steven j. thorburn

Stage Fright

The Perils Of Using Multichannel Audio

> Sometimes it is the system design, sometimes it is the mix, but ultimately, it always comes down to "how does it sound?"

Multichannel audio systems are frequently used incorrectly. They are either under-utilized or used in a manner that detracts from the overall show or event.

For example, recently I had the chance to see what is heralded as a "great Broadway show" in New York. The main theme of the show is dance with a blend of ethnic/regional music and vocal and choral acts added to the mix. The seats were great last-minute seats, on a cross aisle, halfway back at the quarter points. The aisles afforded us with an excellent view of the stage floor and the dancers' feet.

After being led to our seats, I went to work! Walking around the inside of the theater, I looked at one of their patch or tie-in panels, the sound booth, the musicians' pit, and the acoustical design.

Just before the show started, the musicians came out on stage, sitting on two sets of risers that flanked each side of the stage. The introduction narration began with a big voice localized to the stage, followed by a swirling sound effect from surround loudspeakers throughout the theater. Then the show began. A flutist started playing on stage-left near a scrim that replaced the main curtain. The reinforced sound of the flute came from the house-right loudspeaker, consistent with the performer's actual location. Next, a fiddle player located down stage-right, just behind the scrim, started playing. Again, the sound was well-localized, with reinforcement coming from the house-left loudspeaker.

Overall, everything was very enjoyable until the second act, when the "illusion of make-believe and awe" disappeared with the vocal numbers. Male and female vocalists stood at center stage singing a lovely duet; their vocal ranges and timing were fine. However, my attention was repeatedly being drawn to the loudspeaker located at the top house right of the proscenium. The power of the loudspeakers located there kept drawing my attention away from the singers.

This lack of localization to the performers could have been solved with an additional loudspeaker cluster. The Stonehenge design motif with a major keystone rock at center stage provided a perfect place to hide a center cluster. Very little additional equipment would have been required to accommodate the added cluster, as the mixing and playback equipment I saw during my walk-through would support a center channel mix. Sometimes it is the system design, sometimes it is the mix, but ultimately, it always comes down to "how does it sound?" A point source directly over a performer is usually the best way to localize sound to a singer or a soloist musician. The only drawback is the added number of microphones, mix busses, and loudspeaker locations. It is impractical (and expensive) to have a cluster per performer. However, for most situations, a properly applied left-center-right system of some sort works.

Let's think about this. Cinema audio (e.g. Dolby, THX, DTS, IMAX) uses the left-center-right format—why can't we get it to work correctly in live theaters and large houses of worship? The long and the short is, you need three different cluster designs. OK, at least two, with one being mirrored left to right. The center cluster as well as the left and right must be designed to cover all of the seats. For the vast majority of venues, the center cluster will be designed to be symmetrical down the centerline of the house. The left cluster will have a longer throw to the right side of the house while the right cluster will have a longer throw to the left side of the house giving us a "mirror image" system. There also may be other issues like delay and phase/comb filtering; however, it is not hard to design this kind of system, especially given the variety of today's loudspeaker boxes.

Had I heard the vocal mix from just the center channel and not from a stereo mix which put me in what was almost near field, (and definitely the direct field) of the house right cluster, it would have been a perfect evening.

As another example, it is just as important to know when *not* to use a center channel. We recently finished the audio design and commissioning of a large outdoor nighttime spectacle for a theme park in Chocolate Town, PA. The audio system supports a laser show on a 40 by 60-foot screen. Two line arrays (eight boxes each) are suspended from the sides of the screen. While listening to the original stereo recording we noticed a lack of fullness in the system. A center loudspeaker cluster would have filled in the sound nicely, but due to site constraints this was not an option. The closest audience area is at least 80 feet from the screen which practically eliminated the stereo effects anyway. Therefore, we opted to switch the audio to mono, which sounded much better. The signal was fuller and tighter. By experiencing the production first-hand we were able to assure that the audience has the best experience possible.

As system designers, we need to actually visit the installation to listen to how the design works. I am a firm believer in learning from experience. We need to review our work and, at times, experience a show or two to make sure that we know that the design works. This is where sales and engineering needs to work with the installation team. What did the client really ask for? Was it delivered? Was it listened to? And we can't just listen from the "king's" seat (center of house, one-third of the way back) to know if the system works. Walk around the entire venue, EQ from multiple locations, and listen to the different types of performances (solos, group numbers, etc.) to make sure that each and every guest gets the best experience possible.

Steven J. Thorburn, PE, (SJT@TA-Inc.com) is a principal with Thorburn Associates, an Acoustical Consulting and Audiovisual System Engineering firm with offices in northern and southern California and North Carolina.

Electrical Industry Calls For Withdrawal Of Code

BETHESDA, MD—The Inspection Initiative, a coalition of electrical industry organizations co-sponsored by the National Electrical Contractors Association (NECA), is calling for the International Code Council (ICC) to formally rescind its ICC Electrical Code. In addition, they want the ICC to cease the distribution of promotional materials, including draft ordinances and draft legislation, aimed at encouraging regulatory adoptions of the ICC Electrical Code and officially notify all local, state and federal jurisdictions of the decisions to abandon the ICC Electrical Code. This action follows ICC's June 6 announcement that the building officials' group "sees no need for another electrical code" than the National Electrical Code.

In its June press release, the ICC made clear that it "has no plans for the development of an electrical code that would duplicate the purpose and then compete with the National Electrical Code." However, the announcement failed to explain what steps would be taken regarding a 25-page publication entitled ICC Electrical Code. This document is currently marketed as part of ICC's family of building codes, though it isn't a complete book of wiring rules.

▸ **NECA**
www.necanet.org
301.657.3110

TEF Workshop On Intelligibility To Be Held In Chicago

WEST REDDING, CT—The TEF Division of Gold Line, in conjunction with Jim Brown of Audio System Group and Ron Steinberg of RC Communications, will present the 2001 TEF Level II Workshop on Intelligibility. The workshop will be presented from October 11-13 in Chicago. The teaching staff includes: Professor Doug Jones, chairman of the audio department at Columbia College; Dr. Herman Steeneken, senior scientist at the Dutch National Laboratories-TNO Human Factors Group; D.B. "Don" Keele, senior engineer, Harmon-Motive; and John Murray, field training specialist, TOA.

The workshops are done in the field, and the 2001 program will explore topics related to quantifying intelligibility in large acoustical spaces. TEF ownership is not required, but attendees should have either a consulting or design/contracting background and be familiar with the design of sound systems for large room acoustics.

▸ **Gold Line**
www.gold-line.com
203.938.2588

Cuptertino CEO Receives Award

SAN JOSE, CA—Cupertino Electric CEO Jim Ryley has been named northern California's 2001 Ernst & Young Lifetime Achievement Entrepreneur of the Year. He was selected to receive the award for his notable contributions to business and the community. This is a distinction that also qualifies him to be eligible for the honor of National Entrepreneur of the Year, as well as several national Entrepreneur of the Year category awards. Cupertino Electric, a total power and energy solutions company, is one of the largest privately held electrical contracting companies in the United States.

▸ **Cupertino Electric**
www.cei.com
408.808.8000

ASPI Signs Northshore Marketing

ATLANTA, GA—ASPI Digital has appointed Northshore Marketing as the company's representative for the Pacific Northwest, effective September 1, 2001. Northshore will represent ASPI Digital's line of audio-conferencing products in the states of Washington, Oregon, Idaho, Montana and Alaska. Northshore Marketing was founded in 1980 and represents a number of well-known manufacturers in the professional audio and systems integration markets.

Curtiss Singleton, ASPI's director of sales, said the company is very pleased to have the Northshore group on the ASPI Digital team. "Lew Barrett's team has a long and distinguished background in the echo cancellation arena, which adds more momentum to our arsenal of sales talent."

▸ **ASPI Digital**
www.aspi.com
404.892.3200