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NAVIGATING LOUDSPEAKER SYSTEM DESIGN

AESTHETICS, PERFORMANCE AND BUDGET ARE IMPORTANT. BUT THE SIZE, SHAPE AND COMPOSITION OF THE ROOM SHOULD BE THE DRIVING FACTORS

BY RACHEL HAYES

What type of loudspeaker system design is best for our situation? It's a loaded question. The answer for any given church is dependent on numerous factors, including worship style, the room's architecture, acoustics and aesthetics and, of course, budget.

Additionally, the options proffered by manufacturers are astounding. There is simply no standard system design, just as there is no standard church. Therefore, a wise and logical first step is to narrow things down based on the nature of your space and high-level goals and needs, then to seek expert advice all along the way.

THE BASICS

"Acoustics and architecture come first, as they limit the number of [system designs] that can be used," says Nick Dressler, national sales manager with Clearwing Productions in Milwaukee.

Is your room rectangular or wedge-shaped? Are you meeting in a gym or another space with many reflective surfaces? Examining the size, shape, ceiling height and acoustics of your space will tell you a lot about the type of system design you should be considering.

"A wide room often cannot be covered with a center cluster, and a long narrow room will often not be well suited for a left-center-right (LCR) configuration," Dressler notes. "As for acoustics, the reverberation time (RT) of the room can give you an idea of how precise your system needs to be in coverage patterns."
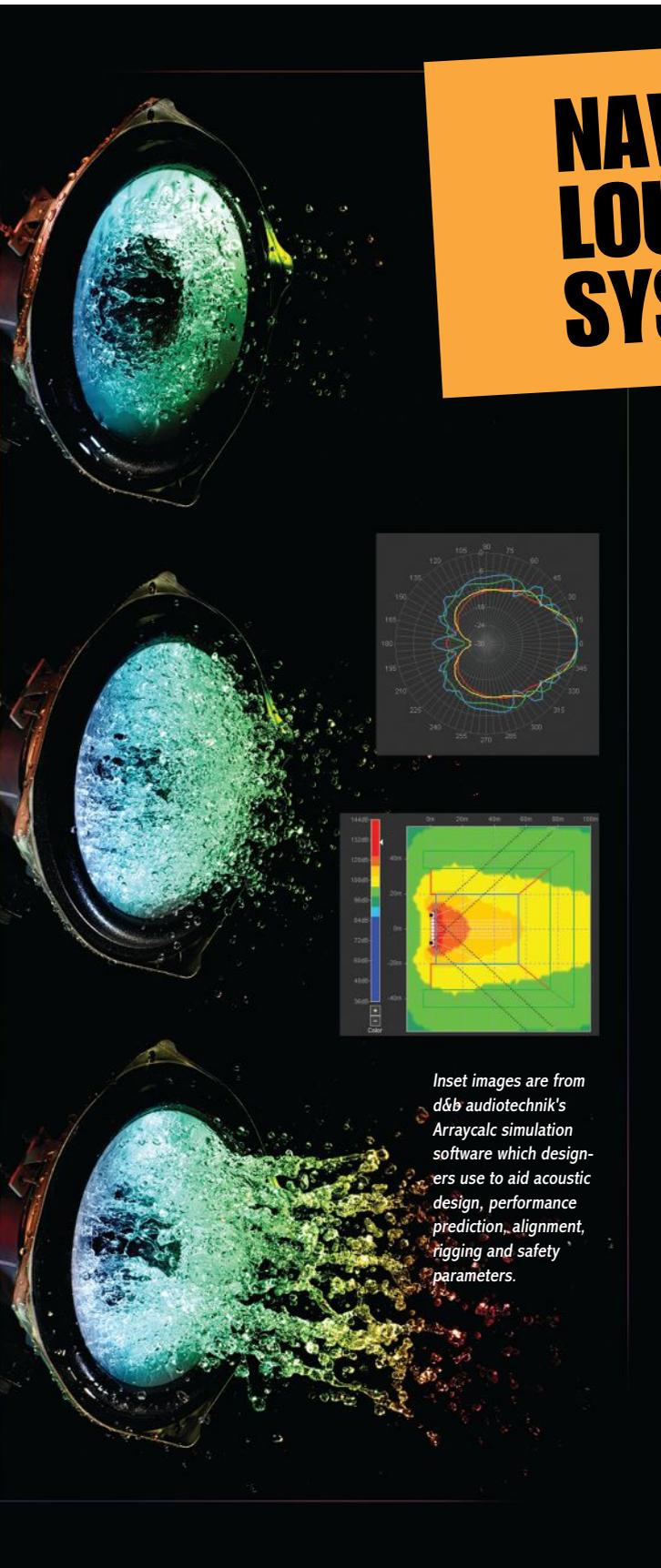
Inset images are from d&b audiotechnik's Arraycalc simulation software which designers use to aid acoustic design, performance prediction, alignment, rigging and safety parameters.

> ## "ACOUSTICS AND ARCHITECTURE COME FIRST, AS THEY LIMIT THE NUMBER OF [SYSTEM DESIGNS] THAT CAN BE USED."
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> NICK DRESSLER, NATIONAL SALES MANAGER, CLEARWING PRODUCTIONS, MILWAUKEE, WI

You can also begin evaluating designs based on your priorities for the system. "Absolutely make sure [the system] is designed to meet needs, whether that's music, speech or a combo," says Paul Henderson, Ph.D. and design principal with Wave just outside Charlotte, N.C.

David Ellis, president of Ellis Pro Media in Renton, Wash., agrees, "What's the program material—is it organ and piano, a full rock band, just speech?"

All of this said, specific situations call for specific advice and the experts have provided a little for some common situations below:

SPEECH-CENTRIC THINKING

While most churches are looking for a system to handle speech along with some style of music, it's important to establish that for certain. According to Henderson, if speech is your priority, a mono system design such as a center cluster will do well, as will a column array—especially if the space is reflective.

"[Column arrays] provide narrow vertical coverage, which can assist in increasing the direct-to-reverberant ratio for reflective environments, and therefore help in increasing intelligibility," he says.

Dressler recommends a system that pulls attention down to the presenter, such as a PA with front fills.

But if music is an equal priority, a stereo system is almost always required.

MULTI-PURPOSE SPACE ISSUES

In multi-purpose spaces like gyms, it's incredibly important to evaluate the acoustics and locate reflective surfaces to select a system design that provides the correct coverage pattern and keeps sound off the walls, according to Dressler.

Safety is another concern—for the equipment and the occupants. "[For these spaces] we look at trim heights, durability and safe rigging. The equipment has to handle basketballs hitting them," Henderson notes.

Ellis agrees, "We worry about the low hangs, and therefore a line array isn't always an option—they get in the way."

Adaptability is also a factor, since multi-purpose spaces are just that, often hosting meals and sporting events, as well as worship services. Therefore, Henderson points to a distributed loudspeaker system design to accommodate clearance heights and their ability to "avoid hitting reflective walls at nearly perpendicular incidence angles."

PORTABLE CHURCH CONSIDERATIONS

Similarly, the portable church must also consider safety, durability and ease of use, because they must be set up and torn down quickly—and often by volunteers with minimal experience.

"I'm a fan of self-powered speakers [for portability]," says Ellis. "They're easy for volunteers and can't really be hooked up wrong."

For durability's sake, Ellis doesn't recommend any low-cost options. "They just won't hold up," he states.

"For smaller, portable churches, it's usually a speaker on a stick situation—something compact and easy to set up," says Henderson. "If you are trying to do line array, find a way to rig them safely."

Ellis says he'd go with a point-source design over line array [for portable churches], "You need fewer speakers to do the job—look for a single channel amp, as well."

TRADITIONAL SPACES

In an aesthetically traditional space where traditional sound is sought—for choral music or an organ, for instance—reverb is typically the wild