

Denver's Largest Dome

Mile Hi Church blends striking aesthetics with functional AV outfitting.

By Dawn Allcot

Mile Hi Church, a Religious Science/Science of Mind church in Denver CO, more than doubled its worship capacity with the construction of a new 1600-seat sanctuary. The impressive structure is the third largest building on the church's campus, and the largest dome building in metropolitan Denver. The new construction also leaves room for further expansion, with the addition of balcony seating planned for the future.

The AV aspects of the project, which cost about \$400,000, add web-casting and broadcast capabilities, along with cross-campus distribution of AV to the old sanctuary, which is still in use, the lobby, green rooms, and infant and toddler rooms.

To assist in the design of the systems, the church called on Denver CO-based D.L. Adams Associates, Inc., a full-service design and consulting firm. Ford Audio-Video Systems, Inc., won the bid to complete the installation. The full-service design and installation firm, founded as Ford Audio & Acoustics, has been in business since 1973 and has offices in Oklahoma City, Tulsa, Dallas, Las Vegas, Austin, Houston and Denver. The project team for Mile Hi Church, out of the Denver office, included Andrew Welker, project engineer,



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All photos: James A. Ford

Acoustical clouds help keep sound from reverberating through the dome-shaped structure.

Jon Stella, project manager, and Will Schmetzer, job superintendent.

"It was exciting to work on this church," said Dan Purdom, project engineer at Ford AV. "The church went all out. They have an incredible 9½-foot grand piano with an extra octave of keys, an organ, a Yamaha M7CL digital mixing console, a JBL line array, two 16-foot-wide rear projection screens....They wanted top-of-the-line, state-of-the-art AV systems. On staff, they have professional musicians who play every week; they wanted to make sure their message is heard."

The church holds one Wednesday night service and three Sunday morning services, as well as memorials, weddings and special events in the new space. Each service uses a full praise band, with vocalists, guitars, horns and cello, plus the piano and organ. Shortly after the

new sanctuary's opening in Spring 2008, Kenny Loggins played there. The new sanctuary holds 1600 worshippers, nearly double the capacity of the former, 850-seat space. "In addition to needing more seats, we wanted a bigger stage in the new building, better acoustics, better sound and video...all those things," said Nathan Marschall, the church's audio coordinator.

Purdom added that cross-campus distribution of AV was also important to the client, and a Crestron control system and Extron matrix switcher helped make that happen.

The former sanctuary had feedback issues, with mics located directly under the main PA. Marschall said that one of the primary needs in the new sanctuary was good acoustics, which were absent in the former space. The new dome-shaped sanctuary, which became one of the



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project's most distinctive and aesthetically appealing features, created the first challenge for the consultant and contractor.

"An elliptical shape tends to want to focus sound," said Stephanie Adams-Ball, senior project consultant for D.L. Adams. "The oval or elliptical shape is integral to the church's religious beliefs. So, as much as the acoustics side doesn't appreciate that shape, we had to work with it."

Ceiling clouds backed with fiberglass insulation, along with K13 treatment sprayed onto the actual dome, absorb some of the sound. Most sound that hits the ceiling or walls of the dome gets absorbed into the K13; remaining sound reflections are absorbed by the insulation on the back of the ceiling clouds. The ceiling clouds provide diffusion, and create a pattern in the ceiling that reflects the geometry and architecture held sacred by the Science of Mind religion.

The JBL line array's placement also played a large role in creating a positive acoustical environment. According to Adams-Ball, who worked under D.L. Adams vice president Ed Logsdon on the project, the JBL VT system gave the client "a lot of bang for the buck." The boxes sit above the stage area, with eight VT4887 ADP-AN speakers and two VT4881 ADP-AN subs in each of two arrays.

Purdum cites some of the key features of the system: "This is a self-powered system, so we didn't need independent amplifiers. The Crown drive is built in. There's onboard EQ and DSP, and they are addressable on the network through the system architecture software from the Harman group." Harman Professional's HiQnet permits the installer to access any Harman components of the sound system remotely through the network.

Dual Renkus-Heinz SGX42 speakers function as front fills, placed behind a metallic grille underneath the lip of the stage. These are powered by Crown CTs-8200USP/CN amps and use dbx DriveRack 4820 DSPs. After installation, the integrator discovered that the line arrays rattled at certain low frequencies. JBL recom-

mended a solution, and the integrator added custom-sized felt strips to the hardware. “The felt-wrapped hardware significantly reduced the rattling at low frequencies, such as music from the organ,” Purdom said.

The array is designed with the church’s future growth in mind. During a second phase of construction, five years or more down the line, the church plans to add a balcony, increasing overall seating capacity to about



A pair of 16-foot-wide rear-projection screens flanks the stage.

2100. Although the top two boxes in each array are aimed at the future balcony area, right now, that space is a solid wall, which created undesirable reflections. “We turned off the mids and high on those two boxes, but left the low mids for aiming considerations,” Purdom explained. “After we trimmed the high end of those boxes, it diminished the reflections.”

A Yamaha M7CL digital mixer handles front-of-house sound for the church, several steps up from the facility’s former analog consoles. Formerly, separate consoles were required for PA and recording. The M7CL handles mixing duties for both on different layers. Marschall said that members of his tech staff and he attended a local Yamaha training class, and Ford AV also provided in-house training.

With the larger sanctuary and expanded sound and video capabilities, Mile Hi Church also expanded its technical staff from two full-time

personnel (Marschall and his video counterpart, Joel Siemion) to eight paid staff members and two volunteers.

Marschall admitted that it took “some time and effort” to get the staff up to speed on the console, but using Yamaha’s Studio Manager Software made it easier. “It was a big help for my staff members to open the files at home, on their own computers, and see how everything is set up on the console without having to sit at the console. There’s a visual reference for them to view and learn at their convenience.” Using the presets in the system also makes it easier for the audio coordinator to change the stage configuration for each service.

This was one of the AV industry’s first applications to include Aviom’s Pro64 in-ear monitoring system with the 6416m mic input module. The system also expands the



The larger stage in Mile Hi Church’s sanctuary gives the church more space, permitting it to showcase a full praise band, featuring vocalists, guitars, horns and cello, plus a grand piano and organ.

church’s capabilities and helps make Marschall’s life easier, too. “It allows the band to adjust its monitor mix to its needs quickly and easily, without asking me to do it. I can concentrate more on mixing the house,” he said.

The system includes the Pro64 digital snake and two of the company’s new 6416i line-level mic input modules, providing 16 balanced line-level analog inputs for the audio network. Audio content from the mixers is routed to the network from the M7CL through 6416Y2 A-Net cards. The ASI A-Net Systems Interface translates the A-Net data to the Pro16 format used by the personal mixers.

Rounding out the sound systems in the sanctuary is an LT-800-072 Assistive Listening Transmitter from Listen Technologies.

The video system rivals the new audio system in the sanctuary in terms of quality and capabilities. Dual 16-foot rear projection Da-Lite screens sit at either side of the stage for image magnification and PowerPoint presentations. Projection rooms carved out behind the stage contain all the necessary equipment, including two Barco SLM R12+ Performers projectors with Barco R9842040 lenses. Purdom noted that the client found both the space and

the budget for rear-projection systems because of the brighter images in high-ambient-light situations.

Three Sony BRC-300 digital pan-tilt-zoom cameras mounted in different areas of the sanctuary handle image capture for video distribution and i-Mag.

A Crestron control system, housed in an upstairs control room, operates an Extron Crosspoint 450 Plus 1616H RGBHV matrix switcher, routed to Magenta Research MultiView UTX

transmitters and MultiView AK1000 high-resolution receivers, sending a feed to the projectors from any of the cameras, a laptop computer at the stage or a laptop in the control room, which handles PowerPoint presentations.

An Extron VTT001 PC RGBHV transmitter and VTE001 receiver send and receive feeds from the control room to a confidence monitor in the center of the stage.

The control room exists as the home base for all AV and lighting

control. All three cameras are controlled remotely via a Sony RMBR-300 camera controller, whereas three client-supplied monitors receive feeds from each of the cameras.

A Clear-Com MS-232 Intercom System runs from the control room to speaker stations residing at FOH, each projection room, the green room, and multiple locations on the stage and in the catwalks.

Audio monitoring is accomplished in the control room by means of a pair of Tannoy Reveal Active AV monitors.

Campus-wide distribution of services, with audio streaming on the web and potential for streaming video in the future, along with broadcast, in the future, represents the final piece of the campus-wide installation projection. "We used to have a program that ran in Denver for 16 years, and we've wanted to bring that back," Marschall said. "We're looking at how to make that happen again in the near future."

For now, most areas of the campus receive live AV feeds of services. Ford AV installed 10 SoundTube CM500i ceiling speakers in the restrooms, green room and infant/toddler areas. The lobby features RSI800 pendant ceiling speakers. These are powered by Crown CTS-600UPS/CN 70-volt amps.

The integrator ran twisted pair wiring into the lobby, children's area, green rooms and the original sanctuary in preparation for video expansion. An Extron FOX 500 TX/RX was provided for routing video to the community room, whereas additional Extron transmitters and receivers send signals to the lobby, children's area and green rooms.

After the main project was completed, the client added three 50-inch Samsung plasma displays in the lobby and 37-inch flat screens from Sharp in the children's area and green rooms.

"Having complete distribution throughout the sanctuary, as well as the rest of the facility, was important to the client," Purdom said. "Everyone, wherever they are on campus, can now watch the services." ■

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