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Reflective Sound

DESIGNING A QUALITY AUDIO SYSTEM FOR A REVERBERANT CHURCH

While the new Queen of Angels Catholic church in Riverside, CA was a dream come true for the parish, the 1,600-seat sanctuary presented some challenges for AV systems integrator Sunset Audio Visual of Upland, CA.

The first was that the church elected to use tile rather than carpet in the sanctuary to minimize maintenance. "Tile sends the sound all over the place," said Stan Kojder, president of Sunset, who oversaw the engineering and installation of the new AV systems at Queen of Angels.

Sunset turned to Bose Professional and its RoomMatch speaker array products to keep the sanctuary's reverberant energy to a minimum. Sunset consulted with Bose engineers, who plugged the sanctuary's dimensions into Bose Modeler software and developed a five-array design to direct the energy at the pews and minimize floor and wall reflections.

Although the sanctuary is essentially square, it echoes traditional church design with a vaulted nave and a crosswise transept. The initial Bose design called for the arrays to be flown within the nave, but Kojder recommended that the two left and two right arrays be hung from the lower ceiling to either side. "We were able to put them in a place that is aesthetically pleasing and still achieve the same result, which was ample coverage of the entire church," he said.

The central RoomMatch cluster, above the chancel, comprises three modules—a 55x10, a 70x20, and a 90x60—that cover a central seating area and two rear, fan-shaped sections. Two arrays firing 90 degrees to left and right, each configured with a 90x20 and a 120x60 module, cover transept seating. A forward pair of arrays, each including a 90x20 and a 120x40 module, are aimed toward the rear corners of the sanctuary and cover the largest swath of main seating. The entire system, driven by three Bose PowerMatch PM8500N networked amplifiers, generates a full-range SPL of more than 109dB averaged across the floor area.

"I was told that a sound system would never work in our church as designed without carpet or the use of other sound baffles," said Mark Jaramillo, head of the parish's building committee. "But with the use of Bose speakers, custom-tuned to our building, our sound is amazing,

and we made no modifications to accommodate it—it accommodated us."

Sunset installed Bose DS 40F ceiling speakers at the altar as monitors, as well as in the sacristy and various public areas. Six Bose DS 100SE surface-mount speakers cover the narthex and outside areas.

A Dante-enabled Yamaha TF5 digital console, along with a Tio1608-D stagebox and digital snake, handle both front-of-house and monitors. One of the most useful features has been Yamaha's TF StageMix remote control iPad app. Since the audio control room has no direct line of sight to the sanctuary, the app allows the operator to remotely drive the desk from anywhere in the space. "And one of the neatest things I love about the iPad app is that it has a built-in RTA. That really makes setup a breeze," said Kojder. Further, he said, Yamaha's MonitorMix app enables choir members to create individual monitor mixes on their smartphones from the matrix, aux, and main outputs that the console operator feeds to the Wi-Fi network.

Kojder and his team programmed the Dante-networked Bose ControlSpace ESP-1240 DSP unit and ControlSpace CC-64 control center so that anyone can easily switch between automix and console control. "You can have individualized EQs and different presets within the console with full control from there. But for a service or a funeral, you can go to automix and the system functions just fine separately from the console," he elaborated.

A distributed antenna setup allows the Shure QLX-D system of wireless body pack transmitters and receivers, combined with Mogan Elite Omni headset mics, to operate in the sanctuary and out onto the church grounds. Additionally, there is a Shure MX418 podium mic at the ambo, a Shure MX393 condenser boundary mic at the altar, and eight wired SM58s for the choir and other applications.

A pair of Vivitek DW3321 5,000-lumen projectors are directed at Targa 137-inch screens either side of the altar. "Cost per lumen, Vivitek has been our go-to. For the cost, you can't beat their projector," Kojder said. An Atlona source and format switcher and HDBaseT distribution system feeds the projectors. Sources include a Vaddio RoboSHOT 12 PTZ USB camera. *