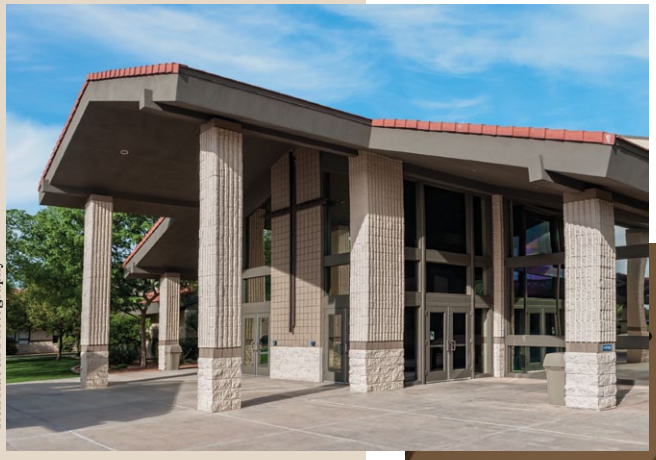

Ron Adock Photography

CrossRoads Nazarene Church in Chandler AZ.

Audio Vision For CrossRoads Nazarene Church

A system designed for clarity, coverage and connectivity.

Ron Adock Photography

The worship area is designed as a wide semi-circle with open space for seating.

By Marty Waverly, CTS, & Nathaniel Hall, CTS, CTS-I, CTS-D

Welcoming more than 1000 worshippers to its Chandler AZ sanctuary each weekend, CrossRoads Nazarene Church hosts three services with songs and instrumentals catering to a variety of musical tastes. The church installed projection technology in the sanctuary more than five years ago, but the audio system predated it and clearly required replacement. Our firm, AVDB Group of Phoenix, was awarded the bid to retrofit the audio system.

Poor Coverage

CrossRoads' Creative Arts Pastor Bryan Starner noted, "Our previous system had very poor coverage, and clarity was lacking greatly. Basically, we had an anonymous donor who desired that we get the best possible system." At our recommendation, the

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church decided to invest in the KARAi line source system from L-Acoustics, which had just been introduced to the US market.

Although the KARAi was unavailable for demonstration at the time, we knew that it offered improvements over L-Acoustics' dV-DOSC system, which we had installed at a neighboring church. "We had been evaluating other systems and had also solicited proposals and quotes from four or five different AV integrators, both small and large," Starner revealed. "The AVDB Group was highly recommended to me by a fellow pastor who had contracted them earlier. I felt good about AVDB's proposal/solution and the cost seemed to be in line with the size/type of our install."

Assembling Resources

From the start of any project, our staff actively participates with our clients to identify the specific audio, video, control and lighting requirements. Special attention is given to criteria, such as musical styles, arrangements and instrumentation, the personality of the congregation and their eagerness to participate in praise, intimacy of the space and delivery of the spoken word, as well as aesthetics, environmental impact and usage efficiencies.

For CrossRoads, we quickly assembled a project team consisting of representatives of the church, our AVDB Phoenix personnel and manufacturer support specialists whose primary goal was to enhance the worship experience of the congregation through superb delivery of both the spoken word and music. Key team members from AVDB included Site Supervisor Andrew Marcheschi and Lead Project Manager Arlon Yates. Our senior executives were also engaged on this project because they maintain personal involvement in all projects to ensure the client's satisfaction.

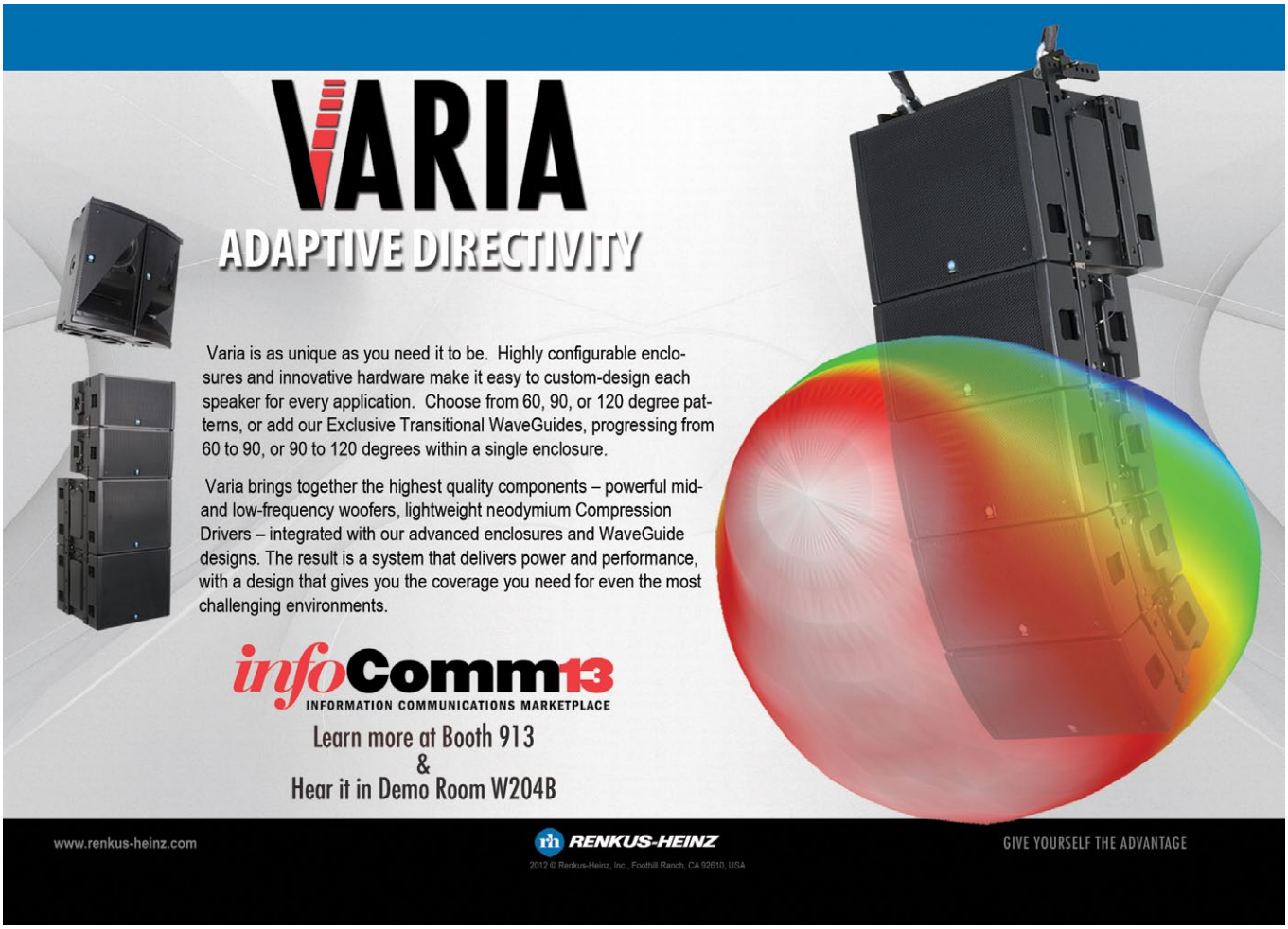
We used computer-aided design tools, such as EASE, EARS, L-Acoustics SoundVision, Nexo NS-1, AutoCAD, RevIT, SMAART and other premier titles for measurement and prediction. The ability to use both industry-wide and manufacturer-specific prediction tools allowed AVDB to reach the best possible solution for all noted requirements.

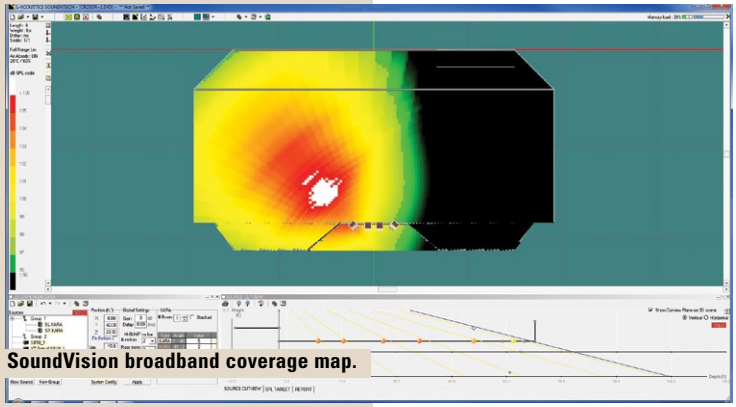
The design and integration of an audio-over-IP system has been greatly simplified by the latest IP-based products and software for measurement and prediction, but real-world challenges made us lean on our collective experience at troubleshooting.

Family Life Center

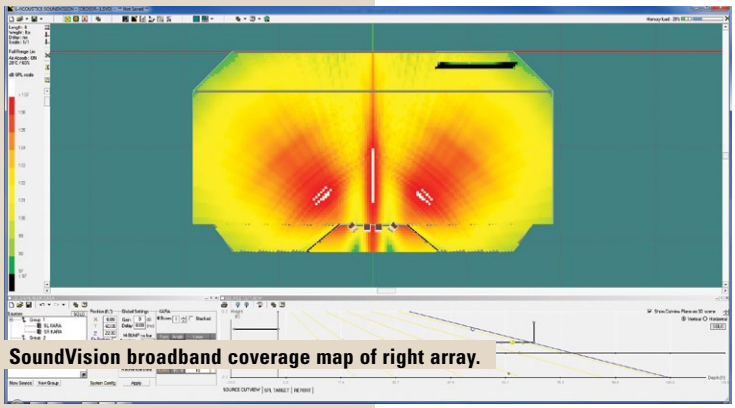
Crossroad Nazarene's main sanctuary was designed originally as a family life center. Repurposed as the main worship center, the seating or pew area was laid out in a wide semicircle. Although it is aesthetically appealing, a fan-style layout generally poses challenges for the AV designer to accomplish adequate coverage from the audio system while maintaining proper sightlines and preserving pleasing room acoustics.

We had to develop an intricate rigging design due to the sharp pitch of the ceiling, and integrate a network solution for remote access to the audio system. Placement of the speaker array was also critical, given the existing projector placement. A specific challenge was the actual rigging of the arrays to the roof structure of the building.

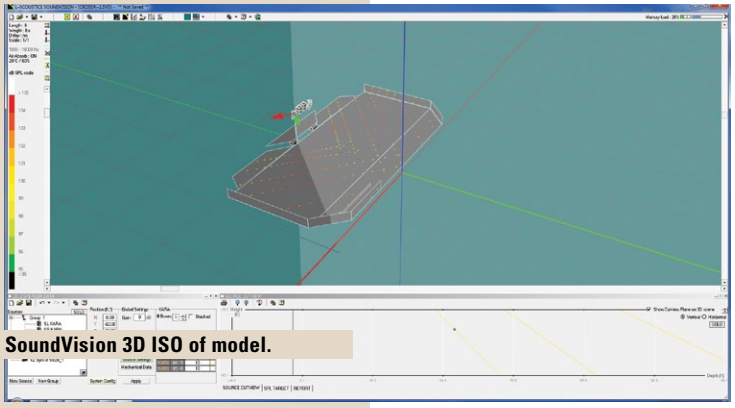




SoundVision broadband coverage map.



SoundVision broadband coverage map of right array.



SoundVision 3D ISO of model.

Tips

- Establish an IP-based closed network for full control of traffic. Allow for future port expansion and network configuration.
- Set realistic expectations and factor in extra days for unexpected overruns.
- Establish honest and open communication with the client.
- Evaluate all possible solutions for best compliance to the needs analysis. It's about the message, not the gear.
- Use comparative analysis whenever possible.

To achieve the design criteria of clarity and coverage, specific array orientation and aiming was paramount to the success of the install. Great care had to be given to maintaining a proper safety factor to the chosen hardware, and structural supports. With a weight of more than 400 pounds each, the arrays were rigged with double-back strut allowing for the fine adjustments necessary to achieve the proper orientation. All hardware was chosen with a safety factor of 5:1 from the already given Safe Working Load specifications from each manufacturer.

A compressed timeline pressed us to deliver a turnkey system at record speed. The build portion of the contract was awarded around mid-November, with client aspirations of having the system up and running before the Christmas festivities.

Our client was skeptical that the deadline could be met and was ready to have us wait until after the holidays to integrate the new system. We guaranteed that, with our relationships with the manufacturers, knowledge of the network configuration and our internal capabilities, we would be able to complete installation and integration in a timely manner. We were released to start the project and basically had about 30 days to complete it.

Audio Capabilities

We were contracted to provide audio design, engineering, integration and commissioning of the new system, which basically consists of L-Acoustics arrays and subwoofers, and BSS processing.

The system features left and right arrays, each comprised of six L'Acoustics KARAi enclosures flanking dual center sub hangs, each comprised of two L'Acoustics SB18i enclosures. Three L'Acoustics LA8 amplified controllers power all enclosures and provide the array morphing technology unique to L'Acoustics that allowed the arrays to be custom configured for both the worship style of the church and the room itself. Our design team engineered turnkey audio, video, control and lighting systems intended to enhance the worship experience.

The contemporary Saturday evening service is totally electric guitar-driven with just a lead vocal, and is certainly pushed the hardest, with somewhere between 95dB and 100dB SPL sustained throughout the service.

On the other end of the spectrum, the first service on Sunday morning features a much more traditional praise team with more vocalists and instrumentation, and that runs at about 85dB. But regardless of the music style and level, the audio system always provides the perfect mix of clarity and coverage.

The arrays provide exceptional coverage from front to back and minimize or, in some areas, even eliminate reflections off the rear wall. "Given the acoustically difficult environment, I'm amazed by how accurate these new arrays are. If you step up 18 inches at the back of our mix booth, there's a very noticeable drop-off in level. That proves that the audio is being directed exactly where it needs to be and isn't bouncing off of the back wall," noted Starner.

Connectivity Ease

Establishing connectivity between the sanctuary and the mixing booth was another important design

goal, and ultimately a future milestone, easily reachable if the audio system addition was designed with the need for expansion. The church had a facility-wide closed LAN network at the time of the audio install. However, the facility's IT infrastructure was not reliably capable of audio transport, nor did it feature the QoS level of management necessary in a live production environment.

Therefore, we used HP Procurve Managed Switches, allowing for future expansion and capabilities, such as offsite monitoring through a VPN, digital audio transport using AVB, Dante, Ethersound or whatever HD-over-IP or Audio-over-IP technology comes along in the future. The use of TCP/IP-based technology is gaining strength in our industry, and our goal is to future-proof our clients' systems so expansion is feasible and easily attained with minimal reconfiguration.

Ease Of Connectivity

The ease of network connectivity between all the components of the new system allowed for a painless setup and calibration of the system. Eventually, the onsite AV staff will be able to access the audio system via network access through their smart devices, allowing for ease of operation and use. The church's multimedia technicians can be alerted of any issue with the system via email or text to their smart devices.

These technicians can respond to calls originating from any audio or network anomalies, and will continue to be the first line of support to continuing the operation of the system. Maintaining a static IP-based closed network allows full control of traffic and helps limit unwanted access.

Project Takeaways

This project was similar to others we have worked on, and reinforced what we have learned through the years, including what we consider to be the first step toward success on any project: Set realistic expectations with the client. On expedited projects, we add a few extra days. This way, when expectations are met a few days early, the client will be extremely happy; on the other hand, if we need the extra days for unexpected overruns, we have them to work with.

We work on developing strong relationships with manufacturers of products and rally their support when needed. On this project, they supported us with "just-in-time" scheduling of arrival of gear, assistance with sound modeling and coordination of the connection between products and the church's IT network.

We believe in honest and open communication with the client or end-user. We establish daily or bi-weekly communications with the team for providing project status updates, limitations that are being caused by other trades, delay in shipment or just to let them know where we are related to the completion. This eliminates any surprises and/or grief from the end user. It also helps the end user feel "involved" from the consultation process all the way through to the turnover of the system.

Successfully accomplishing detailed work within a constricted timeframe is the reason clients seek out the AVDB Group. Even when the project is complete, we provide ongoing personalized service and support. By fully supporting our clients, we have formed countless long-term relationships and established a proven track record in customer satisfaction.