WEAVING A MASTERPIECE, WESLEY METHODIST CHURCH

At a Singapore church steeped in history yet embracing technology, Richard Lawn finds a finely crafted merger of form and function.

THE OLDEST METHODIST CHURCH with an English-speaking congregation in Singapore, the Wesley Methodist Church (WMC) holds special significance for Electronics &Engineering Pte Ltd (E&E) managing director Ronald Goh. Mr. Goh attended the Fort Canning district church during his teenage years and has been its sound system and A/V systems integrator for the last two-to-three decades. When the church began an extensive renovation programme last year, E&E was asked how WMC could further improve on its A/V systems, taking advantage of the latest in A/V technology while bearing in mind that any upgraded system must stay relevant for at least the next 10 years. Having personally overseen the installation of the A/V system in the adjacent Wesley Hall, Mr Goh triumphantly returned to the main sanctuary to compose his own masterpiece. After studying the new seating arrangements from the architects and in consultation with the Truephonic acoustics and technology firm based in New York, Mr Goh proposed a 3.1 sound system for the main sanctuary seating as well as for the pew style seating in the baptismal hall. Every seat in the church will be served by a centre speaker channel for the sermon or dialogue and a pair of left and right speakers for the choir and musical instruments (a 25-piece band performs during feast days). The .1 in the 3.1 features eight 12-inch subwoofers for the 'uhmm' factor.

Completed in 1910, the English-style Gothic building with exposed brickwork originally accommodated English-speaking residents of the island, but expanded to also serve a number of Filipino and Chinese residents. Badly damaged during the Second World War, the church was largely reconstructed. The sanctuary was renovated and a six-storey building was completed in 1988, needed for the growing congregation flocking up Fort Canning hill to Wesley. Church membership has continued to grow. Following a review conducted by the church committee in 2005, the conclusion was reached that it had run out of space in which to conduct services.

Like most Singaporean churches, extending the land was not an option and so the existing plot had to be maximized. A budget was approved for the Plaza section of the church to be constructed on what was previously an open rooftop space. The church decided to fund a project to excavate the foundations and construct a new chapel below ground. The expansions have continued and what was initially penciled in as an S$1 million project rose to S$14 million in just six years. Whilst construction of Wesley Hall was in progress, the church had no option but to relocate its services to the Plaza Hall in addition to Bible House, located a stone's throw away from WMC. E&E upgraded the sound reinforcement systems to enhance the extra services that were scheduled during the construction. EAW JF10 and JF60z speakers powered by Powersoft Digam

M20D and M28Q amplifiers provided FOH and delays respectively, fed from SymNet Express 8×8 Cobra processing. Remaco 72×72-inch and 84×84-inch motorised projection screens, an Eiki XSP2500 DLP and Sony BRC-300P cameras were also supplied to the Plaza Hall for its multipurpose needs.

Steve Sockey of Truephonic consultants was drafted in to enhance the acoustics for Wesley Hall's contemporary style services. The L-shaped hall was acoustically treated with special K-13 spray-on foam paint, whilst RPG Binary Amplitude Diffsorbor (BAD) diffusion/ absorption panels were added to the lateral walls leading to specular scattering and a closer to ideal diffusion line. With the architect opposed to the suspension of any clusters of speakers on the grounds of aesthetics, a distributed audio system was designed in place of a favoured FOH specification. The system includes four EAW QX5694 speakers supplemented by four SB1000ZR subwoofers powered by Powersoft Digam D4002, D2002 and M50Q amplifiers. Two EAW UX3600 processors provide loudspeaker management, whilst a PreSonus Studio Live 24.4.2 digital console with a Firewire interface is used for mixing the musicians, choirs and singers on stage, who benefit from a selection of Shure wireless and wired microphones in addition to eight myMix personal monitors, receiving the resultant mix from the PreSonus console via an IEX-16L 16-channel live input expander.

Two Remaco TEN-3922H tab-tensioned motorized screens at the front of Wesley Hall take their images from Christie DHD 8,000 lumens DLP projectors. Video content sources include a Datavideo HDR-45 video recorder/player with a removable hard drive enclosure, four Panasonic AW-HE50SE motorized cameras, a PC and a Samsung Blu-ray player. Ten Blackmagic Design SDI-HDMI converters, three Extron MDA 4V HD-SDI distribution amplifiers and an Extron 12-output composite video distribution amplifier have been added to the video signal mix. A/V management has been further simplified with the addition of an AMX NI-3100 Netlink controller, interfaced with an AMX Modero 5.2-inch matrix display. Finally, the rear A/V control and postproduction room was soundproofed, allowing the technicians to communicate without distracting the worshippers.

Most recently, the reconstructed main sanctuary was opened up for E&E's engineers to apply their definitive A/V touch. 'I wanted to create a true 3.1 sound experience for the congregation here,' explains Mr Goh. Judging by the split personality of this room, his vision was extremely ambitious when most system designers would have possibly opted for intelligibility at best. He further adds: 'I want to bring the sound from the choir and musical instruments out onto the congregations towards the rear so as to fill the whole church with music rather than just for the front pews.' From the altar, the main sanctuary extends 40m forwards to the main entrance, whilst shorter 20m lengths are offset to the left and right, for which the height of both rises from 6m at the top of the lateral walls to an apex of 10m. The sanctuary being challenging enough in itself perhaps, for the adjacent baptismal hall and atriums bolted on to the left (with variable 2.8m to 3.5m ceiling heights owing to concealed overhead ducts) E&E opted sensibly to design a separate 3.1 sound system in this dedicated zone.

Taking advantage of the way the ceiling was segmented to fit in the aircon ductings, two 55-inch LED video panels are located in each segment to serve five rows of pew seats with each video panel served by its own 3.1 sound system to mirror the speaker layout in the main sanctuary seating. Three ceiling suspended clusters comprise the core FOH system for the main sanctuary, combining EAW QX396i speakers with SB120 subwoofers, whilst three separately suspended MK2396 speakers add further depth and clarity. Powered by three K2 and one Ottocanali 12K4 Powersoft amplifiers and connected to the speakers using Belden 7477 cabling, the full range LCR system serves the main hall pews. 'During the choral service enhanced with the musical instruments, the left-right clusters provide the stereo effect and ambient sound bringing the music down the pews to give the whole church a richer sound that was not possible without the 3.1 sound system. The centre speaker channel remains the speaker in use during sermons,' further explains Mr Goh. The loudspeaker system is controlled by an EAW UX3600 loudspeaker processor with stored system presets.

Mixing is performed on a Yamaha QL1 16-channel console inserted with an MY8-AD96 analogue expansion card in one of the rear control rooms.The church services simply combine a piano, choir and organ and for such a simple use, an 8-channel Yamaha Ri8-D input stage rack inserted with an MY8- AD96 Dante network card and Radial J48 DI boxes was deemed to be sufficient. The altar is equipped with MX418S gooseneck microphones, whilst the choir benefits from six Shure overhead Microflex MX202 condensers. Powered by dual Ashly Audio KLR3200 amplifiers, four EAW Microwedge MW8 monitors discretely assist the pianist and church leader when required.

In addition to the eight channels of Shure ULXD wireless microphone transmitters and receivers available, a total of eight myMix personal monitors can also be called upon. These are interfaced to a Focusrite Rednet 3 digital input and myMix IEX16L 16-channel input expander and routed to the Dante Ethernet network via a Netgear GS716 16-port Gigabyte switch. By using Dante compatible products in this project, E&E has created a low-latency network that has been further extended to the cry rooms and peripheral rooms by incorporating SymNet Edge xIn4 and xOut4 insert cards into the amplifiers driving Community D6 speakers.

The baptismal hall integrates most of the 50 EAW SMS5 5-inch compact speakers used for the project into the concealed ducting segments; some of the SMS5 models serve as fills in the main sanctuary. The two-way EAW speaker system is powered by Powersoft Ottocanali 4k4 and 8k4 amplifiers. Precise time alignment and delays were conducted using the EAW UX3600 loudspeaker processor software.

Like the audio system, the visual requirements of the sanctuary were addressed as two separate sections. Just as many of the seats to the left of the altar have been installed with an induction loop to benefit the hearing impaired, the visually challenged have been offered a front of house vista in almost every seat. It's probable that Mr Goh and his team sat in every pew of the church to determine where they could best view a monitor

screen should a clear sight of the altar not be possible. SDI/HDMI converters connect the video feed to numerous 32-, 40- and 55-inch Samsung screens mounted into the ridged ceiling of the baptismal hall and behind the pillars of the main sanctuary. The main video system can be activated from the control of a Crestron TSW-752 7-inch touchscreen networked via Wi-Fi to the main Crestron CP3 processor. The main sanctuary video display uses a Remaco Ten 5630 motorised tension screen receiving its content from a Christie Roadster HD20K 20,000 ANSI-lumens projector.

The scale of the visual outputs certainly command attention, but it's the orderly production area in the rear control room to the left of the entrance that deserves further praise. Originally the two control rooms were to split the audio and video duties and as such, the amplification and loudspeaker processing hardware along with the inventory of microphones is racked in the right control room. However, the Wesley production team – consisting of three video operators and one audio engineer overseeing the Yamaha QL1 console – insisted on working together in the same room. That left one workbench with limited space to conduct their respective video recording, presentation and control duties.

The tight space was addressed by employing Apple touchscreen monitors connected to iMacs installed with Final Cut Pro software, along with a Blackmagic Design video control and distribution solution that has an Atem1 M/E 4K Production Studio and Smart Videohub 20×20 SDI router at its core. As such, the touchscreen controllable workspace is free of switchers, cabling and excessive scalers, embedders and such like. The Atem1 switches between SD, HD or Ultra HD video standards allowing live production from varied video sources including four Panasonic AW-HE60 cameras, a disk recorder, Blu-ray player and computer graphics. Full switcher control is performed from one of the iMacs with downloaded Atem software control. The Atem Production Studio includes 6G-SDI and HDMI 4K inputs that are SD, HD or Ultra HD switchable. Each input supports embedded audio mixing and features a frame resynchroniser, whilst a balanced XLR audio input receives a feed from the Yamaha QL1 console. The Atem1 includes outputs for recording the service to a video master for broadcasting and streaming online. This includes programme and down-converted programme outputs together with auxiliary outputs allowing clean feeds to the Christie projector, disk recorder and multiple Samsung monitors. The multi-view outputs are 1080i HD for use with any TV, whilst a balanced XLR output of the audio mix can be embedded into the video outputs.

The switcher-less production area has been simplified as a result of the integrated multi-view monitoring the video inputs on the iMac. The layout has been customised with assigned source labelling. A 1U Blackmagic Smart Videohub 20×20 router has been added to assist with monitoring control, visually routing the signal for which the monitor simultaneously depicts live video, crosspoint connection labels and TV formats. The inclusion of an Ultrastudio for Thunderbolt mini recorder and mini monitor provides both capture and

playback respectively in both SDI and HDMI formats. A compact HDMI to SDI 4K mini converter allows the conversion from SDI to HDMI in all SD and HD formats.

If the original architects of Wesley Methodist Church could travel forward over 100 years in time, it's hard to imagine what their reaction would be. Such a house of worship was never intended to have the latest A/V technology installed into its architecture as the resonant acoustics of the interior stone was specifically constructed for amplifying the sermons, hymns and musical accompaniments. However, times have changed and an audience privileged to have become accustomed to HD, 4K, Dante networkable and surround sound technologies expect fidelity both with modern musical styles and the spoken word. The congregation's reactions to the new sound system and A/V installation have been positive, with members likening the experience to 'watching the church services in my living room with a huge video display accompanied by a 5.1 concert hall quality sound system.' Having helped to stimulate the services with a multitude of sensitively designed audio-visual technologies, Mr Goh probably feels as proud now witnessing a fully engaged Sunday congregation enjoying the A/V and sound system installation as he did in the seventies.

www.wesleymc.org. www.enepl.com.sg www.truephonic.com