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Audio Magazine: proposed series Chapter 11 - Conclusion

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Our short guided tour of new audio is about to come to a close. We have not seen all the sights. That was not possible in the time and space available to us. But I hope you may have been able to capture some of the spirit of excitement which we find available in the vistas we were able to share.

More significantly, I hope you understand that we were looking at the view from the frontier of a field that is just now being explored. The pieces of the mystery of audio are being carefully put into place in ways we could not see for lack of time. Maybe we can take special side trips in the future.

As with any visit to a strange place, a brief resume of what we saw can help clarify the more important overall picture. If there is any single message which results from this work, it is that subjective and objective audio can be brought together. But it cannot be done by forcing the subjective person to learn mathematics. Nor can it be done by imposing subjective concepts on the person using meters. Both views of audio must be brought to a common place where they can use the same language and talk to each other.

For the subjective person this means that flowery and wispy verbal descriptions must give way to words which convey spatial, tonal, temporal, and intensity values. When contemplating the illusion of sound for one's own benefit it is perfectly acceptable to think in terms like "billowy", "blue velvet", and "wooden". But don't try to use such language when you talk to an objectively oriented person. He won't understand what you mean.

An objective person, on the other hand, should not get mad because the terms "slew rate distortion","minimum phase", and "impulse response" don't turn on the subjective listener. Learn how to relate those terms to spatial, temporal et al values. Also if a listener claims that a device has distortion when you give it a clean bill of health, don't laugh. He may be correct. Get him to describe it in those same terms you use so you can check what it is he hears.

Fine, now where can we go to buy a spatial-tonal-temporal-intensity meter and measure what we hear? Well we can't find any. Not yet anyway. The reason? These values are a higher dimensionality of representation than frequency and time measuring tools we now use. But for a start we know that these reduced dimension physical measurements are accurate and we can mathematically map their story up to the listening experience.

Oh swell! we use our same old instruments and still don't know how it sounds, is that right? Not at all.

The first thing we have to do is know how to make our present measurements properly. Don't just take the square root of the sum of the squares of distortion components and lump them under a one-number "distortion" measurement. Make the measurement correctly. Which means document the amplitude and phase as a function of frequency, signal level, and time.

Don't think sound is steady state because the simple equations we use have boundary values. The sound image is dynamic. This thing we call harmonic or intermodulation distortion may depend upon how long the tones are applied. Measure it.

Think about incoherent crescendos and what that means to the final sound image. Measure it. Think about coherent partials in a complicated musical chord and their dynamic processing. Measure it.

Now ask what fundamental type of signal might indicate true transient properties in the final sound image. Is it an impulse? Measure it. Interpret the measured response in terms of a solitary space and time event like a pistol shot. Work with the subjective person. Does this impulse behavior or that impulse behavior correlate more closely with accuracy in transients? If not, what does? Measure it.

Always, always, always interpret the subjective affect in terms of the perceived final sound image. Don't get hung up with admiring a measurement at a component level. You might end up with egg on your face.

Always be truthful. It is regretable this must be said. Don't try to hide not-so-good measurements from either the listener or yourself. Appreciate there may be complementarity in components. A sow's ear part of an audio chain can hide piglet's ear performance of another part. A quad mix down from 87 microphones may obscure certain subtleties of imperfection in response which can grate on the nerves for other program sources.

Think in terms of the sound image. Can a small change in gain with sound level of a speaker translate into instrumental wander in stereo imagery? Does a polar response cause spatial and temporal smear of the sound image?

There are special test signals which can map directly to a pitch-delay representation. A fully coherent signal with separately distinguishable

pitch and delay attributes is already in use on AUDIO's speaker tests. Some of this data is in good agreement with subjective impressions. More work is needed.

Now let's lift our sights a little further. What we have done is give a pedigree to the concept that the illusion of sound has a number of dimensions. Remember our old one-dimensional way of analysis? There isn't just one of them - there are two of them. When we start talking in terms of higher dimensions, we must recognize that there may be quite a few equally valid representations for any number of dimensions we wish to use. Two different groups of people can each have valid descriptions using the same number of dimensions.

If a psychoacoustic evaluation indicates that "warmth", "brittleness", etc are valid descriptions, we must not assume it is not accurate. We've made a lot of room for alternate descriptions when we consider a geometry of sound. If someone comes up with a proper, legitimate description we must be clever enough to know how to translate his terms into our own.

What can we expect to result from this more complicated look at audio? Why, better sound of course. Isn't that what it's all about?