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CASE STUDY - PLACES OF WORSHIP | BASILICA OF THE SACRED HEART



THE SACRED HEART AT THE CENTER OF NOTRE DAME

For more than 140 years, the Basilica of the Sacred Heart — which serves as the mother church of the Congregation of Holy Cross in the United States — has served the community, students, faculty and staff of the University of Notre Dame. It's given the community a place to gather, worship and experience a truly powerful, immersive space.

The original presence of the Roman Catholic Church at this location began in a log cabin in the 1840s, which was replaced with the first church structure on the site later that same decade. The University's congregation quickly outgrew the small church, and, in the spring of 1870, construction started on the now-historic structure standing today.

Over its lifetime, the Basilica has undergone three major renovations aimed at ensuring the historic and religious structure continues to serve its community, as well as pilgrims and more than 50,000 visitors each year. The Gothic Revival-style church is built in the traditional shape of a Latin cross, measuring 275 feet long and 114 feet wide. In 1992, the church was designated as a minor basilica and is graced with 44 large stained-glass windows, 114 life-size images of saints and 106 smaller scenes.

Part of delivering an impressive, communal experience is providing an audio solution that heightens the environment without detracting from the majesty of the space — and the Basilica of the Sacred Heart needed a new solution.

DELIVERING IMPACTFUL VIRTUAL AND LIVE SERVICES FROM AN AWE-INSPIRING LOCALE

The Basilica of Notre Dame received its first upgrade in 2002 for its move into broadcast, with the first Mass being broadcast in 2016. That same year, cameras were upgraded to high-definition resolution with audio improvements to be addressed at a later time.

With the upgraded cameras, Notre Dame Studios — the broadcast team that manages digital streaming for both Notre Dame University and the Basilica — relied on the original house audio, which was designed to simply feed the Basilica's audio into the broadcast studio through a mixer located within the Basilica itself.

Given the nature of the space and the materials used within the historic structure, the reverb was high — averaging four seconds — and audio clarity was extremely poor, meaning the Basilica needed to improve the audio system that was transmitting to the broadcast center. Because of this, the audio upgrade evolved to a major overhaul of the sound system to ensure that, for the first time, the Basilica would



have audio that was clear and intelligible, regardless of the size of service. This also included the ability to capture the choir located in the separate loft section.

In 2019, DSH Audio Visions was brought in as the project design consultant to define and upgrade the sound system of the Basilica. The upgrade enabled Notre Dame Studios to stream services of varying sizes and ensured the experience in-person and virtually is enjoyable while delivering the message of fellowship clearly. The Bose Professional system that DSH Audio Visions specified allowed the Notre Dame Studios team to mix an appropriate audio experience for the broadcast versus what was live in the Basilica.

A ROBUST SOUND SYSTEM SET TO MATCH LOFTY EXPECTATIONS

In a reverberant space like the Basilica, the MSA12X self-powered digital beam-steering array loudspeakers excel, creating a solution worthy of this 140-year-old location, delivering the audio quality and clarity supporting the Basilica's final vision.

The MSA12X loudspeakers require no external amplifiers, and the combinations of single loudspeakers, double stacks and triple stacks were used to deliver the audio performance the Basilica was seeking, regardless of the zone being used within the space.

The main nave employs a triple stack of the MSA12X loudspeakers; the transepts have single stacks aimed backward; there are double stacks aimed toward the back of the sanctuary; and the Lady Chapel uses single stacks.

Given the complexity of the space and the variety of services held throughout the different locations within the Basilica, the sound system would need to serve the different zones efficiently no matter where congregants sat.

AUDIO TO MATCH THE HISTORY, PRESENCE AND STATURE OF THE BASILICA OF THE SACRED HEART

Originally, the team was concerned about the pillars in the Basilica and the acoustic 'shadows' they caused. Knowing these areas needed to be addressed, the Bose Professional solution incorporated the pillars' unique properties. It was vital the Basilica's historic interior and atmosphere was preserved and not be marred by excessively visible audio equipment. Through the use of the Bose Professional Modeler Sound System software, DSH Audio Visions ensured the Bose Professional audio solution was a perfect, customized fit.

Now, the Basilica offers both in-person attendees and virtual worshipers the same moving experience with audio and video. Regardless of where congregants sit, even if it's in the Lady Chapel, the choir sounds as though they are singing right next to the individual — even though they are approximately 200 feet away.

Mass and other ceremonies now offer excellent articulation and a consistent, impactful musical experience despite common challenges outfitting liturgical structures. No longer are the building's shape, architecture or interior materials unsurmountable obstacles to achieving natural, highly intelligible audio.

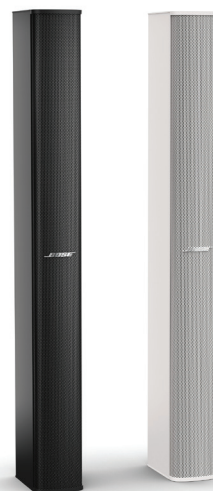


Originally the university's goal was to improve audio quality to the broadcast center. The resulting solution provided an audio experience that was clear and enjoyable within the space itself and for broadcast services. The nature of the Basilica presented a challenge, yet the resulting audio solution provided life-like audio that was clear and intelligible for both music and the spoken word. ■

SYSTEM COMPONENTS

Panaray MSA12X steerable array loudspeaker

Modeler sound system software



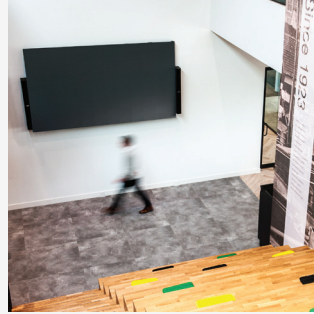
Panaray MSA12X

Panaray MSA12X is a self-powered digital beam-steering loudspeaker that enables improved room aesthetics, with outstanding vocal intelligibility and tonal consistency. The proprietary Articulated Array transducer configuration allows wide, 160° horizontal coverage throughout the room, and MSA12X's modular design allows building of vertical arrays using 1-3 units. Dante digital audio network interface comes standard for connection with other Dante-enabled products over Ethernet-based networks.

CONSULTANT: **DSH AUDIO VISIONS**

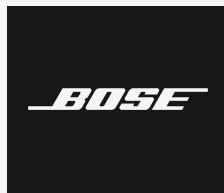


DSH Audio Visions shares its passion and expertise for audio across a variety of verticals from houses of worship to school athletics and auditoriums to sports and performance venues.



Bose Professional serves many different markets, delivering great sound in venues all around the world — performing arts centers, theaters, places of worship, stadiums, restaurants, schools, retail stores, hotels, and corporate buildings.

We know that our pro audio customers depend on us in a unique way. This is your business, your reputation, your livelihood — not just an amp, not just a loudspeaker. So, when you buy a Bose Professional product, you get the full weight of the global Bose Professional team behind you — our time, support, and attention. We see every purchase as the beginning of a partnership.



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