CASE STUDIES

Educational Facilities

Unite Your Audience

The Martin Audio Experience

MARTIN AUDIO
LONDON

Martin Audio

At Martin Audio we believe that uniting audiences with exciting sound creates shared memories that sear into the consciousness delivering more successful tours, events and repeatedly packed venues.

We achieve this by an obsessive attention to detail on the professional sound system's acoustic performance, frequently challenging convention and involving a sophisticated mix of design, research, mathematical modelling and software engineering, to deliver dynamic, full-frequency sound right across the audience.

With over fifty years of live sound and installation expertise to our name, Martin Audio offers a wide range of premium professional loudspeakers so customers can be assured of selecting the right system for their chosen application, whether it's a small scale installation or a festival for over 150,000 people.

Educational Facilities

Hosting a vast range of functions and events, including Christmas carols, organ recitals, graduation day ceremonies, plays, VIP and academic lectures — as well as potentially third party rental providing an additional revenue stream - educational facilities often require a versatile sound system. Martin Audio understands these challenges, and the following are classic examples of how our products have delivered optimum solutions.

Martin Audio supports Centenary Celebration of Wuping School

Recently, Wuping No. 1 Middle School in China's Hubei Province celebrated its 100th anniversary, during which it has adhered to a philosophy of "cultivating people with moral integrity and all-round development". During that time it has trained more than 50,000 graduates, many of whom have become high ranked in governing the country, studying, and developing industries.

To mark the occasion, a specialForever Azaleaconcert was performed in the concert hall of the newly built Science and Art Museum, presenting an audio-visual feast to alumni, guests, teachers and students. Martin Audio's signature sound and consistent coverage created a stunning live atmosphere for the concert, which the school is seeing as a new starting point.

Going forward, this auditorium will be used for a variety of concerts and operas, as well as other cultural and artistic activities, including major conferences, with the new Martin Audio TORUS providing precise coverage, sound consistency and scalability. It is generally agreed that this has created a wonderful auditory space for teachers, students and audiences alike.

In the early stages of the project design, the technical team used Martin Audio's proprietary DISPLAY3 predictive software to model coverage, sound propagation characteristics and other factors. This simulation provided the optimum solution.

The left and right hangs comprise the classic TORUS constant curvature array, to provide excellent bandwidth and clarity. Each hang consists of six T1215 and a pair of T1230 array speakers—the former providing an SPL of up to 134dB (6dB), and the latter an SPL of up to 132dB (6dB). It comfortably meets all live performance requirements.

TORUS constant curvature cabinets have two vertical angles of 15° and 30°, with a coverage distance of up to 30 meters and capacity to manually adjust horizontal dispersion coverage patterns for additional flexibility.

In order to enhance LF extension, two Martin Audio SXCF118 18in cardioid subwoofers have been installed in combination with the TORUS T12 array. With its cardioid directivity, compact footprint and high energy output characteristics, the SXCF118 provides ultimate LF energy.

Wuping No. 1 Middle School, China

The off-stage fill comprises Martin Audio FlexPoint coaxial point sound source, with the FP12 delivering the sound image with accuracy as required, at the different listening points.

Lip-fills comprise four PI8 8in passive two-way speakers to supplement the coverage of the front row audience and further enhance the listening experience. A further four coaxial CDD10B speakers enhance the stage experience, and this mobile return also uses FlexPoint FP12 speakers to provide performers with flexible monitoring needs. In addition, two further PI8s provide reference monitoring in the control room.

The entire system is driven by Martin Audio iKON digital amplifiers, which supports Martin Audio VU-NET control software and Dante integration, and can be modeled in 3D using DISPLAY 3 to provide sonic consistency and precise coverage.

Acoustic design company on the project were Guangzhou Sound Doctor Acoustic Technology Co., Ltd and the sound and lighting were realised by Baishi Safety Technology Co., Ltd. Of the latter, Xu (Rico) Ruixian, General Manager at Martin Audio distributor, Guangzhou Guidance AV Technology Ltd Co, stated: “We have known and worked together for more than ten years.”

Martin Audio WPM for Falls Area Performing Arts Center

Located at the Oconto Falls High School in Wisconsin, an ageing sound system in the Falls Area Performing Arts Center (PAC) has been replaced with Martin Audio's new scalable resolution Wavefront Precision Mini (WPM) line array. Part of a complete AV upgrade to the technical infrastructure, the work was carried out by Camera Corner Connecting Point in Green Bay, Wisconsin, following a competitive bidding process.

According to their project designer, Steve Littlepage, the contract was broken into two phases: a complete video upgrade, followed by the installation of the PA and system processing, as well as supply (and relocation) of a new digital mixing console.

The function of the PA was to provide an even coverage for a seated audience of up to 700, and be sufficiently versatile to serve not only a range of school events, but incoming productions hosted through a community foundation, for which the school has a long history.

The existing sound system was inadequate for both high school musical productions and outside productions, relying on a point source centre cluster hung from the ceiling above the orchestra pit, and a pair of smaller point source speakers mounted on either side of the proscenium. "The audio coverage across the audience was less than ideal, and feedback issues from microphones on stage were souring performances," noted Littlepage. The primary goal for the new PA system, therefore, was to improve the experience for the audience.

Camera Corner was given carte blanche by the client to design a system "that would solve their issues and help the venue be a technology leader in the area." After careful consideration, their PA of choice was the WPM—their first Martin Audio line array deployment.

"We considered a variety of manufacturers, focusing on line array solutions for the venue, but the WPM had exactly the right coverage to price ratio for the project," Littlepage continued. "Using an array allowed reduction of the level variance from the front to back of the audience—unlike the point source solutions we considered—and the wide horizontal pattern allowed consistent coverage left to right across the venue."

The designer was also aware that the locations for where they could place new loudspeakers were limited, and this additionally created weight restrictions. Camera Corner's solution was to hang the arrays from the building truss—between the proscenium opening and the first ceiling cloud. "The compact size of the WPM allowed us to do this while still minimising the impact this location had on the lighting system."

Through a combination of the Martin Audio Display optimisation software and EASE modelling of the arrays, Camera Corner was able to illustrate the coverage of the system during the design phase and explain the advantages of this system to the school officials.

"Attention was given to reduce the amount of stage wash coming from the arrays as well as slapback off the rear wall. It was important to improve the gain before feedback of the system as the school theatre performances are regularly run by student operators."

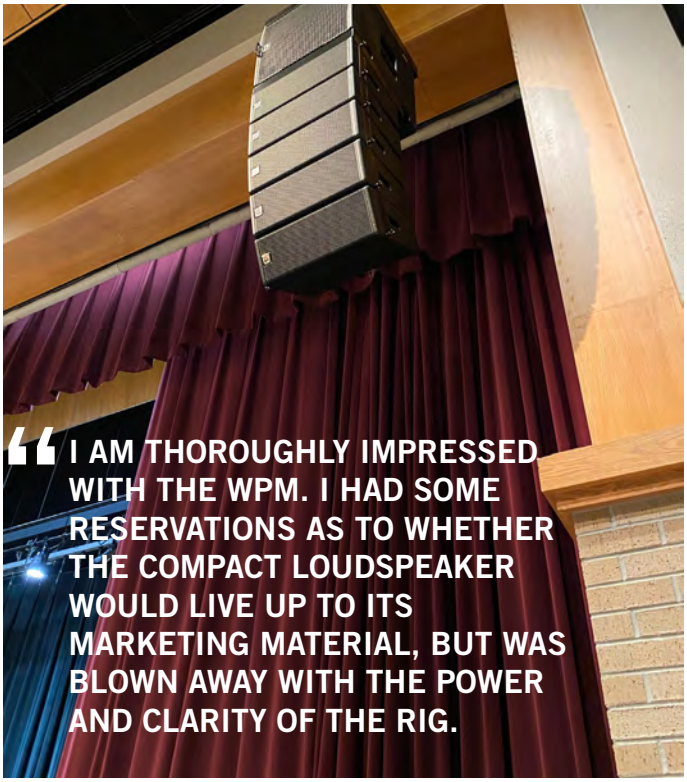
The design comprised five Martin Audio WPM elements per side, with one SXF115 subwoofer flown above each array. Two SX218 subwoofers sit at the proscenium opening to round out the bottom end for more audio intensive events, while four Blackline X8 speakers serve as lip fills across the front of the stage. The arrays are permanently hung, and the ground subwoofers and lip fills can be moved when necessary for a particular event or when not in use.

To further optimise this, the main PA system is powered by Martin Audio iKON amplifiers—one iK81 assigned to each array, in single-box resolution.An iK42 has been deployed for the SX218 subwoofers, with two channels per cabinet. Spare channels of the iK81 amplifiers, not being used for the arrays, are used to drive the Blackline X8 lip fills.

At the same time Camera Corner replaced the entire video system, and added Crestron control for the audio and video system. They incorporated two operating modes for the system, a 'Performance' mode for theatre, and 'Presentation' mode, for simple lecture style presentations.

In summary, Steve Littlepage said, "I am thoroughly impressed with the WPM. I had some reservations as to whether the compact loudspeaker would live up to its marketing material, but was blown away with the power and clarity of the rig.

"I knew that any line array solution would provide the necessary SPL but being able to circuit the array with single-enclosure resolution allowed the Display software



to optimise each loudspeaker to provide a seamless audio experience from back to front.

"The coverage in the auditorium matched what we predicted in both Display and EASE. Based on this experience, I will turn to Martin Audio again for future projects. In fact we are planning an event for our own engineering team to dive into the details of the system and use it as a location for acoustical analysis training."

The School's Network Manager, Brandon Olsen, also praised the system which had become an expedient, as opportunities were starting to be lost to other venues.

"We have noticed a huge change in the quality of audio we are able to project within our PAC," he said. "With the flexibility of flown arrays, floor subwoofers, and stage centre fills, we now have the ultimate confidence in the quality of what each member of the audience is hearing.

"With everything from meetings with 10+ microphones to full performance modes with audio, this system has expanded the PAC to levels we never thought were imaginable in the space. Wherever you're seated, the audience experience never changes.

"With the flexibility and functionality of our Martin Audio system, the PAC usage has more than doubled and new opportunities are back on the table in this amazing newly updated space."

Following the installation Camera Corner provided full operator training for the key personnel and assisted with the first event for the new system, which Steve Littlepage says "went fantastically". Managing the project was Tony Stahl, and account manager was Chris Lecher.

CDD Playback Featured in Full Sail University's Dolby Atmos Facility

Specialising in Audio Production, Music Production, Show Production and Recording Arts degrees, Full Sail University recently commissioned a new Dolby Atmos-enabled facility for class sessions, workshops, listening experiences and guest lectures at its Winter Park, FL campus. Playout of the 'objects based' spatial concept is uniquely via 26 carefully selected, and strategically located loudspeakers from the Martin Audio catalogue.

One of the largest, and most advanced Dolby Atmos rooms on a university campus, according to Education Director of Audio Arts, Brandon Egerton, this had been a topic of discussion for a number of years. "But we needed to make sure we were wrapping our arms around the right technology. We felt it was important to have a solid understanding of both the emerging technology and also how the industry intended on adopting it and so we intentionally took our time."

Along with Darren Schneider, who is in charge of Full Sail's Advanced Session Recording they utilised existing industry collaborations to gain "a really intimate perspective of the production workflow."

"We already have a 7.1 dub stage on campus, but we wanted to create an additional dedicated space for our students to explore and engage with the Atmos format. The biggest challenge for any educational institution is the ability to teach a larger number of students a format in an intimate setting. This new classroom facility allows us to do that."

Taking up the story, Michael Orlowski, Director of Technical Services, explained how the classroom space was originally designed as a 5.1 large audio classroom. He noted, "This room was frequently used for courses focused on surround sound and multichannel audio, making it a perfect candidate for renovation and an upgrade to Dolby Atmos."

Seeking the ideal playout for such discreet and localised positioning of an object-based format led Full Sail to the Focusrite Group and their engagement with Martin Audio. "Our goal in creating this space was how do we accurately demonstrate the Dolby Atmos format … hear the immersive properties of an Atmos mix and the separation between ceiling speakers, side speakers and rear speakers? And so, our approach was to consult with our manufacturers who specialize in high quality installation-class audio systems."

"We had a roadmap meeting with Focusrite Group where we were first looking at installation classroom speakers for [Martin Audio's] O-Line product, giving students in the first row and students in the last row the same optimised experience."

Schneider said that while their interest was piqued by O-Line for this application, their focus then pivoted to the discreet coaxial differential dispersion technology of CDD.

Full Sail University, Florida

> **“WE’RE EXTREMELY HAPPY WITH THIS OUTCOME.**

The Dolby Atmos SPL spec of 85dB in the 100-seat space was achieved once they had upgraded to the CDD12 and increased the original sub capability. “Dolby has a 20dB headroom, and although we’ll never achieve 105dB we have limited maximum level that the teacher can set in the room to 85dB SPL.” A global system touch panel control panel ensures this.

Full Sail’s end result was to specify three of the largest CDD12 as a conventional L/C/R system, with students and guests enveloped in a (side/rear/overhead) surround system comprising 12 CDD8 (four per wall) and eight Martin Audio C8.1T series speakers overhead. LF extension is delivered through a pair of SX118 (1 x 18in) subs, with a matched pair at the rear,

Fellow Focusrite partners, Linea Research have provided the engine, in the form of pure Class D amplification, with a 44C10 4-channel DSP amp driving the L/C/R CDD12s and front pair of LFE’s, and three 8-channel Linea Research 88C03 assigned to everything else.

Orlowski explained how they had arrived at this integrated solution. “When we met with Martin Audio, we learned about the asymmetrical dispersion that the CDD range provided, and its ability to work well with an existing classroom that has a drop ceiling.”

Dolby were very specific about speaker placement and angulation, he said, in order to meet the specification required using Dolby’s DARDT room design tool. “Having ingested all the information on the CDD speakers it was straightforward to go through the product line to find which speakers we needed.”

Assisted by Martin Audio’s technical specialists Brad Stephens and Joe Lima, he said, “Martin Audio was great to work with. We could take those specifications, put them into DARDT, and have Dolby look at the plan.” This included roof predictions taking into account intrusion of HVAC, projection positions etc. “We could input into the DARDT and simulate what the performance was going to be, and as we made adjustments Brad and Joe would join us on Zoom calls to make changes as to how many amplifiers we were going to need.”

And it was the dedicated DSP of the Linea Research amplifiers that provided a real plus point. As Michael Orlowski pointed out, “Since this classroom would be hosting multiple degree programs and demonstrating the software of Avid Pro Tools, Apple Logic and so on, we didn’t wish to put the room corrective EQ, including delays into [DADman control software], only for any of those settings to change in a lecture, and then not be properly recalled …shifting the Dolby curve that we had tried so hard to hit.” So instead, all corrective EQ is stored within the Linea Research amps. “Everything else is set up in a flat recallable preset so we can teach the technology, but it doesn’t change the sound characteristics of what the speakers and amplifiers are doing.”

Feeding the speakers is an Avid Pro Tools AVID MTRX II. The signal comes out over Dante and passes through a QSys Core, feeding the Linea Research amplifiers, again within Dante.

Aside from their satisfaction with the Martin Audio CDD deployment, Full Sail’s takeaway was the Linea Research amplification. Orlowski further stated “Martin Audio came out and did training to run the System Engineer software. We did straight-out-of-the-box tuning and voicing with Martin Audio, and Dolby then tuned the room with two presets: one matches Dolby’s modified X-curve for music and home entertainment, the second was a more flat, corrected response. The tuning presets are stored in Linea Research, and we used the Linea Research plug-in on QSys to switch between the two tunings.”

The new room was commissioned in August, road ready for their first major event when industry legend Bob Clearmountain hosted two educational sessions exclusively for Full Sail University students in the space, sponsored by Apogee.

In conclusion, Michael Orlowski, acknowledged, “We’re extremely happy with this outcome.”

Millikin University upgrades Multipurpose Hall with TORUS

Located in the Perkinson Music Centre at the 122-year-old private Millikin University in Decatur, IL, Kaeuper Hall is a 167-seat auditorium that has just taken delivery of the very first white Martin Audio TORUS system, matched to the room décor.

In fact it is the Hall’s first ever permanently installed sound system, despite its multipurpose usage. “There was no PA in there previously, they had just been using speakers on sticks … since forever, yet it runs pretty much the whole gamut of performance,” according to designer Graeme Brown, whose company Advanced Audio & Lighting Systems carried out the integration. This includes events ranging from lectures to individual recitals and opera rehearsals to guest performances and intimate concerts.

The University contacted his company for a quote, and Brown was soon on site carrying out a survey. His concern was not so much the boutique size of the room as the fact that the superstructure was largely wood framed concrete, and the room had not seen a cable run in its life. But the clients did know precisely what they wanted.

Brown’s initial instinct had been to specify a WPM line array (from the Wavefront Performance series). But recognising the room was too small for a line array, he quickly turned his attention to Martin Audio’s TORUS constant curvature, knowing this to be perfect for the throw distance and dynamics of the room.

“TORUS actually provided a much more even coverage pattern [due to its size], and thanks to the wood frame we could rig it hard and tight to the ceiling—in fact it was a super clean install.”

Sensing a slight dead zone centre in front of the stage he added a Martin Audio CDD10 coaxial differential dispersion speaker over the proscenium arch to cover the front rows. Low frequency extension was provided by an SX118 single 18in sub mounted on each side behind each TORUS array, which comprised a pair of the T1230 (12in 30° fixed angle) speakers. The system is powered by an iKON iK42 and iK81 multichannel amplifiers.

The company had worked diligently on creating the optimum outcome, carrying out modelling and pre-vis in the EASE environment, with assistance from Martin Audio’s Joe Lima. “We made good use of the asymmetrical horn flares,” he said, adding that the adjustable horizontal pattern could be adjusted to 75° via the Dynamic Horn Flare. “Essentially, what this means is the outside is all the way narrow and inside all the way wide on the adjustable horn flares.”

Once TORUS was fired up, the results were palpable for all who heard it. Graeme Brown reports, “The tuning experience was wonderful—really quick and simple, and one of the fastest system tunes I can remember doing. There were minimum EQ changes it immediately came alive. The system was very responsive, and extremely well behaved, as is the room itself.

“TORUS appears to be an extremely versatile system,” he concluded. “It’s the second one we’ve done but the first one I’ve done vertically. These boxes are certainly pretty magical for what they are, and the University is in love with the system.”

His company will be carrying out the next phase of upgrading the infrastructure when they return to replace the old lighting and dimmer structure.

Ritsumeikan University upgrades with CDD

Located in the north-west of Kyoto, which is known as the city of culture, Ritsumeikan University’s Kinugasa Campus recently installed a Martin Audio CDD system in two of its halls.

Ritsumeikan is a historical university founded in 1900 by Kojuro Nakagawa, originating from former prime minister Saionji Kinmochi’s private school. Surrounded by famous temples, its quiet atmosphere makes it perfectly suited for academic and research.

It was in the Igakukan (Institute of medical learning), located within Kinugasa Campus, that the upgrade took place in the two halls. The building itself contains various classrooms, common rooms and offices, as well as a cafeteria and a multipurpose hall.

CDD12 was adopted as the main speaker due to its wide coverage and clear sound which can be heard even directly in front of the stage. Several ADORN ACS-55T ceiling speakers were installed under the balcony on the second floor to cover the depth, adopting advanced FIR filter tuning.

The overall aim of this renovation was to expand the user base by providing a professional infrastructure, and Dante was selected for the main signal routing within a Symetrix DSP environment. Touch panel control which is provided at the side of the stage for users who are not familiar with sound system technology, facilitating easy adjustment of levels and playback of microphones and presentation materials. Even for larger events that require a more advanced approach, Dante signals are distributed to the control room, allowing professional operation via the mixer.

Since Halls 101 and 102 are both connected via Dante, they can be combined, as well as share activity via video. For example, an event taking place in one venue can now be fully shared with another hall. Speakers using wireless mics can be heard equally in both halls, and communication with the hall during, say, a web conference is possible simply by connecting a USB.

Stated Mr. Kengo Kurashina of Ritsumeikan’s Office of Information Infrastructure, Information System Department: “Because of Covid-19, we still have to maintain social distance. However, I want our students to learn just as if they are present.

“I hope to have created those kind of conditions. Martin Audio’s speakers are as attractive as the sound is accurate and rich. I have used it previously in another campus and succeeded in achieving the quality of sound that is usually difficult to realise in the classroom.

“This hall is used for a wide range of student activities such as ceremonies, academic classes, theatre, dance performance shows and traditional performing arts. Therefore, I set a goal to be able to express not only speeches but also audio and music from the Web, with overall consistency.

“Also, since the audience needs to keep a distance, I wanted to expand the sweet spot as much as possible and so I made the decision to tune the speakers with FIR.”

IMS Technology Services supplies Martin Audio for Temple Uni

Liacouras Center, Philadelphia

The recent Temple University Commencement with six ceremonies over four days and more than 9,000 graduates at the university's Liacouras Center was successfully reinforced by IMS Technology Services deploying Martin Audio WPM, CDD and SX218 subs.

Asked about the event, Chris Leonard, Director of Audio, explains: "The Liacouras Center is a 10,200 seat multi-purpose sports arena on campus that is used for concerts, family shows,Templemen's and women's basketball games and more.

"First and foremost," Chris continues, "our primary goal was to have speech intelligible for every seat in the room so that family members hear the name of their graduate whether they are seated in the front row or 250 feet away in the back part of the arena."

Working in any major arena to ensure clear speech throughout the venue possesses unique challenges in audio coverage depending upon seating configuration, materials the building is made of, size of crowd and type of event. For this event, IMS designed and deployed a system consisting of 56 Martin Audio WPM boxes with two main left right hangs of 16 and two left right side hangs of 12 for extended coverage in the arena. They also had a complement of 10 CDD12s and six CDD8s in a mix of front fill and foldback reinforcement so the faculty on stage could hear what was going on during the ceremony. Two stacks of SX218 subs in cardioid mode were ground-stacked by the stage. Five Martin Audio iK81s and two iK42s were used for amplification.

Commenting on the system's performance, IMS FOH engineer on site Aram Piligian explains, "In terms of challenges, the event did not include delay speakersso the WPMs had to cover up to the back row of the arena's upper deck which they did very effectively. In addition to speeches, there was a 35-piece wind ensemble which had to be reproduced as well.

"The system sounded great with plenty of headroom and I felt comfortable knowing that what I was hearing at FOH was what the entire audience was hearing. The client was very happy with the way it sounded. In terms of amplification, because of the throw distance required, we were able to do one box resolution for the main hangs and two box resolution for the side hangs to achieve optimum coverage.

"Another highlight with WPM is the ability to do Hard Avoid® which keeps the energy off the stage and lectern where the speeches are given and enables much more gain before feedback and extra headroom which makes for a better mixing experience. We were able to get exceptional clarity for all of the seats. Prior to the event, we used Display® software for the prediction and this gave us the confidence that the system would perform and provide the sound quality we needed before we even got it up in the air."

Asked about the effectiveness of WPM for IMS Technology Services events, Chris concludes: "We produce a wide variety of corporate and association events with audiences ranging anywhere from dozens to tens of thousands of people, so we need a speaker that can handle these events with different ceiling heights and acoustical challenges with a primary focus on speech. The power and consistency that WPM brings to speech in all of these environment is the primary reason we chose these speakers and why our clients experience outstanding audio quality and results."

CDD Surround System Deployed at Mfah Glassell School of Art

Museum of Fine Art, Houston

Jaffe Holden was commissioned to provide AV and acoustic consulting and design for the Glassell School of Art auditorium at the Museum of Fine Art Houston.

The Glassell School of Art is housed in a visionary 93,000-square-foot L-shaped building constructed from a series of sandblasted, pre-cast concrete panels, alternating with panes of glass, in a rhythm of verticals and slight angles.

Discussing the project, Garth Hemphill, Associate Principal Audio Video for Jaffe Holden explains, "The venue is a multi-purpose auditorium with approximately 150 seats which doubles as a lecture and film instruction space. Given the variety of needs for the space, we designed a solution employing a Martin Audio CDD Surround system which also doubles as a presentation system.

"There's no center channel for the system because there was no space for the speaker behind the screen, so it's actually more of a 7.1 system with a derived center channel which is the Center channel stem mixed to both Left and Right Front loudspeakers."

The system consists of CDD10's for the front mains left and right mounted on the wall next to the screen, with four CDD6 Surround speakers on the sides—two left and two right—mounted on the side wall and two CDD6 at the rear of the room mounted on the ceiling facing down. There's also a single SX118 sub used when films are being screened that is positioned dead center under the screen up against the front wall.

Asked about his choice of speakers, Garth responds, "one of the main reasons we went with the CDD's was their coverage pattern because the room consists of concrete walls, hard floors, hard wood ceilings and can become an echo chamber. There's some acoustic treatment in the ceiling behind the slatted wood which helps but it's still fairly live sounding.

"So the nice thing about the CDD's control capability is that we could create defined coverage zones and keep a lot of the energy that we didn't want to have bouncing around the room off the walls. Another great thing about CDD is that the frequency extends low enough that you can get some really excellent sounding music out of it without a sub.

"The system is working really well for the space. One of the critical concerns was being able to have a lectern up front with a mic without severe feedback problems because the speakers are on the wall behind and above but the pattern control comes into play there and the CDD's really work well, producing enough gain without problems. We're also able to run the speaker's mic into the sides and back as well so we don't have to run it as hot up front and it gives a very natural ambient sound with the voice.

"Martin Audio CDD functions exceptionally well for film Surround which originally seemed like a stretch but has actually worked out really nicely. The biggest issue when you go see a movie is that the side surround speakers sound great four or five rows in from that side but you really don't hear the other side much.

"Granted this is a fairly small room but because of the way the horn delivers the high frequencies evenly from near to far, you actually get much more even coverage for every seat than you would with a typical Surround speaker," Garth concludes. "Not surprisingly, the client is pleased with the system's versatility and how it achieves high audio quality throughout the room."

WPM for Australian University's Great Hall


University of Cumbria

Constructed in the early 1970s, the University of Newcastle's Great Hall, in the Australian state of New South Wales, is a significant landmark building on the University's Callaghan campus, located in the western suburbs of Newcastle.

The building is multi-functional and used by the University and Newcastle community for a wide variety of functions ranging from formal University graduations, public performances, sit down dinners, open days, community events as well as teaching and learning activities.

The new audio-visual Infrastructure upgrade was focused around providing a significant improvement in audio and video quality and reliability within the Great Hall. The end result, based around a Martin Audio WPM PA, achieved that and more. It is flexible, scalable and supports the University's teaching, learning and community outreach activities.

The Consultant / Project Manager was InDesign Technologies, led by Peter Coman and Livia Renhe, and when it came to the audio component they were assisted by the Technical Audio Group (TAG), Martin Audio's Australian distributor, as they set out to convert the existing analogue system to a fully digital solution built on Audio Visual over IP technology. Another key specialist was David Gilfillan (Gilfillan Soundwork), a leading electro acoustic consultancy, who was engaged to verify and assist in the design and commissioning of the system. Finally, the team from Xcite Audio Visual provided their notable expertise for the integration of the project.

The room itself features total seating of 1,231 (including 448 tiered seats and 783 removable auditorium seats).

The biggest challenge the team faced was a tight timeline, exacerbated by a lack of existing architectural drawings. "The previous audio was inadequate for the room and unreliable," recalls Coman. "It was absolutely paramount that the audio issues be overcome."

The space itself was awkward; it's around 50m from front to back with a stepped ceiling. Some areas have 20-metre high ceilings and there is a combination of concrete, brick and timber surfaces. "The 3D drawings allowed us to produce detailed audio mapping and models in order to determine speaker placement," said Coman. "As we had hundreds of kilograms of equipment to hang from the ceiling, a structural engineer was engaged to examine the facility and tell us what we could and couldn't attach to."

There were a number of factors that led to InDesign specifying Martin Audio as the primary PA source. "In the first instance, the client had a previous Martin Audio installation that they were happy with, and secondly, we trust the brand. It provides a value for money solution and

they were able to offer a system that was fit for purpose, and which met our budget.

"On top of that, the entire system is digital, so being able to incorporate the Martin Audio Dante foldback speakers integrated perfectly into the rest of the system."

Finally, there was Martin Audio's ability to meet a tight deadline and the support provided by TAG.

The main PA system consisted of six hangs. AtFOH (Left/Right) are 14 x Martin Audio WPM per side with Left/Right hangs of 4 x MSX per side and Left/Right delays of 10 x Martin Audio WPM per side. Front fill consists of 6 x Martin Audio CDD6 below the front lip of the stage and a pair of Martin Audio CDD6 as out fills to cover the outside front corners. Four CDD-LIVE 12 were also deployed.

Amplifiers/FIR processing consisted of 7 x iKON iK81 advanced 8-channel amplifiers and 2 x iK42 4-channel amps. Due to the challenging acoustic space, every WPM and MSX enclosure was individually powered and processed.States TAG's Ewan McDonald, "Martin Audio do something very cool in that you can not only steer sound to the audience area but you can set 'hard avoid' areas where it will actively cancel energy to these surfaces. This was really important given the huge reflector of a back wall and the lectern position which could be directly under the arrays or even in front of the lower cabinets.

"The Martin Audio Display software fine tuned the frequency response at every listening position and we were then able to download those FIR parameters for each cabinet into the iKON amps using Martin Audio's VU-Net software."

The biggest challenge had been the architectural space. "The room had lots of reflective, non-symmetrical surfaces and so we deployed a large delay system. We used the main FOH arrays to cover the floor seating, and the delays were flown out wide, angled down and inwards to minimise the reflections from that rear-angled wall. Being able to optimise the arrays in the vertical plane using Display meant we could keep any interactions between these two systems to a minimum."

Peter Coman summed up the success of the project thus: "With a can-do attitude, 10 months of meticulous planning and an install period of 18 days, the University of Newcastle made a generational upgrade to the AV facilities in its Great Hall. The aging and unreliable analogue solution was transformed into a world-class, modern, digital solution befitting of the cultural significance of the Great Hall to the University and local community."

Recommended Products

CDD

PASSIVE INDOOR
LOUDSPEAKERS & SUBS

martin-audio.com/products/series/cdd

FlexPoint

PASSIVE POINT SOURCE
LOUDSPEAKERS

martin-audio.com/products/series/flexpoint

O-Line

PASSIVE OPTIMISED
MICRO LINE ARRAY

martin-audio.com/products/series/o-line

TORUS

CONSTANT CURVATURE
ARRAYS

martin-audio.com/products/series/torus

Wavefront Precision

PASSIVE OPTIMISED
LINE ARRAYS

martin-audio.com/products/series/wavefront-precision

SX Series

HIGH IMPACT, LOW FREQUENCY
PERFORMANCE SUBWOOFERS

martin-audio.com/products/series/sx

martin-audio.com/case-studies/education

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This is just a small selection from a wealth of examples from around the world that you can find out more about by visiting **www.martin-audio.com**

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