



# Shape matters

What appears to be an acoustic wave is a series of decorative scrolls

Singapore's Queenstown Baptist Church has been equipped with a tailor-made sound system that's just the right fit. **Richard Lawn** reports

**WHEN AN AUDIO CONSULTANT IS**

called in to improve the audio in a church's unique worship space, they enter the venue with an open mind in the knowledge that they cannot impose a cut-and-paste design from a previous solution. Specialist house of worship AV consultant Robert Soo readily admits that he has gazed at some Singaporean sanctuaries for long periods of time, becoming ever more perplexed in his attempts to tame the space. Having been asked to troubleshoot and tweak the audio system in Queenstown Baptist Church (QBC) for several years, he eventually received a request to design a new AV system that would enhance its modern contemporary Sunday services.

Despite having familiarised himself with the church for several years, Soo acknowledges he was going to be tested by the room's low ceiling, asymmetrical shape, lack of acoustics and tight budget. 'Each time I created a design, it was a case of going back to the drawing board,' comments Soo. The room width at the front is approximately 13.7m, tapering out to 26m at the rear over the 18.5m depth. What appears to be an acoustic wave suspended below



the 4.7m-high ceiling is in fact a series of decorative scrolls that serve no intended acoustic purpose.

Having ruled out a line array at the outset, Soo conceived a simple point source design. 'The idea was to keep the speakers as focused, tight and flush as possible to the ceiling in order to maximise height and minimise reflections. However, it was always going to be a challenge balancing performance, aesthetics and acoustics in this tricky room.'

Several loudspeaker suppliers were asked to provide demonstrations over a number of weekend services

of eight technicians including sales manager Koay Kheng Ying. 'We had to gradually phase out and dismantle the old system during the week, clear up in time for Sunday services and carry on where we left off on the Monday.'

The sanctuary is now adorned with four ceiling-mounted Outline Vegas 12 two-way cabinets paired as separate L-R systems for half of the

hall each. 'The 1.75-inch compression driver is mounted onto a rotatable horn assembly, ensuring we could orientate them horizontally while maintaining the required HF dispersion,' explains Soo. 'The rotatable 90° x 60° waveguide really mitigated the effects of the low ceiling and



**Four ceiling suspended Outline Vegas 12 speakers provide the main sound reinforcement in QBC's sanctuary**

controls the directivity.' Suspended from poles fixed onto individual concrete blocks above the ceiling décor, the Vegas 12 operates within a 55Hz to 19kHz frequency range.

Low frequencies down to 35Hz (±3dB) are maintained by pair of L-R Outline DVS 118 subwoofers, whose crossover is set at 80Hz. Similarly, the quasi-omnidirectional 18-inch

models are pole-mounted to concrete blocks above the ceiling, but flush-mounted to the rear wall ensuring a line of sight of the stage for the congregation. 'There is a 3dB loss from the front to the extreme rear seats, but I ruled out side- and rear-fills as it would have over complicated the audio pattern and would have been costly,' adds Soo. 'Adding the pole mounts to the speakers had already pushed PAVE to the limits. Luckily, they have contortionists who could climb into the tight ceiling and prepare the fixing points.'

The four Vegas 12 cabinets and dual DVS 118 subwoofers are powered by single Powersoft Quattrocanali 2404 DSP+ four-channel and Duecanali 1604 DSP+D two-channel amplifiers. All relevant Duecanali and Quattrocanali amplifier parameters are accessed on a PC running Armonia Pro Audio Suite software. In addition, Dante cards have been inserted into both Powersoft amplifiers to create an audio network system for management and control from a PC via the Cat-6a infrastructure. Loudspeaker management settings are programmed within a Xilica XP-4080 processor.

FOH operations have been digitally upgraded to provide ease-of-use for the audio, video and lighting operators. Central to the audio control is a 48-channel Allen & Heath SQ-7 console that is Dante-enabled courtesy of an M-SQ Dante-A card. Incorporating a XCVI 96kHz FPGA engine, the 33-fader console comes with 32 on-board preamps and connects to the two DX168 96kHz remote stageboxes.



**Low frequencies are maintained by pair of L-R Outline DVS118 subs**

The previous monitoring system was not earmarked as part of the audio upgrade. However, the musicians and singers now benefit from six myMix personal monitor systems, which are connected over the Cat-6a network to an IEX16 16-channel input expander for line-level signals. The addition of a Ferrofish Verto32 integrates these MADI devices into the Dante network.

In terms of inputs, up to 10 channels of Shure QLXD4 digital wireless receivers can be connected to Beta 58 handheld wireless microphone transmitters. Specified on account of being able to quickly locate open frequencies and deploy them to transmitters via a one-touch sync function, the QLXD4 operates within the reduced 530-602MHz bandwidth. The IT infrastructure that has been added by PAVE has also enabled the use of Shure Wireless



**The 48-channel Allen & Heath SQ-7 console**

Workbench software for remote control of receiver settings from a PC, including networked channel scanning across multiple receivers. The shielded drum kit is equipped with a selection of models including a Sennheiser e902 on kick, EV PL35s on tom toms, Audio-Technica AE2300s on snare and AE3000s on overheads and hi-hat.

With the addition of a Datavideo SE-2850 multi-definition switcher at FOH, QBC can now connect up to 12 channels of HD or SD inputs. In addition to its connection to the SQ-7, the SE-2850 comes with audio de-embedding, delay and four XLR inputs. Capable of producing 4:2:2 10-bit image resolution with I/O configurations, the SE-2850 features dual picture-in-picture (PIP), downstream keyer (DSK), logo insertion and an integrated title overlay system. 'With most modern-

day houses of worship, there is a continual demand to add dedicated video outputs,' expresses Soo. 'In addition to the previously existing confidence monitor projector, there is digital signage throughout all the various levels. Having extra outputs is vital for future-proofing.'

Video inputs include a Blu-ray player and a new Panasonic HE-40 PTZ camera managed by an AW-RP50 controller. The addition of Datavideo DAC-60 HD/SD-SDI to VGA, DAC-70 HDMI/VGA to HD-SDI and VGA to HD-SDI converters provides consistency of image from the inputs to the two WUXGA 7,000-lumen Epson EB-G 7905Us that project onto the rear stage wall. A Blackmagic HD-SDI video distribution amplifier mini converter completes the video upgrade.

Fully digitalised, the AV volunteers at QBC are getting up to speed with the new setup. 'They're getting used to the layout of the control surface, but like the preamps on the SQ-7,' confirms Koay. 'The new AV system has a lot more flexibility built into it and, with further training, the AV volunteers will be able to blend the added benefits into their productions. What is the most satisfying is that it has received very good comments from the church. It has elevated the worship experience to a brand-new level.'

Gazing at the finished result, Soo adds: 'It looks simple - but it really was not. Ultimately, the finished design was a best fit in a challenging space and PAVE got it spot on.'

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**The musicians benefit from six MyMix personal monitor systems**

