is especially noticeable to me in vocals and piano. The sound from a piano heard live comes from the soundboard, and it doesn't really come from all around you, even in a lively room. Same with vocals, if you're not in a cave or a shower, the direct sound is much louder than the reflected sound. So in some ways, it works but in others, it doesn't.
Another discussion about direct and reflected sound

Subject: Re: Image perception
Posted by Earl Geddes on Sat, 21 May 2005 19:33:48 GMT
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WayneWell as usual I agree with a lot of what you say, but some I don't.Without going to deep into details let me say that in the reply above, I am not sure that we are talking about the same thing. I mean Bose speakers could never do what I am talking about. In fact, after thinking about it, I am not sure that any wide directivity speaker could do it unless it were well away from any boundaries, which is tough in a typical room. It would need to be like the trick that I used to do as a kid. Lay on the floor and place the speakers about a foot or two away from your ears. The image will be locked on, almost like headphones.In your link, I would agree that most of the terms that you mention are nebulous and ill defined, but I don't think that "disappearing speakers" is. I use this term, I think that it is very clear what it means - you cannot locate the speakers even though there is a sound stage - and obviuos when you hear it. All of the other terms I avoid.At my current understanding of the disappearing speakers it is done by a setup that is free from diffraction in the vicinity of the speaker. Horns, to me, have never had this quality, because most diffract somewhere - at the throat or the mouth, or a diffraction slit. You can always pinpoint a typical horn. You can almsot always do this with a typical tweeter too, as there is always nerby diffraction from the tweeter assembly, mounting, enclosure, other speakers. When you have a system that has a minimum of diffraction then the speakers do indeed seem to disappear. This is what I have always tried to achieve and what I believe my speakers do better than any others that I have heard.So to me, disppearing speakers is a very real objective.But my current post is not really about disappearing, although it may well be that until the speakers do disappear, the effect that I am talking about may not be readily apparent. Thats what I am trying to find out.PS. To call image localization "phase" dependent is not really a good usage of the term. Thats because there are actually several complete phase otation between the two ears at HF and the phase is then ambifguos. The better term is inter-aural time difference. Sure phase depends on this, but this term is unambiguous while the phase is not. Phase differences are only meaningfull between 10 and 360 - after that its a phase delay or there are multiple dealys with the same phase difference.Perhaps a minor point, but in some situations a critical one.Earl

Subject: Re: Image perception
Posted by Wayne Parham on Sat, 21 May 2005 20:06:20 GMT
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Yes, the replies in the link weren't completely on point, but they were along the same lines. There were actually three or four different issues lumped together. Still, I thought you might find some of the comments interesting.One thing I thought was telling was how people perceived the sound of directional sources and reflected energies. My conclusion is that uniformity is more important than directionality, but uniformity includes things outside the loudspeaker. It includes placement, orientation and directionality and involves the way the speaker(s) fill the environment with sound.Hopefully, others will chime in because I think there is some real merit in looking at this.

Subject: Re: Image perception
Posted by Manualblock on Sat, 21 May 2005 23:16:57 GMT
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I can try to provide some experience. What I get with the 45 deg. toe-in and about 10 feet back equidistant from each speaker(I measure the distance with a ruler). The speakers are 3 ft in front of the back wall and I sit in the apex of a bay window with drapes.The sound narrows as you pull forward until at about 6 ft the players are clearly defined and static, like a 2d representation very clearly defined but spread slightly wider than the speakers 8ft seperation. As you pull back to about 10 ft + the the sound meshes and players bleed into the space occupied by each other and fill a broader space; more like you hear at a classical music concert hall.Further back into the room at about 14 ft the soundstage widens and broadens but the different instruments can begin to change orientation; ie, they might shift their place as the notes change.Hope this is of some use.

Subject: Toe-in
Posted by colinhester on Sun, 22 May 2005 01:36:14 GMT
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How does the toe-in angle affect your sound stage at equal listening distance? It sounds like your setup is pretty close to what Cardas recommends for ideal near field listening: 10' speaker separation and 10' from each speaker
http://www.cardas.com/content.php?area=insights&content_id=28&pagestring=Room+Setup+3

Subject: Re: Image perception
Posted by Earl Geddes on Mon, 23 May 2005 18:29:30 GMT
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OK so you too get a pronounced effect. Thats good. But you did not rate the perceptions. What did you like best? Least?

Subject: Re: Toe-in
Posted by Earl Geddes on Mon, 23 May 2005 18:32:50 GMT
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The best answer to this question is found in the white paper
athttp://www.gedlee.com/new_loudspeaker.htmIf you still have questions after reading that let me

know.In the link that you posted the listener is off axis of the loudspeakers. Unless these are constant directivity loudspeakers (which very few are) the direct sound will not be flat.

Subject: Re: Image perception
Posted by Manualblock on Mon, 23 May 2005 19:41:56 GMT
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Sitting as far back as is reasonable puts me about 12 ft back and 2 ft from the wall behind me. I get a wide, albeit less defined soundstage. The blending of all of the instruments provides a nice effect that I enjoy. I listen that way now pretty much exclusively; so I would say the sacrifice in ultimate definition is worth the expansive and wider presentation to me.Sitting within the 10 ft range; the individual artists are etched more clearly and are more stable but that gets on my nerves after awhile.So; to answer your question I favor a less defined and more expansive sound.This BTW is a usefull excersize to get one out of the usuall rut and to establish some sort of data base that has a small chance of being understood by the group as a whole.So whats the thrust of the information so far?

Subject: Re: Image perception
Posted by Earl Geddes on Mon, 23 May 2005 19:53:02 GMT
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So far? Your the only respondent I find it most interesting that your perceptions and preferences are identical to mine. I like the solid precise imaging - for a while, but then it gets edgy to me. If I back up to take the edge off I still get a good imgage - not as precise, but far more listenable over the long term.But from experince I have found that if new people come over, I had better put them in that nearfield prcise image or I don't get a "wow" out of them. Again, from my experience, good loudspeakers don't stand out. They don't jump at you and say "I'm great!" They just never get on your nerves. Kind of like the bar clown who you laugh at for the first 1/2 hour or so, but then you just want to get away from him - and usually can't. Good speakers are more like the quiet guy you sit next to and gradually get to know and find out that he's really well read, intelligent and worth listening to. You never find this out unless you take the time to get to know him.I get down right annoyed when people listen to my speakers and have immediate comments. It takes me hours to decide on something like sound quality - how do they do it in minutes or seconds!?Enough ranting.Bye for nowEarl

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Subject: Re: Image perception
Posted by Wayne Parham on Mon, 23 May 2005 22:51:05 GMT
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I agree. I like to live with a component for a while to evaluate it. I understand the reasoning behind double blind tests and I don't discount them at all. This isn't about that. I just like to like to have some time with a component, and the keepers are the ones I find myself yearning to listen to music through, hard to shut off, make me late for a meeting because I have to listen to "one more song"...

Subject: Re: Image perception
Posted by Manualblock on Mon, 23 May 2005 22:57:10 GMT
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Merit? This is one of the most interesting threads yet. I hope Dr. Geddes pursues this and others like yourself participate. Thinking about it this is what these forums should be doing.With the speaker talent that posts here it would be very informative.This seems to be something that the SD guys would appreciate since their systems are very sensitive to placement.I know you can explain many of the effects and causes that result in particular sound behaviour; but there is nothing like personal reports.Just try to keep the focus on exposing trends and impressions.Dictate up-front that it is not a competition and that anything not pertinate will be moved to another thread.

Subject: Re: Image perception
Posted by Earl Geddes on Mon, 23 May 2005 23:46:36 GMT
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YepAnd that doesn't happen in a few seconds or minutes.

Subject: Re: Image perception
Posted by Wayne Parham on Mon, 23 May 2005 23:55:33 GMT
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around in the room and the balance doesn't change much. The speaker images pretty much the

in corners, it's nearly the same. If they are against a wall but walls on either side are very far away, then they have a cone where sound is good. They act like you're talking about. If they're pulled out away from walls, out into the middle of the room, then they seem to form pockets of

listening is on-axis, and distance from them changes their character, not as much as movement

I'm most familiar with, in 500 words or less.

Subject: Re: Image perception
Posted by Manualblock on Tue, 24 May 2005 01:19:07 GMT
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You can use some more words. I now have to start really listening to the 4's and deciding on some recognisable parameters.

Subject: Re: Image perception
Posted by Wayne Parham on Tue, 24 May 2005 02:39:59 GMT
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Nope, 500 words was the limit this evening. I was too tired to write any more than that.

Subject: Re: Image perception
Posted by Bob Brines on Tue, 24 May 2005 09:58:13 GMT
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I ran your test.The setup: Single driver speakers -- the Fostex's I had at GPAF -- 8' apart, 3' from the back wall. Room open on the left, glass wall (windows) 3' to the right. Normal listening position 11' back. Normal toe-in has the cross 9' from the speakers.With the 45° cross and at my normal distance, the sound stage is diffuse with little or no imaging. At 6', everything comes together. Wide, deep sound stage and very good imaging. The sweet spot is head-lock small. Moving in farther, the sound stage keeps expanding to the speaker width, but imaging becomes exaggerated left-right.Back to my normal setup. I don't have any 5.1 or better audio and my surrounds are OK for movies, but too far apart for music. All of my listening is in stereo or 2.1 -- I have a sub crossed to the Fostex pipes at 40 Hz. Nice deep sound stage with a sweet spot about 2' wide aimed at the middle of a love seat. Both seats get decent imaging, but the imaging is very good in the sweet spot. The right speaker "disappears", but the left one always seems to draw a bit of attention. Most orchestral music seems to be left channel heavy, since thats where the bulk of the violins are. Small ensemble music seems to spread across the sound stage correctly. Of course, imaging is exactly what the recording engineer wants it to be -- a problem I have with the whole imaging fetish.As I said, I listen in stereo almost exclusively. The room is a bit dry, but as long as there is decent ambiance on the recording itself, the presentation is acceptable. When guests come over who don't know or care about imaging and sound stage, I play Alison Kraus,

Diana Krall or the like through the Pro Logic function of my HT receiver and run the receiver in 5.1. Now the music comes from everywhere and is diffuse, warm and fuzzy. That's what the great unwashed wants to hear. God save Dr. Bose.Bob

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Subject: Re: Image perception
Posted by Manualblock on Tue, 24 May 2005 10:35:39 GMT
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Your working too hard man. Get some sun fer crissakes. No one on their deathbed ever said "Gee; I wish I spent more time at work."

Subject: Re: Image perception
Posted by Wayne Parham on Tue, 24 May 2005 11:08:30 GMT
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Sounds like a good idea. And now the doctors are back to saying a little sun is good for you, just like the good ol' 1950's! Time to get out on the motorcycle, maybe run out to the lake and grab some fried mushrooms and a burger. Can't be too healthy, you know, it's bad for you!

Subject: P.S.
Posted by Bob Brines on Tue, 24 May 2005 12:18:51 GMT
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This morning, I turned on the Sirius channel 6080 -- Classical Symphony -- through my Dish satellite system. They played a CD reissue of an old '60s Beethoven concerto recording by George SZell and the Cleveland Symphony Orchestra. Strictly two mic stuff. My speakers dissapeared. Great wide, deep sound stage and reasonable imaging, given that this is a large orchestra. Q.E.D. -- modern multi-mic'ing sucks.BTW, do you have any idea what the technical specs are for the Sirius feed through Dish? It sounds pretty good, although obviously compressed in dynamics.Bob

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Subject: Re: Image perception
Posted by Earl Geddes on Tue, 24 May 2005 13:10:12 GMT
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I may have missed it but if the imaging is so good at 6' why do you listen further back? Which image do you prefer.By the Sattelitte radio uses AAC compression from Fraunhofer. The next generagtion of MP3. AAC is why they let MP3 leak into the public domain. They thought the market would jump on the newer better AAC. Big miscalculation.

Subject: Re: Image perception
Posted by Manualblock on Tue, 24 May 2005 13:42:00 GMT
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Wasn't there an old song,"Everything old is new again."

Subject: Re: Image perception
Posted by akhilesh on Thu, 26 May 2005 17:17:56 GMT
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HI Earl,At GPAF, I heard your speakers the way you had positioned them, from the couch. Then, I moved forward a little, so the apex was at my ears, or a little bit behind. I preferred the imaging in that positiont. I remember telling you that, and you said it was a matter of preference. So, one more data point for you: I prefer being at the apex of the speakers and getting the "headphone effect" i think you termed it. MAkes it sound more immersive for me. -akhilesh

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Subject: Re: Image perception
Posted by Earl Geddes on Thu, 26 May 2005 17:52:16 GMT
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ThanksThere is a blend of responses, but the far-field one seems to be the preference. All agree that the near-field "headphone" effect is the bigger "wow", but once this effect has been settled into, the far field is prefered as being more natural and listenable over the long term.I really do enjoy the near-field rock-solid bigger-than-life effect as a once-in-a-while entertaimnment. But I can't listen like that for a long time, it gets unsettling.

Subject: Re: Image perception
Posted by akhilesh on Thu, 26 May 2005 18:31:56 GMT
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Of course, this assumes that one GETS to listen to music for more than a few minutes a day. I listen maybe 30 minutes a day. So far, I like the "headphone effect" with slightly rolled of highs to assuage the fatigue, if any. Not to mention the euphonic distortion of my 45 SEt amp in the 90-3500 Hz range. Really sounds good to me!-akhilesh

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Subject: Re: Image perception
Posted by Bill Wassilak on Thu, 26 May 2005 19:47:07 GMT
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I agree with what you said so I guess I'm in the minority, because I like the near field listening myself. I'm using line arrays and there designed so I'm always in the near field. I don't listen to my system everyday but when I do fire it up I listen at least 2+ hours or more and it dosen't bother me. When you switch media you can really tell a difference on what they did in the control rooms of a studio or differences in acoustics from different halls on live recordings.Bill W.

Subject: Re: Image perception
Posted by Earl Geddes on Fri, 27 May 2005 12:33:02 GMT
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ThanksYour message pointed out an error that we are both making in terminology. The listening that I am talking about is the the "direct field" i.e. the field where the reverberant energy is negligable compared to the direct energy. This is quite different from the direct field of the source and they may or may not overlap. So your being in the near field of the line arrays does not mean that you are also in the direct field. I suspect that you are, but I wanted to be clear about this.Also, the direct field tends to be frequency inpependnet, while the near field is highly frequency dependent. So the two may overlap at some frequencies and not at others.

Subject: Re: Image perception
Posted by Bill Wassilak on Fri, 27 May 2005 13:58:25 GMT
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>>So your being in the near field of the line arrays does not mean that you are also in the direct field. I suspect that you are, but I wanted to be clear about this.I should of made it a little clearer, the line arrays are toed in about 45deg pointed directly at my seating position. So my reverberant energy is very very low just a little off the side walls compared to whats coming directly at me out of the speakers.

Subject: Re: Image perception
Posted by Earl Geddes on Sat, 28 May 2005 22:43:51 GMT
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Your line arrays will reduce ceiling and floor reflection energy, but the horizontal directivity will be almost 360° due to the small size of the drivers. So you are getting a lot of early lateral reflections off the side walls. The pointing angle for these speakers is pretty unimportant because the directivity is so wide.I am not sure that you can actually claim to be in the direct field of these sources.

Subject: Re: Image perception
Posted by Earl Geddes on Mon, 06 Jun 2005 17:22:09 GMT
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WayneMissed this post until now.I have been doing a lot of measuring and investigation as of late and now I think that I have a pretty good understanding of what is required for good imaging and sound quality. Mind you none of this is actually new, it is completely consistent with what I have belived and used all along, but now I have some more data and experience to better quantify things.There are two aspects of the sound REPRODUCTION problem (note - I am only talking about reproduction here NOT sound reinforcement or musical instruments). These are the transient response and the steady state response - both defined here as in-room responses. For imaging it is critical that the first 5 - 10 ms of the impulse response be reflection free. That is best done with careful polar design, speaker placement and selective room absorption. The image will be degraded for any sound arrivals between the impulse arrival and 5-10 ms. This first arrival must also be fairly flat in freq resp. or it won't sound narural. Make no mistake about it getting these kinds of impulse responses in real rooms is very very challenging. If there is a floor or ceiling reflection, then the image will be less precise and will tend to move in the direction of the reflection, but early lateral reflections will cause coloration and seveer imaging problems - so lateral reflections are worse than vertical ones.Now to get a natural sound - in a small room - one also needs for the steady state response to be the same as the direct response - nearly flat. This is measured using a spatial average technique to get a good measurement stability. If these two things are achieved, I have found that the imaging is extremely precise and the overall response is quite natural. The speakers will disappear and only a sound stage remains.Now when one listens very close, then the reflections are brought down by the direct to reverberant ratio increase and the imaging becomes quite precise, but, IMO, not natural. It sounds as if you have been transported into the recording. This will also occur in a very well damped room that had no room reflections to speak of. In these situations only the transinet response is important because there is no real steady state response.In a lively room, however, where there is a lot of reverberant energy, things are much more difficult to do, but if done correctly they are much more realistic. It then sounds as if the music was moved into the room with you - not you into the recording. The room adds spatiousness and gives an overall perception of the music being in the same space as the one that the listener is in. The steady state response, as well as the transient response are both critical for this to work properly.This is my current level of understanding of imaging and naturalness as well as the disappearing speaker trick. The speakers will only disappear in the

lively room as they will always be obvious in the transient only situation.

Subject: Re: Image perception
Posted by rnhood on Tue, 21 Jun 2005 00:52:11 GMT
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I generally prefer the more limited directivity since it minimizes image wander and better defines a consistent stage. This image wander is for the most part due to the complex nature of reflections and their resulting audible effects. However, in a home theater set-up the more omni type speakers tend to hold a better central image for those sitting off center and, add a bit of artificial life into the mix that is often perceived as adding excitment. The center channel will usually ensure the central image for off center seating but, the onmi mains help in this regard.

Subject: Re: Image perception
Posted by Earl Geddes on Tue, 21 Jun 2005 01:16:55 GMT
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I find the exact opposite of you to be true in my Home Theaters. The higher directivity sources make the system image more stable, even the center channel, and with less wall reflections the sound is less colored. Most who experince my theaters are impressed by how well the image quality holds off center. I see no reason why an omni system would ever image well off axis. I only use omni speakers for the surround channels where image and coloration are of a far less important nature.
