

WorshipAVL

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July–August 2023

SAINT CHARLES BORRROMEO

Engaging audio for 3,400-seat sanctuary

WESLEY HALL
SIMPLYING CONSOLE
PROGRAMMING

DESIGNING FOR
INTELLIGIBILITY
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Singapore: MICA (P) 014/05/2023 PPS 1644/05/2013(022954)



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Broadcast streaming is enabled from a Waves Soundgrid Server and a Yamaha CL3 console

True to Wesley

Electronics & Engineering Pte Ltd has installed a comprehensive AVL upgrade at Wesley Hall to make services more engaging

WESLEY HALL AT WESLEY

Methodist Church in Singapore has recently undergone extensive upgrading work to offer an engaging contemporary worship experience for both in-person and virtual attendees. The improvements include a new seating and stage arrangement, improved front of house control areas, a video control room and an acoustically optimised sound mixing room.

The number and skill of volunteers operating video, sound and lighting technologies has grown to support the added technology and extent of content creation and live worship.

Initially, in the wake of the pandemic, the project focused on addressing the limitations of the L-shaped physical space and relatively low ceilings. However, there was also a real need and vision to create, capture and stream live content from the space. In the spring of 2022, the church

committee overseeing the project selected local architect Ong & Ong and acoustic/production consultant Truephonic LLC to collaborate on the concept and design. Later, the team's design was built by Sunray Woodcraft and installed by Electronics & Engineering Pte Ltd (E&E). All firms worked together to meet a moderate budget and a tight schedule.

The church committee and design team immediately agreed that the stage and audience must be reorientated. By rotating the stage by 45°, the worship services are intended to feel much more intimate and engaging. The short side of the room accommodates two ideal camera positions, the control area for live sound mixing and lighting control without blocking sightlines. "Previously, one seating section had raked seating and the other seated sections veered off to the side of the stage," explains Steven Sockey, principal consultant



The compact FOH production area was achieved through digitisation

with Truephonic. "The room played to one group of people and not the other. We wanted to update the room so that it played well to those in attendance and those experiencing the service through the lens."

However, the team was able to preserve some elements. The space is used for modern worship with large loudspeakers, so the acoustics remain a prime consideration. During a previous renovation, acoustic



The video control room resembles a broadcast suite

treatments were installed, including perforated wood panelling on the walls to balance the sound. This design allows low-frequency sounds to pass through to the thick acoustic batting while limiting high-frequency absorption. Also, the ceiling continues to be equipped with technical equipment such as stage lighting, speakers and air conditioning. Therefore, the black acoustical spray, “Cell Spray”, was touched up and reused.

A production suite was built backstage to support livestreaming and content creation, with the goal of not only reaching more viewers but also growing the church’s staff and volunteer team’s capabilities. Sockey notes: “The video room is similar to a broadcast-style control room. This setup enables the church to upscale teams and reliable workflows based on widely accepted best practices. There is a chair for each person and role.”

The production suite includes a purpose-built audio room that underwent a predictive and iterative analysis using numerical optimisation to enhance the audio quality for recordings and livestreams. Sockey

explains: “The analysis starts by defining an objective function, represented by a mathematical equation that describes the desired outcome considering given constraints. Typical constraints, for example, might be the minimum or maximum possible room size. The computer can then compute and find the best possible design by modifying variables such as wall dimensions, listener location or loudspeaker positions.”

The subjective selection of a loudspeaker system proved to be a trickier proposition. Sockey continues: “I know line arrays are the go-to and the first choice for many, and no doubt there can be some real advantages. But with Wesley Hall’s limited ceiling height and dissimilar seating arrangement, a line array is not viable. We also know how passionate people can be about speaker brands. So, the team narrowed the field to three equivalent compact enclosures/ systems and invited them to a blind audition. Each option was technically excellent and from a well-respected manufacturer.”

Wesley’s technicians supplied rigging equipment and hosted the

The loudspeaker system used in Wesley Hall consists of three arrays, each with three Outline Scala-90 constant curvature arrays. Although the enclosures are used in horizontal mode, the arrays are 700mm tall and avoid interfering with sightlines. Two ceiling-suspended clusters of Outline SUB 118 subwoofers are interspersed between the three Scala-90 hangs in cardioid mode and can reproduce low frequencies down to the lowest octaves. The entire system is powered by a single Outline QTA Quattro Dante four-channel and QTA Otto Dante eight-channel amplifiers. Four Vegas 8cx cabinets have been added as fills and delays.

E&E was selected to install the production systems. Their responsibilities included the installation of sound, lighting and video equipment, as well as manufacturing and installing custom furniture in the production suites. Joe Fong, COO at E&E, created furniture mock-ups to ensure proper sightlines, which Truephonic appreciated. While Truephonic was tasked with conveying the design intent, as the installer, E&E was responsible for verifying that all details were fully addressed.

The Wesley Hall team is utilising consoles and stageboxes, which have been retained and reused due



The upgrade includes a Shure wireless microphone and IEM system

speaker manufacturers for the audition, which was conducted with all lights turned off so that the speaker systems could be judged purely on their sound and with the brand unknown to attendees. The evaluation process included two playback tracks and live performances by a guitar player and singer. All three systems were well-received and scored nearly identically. Ultimately, an Outline Scala-90 loudspeaker system was selected. “Outline’s [former] CEO, Giorgio Biffi, promised – and delivered – products on time at a time when the supply chain was broken overall,” says Sockey.

to the familiarity and training of the volunteers. Rio1608 16-in/eight-out stageboxes transmit microphone inputs to Yamaha CL5 and CL3 consoles for FOH and video mixing over a redundant Dante network. The Shure wireless microphone system can be monitored using the Wireless Workbench software. UA834WB amp receivers and UA860SWB boosters ensure audio signal clarity throughout the venue’s tricky shape. A variety of wired microphones are available for performers and pastors. Volunteers communicate during performances through the Clear-Com FreeSpeak II 1.9 GHz system.

PROJECTS

The lighting design provides full show effect capabilities for both the live congregation and livestream viewers. Cameo fixtures were used, controlled from a grandMA3 Command Wing XT console over MANet and converted to DMX. A pair of Cameo Haze 1400 Pro haze machines enhance the full theatrical impact.

The system comprises seven network switches that are interconnected using 10G fibre links, establishing a robust and high-speed network infrastructure. Additionally, there are two 1G fibre links dedicated to connecting to the Wesley network, facilitating reliable internet access. To enhance network segmentation and facilitate efficient management, five VLANs with DHCP servers have been configured for distinct purposes. These VLANs include the main control with internet access, Dante primary, Dante secondary, stage lighting and NDI.



The Steves reunited – Sockey and Meyer combined their talents

Design inventory, including Smart VideoHub 12G 40x40 routers, Master Control panels, an ATEM 1 M/E Advanced Panel and a HyperDeck Studio HD Plus broadcast deck, are connected to Apple iMac 24-inch

to Singapore to work with the teams, Meyer praised the project, calling it “incredible” and noting that it was more than just a church installation; it was analogous to the standards of show creation. Meyer’s primary goal was to ensure that the Wesley volunteer operators fully understood how to get the best out of the systems to achieve their ministry goals.

Despite initial budget limitations, the entire team ensured that Wesley could “pack a punch” with the capabilities designed into the space and combined with existing and new gear. The resultant streaming and content creation capabilities have

online viewers alike. Collaborating with the architect, Truephonic as well as E&E, the team was able to promote audio and video quality for recordings and livestreams with a purpose-built audio room and production suite. The project has enabled the church to reach more people, grow its ministry team and engage with a modern community. The Wesley Hall renovation sets a high standard for integrating technology and architecture in contemporary worship spaces.

“All consultants, contractors, vendors and partners worked well together to deliver a venue that was in line with the post-pandemic vision for our church,” says Jonathan Huang, deputy director of administration for Wesley Methodist Church. “We have seen an enthusiastic uptake by our team and are continually growing in what we can achieve with this system. To date, we have successfully facilitated the return of our congregation to our worship services, held a play, facilitated a hybrid onsite/online seminar and even created a multi-sensory Easter experience in the space, with no shortage of positive feedback. Thank you to the entire team for a job well done.”

“Our team has had a wonderful experience collaborating with



A flexible space for engaging and intimate worship experiences

Furthermore, wireless control capabilities have been incorporated into the system by connecting three wireless access points to the control network. It is important to note that the entire system operates on a 10G fibre network, ensuring seamless and efficient data transmission throughout.

The NDI and Dante video- and audio-over-IP networking are fulfilled by three main racks. The Blackmagic Design URSA Broadcast G2 studio and 6K Pro pocket cinema cameras feed SDI and SMPTE fibre input signals to the ATEM 2 M/E Production Studio 4K video switcher. The HDMI and 4K signals are output over NDI to the pre-existing 3.84m x 2.4m videowall via two Novastar VX45-N LED processors, a Chief confidence monitor and 13 LG OLED and Samsung UHD displays. The live feeds are routed to Blackmagic VideoHub 12G 40x40 video routers and Master Control router panels in the broadcasting studios. Blackmagic

monitors loaded with Studio OBS and editing audio recording software.

The livestreaming audio mix is made on a Yamaha CL3 console on the Dante network, with a Waves Soundgrid Server One-C connected to the WSG-Y16 V2 I/O interface card for additional plugin effects. Dante conversions are further enabled with Focusrite RedNet A16R Dante analogue audio interfaces. The audio suite and control rooms feature Genelec 8331A, 8341A and 7350A SAM monitors.

During commissioning, Steve Meyer, a director and producer, was brought on board to help train and guide the team as they became oriented in the new facility. Meyer’s expertise in directing and engineering and his ability to work effectively with people and understand technology made him a valuable addition to the team.

Sockey had met Meyer at the Dolby Theatre in Hollywood during a live broadcast in 2015. After crossing the international date line from California



Yamaha Rio1608 stageboxes are connected to the Yamaha CL consoles over the Dante network

positioned the church as a growing modern community which has extended its reach, especially online.

The renovation of Wesley Hall at Wesley Methodist Church in Singapore showcases the potential of modern worship spaces. By addressing the limitations of the L-shaped physical space and relatively low ceilings, the design team created a modern, versatile venue for in-person and virtual worship experiences. The reorientation of the stage and audience resulted in a more intimate and engaging worship experience for onsite attendees and

such enthusiastic and committed teams to accomplish the successful completion of this project under such a compressed timeline. We are grateful for the confidence that the church committee has placed in us over the years to implement these upgrades that are aligned with the ever-changing technological landscape,” concludes Gary Goh, CEO at E&E.

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