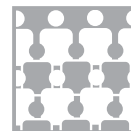


New Technology Serves a Timeless Purpose



At the Abbey of Gethsemani, small, affordable line arrays have improved speech intelligibility while preserving the resonance of the monastery's sanctuary

By Rebecca Hansen Carrer



Many churches are highly reverberant spaces that make music and singing sound wonderful but pose problems for speech intelligibility. Yet, if churches represent an extreme among building types for balancing clear speech with musical splendor, monasteries represent an extreme among churches in this regard.

Monastic churches are designed for chanting. They are places where the simplicity of human voices, rising in unison, fills both vaulted space and spirit. Reverberation is essential to creating the majesty, solemnity and joy of the chant. Of course it can also interfere severely with the ability of participants and observers to hear spoken prayers, homilies and other addresses.



Intelligible speech without sacrificing the power of music.

For decades the Abbey of Gethsemani in Trappist, Kentucky, the oldest Cistercian monastery in the country, struggled with the tradeoff between inspirational song and intelligible speech. A succession of solutions, mostly traditional horn and bass clusters hung high in the church's 45-ft. ceiling, failed to significantly improve the situation.

"This is such a wonderful church," says Father Paschal Phillips, who initiated the search for a better solution, "the interior so calm, quiet and clear during the singing. I felt that the spoken word should be heard with the same plainness and purity."

The monks were told they should blanket the building's handmade brick walls and open-beam ceilings with acoustical treatment, but they feared destroying

the special sound of the chant, and the austere beauty of the architecture.

"The prospect of having acoustic material along the sides or ceiling of the nave was troubling," says Brother Aaron Schulte, who oversaw the project for the Abbey. "In a renovation some years ago the church had been stripped down to the walls of original bricks, formed and laid by the hands of our monks. The effect in the tall, narrow church is beautifully plain, which goes with the nature of the Cistercian order; covering it might have destroyed that impression."

The Panaray® MA12 modular line array loudspeaker.

The search for a solution led to Bose Corporation and its worldwide network of trained, authorized dealers. Brother Schulte found a local Bose® dealer, Mike Dewees of Acoustical Audio Designs, who worked with the support of the Bose Professional Systems division. The dealer offered an innovative alternative – based on groundbreaking new technology. The Bose Panaray® MA12 modular line array loudspeaker delivers high speech intelligibility in very difficult spaces with little or no acoustic treatment. In addition, unlike most line arrays, which incorporate sophisticated, expensive digital signal processing, these loudspeakers are far smaller, less expensive and easier to work with.

"Bose has simplified the technology down to a small package that makes line arrays practical and affordable for even mid-size and small facilities," says Mike Dewees.

The Panaray MA12 modular line array loudspeaker consists of twelve 2¼-inch drivers acting as one. The loudspeaker's very tight vertical pattern control, which helps eliminate undesirable reflections off of the ceiling and other surfaces, is achieved solely through the physical arrangement and unique acoustic properties of the drivers, rather than through digital signal

THE VENUE:

Sanctuary of a more than 150-year-old monastery; the setting for daily prayers as well as global events such as the East/West Dialogues.

THE CHALLENGE:

Improving speech intelligibility in a highly reverberant space without destroying the resonance of chants, song and organ music or the beauty of the building, originally hand-built by the monks.

THE SOLUTION:

Bose Panaray MA12 modular line array loudspeakers control reverberations. The Bose Auditorer® audio demonstrator enabled the monks to listen to the solution before making a decision.

THE RESULT:

The spoken word is clear and intelligible, yet the acoustic and visual beauty of the space is unchanged.

processing which adds cost and complexity to other line arrays. Stacked one on top of the other, two or more arrays create cylindrical sound waves, which are desirable in this situation because they reduce the drop-off in sound pressure levels as the distance between the loudspeaker and the listener increases. As a result, listeners

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Brother Aaron Schulte



throughout the sanctuary hear relatively consistent sound. Someone sitting in back, for example, hears the spoken word as well as someone sitting in front, and differences in loudness from front to back are barely perceptible.

Improving the sound while preserving the aesthetics.

The loudspeakers are positioned at about standing eye level to provide excellent sound whether the monks are on their feet or seated. Yet they are visually unobtrusive. Stacked pairs of the slender, bar-shaped array (each 4.2" wide x 38.7" high) are mounted on pillars at either side of the Gethsemani altar as well as on the walls of the nave, just ahead of the monks' stalls, and in the upper balcony. Two single arrays are in the visitor area below the balcony. This design controls sound energy so well that acoustical treatment was needed only on a section of ceiling over the altar and at the intersection of the transepts in the traditional cruciform church. The long, narrow nave, where the monks' stalls are located, remains untreated.

Hearing the system before it's installed. The Auditorer® audio demonstrator.

If the solution seemed too good to be true, the monks were glad to have the opportunity to hear it before making a decision. With the help of the Bose® Auditorer® audio demonstrator, they were able to listen to both the proposed sound system and unreinforced choir with various levels of acoustical treatment, weighing effect against cost and judging at what point sound absorption went too far.

“The people who spend hours each day in the church chanting and singing are inevitably best qualified to evaluate the impact of any proposed changes to that sound,” says Steve Miller, the Abbey’s Bose account representative.

“Their ears can hear slight differences in the personality of the sound, which the ears of outsiders, no matter how experienced in audio solutions, might not be sensitive to.”

Today, from any position in the sanctuary, monks, guests and observers hear spoken words clearly. “Older members of our community could hardly believe it,” recalls Brother Aaron Schulte.

“I hear comments like, ‘I’ve been here more than fifty years, and this is the first time I can actually understand everything being said.’”

Another characteristic of the Panaray® MA12 modular line array loudspeaker is high gain before feedback, which means that a person using a microphone can move right up next to a loudspeaker without producing feedback noise – an added benefit given that the Abbey often serves as a venue for the Cistercian order and for ecumenical initiatives.

“We feel much more confident about using the church for major events now,” remarks Brother Aaron.

Still the chants that fill the church several times a day have lost none of their resonance, and the new speakers are nearly indistinguishable from the architecture.

“We’ve struck the perfect balance,” concludes Schulte. “Speech intelligibility is excellent, yet we didn’t lose any of the sanctuary’s vocal and visual impact. Reactions from our monks and visitors are immediate and uniformly positive. We’re completely satisfied with the results.”



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Mike Dewees, Acoustical Audio Designs

An affordable, effective solution.

While the 150-year-old monastery may seem an unlikely early adopter of technology, its experience as one of the first installation sites for the Panaray MA12 modular line array loudspeaker leads the way for other houses of worship to follow. This evolutionary step forward in loudspeaker design is a simple way of solving the speech intelligibility

problem common to many houses of worship across the country, while preserving the majesty of voices raised in prayer and song. And it's affordable for even small and mid-size congregations.

An authorized Bose dealer can bring the impact of Bose sound to your congregation or business. To find one near you, call:

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