Who needs a Haas Kicker?

Some need it and others do not. In the following pages I hope to provoke critical thinking... and you can find out which group *you* fall into.

Group ONE

In group one you want to adhere to the design criteria for LEDE/RFZ because you want the room to be perceived bigger than it really is. You want your critical listening environment to be reasonably accurate and to have the 'creature comfort' of a diffuse sound field returning to you from the sound source after a few milliseconds delay to terminate the ISD (initial signal delay).

The psychoacoustic effect of the LEDE design technique is to give the listener *the acoustic clues of a larger space*, thus allowing the perception of hearing the studio or recording sound source, rather than the control room.

The following is a quote from a paper by Don Davis and Chips Davis;
"The term LEDE is applied to a control room when the following criteria have been satisfied:
1) There is a low-frequency asymmetrical outer shell, free of pronounced resonances at low frequencies. This shell is large enough to allow the development of bass frequencies.
2) There is a symmetrical inner shell The crossover frequency between the outer bass shell and the inner geometric frequency shell is:

$f_x = ((3(\text{velocity of sound}))/(\text{smallest room dimension}))$.

3) There is an effectively anechoic path between the monitor loudspeakers and the mixer's ears which extends for at least 2 ~ 5 ms beyond the studio's initial time-delay gap.
4) There is a highly diffused (at geometrical frequencies) sound field present during the initial onset of the so-called Haas effect.
*5) The monitor loudspeakers, microphone technique, and mixing console do not' 'mask" the desired anechoic path from the monitors to the listener, including the period beyond the monitor to the ear's physical distance (studio **ITD** + 2~5 ms)*
6) No early early sound (EES) is present. This is sound that arrives at the mixer's ears ahead of the direct sound traveling through the air. EES occurs when monitor loudspeakers are not shock mounted and therefore radiate through the structure and reradiate in the air, usually from the ceiling, near the listener
7) The hard-surfaced rear wall, rear side walls, and rear ceiling are so spaced temporally as to provide interwoven comb filter patterns which become a high-density early sound field without measurable anomalies.

Checklist of LEDE priorities:
1) Determine the lTD for the studio with which the control is to be associated.
2) Choose a volume as large as possible for the outer acoustic shell of the control room (low-frequency boundaries) and make it as asymmetrical as possible while maximizing mass, stiffness, etc.
3) Using the smallest dimension, calculate "crossover" frequency for gradually changing from a symmetrical geometrical acoustic interior shell to the asymmetrical wave acoustic outer boundary.
4) Design a control room lTD> studio lTD.
5) Arrange the rear wall, rear side walls, and rear ceiling for time-spaced diffused controlled· level early reflections that fall in the Haas effect zone."
Quoted from 'The LEDE™ Concept for the Control of Acoustic and Psychoacoustic Parameters in Recording Control Rooms', by Don Davis and Chips Davis.

I keep hearing of an issue involving the length the ISD gap and the timing of its termination. Some say that it must be 12 to 15mS and 15 decibels down.. some as much as 30mS and -20db relative to the source

material. ***There is no set value***. The requirements of LEDE simply state that the ITD of the Control room must be larger than that of the Studio room or source.

If this is your design preference then you **DO** need a termination of the initial signal delay gap. It is also important to note that this design principle works very well even with rooms that are non-ideal in size - like the typical home studio. Hence the proliferation of this easy-to-implement design criteria in RFZ (Reflection Free Zone) format.

It is important to note that while the design criteria is the same for both LEDE and RFZ, many people, including myself, consider RFZ a 'different' style of CR even though it must satisfy all of the LEDE criteria. Example; when I think of LEDE, I visualize a large control room with an anechoic front end while the rear section is highly diffuse via QRDs and the like. On the other hand, the RFZ control room can be reflective in the front end with hidden trapping behind the thin inner shell. The room surfaces are angled to create a 'zone' that is reflection free. The better designs create a fairly large mixing 'zone', howbeit smaller than their elder counterpart. In RFZ, the diffusion elements are more evenly scattered throughout the room and, while meeting the same design criteria as LEDE, some rooms will look and can sound quite different.

So in these types of rooms, you **need** the 'Haas kicker' or Termination of the Initial Signal Delay to give the perception of being in a much larger room. This is a 'creature' comfort, though. It is not required for accuracy. The point is; the brain senses the LF modes but the ear is waiting for mid and high frequency clues to be able to relate to the environment. Without these clues, we are confused and tire easily due to the constant strain. You need the termination of the ISD for ***comfort***. The point made by Davis is that this termination must be made ***after*** the termination of the ISD of the Tracking Room or source material - so that the latter can be ***heard***.

Group TWO

Group two is a little more free-spirited. For example;

The use of diffusion in the back and sides of a room designed to meet the Non-Environment criteria is completely avoided except as a by-product of the front baffle wall design. The front of these rooms are designed to be reflective, but only to sounds made by or emanating from the occupants, not the studio monitors. A diffractive/diffusive front end is possible, though deep diffusion or diffraction that could adversely affect the source is forbidden. The Monitor Speakers are always flush-mounted for LF accuracy and conformance to the NE concept.

NE rooms are not uncomfortable. They are actually very pleasing as well as very accurate. Properly designed, these rooms sound natural when the producer and engineer are talking in conference and/or while working and moving about. This is due to the large reflective/diffractive surface of the front baffle wall.
There is no 'Haas kicker'. As far as the source goes, there is ***no return***. LF modes are damped as tightly as possible via deep trapping and wave guides in the back, sides, and ceiling of the room. The Initial Signal Delay is ***never*** terminated. But the occupants of an NE designed room do not experience the lack of ISD termination or Hass effect because the noises that they make are reflected back off the front wall and they get the clues they need to relate to that environment.

There is more than one way to skin the proverbial cat.

As Philip Newell so rightly put in his book ***Recording Studio Design***, "... we should be able to easily realize how the study of acoustics, and audio in general, can often be seen as a black art. Hearing perception is a world where everything seems to be on an individually sliding scale."

Don't get stuck with an idea just because Tom, Chips, Peter, Philip, or John says it's the way to go. Question Everything and ask why.

I believe that, like most things in life, it boils down to knowing what you really want and/or need. - And, sadly, only about 5% of the population will do the hard work of thinking... Thinking and categorizing what they want. Then only a small percentage of that percentage will make the plans and implement the strategy to get what they want. Such is the state of humanity... but I digress.

So, basically the LEDE idea is that the Control Room will have an acoustic signature of a much larger room ***if*** it has a signature at all. This is a consensus that seems to work pretty well. -- We should adopt the scientific approach to philosophies, theories, and design criteria; Use the model that works the best for the current situation and when a better model is found, abandon the old one the adopt the new one that suits our current needs.

It seems that most studio designers have their own unique way of approaching studio design, therefore I have decided to call my technique ***The Balance***.

The Balance criteria is as follows:
*1) There is a low-frequency **symmetrical** outer shell, determined by ratio, prime numbers, and large enough to provide modal support of all the notes on a keyboard. (down to 27.5Hz) The ideal volume being close to 120 cubic meters.*
2) The low-frequency outer shell is complimented by a symmetrical inner shell which provides isolation MAM and the crossover frequency between the outer bass shell and the inner shell is ½ the schroeder frequency of the room based on 0.2 second decay (RT60).
3) Trapping and wave guides are integrated into the studio shell system and into the surface treatment to provide low-frequency damping to 0.2 seconds @ 100Hz.
4) There is an effectively anechoic path between the monitor loudspeakers and the mixer's ears extending in time to at least 15 milliseconds after the source sound reaches the mixer's ears.
5) There is a highly diffused (at geometrical frequencies) sound field present during the initial onset of the so-called Haas effect. The diffused sound field is uniform from the transition region of the room through to 4kHz.
6) No early early sound (EES) is present. This is sound that arrives at the mixer's ears ahead of the direct sound traveling through the air.
7) The front surfaces of the control room can be reflective/diffusive/diffractive as long as no diffraction or diffusion occurs from the source material. A hard front baffle wall can be similar to the non-environment approach.
8) The rear wall, rear side walls, and rear ceiling are so designed to provide a balanced and reflection free zone for all occupants of the room without measurable anomalies.
*9) Diffusion will be positioned to provide a balanced sound field and even response in **all** parts of the room. Diffusors are built as single units calculated to provide minimal lobbing with diffusion extending from the transition region of the room to 4kHz minimum.*

Yes, we use the *Haas* kicker. My rule is 20/20; 20mS after source and -20db.

It is important to me that you are comfortable for the long hours that you will spend in one of my control rooms.

Sincerely,

John H. Brandt